MEMORANDUM

TO: MLDS Governing Board

FROM: Mr. Ross Goldstein, Executive Director

DATE: September 5, 2024

SUBJECT: Project Approvals and Updates

Purpose

This agenda item is to update the Board on projects that have been reviewed and approved by the Executive Director under *Project Approval and Management Procedures;* projects that, when necessary, require Board review and approval; and updates on ongoing projects. Please note that in addition to the information presented for each new project, this memorandum also includes the complete project abstract submitted by the researcher for your further information and review.

Projects for Consideration

ERA # 97	Skills that Pay: Unpacking Subject-Specific Competencies to Predict Economic Wellbeing
Researcher	Dr. Nolan Pope University of Maryland College Park, Department of Economics MLDS Center Investigator
Research Questions	1) What tested competencies across math, reading, science, and social studies hold the most predictive power for determining future economic outcomes? 2) How does the predictive power of these competencies vary based on different contexts (e.g.,individual and household characteristics, school/district resources, geography, labor market conditions, field of postsecondary degree or certificate)?
RPB Review	The RPB was supportive of the project.
Exec. Dir. Determination	Approved. The subject of this project is responsive to the Research Agenda, provides information about student performance that can be used to improve the state's education system, requires the use of longitudinal cross sector data, and is being conducted by a qualified researcher.
Board Action	Informational

ERA # 99	A Longitudinal Examination of Workforce Outcomes for Justice-Involved Youth in Maryland
Researcher	Dr. Angela K. Henneberger University of Maryland Baltimore School of Social Work MLDS Center Research Director
Research Questions	1. What is the relation between juvenile justice system contact and workforce outcomes (i.e., workforce visibility and quarterly wages)? 2. Is the relation between juvenile justice system contact and workforce outcomes explained by educational outcomes in high school and college (e.g., high school dropout; high school graduation; GED attainment; college enrollment; college degree attainment)? 3. Does the relation between juvenile justice system contact and workforce outcomes differ by the timing (e.g., early versus late; mid-year versus end of academic year) and length of juvenile justice system involvement or the youth's level of exposure to the juvenile justice system (e.g., arrest with DJS referral, adjudication without residential placement, and residential placement)? 4. Does the relation between juvenile justice system contact and workforce outcomes differ by race/ethnicity, gender, free/reduced price meals, special education status, and/or region?
RPB Review	The RPB was supportive of the project. There was one question related to definitions of workforce outcomes.
Exec. Dir. Determination	Approved. The subject of this project is responsive to the Research Agenda, provides information about student performance that can be used to improve the state's education system, requires the use of longitudinal cross sector data, and is being conducted by a qualified researcher.
Board Action	Informational

Project Title	Agency Control #
Skills that Pay: Unpacking Subject-Specific Competencies to Predict Economic Wellbeing	97

Section 1. Principal Investigator

Principal Investigator (please list additional project team members in Section 7)
Dr. Nolan Pope
Principal Investigator's Email Address and Phone Number
npope@umd.edu
Name of University or Organization
University of Maryland, College Park (UMCP)
Principal Investigator Background and Qualification (provide overview of experience and attach a CV)
Dr. Nolan Pope is an Associate Professor at the University of Maryland at College Park in the Department of Economics. He is an Investigator with the MLDS Center Research Branch Team. Pope is a labor economist and applied microeconomist who specializes in public policy that improves individuals' labor market and educational outcomes. Nolan uses quasi-experiments, large administrative data sets, and field experiments to answer questions in education, public economics, and labor economics. His recent research focuses on how measuring and rating teacher quality affects both students and teachers, and how public policies influence underprivileged groups such as immigrants and low-income populations. For this project, he brings specialized expertise in examining multidimensional aspects of K-12 assessments beyond traditional measures. He holds a Ph.D. and M.A. in Economics from the University of Chicago, and a B.A. in Economics from Brigham Young University.

Section 2. Project Information

Abstract or Brief Description of Proposed Project (no more than 1,500 words)
Despite the well-documented role of math and English skills in shaping career opportunities and economic advancement, substantial gaps remain in our understanding of how specific, measurable

competencies within these subjects (and other subjects) translate to economic wellbeing. Examples of these gaps include:

- To what extent do composite scores in standardized exams mask variation in competency mastery (e.g., analyzing patterns, modeling, making connections, etc.)?
- Are we teaching and properly weighting competencies that ultimately influence future academic success and economic mobility?
- How much do specific competencies matter for performance in a particular industry/degree field as opposed to earnings in general?

This is an exciting and underdeveloped area of study requiring detailed longitudinal data on 1) subscore data from assessments designed to measure progress on specific competencies, and 2) long-run economic outcomes. Although several studies have used test scores to predict future economic outcomes (Watts 2020; Papay et al., 2020; Chetty et al., 2014), virtually no research examines the predictive ability of individual competencies measured by these exams.

This project will quantify the extent to which math, reading, science, and social studies competencies developed and assessed in K-12 predict economic outcomes in adulthood. To do so, we will leverage longitudinal student-level data from Maryland's Longitudinal Data System Center (MLDSC), which provides rich K-12 data, including subscores for a variety of state exams which can be linked to postsecondary and workforce data.

Research Questions: Our core research questions include:

1. What tested competencies across math, reading, science, and social studies hold the most predictive power for determining future economic outcomes?
2. How does the predictive power of these competencies vary based on different contexts (e.g., individual and household characteristics, school/district resources, geography, labor market conditions, field of postsecondary degree or certificate)?

Data: To conduct this analysis, we will use data from the Maryland Longitudinal Data System Center (MLDSC). The data center provides a centralized repository of student data and workforce data stemming from a partnership between numerous state and non-profit entities which include the Maryland Higher Education Commission, the National Student Clearinghouse, the Maryland State Department of Education, the Maryland Department of Labor, and the Maryland Department of Human Services. The data encompasses all students enrolled in a Maryland-based public school. Data are available from 2008 to 2023.

To measure individual competencies, we will rely on two state assessments which were implemented during the "No Child Left Behind" era in the early 2000s and continued to be administered through 2015. The 2015 cutoff ensures that most of our sample will have reached adulthood—and many will have begun careers.

The first exam, the Maryland "High School Assessment" (HSA), was administered to all 9th and 10th graders across the state. The HSA includes four core subject exams in algebra, English, biology, and government. Some students also take the algebra exam in 8th grade - we will include these students in the sample and will control for the grade when students take this exam (and other exams) in our

analysis. For each exam, students were scored on several sub-components, graded on a scale ranging from 240 to 650. The sub-components, all of which are available within the MLDSC, are presented in Table 1 below.

Table 1: Maryland High School Assessments Sub-Components

Algebra	Analyzing Patterns and Functions	Modeling Real World Situations
	Collecting, Organizing, and Analyzing Data	Using Data to Make Predictions
English	Language Usage and Conventions	Reading/Lit: Making Connections and Evaluation
	Reading/Literature: Comprehension and Interpretation	Writing – Composing
Biology	Inheritance of Traits	Skills and Processes of Biology
	Interdependence of Organisms in the Biosphere	Structure and Function of Biological Molecules
	Mechanism of Evolutionary Change	Structure and Function of Cells and Organisms
Government	Economic Principles, Institutions, and Processes	Protecting Rights and Maintaining Order
	Evaluating Sources & Evidence, Critiquing Conclusions	Systems of Government and U.S. Foreign Policy
	Impact of Geography on Governmental Policy	U.S. Government Structure, Functions, and Principles

The second exam is the "Maryland School Assessment" (MSA), given annually to all students between grades 3 through 8 for math and reading. All 5th and 8th grade students were also required to take a science exam. Similar to the HSA, each subject exam was graded across multiple subscores on a scale from 240 to 650. Table 2 lists the MSA sub-components.

Table 2: Maryland State Assessments Sub-Components

Algebra	Algebra, Patterns, or Functions	Processes of Mathematics

	Geometry and Measurement	Statistics and Probability
	Number and Relationships Computation	
English	General Reading Processes	Literary Reading Processes
	Informational Reading Processes	
Science	Chemistry	Life Science
	Earth/Space Science	Physics
	Environmental Science	Skills and Processes

We will link these competencies to economic outcomes and other intermediate outcomes available in the MLDSC, including workforce outcomes (e.g., earnings, nonemployment,[1] employer industry, predicted earnings growth) and postsecondary education outcomes (e.g., college-going, STEM course-taking/major, degree attainment, degree field, CTE-related certificates and apprenticeships etc.).

Population: Our study will include all students with HSA or MSA exam records, as well as earnings data in the MLDSC. The earnings data come from the State of Maryland's Division of Unemployment Insurance and do not include wages for federal employees, military employees, individuals who are self-employed, private contractors, or individuals who reside and work outside Maryland.[2]

Research Project Question

Our core research questions include:

1. What tested competencies across math, reading, science, and social studies hold the most predictive power for determining future economic outcomes?
2. How does the predictive power of these competencies vary based on different contexts (e.g., individual and household characteristics, school/district resources, geography, labor market conditions, field of postsecondary degree or certificate)?

Research Methods (provide a brief description of the research methods you plan to use)

[1] We use the term "nonemployment" to refer specifically to individuals not employed in the Maryland workforce as captured by Unemployment Insurance (UI) data. This definition includes those who are unemployed and out of the labor force as well as those who may be employed outside Maryland, working in federal or military positions, self-employed, or engaged in other forms of work not covered by UI data.

[2] 5% of the Maryland workforce is employed by the federal government, compared to 2% in the U.S. population. See: https://msa.maryland.gov/msa/mdmanual/01glance/economy/html/labor.html.

Our empirical strategy relies on a framework modified from Bettinger, Evans, and Pope (2013), who calculate the extent to which different ACT subscore components predict college performance and retention. Specifically, we will estimate the additional predictive power that each subscore in Tables 1 and 2 provides, conditional on other subscores and contextual factors. To do so, we estimate the following estimating equation:

$$Outcome_i = \alpha + \sum_{k=1}^{K} \beta^k Subscore_i + \gamma X_i + \epsilon_i$$

which links K different subscores to economic and postsecondary outcomes for student i, conditional on a variety of time-invariant covariates X_i such as student demographics. Each subscore will be normed to mean zero and standard deviation one. As previously stated, we will focus on workforce (e.g., wages, nonemployment, employer industry, predicted earnings growth) and postsecondary education outcomes (e.g., high school graduation, college matriculation, college completion within six years, STEM major/degree field, completion of career/technical education or an apprenticeship). Given that the wage data have the greatest coverage between 2015 and 2020,[3] we will conduct separate analyses using the whole sample and with smaller samples of students who transition into adulthood during this core period.

In total, the HSA has 20 subcomponents but each are only measured once, and the MSA has eight subcomponents (in math and English) which are re-measured six times from grades 3 through 8 and six subcomponents (in science) which are re-measured twice in grades 5 and 8. Given the large number of potential predictors, we will also utilize LASSO (least absolute shrinkage and selection operator) methods to identify key variables. However, recognizing the limitations of LASSO—particularly its potential to shrink correlated variables arbitrarily—we will implement an additional step in our analysis to address this concern. Specifically, we will conduct a series of analyses where each subscore is examined individually, including relevant control variables, to determine its predictive accuracy for the given outcomes. This approach will involve running the models across multiple random seeds to assess the stability and consistency of each subscore's predictive power. By comparing the predictive accuracy of each subscore in these individual models, we will be able to rank the predictive power of each test and subscore more accurately. This combined approach will help capture the nuanced contributions of each subscore while mitigating the risk of arbitrary shrinkage in highly correlated variables.

Because educational competencies do not develop in isolation but are influenced by broader contextual factors, we will also examine how these predictions vary across different student contexts. The contexts in our analysis will be formed by aggregating data at multiple levels:

- **Individual and Household Level**: Contexts will be formed based on demographic data such as race, ethnicity, and socioeconomic status (e.g., eligibility for FARMS). These factors will be used to form subgroups for analysis.

[3] Match rates for wage data were lower prior to 2015 and wage data coverage drops substantially during the COVID pandemic from 2020 to 2021.

- **School and District Level**: Contexts will be formed using data on school and district resources, including funding levels, staffing ratios, and school climate measures. We will aggregate these data to the school and district levels to capture the broader educational environment.
- **Geographic Level**: Contexts will be created using geographic information to account for regional differences, such as local labor market conditions (e.g., unemployment rates, industry composition) and economic indicators.
- **Educational Pathways**: Contexts will be based on students' field of postsecondary degree or certificate and their educational trajectories, including the types of courses they have taken and their academic performance.

Finally, we will assess the extent to which predicted earnings using sub-scores ultimately differ from predicted earnings from other traditional measures of proficiency, including composite exam scores and GPAs. We will first examine the correlation between these different sets of predicted earnings. We will then assess differences in predictive capabilities between these different measures. In other words, to what extent are predicted earnings derived from sub-scores more informative than predicted earnings derived from composite measures?

How will this research benefit the State of Maryland?

This project will establish new insights on the relationship between subject-specific competencies and economic mobility in Maryland. By leveraging detailed subscore data from the Maryland Longitudinal Data System Center (MLDSC), our study will provide data and evidence on how individual skills in math, reading, science, and social studies predict economic outcomes. This addresses a critical gap in the literature: while several studies establish the importance of broadly-defined math and English proficiency in economic advancement (Watts 2020; Papay et al., 2020; Chetty et al., 2014), no research—to the best of our knowledge—links detailed competency data to long-term economic success. Our project aims to provide new insights towards making educational systems more effective and equitable by identifying high-yield competencies and how they differ across student contexts, particularly for students whose skills may not align with traditional competencies. This includes those with specialized interests or who choose to embark on alternative educational and career pathways by pursuing CTE-related certificates and apprenticeships. This can help inform the Governor's Workforce Development Board's aim of making sure that 45% of students have a credential of value after high school by exploring which competencies matter for credential and degree completion.

From a policy perspective, our findings will identify high-yield competencies that educators and policymakers can use to tailor curricula and exams to emphasize these areas. Understanding how these competencies vary based on student context will provide further possibilities for tailoring educational approaches at the district, school, and even classroom level. This research will also provide data and evidence for high-stakes educational decisions such as graduation requirements and

grade retention policies. These decisions are frequently made using composite standardized exam scores that could potentially overvalue competencies that poorly predict future economic wellbeing.[4]

Explain why this research requires longitudinal cross-sector data?

Our research focuses on the predictive power of standardized assessment sub-scores (measured in K-12) for postsecondary and economic outcomes, so we will be using K-12, postsecondary, and workforce data in our analysis. We are also interested in the importance of competency-based skills for economic outcomes across various different contexts that vary across individuals, schools/districts, regions, and educational pathways.

Proposed Center Output

Our proposed Center products are a presentation in the MLDS Research Series and an MLDS Center research brief. We will also publish a publicly available policy brief through RAND and will provide this policy brief to the Center in addition to the presentation and MLDS Center research brief.

Timeline for the proposed project (identify major deliverables and approximate dates)

June 2024 - September 2024	● Apply for MLDS data ● Submit Urban Institute Student Upward Mobility Initiative (SUMI) grant application
October 2024 - August 2025	● Data cleaning and analysis
September 2025 - December 2025	● Write draft of paper, MLDS Center research brief, and RAND policy brief ● Release working paper through the National Bureau of Economic Research (NBER) and both research briefs
January 2026 - August 2026	● Presentation in MLDS Research Series ● Present paper at conferences (eg AEA, AEFP, SOLE, APPAM) ● Revise paper and prepare for journal submission
September 2026 - August 2027	● Journal submission ● Revise paper using feedback from journal(s) and resubmit

Plans for further development (i.e. journal submission, etc)

[4]For example, research shows that passing the high school math exit exam in Massachusetts boosts high school graduation for low-income students while there is no effect of passing the high school English exit exam. See Papay, Murnane, and Willett (2010).

We will publish our study in a peer-reviewed journal. This step will help signal the rigor of our research, and the peer review process will improve the quality of the paper while establishing credibility for our findings.

Section 3. MLDS Center Research Agenda

Does your project relate to one of the following areas which the General Assembly has specifically directed the MLDSC to study:	**Yes**	**No**
The impact of a State or federal education program?[5]	X	
The performance of educator preparation programs?		X
Best practices regarding classroom instruction?		X
The impact of child welfare programs on the educational and economic outcomes of students?		X
An analysis of social determinants, provided by State agencies[6] and appropriate local agencies, that impact education performance of students and indicate the need for wraparound services for students.		X

Research Agenda Category (page 2 of the Research Agenda) – Which category does the project address? Please explain.
The primary research agenda category that our project addresses is **Educational, Service & Workforce Outcomes**. Our first research question focuses on exploring how tested sub-score competencies across math, reading, science, and social studies predict future economic outcomes which is consistent with "research and reports on student-level and/or institutional-level characteristics and the importance of these characteristics in predicting outcomes". We will also contribute to the **Methodological Inquiries** research category by using machine learning (LASSO) methods to determine the most important test sub-scores and quantify their predictive ability. We will assess to what extent predicted earnings derived from sub-scores are more informative than predicted earnings derived from composite measures. Our findings will contribute new insights about which competencies matter most for students' economic outcomes and how to improve the efficiency of test score measurements to better predict long-term outcomes. This is consistent with "research and reports intended to improve the selection and application of research and statistical methods when using MLDS data".
Research Agenda Themes (page 2-3 of the Research Agenda) - Which cross cutting theme is incorporated in the project? Please explain.
The primary cross-cutting theme incorporated into our project is **Social Determinants**. Our second research question focuses on how the predictive power of test sub-score competencies varies based

[5] All projects must relate to a state or federal education program. If you are not sure, please contact ross.goldstein@maryland.gov.

[6] State agencies include: Maryland Department of Health, Department of Human Services, and Department of Juvenile Services

on different contexts (e.g., individual and household characteristics such as socioeconomic status and race, school/district resources, geography, labor market conditions, field of postsecondary degree or certificate). This is consistent with “research and reporting that considers the environmental conditions in the places where people live, learn, and work that affect a wide range of educational or workforce outcomes”.

Section 4. Data and Cross Sector Analysis

Sectors*	**X**
Early Child Sector	
K-12 Education Sector	X
Adult Education Sector	X
Justice Involved Youth Sector	
Child Welfare Sector	
Postsecondary Education Sector	X
Other Completions and Credentials Sector	X
Workforce sector	X

Put an 'x' next to each data sector your project will include. You must have at least 2 sectors.

Optional - Additional Information about planned data use (such as cohort identification; years of data needed)
Do you plan to request to include external data as part of your project?
No.

***Sectors**

K-12 Education Sector;
- Public School Student Education Records (Attendance, Assessments, Grades, Completions, Discipline, etc.)
- Public School Characteristics

Adult Education Sector;
- GED/NEDP Exam Results
- Apprenticeship
- Adult Education
- Correctional Education

Postsecondary Education Sector;
- College & University Enrollments, Courses, Credits, Grades, Degrees & Financial Aid
- College & University Student Workforce Training

Other Completions and Credentials Sector; and/or
- Industry Certifications
- Licenses

Workforce Sector.
- Public School Teacher Characteristics and Credentials
- Public School Staff Characteristics and Credentials
- Workforce Earnings
- Workforce Labor Sectors

Section 5. Financial Information

The MLDS Center incurs costs for every project related to: (a) IT support and infrastructure; (b) assistance from subject matter experts, (c) criminal history background checks; and (d) creation of an analytic data set. Average project costs are between $3,000 and $5,000. A detailed, customized estimate will be provided prior to project initiation. (Please indicate your answer with an "X)

X	I will reimburse MLDSC for all applicable fees.
	I will only able to provide partial reimbursement.
	I will need a waiver.

Grant Funding (indicate with an 'X')

	This project has already received funding
X	I plan to apply or am in the process of applying for grant funding
	No grant funding is planned

Name of Grantor

Urban Institute Student Upward Mobility Initiative (SUMI)

RFP or Grant Program Information (you may provide a link to the grantor's website)

https://studentupwardmobility.urban.org/sites/default/files/2024-03/SUMI_RFP.pdf

Amount of grant funds sought or awarded.

$150,000

Grant Application Date

We have advanced to the final round, which is due on June 28th.

Do you intend to proceed without grant funding?
No
Are you receiving other funding for this proposed project? If yes, how much?
No

Section 6. Special Considerations

Principal Investigators NOT affiliated with a Maryland College or University – please provide information on: **a. Your familiarity with Maryland policies affecting your research topic; and** **b. How your project meets a specific Maryland research need?** **Please also upload (with this form) any letters of reference or endorsement from a Maryland researcher or a State or local agency that vouches for your qualifications and expertise.**
N/A - PI Pope is affiliated with UMCP. Pope is also a member of the MLDS Center Research Branch Team.
For projects that involve a small population, please confirm that you are aware of the MLDS Center's data suppression policy and explain how you will report your findings while conforming to the suppression requirements.
N/A - Our project does not involve a small population, but we are aware of the MLDS Center's data suppression policy and we will report our findings in accordance with the policy by suppressing data in any cells for which statistics are computed using fewer than 10 observations.
For projects that involve a single school system, university, or program, please explain the statewide implications of the project. **Please also upload (with this form) any letters of support from the subject (i.e. school system or university) of the study.**
N/A - project focuses on all students enrolled in public K-12 schools in Maryland and therefore the project has statewide implications.

Section 7. Project Team

Project Team

- **Please list all members of the research team and indicate roles and responsibilities.**
- **If the Principal Investigator listed in Section 1 above is NOT the primary point of contact for the project (including research, data access, and presentations to stakeholders), please indicate which team member is the primary point of contact and provide that individual's contact information.**

Name and Organization	Role	Is system access needed? (Yes/No)
Nolan Pope (UMCP)	PI	Yes
George Zuo (RAND Corporation, UMCP PhD '21)	Co-I	Yes
Cameron Conrad (UMCP PhD Candidate)	Co-I	Yes

Section 8. Submission

Once this form is completed, please complete the online application (here) and upload this form, CVs for all members of the research team, and any other supporting materials.

Project Approval - Detailed Application

*This form is subject to disclosure in a Public Information Act request.

Project Title	Agency Control #
A Longitudinal Examination of Workforce Outcomes for Justice-Involved Youth in Maryland	ERA 99

Section 1. Principal Investigator

Principal Investigator (please list additional project team members in Section 7)
Angela K. Henneberger
Principal Investigator's Email Address
Angela.henneberger@maryland.gov
Name of University or Organization
UMB/MLDS Center
Principal Investigator Background and Qualification (provide overview of experience and attach a CV)
Dr. Angela K. Henneberger is a Research Associate Professor at the University of Maryland School of Social Work. Dr. Henneberger's research is situated at the intersection of education, developmental science, and prevention science, leveraging administrative data to examine the academic, social, and behavioral development of students in school contexts, with implications for policy and school-based prevention programming. Her most recent research, funded by the Institute of Education Sciences (R305A230398), leverages statewide administrative data to conduct long-term follow up analyses of an initial randomized controlled trial of a multi-tiered systems of support (MTSS) framework to improve students' academic and behavioral outcomes. The ultimate goal of her research is to strengthen the design and evaluation of policies and programs to prevent developmental problems and promote healthy development in school-based settings. Her research leveraging administrative data to support decisions in school-based settings has won awards from the Society for Prevention Research and the American Educational Research Association. Dr. Henneberger also serves as the Research Director and Principal Investigator of the Maryland Longitudinal Data System (MLDS) Center Research Branch, an interagency agreement with the state of Maryland to conduct advanced statistical analyses to inform state and local education policy decisions. Dr. Henneberger received her Ph.D. from the University of Virginia, where she was awarded an Institute of Education Sciences (IES) predoctoral fellowship. She completed a postdoctoral fellowship at the Pennsylvania State University in the Prevention and Methodology Training (PAMT) program.

Section 2. Project Information

Background and Purpose of the Study **(No more than 500 words; please include references; references do not count toward the word count)**
Early evidence suggests a negative association between justice system involvement and educational attainment (e.g., Kirk & Sampson, 2013). For example, Widdowson & colleagues (2016) showed a negative relation between arrest and postsecondary enrollment in 4-year colleges, but arrest had little effect on enrollment in 2-year colleges. Effects for 4-year colleges endured into emerging adulthood. Prior work using MLDS data found that justice

system involvement was associated with a lower likelihood of high school graduation and postsecondary enrollment and a higher likelihood of suspension in the 12th grade even when accounting for confounding factors, and these relationships varied based on one's characteristics, including region, race, sex, and race-sex and the outcome measured (Tinney, 2024). Results also showed differences in educational outcomes by the timing and level of justice system involvement.

A natural next step in the developmental transition into young adulthood is entering the workforce, and a key component of reintegration for justice involved youth is ensuring positive interactions with the community, whether that be through education or the workforce. In this study, we build on the prior research of Tinney (2024) by examining the workforce outcomes for students who were involved in the juvenile justice system. Additionally, we will examine mechanisms in the relation between justice system involvement and workforce outcomes. Potential mechanisms include the students' successful progression in secondary education (e.g., grade retention, academic performance, high school graduation), and postsecondary enrollment (e.g., no enrollment, 2-year enrollment, 4-year enrollment), persistence, and degree attainment. We will examine moderating factors including region, race, sex, free/reduced meals status, the youth's level of exposure to the justice system (e.g., arrest with DJS referral, adjudication without residential placement, and residential placement), and the timing (e.g., early versus late; mid-year versus end of academic year) and length of justice system involvement.

References

Kirk, D. S., & Sampson, R. J. (2013). Juvenile arrest and collateral educational damage in the transition to adulthood. *Sociology of education*, *86*(1), 36-62.

Tinney, E. (2024). How justice system involvement impacts educational outcomes in Maryland. Presentation for the MLDS Center research series. Available online here: https://mldscenter.maryland.gov/ResearchSeries.html.

Widdowson, A. O., Siennick, S. E., & Hay, C. (2016). The implications of arrest for college enrollment: An analysis of long-term effects and mediating mechanisms. *Criminology*, *54*(4), 621-652.

Research Project Question

1. What is the relation between juvenile justice system contact and workforce outcomes (i.e., workforce visibility and quarterly wages)?
2. Is the relation between juvenile justice system contact and workforce outcomes explained by educational outcomes in high school and college (e.g., high school dropout; high school graduation; GED attainment; college enrollment; college degree attainment)?
3. Does the relation between juvenile justice system contact and workforce outcomes differ by the timing (e.g., early versus late; mid-year versus end of academic year) and length of juvenile justice system involvement or the youth's level of exposure to the

juvenile justice system (e.g., arrest with DJS referral, adjudication without residential placement, and residential placement)?

4. Does the relation between juvenile justice system contact and workforce outcomes differ by race/ethnicity, gender, free/reduced price meals, special education status, and/or region?

Research Methods
(Please include information for: Sample/Cohort and Justification; Definition of Measures and Constructs; Analysis Approach)

Cohort

This study will use data from the 2011 ninth-grade cohort (see cohort table below). This cohort was selected to have 3 years of middle school data for measuring covariates, while maximizing the number of years of data into young adulthood for a typically progressing high school student (6 years of post-high school data prior to the COVID-19 pandemic in 2020). We will check the robustness of our findings by replicating results using the 2012 and 2013 cohorts.

9th grade	10th grade	11th	12th	PS1	PS2	PS3	PS4	WF1	WF2
2013	2014	2015	2016	2017	2018	2019	2020*		
2012	2013	2014	2015	2016	2017	2018	2019	2020*	
2011	2012	2013	2014	2015	2016	2017	2018	2019	2020*

*Aligns with the beginning of the COVID-19 pandemic (March of 2020)

Measures

Dependent variables. Workforce visibility (yes/no) in the Maryland labor market and workforce earnings (quarterly wages) will be measured using Maryland UI records. Exploratory analyses will examine, for DJS-involved students, what are the most common labor sectors for employment in Maryland? Labor sector of employment will be explored using the NAICS codes associated with employment in the Maryland UI records. Maryland workforce data are limited to individuals working for employers subject to Maryland UI, and our team will consider submitting aggregate data to the Comptroller to better understand UI wage missingness for the DJS involved population.

Independent variable. Justice system involvement (yes/no) is a binary variable indicating that a student was involved in the justice system.

Moderating variables. Level of justice system involvement is an ordinal variable based on five levels of justice system contact: no involvement, arrest, adjudication, non-residential placement, and residential placement. Length of justice system involvement is a count variable indicating the number of estimated days a student was involved in the justice system and will

be estimated using dates of contact and school enrollment dates. Timing of justice system involvement is a count variable that indicates the last semester the student had contact with the juvenile justice system in high school.

Race will be measured using a series of binary variables (White, Black, Indigenous, Asian or Pacific Islander, and Multiracial). Ethnicity will be measured using a binary indicator (Hispanic or not). Gender will be measured using a binary indicator (male/female). Free/reduced price meals will be measured using a binary variable indicating eligibility for the national school lunch program (yes/no). Special education will be measured using data from the Maryland State Department of Education indicating whether the student was eligible for special education services under the IDEA Act (yes/no).

Region will be measured using a series of binary indicators for the school district of the student's high school. There are 24 school districts in Maryland. A second measure will use a series of binary indicators for the DJS region in which the student was involved (Baltimore City, Central, Eastern, Metro, Southern, and Western). These regions are Baltimore City (one school district), the Central district (Baltimore County, Carroll, Harford, and Howard counties), Eastern Shore (Caroline, Cecil, Dorchester, Kent, Queen Anne's, Somerset, Talbot, Wicomico, and Worchester counties), Metro (Montgomery and Prince George's counties), Southern (Anne Arundel, Calvert, Charles, and St. Mary's counties), and finally Western (Allegany, Frederick, Garrett, and Washington counties). Each county (and Baltimore City) represent one school district

Educational attainment will be measured using a series of binary variables to indicate: high school graduation; GED attainment; college enrollment; and college degree attainment. Data will be used from two-year and four-year public and independent college enrollments and degrees. Data on enrollments and degrees from Maryland come from the Maryland Higher Education Commission, and data on out-of-state enrollments and degrees comes from the National Student Clearinghouse for students who were enrolled in a Maryland high school in 12th grade. We will also explore using data from noncredit completions and apprenticeship files.

Analyses

This project will build from the analyses already completed for Tinney (2024). First, descriptive statistics will be used to preliminarily examine the characteristics of students with justice system contact over time and to descriptively examine education and workforce outcomes. Second, propensity score matching will be used to compare otherwise similar youth who have no justice system contact and those who have justice system contact. Logistic regression will be used for binary outcomes (e.g., workforce visibility) and linear regression will be used for continuous outcomes (e.g., log wages). Moderating effects will be tested using interaction terms. Mediating effects will be tested using path analysis to determine whether the relation between x1 and y1 is reduced after adding mediating variables, indicative of partial or full mediation. Descriptives and models will be run statewide and by district/region.

How will this research benefit the State of Maryland in terms of state or local policy and/or practice?
There are three key benefits to the state. (1) Prior to linking to the MLDS, DJS primarily explored outcomes in terms of recidivism. However, DJS is interested in positive youth development outcomes for their population, and this study will build on the prior examination of educational outcomes to another key early adulthood outcome - participation in and earnings in the workforce. (2) The findings may help DJS tailor reintegration programs to help justice involved youth successfully transition back to the community (i.e., participation in the workforce). (3) This project provides the first attempt at linking DJS data with workforce data in Maryland and the code can serve as a sample for future research on this topic.
Explain why this research requires longitudinal cross-sector data?
This project is cross-sector because it uses data from the K-12, DJS, adult education (i.e., GED attainment), postsecondary, and workforce sectors.
Proposed Center Output **(Typical products for the MLDS Center include a research series presentation to stakeholders and a research brief in the MLDS Center template).**
MLDS research series and research brief in the recommended template.
Timeline for the proposed project (identify major deliverables and approximate dates)
The initial phase of the project will focus on research questions 1 and 2. Here is the timeline for that phase: • June - July 2024: MLDS Proposal and feedback • June - July 2024: Literature review on juvenile justice system involvement and workforce outcomes • Late Summer 2024: Descriptive statistics completed and shared with DJS • Early Fall 2024: Presentation to MLDS RPB for feedback and approval • Fall 2024: Analyses begin and initial results completed • Fall 2024: Analyses shared with DJS • Winter 2025: Updates to analyses based on feedback from DJS • Spring 2025: Finalize analyses and draft MLDS research series presentation and research brief • Summer 2025 forward: Further development The second phase of the project will focus on research questions 3 and 4. A timeline will be developed upon completing the initial phase of the project.
Plans for further development (i.e. journal submission, etc)
Academic publication and presentation at conferences such as *American Society of Criminology* and *Academy of Criminal Justice Sciences*

Section 3. MLDS Center Research Agenda

Does your project relate to one of the following areas which the General Assembly has specifically directed the MLDSC to study:	**Yes**	**No**

The impact of a State or federal education program?[1]	x	
The performance of educator preparation programs?		x
Best practices regarding classroom instruction?		x
The impact of child welfare programs on the educational and economic outcomes of students?		x
An analysis of social determinants, provided by State agencies[2] and appropriate local agencies, that impact education performance of students and indicate the need for wraparound services for students.	x	
Does your project use State or Federal financial aid[3] data?		x

If you are requesting to use FAFSA data please explain how this research will benefit the administration of Title IV federal financial aid.

N/A

Research Agenda Category (page 2 of the Research Agenda) – Which category does the project address? Please explain.

Educational Services and Workforce Outcomes. We seek to better understand the workforce outcomes for students who were involved in the justice system, including an understanding of how educational factors examined in Tinney (2024) link to workforce outcomes.

Research Agenda Themes (page 2-3 of the Research Agenda) - Which cross cutting theme is incorporated in the project? Please explain.

Equity and inclusion. Black boys are disproportionately impacted by the juvenile justice system. Having a clear understanding of the differential impacts of DJS involvement on workforce outcomes by race, ethnicity, gender, and region will help to tailor reintegration programs and policies that may help to reduce future disproportionalities in the workforce.

Section 4. Data and Cross Sector Analysis

Sectors* *The data falling within each sector is outlined below. The purpose of this section is to ensure the project is cross sector. Projects will not necessarily use all data elements within the sector (see methods section for definitions of measures).	**X**
Early Childhood Education Sector	

[1] All projects must relate to a state or federal education program. If you are not sure, please contact ross.goldstein@maryland.gov.

[2] State agencies include: Maryland Department of Health, Department of Human Services, and Department of Juvenile Services

[3] Financial aid data derived from the FAFSA may only be used in research to improve the administration of federal financial aid programs.

K-12 Education Sector	x
Adult Education Sector	x
Justice Involved Youth Sector	x
Child Welfare Sector	
Postsecondary Education Sector	x
Other Completions and Credentials Sector	x
Workforce Sector	x

Put an 'x' next to each data sector your project will include. You must have at least 2 sectors.

Do you plan to request to include external data as part of your project?
No.

***Sectors**

Early Childhood Education Sector;
- PreK Academic Engagement

K-12 Public School Education Sector;
- Enrollments and attendance
- Assessments
- Courses and grades
- Completions
- Discipline
- Public School Characteristics

Adult Education Sector;
- GED/NEDP Exam Results
- Apprenticeship
- Adult Education
- Correctional Education

Justice Involved Youth Sector;
- Juvenile Justice Records
- Juvenile Education Records

Child Welfare Sector;
- Out-of-Home Placements

Postsecondary Education Sector;
- College & University Enrollments
- College & University Courses, Credits, and Grades
- College & University Degrees
- College & University Student Workforce Training
- Financial aid

Other Completions and Credentials Sector; and/or
- Industry Certifications
- Licenses

Workforce Sector.
- Public School Teacher Characteristics and Credentials
- Public School Staff Characteristics and Credentials
- Workforce visibility/participation
- Workforce Earnings
- Workforce Industry

Section 5. Financial Information

The MLDS Center incurs costs for every project related to: (a) IT support and infrastructure; (b) assistance from subject matter experts, (c) criminal history background checks; and (d) creation of an analytic data set. Average project costs are between $1,000 and $3,000. A detailed, customized estimate will be provided prior to project initiation. (Please indicate your answer with an "X)

	I will reimburse MLDSC for all applicable fees.
	I will only be able to provide partial reimbursement.
x	I will need a waiver.

Grant Funding (indicate with an 'X')

	This project has already received funding
x	I plan to apply or am in the process of applying for grant funding
	No grant funding is planned

Name of Grantor

We may submit grants to fund this research, and, in that case, the MLDS Center will be notified with the names of the grants and organizations of interest. Potential grantors include the National Institutes of Justice (NIJ) and the Annie E. Casey Foundation.

RFP or Grant Program Information (you may provide a link to the grantor's website)

https://nij.ojp.gov/funding/current
https://www.aecf.org/grant-making

Amount of grant funds sought or awarded.

Seeking $100K-300K.

Grant Application Date

N/A

Do you intend to proceed without grant funding?

Yes.

Are you receiving other funding for this proposed project? If yes, how much?

Section 6. Special Considerations

Principal Investigators NOT affiliated with a Maryland College or University – please provide information on: **a. Your familiarity with Maryland policies affecting your research topic; and** **b. How your project meets a specific Maryland research need?** **Please also upload (with this form) any letters of reference or endorsement from a Maryland researcher or a State or local agency that vouches for your qualifications and expertise.**
N/A
For projects that involve a small population, please confirm that you are aware of the MLDS Center's data suppression policy and explain how you will report your findings while conforming to the suppression requirements.
N/A
For projects that involve a single school system, university, or program, please explain the statewide implications of the project. **Please also upload (with this form) any letters of support from the subject (i.e. school system or university) of the study.**
N/A

Section 7. Project Team

Project Team

- **Please list all members of the research team and indicate roles and responsibilities.**
- **If the Principal Investigator listed in Section 1 above is NOT the primary point of contact for the project (including research, data access, and presentations to stakeholders), please indicate which team member is the primary point of contact and provide that individual's contact information.**

Name and Organization	Role	Is system access needed? (Yes/No)
Abbey Potter, UMCP	Analyst	Yes, already has access
Wade Jacobsen, UMCP	Analyst	Yes, already has access

Section 8. Submission

Once this form is completed, please complete the online application (here) and upload this form, CVs for all members of the research team, and any other supporting materials.