The Potential Outcomes of the Harford County Public Schools North Star Initiative

Final Report

Prepared by

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At Salisbury University

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NORTH STAR

TABLE OF CONTENTS

ACKNOWLEDGEMENTS

Thank you to the following people who made this research report possible:

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INTRODUCTION

The Business, Economic, and Community Outreach Network (BEACON), of the Franklin P. Perdue School of Business at Salisbury University, conducted a comprehensive study to determine the potential outcomes of the North Star Initiative of the Harford County Public Schools (HCPS) in Harford County, Maryland. This study included economic impacts, and a Return on Investment (ROI) analysis of the North Star initiative.

The goal of the HCPS North Star initiative is to ensure that all students have access to academic opportunities, social-emotional support, and real-world experiences tailored to meet the needs, abilities, and interests of diverse learners. Every student will graduate ready for success in college, career, and life. According to the HCPS leadership, a North Star graduate of HCPS will achieve success in one or more of the following "college and career" outcomes:

- Earns course credit in one or more Advanced Placement (AP) or International Baccalaureate (IB) courses;
- Earns college credit in one or more dually enrolled courses;
- Attains a licensure, certification, or meets the Technical Skills Assessment (TSA) requirements in a Career and Technology Education (CTE) program.

Research Questions

The BEACON team that performed this study focused on the following study questions:

- What is the expected value of North Star to a student?
- What are the changes in college readiness attributable to North Star?
- What are the changes in career outcomes attributable to North Star?
- What are the added economic and employment outcomes of the North Star Initiative?
- What is the Return on Investment (ROI) on each public dollar invested?
- What are some non-quantifiable benefits of the North Start initiative?

KEY FINDINGS

Work Performed by the Study Team

The BEACON team that performed the study started by conducting primary and secondary research that included a review of the relevant literature, interviews with HCPS leaders, and a compilation of relevant economic factors. Previous studies undertaken by BEACON on related issues were also utilized at this stage.

Based on the findings from the primary and secondary research, the BEACON team developed a Simulation Model for Scenario Analysis. The team then identified viable scenarios for potential North Star outcomes. The Scenario model was simulated up to 250,000 times to determine viable future outcomes. The middle 50% of the viable outcomes were then used to develop an economic model through which potential economic and employment outcomes for future North Star graduates were estimated. These outcomes were also used to calculate estimated Return on Investment (ROI) for each public dollar invested in North Star students. Finally, the BEACON team prepared an informed analysis of the non-quantifiable potential outcomes for future North Star graduates.

The North Star Outcomes Scenario Model

As described above, in order to estimate the likely outcomes of the HCPS North Star initiative, the BEACON team developed a Scenario Model. This model, based on a Monte Carlo simulation used a series of assumptions and associated viable probability ranges to examine the future outcomes of the North Star initiative. These findings were then compared to the simulated hypothetical future contributions of HCPS students in the absence of North Star.

The simulation was run with 250,000 iterations of each input variable within a viable range of probabilities. The bottom and top 25% of the model outputs were then discarded as being statistically improbable outcomes and the remaining cluster of outcomes were reported in the scenario analysis. A few key assumptions and features of the model are as follows:

- The model assumes a student participation rate of 75% to 80%;
- The model assumes a 50-year career horizon for North Star graduates;
- The model assumes that the North Star Initiative will run for at least ten years;
- The simulation model has a +/- 5% sensitivity.

A limitation of the study is the assumption of zero leakage of these student outcomes outside the jurisdiction. In practice, this limitation may not be a significant factor. This is because it is highly likely that such a leakage would happen with or without the existence of the North Star initiative. Nevertheless, a program of retention (or attracting back) of North Star graduates should be explored.

The assumptions for the aforementioned viable outcomes were developed using two proprietary knowledge bases developed by the BEACON team over the past 15 years. These knowledge bases focus on educational attainment outcomes and workforce development outcomes. The assumptions were further refined using Social Accounting Matrix data acquired from the Minnesota Implan Group and Regional Input-Output Modeling System (RIMS II) multipliers acquired from the U.S. Bureau of Economic Analysis.

Figure 1 below is a screen shot of the graphical representation of the simulation model that was utilized to explore the economic value scenarios generated based on the HCPS North Star initiative.

Figure 1: The North Star Scenario Model

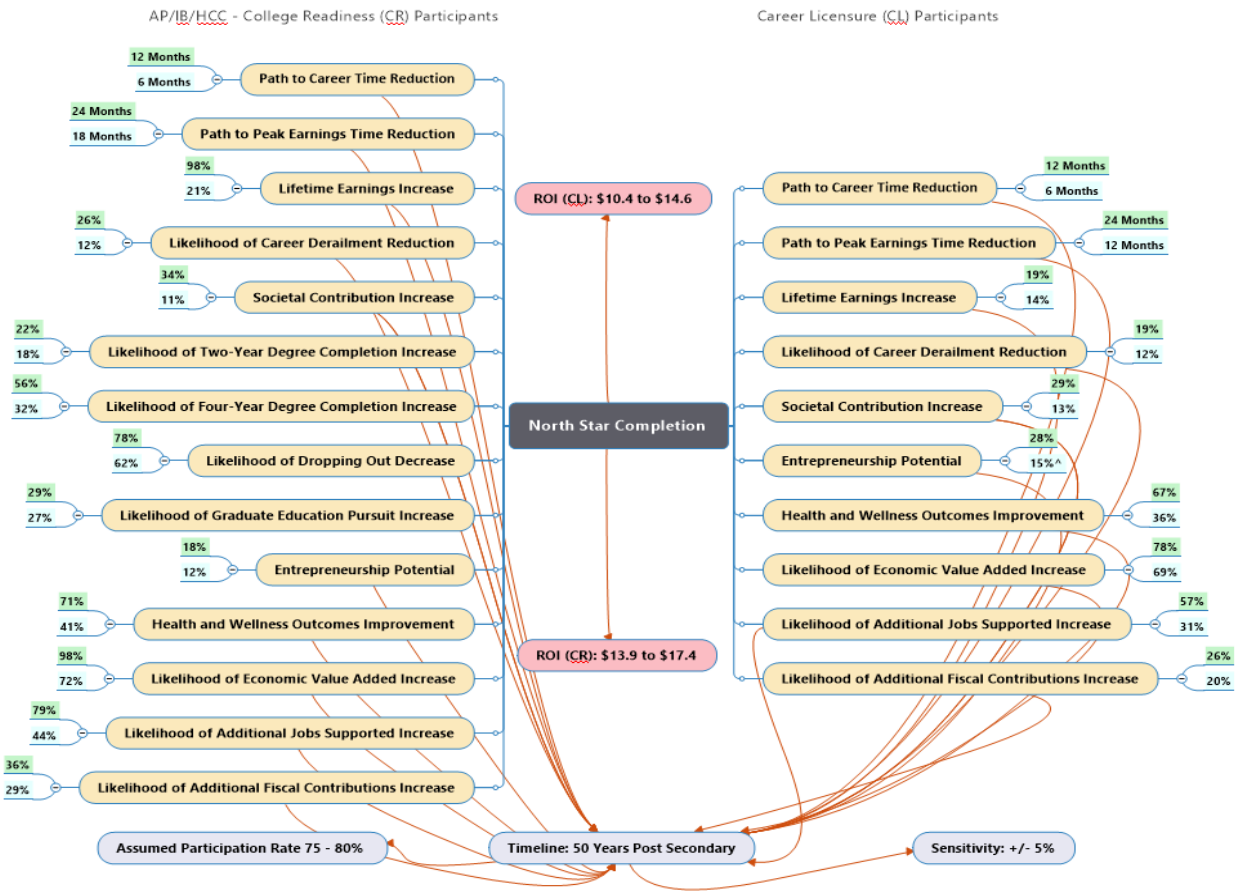
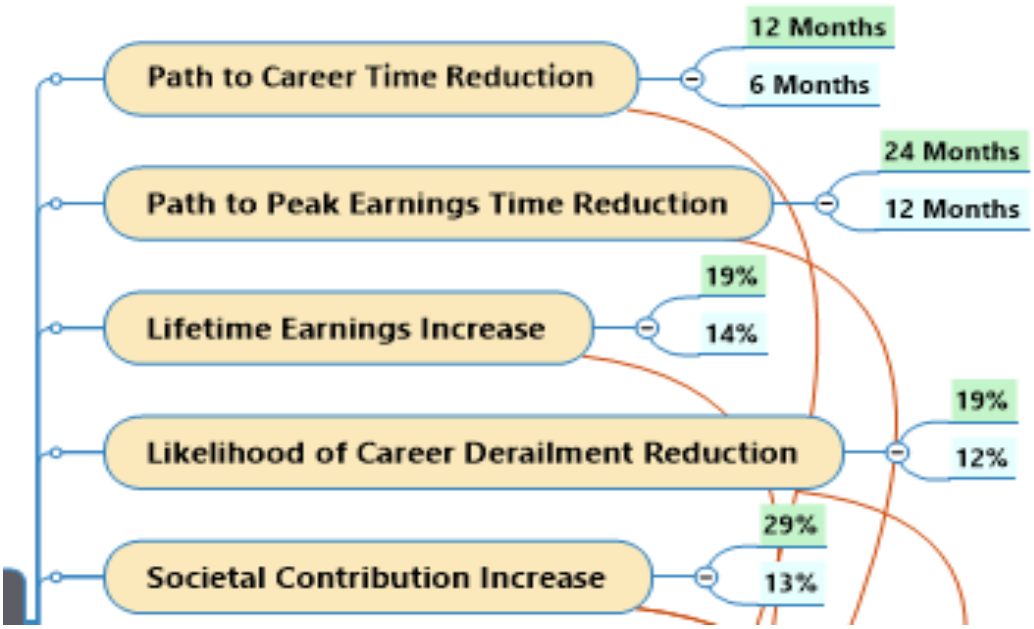


Figure 2 through 7 in the following pages are zoomed-in versions of the screen shot of the graphical representation of the simulation model. These versions are then used to further examine the simulation results.

Figure 2: What is the expected value to a student?
(Career Licensure)



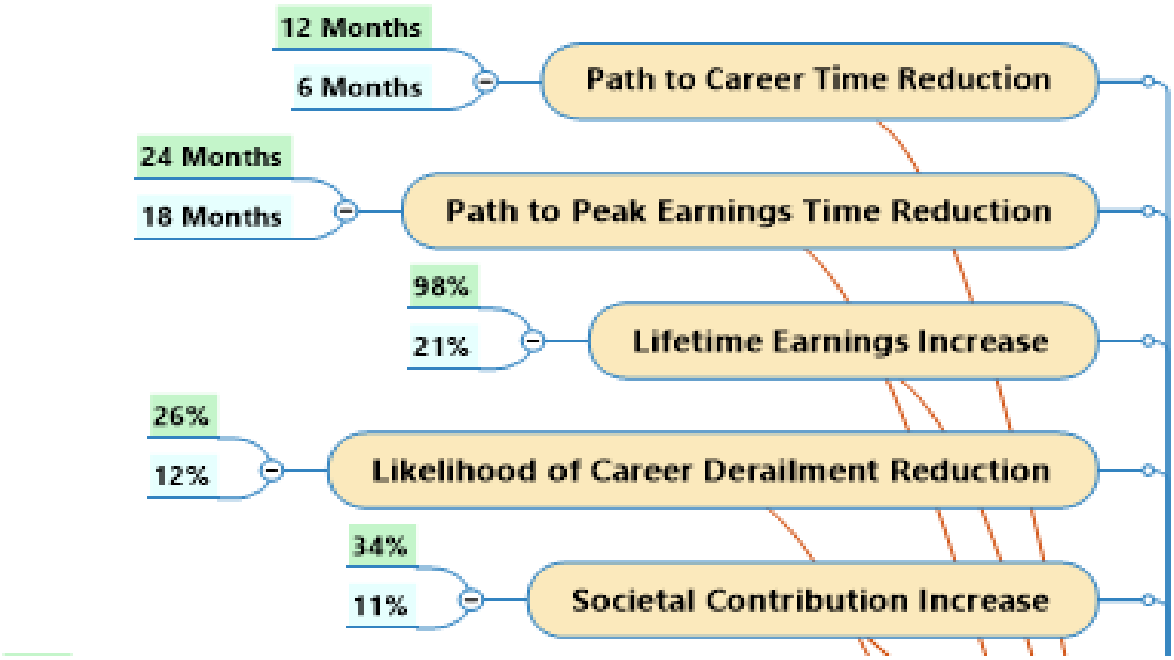
In these branches of the scenario model, the five potential Career Licensure outcomes listed were simulated WITH (upper sub-branches) and WITHOUT (lower sub-branches) the North Star initiative. As the green shading indicates, in each case, the outcomes were clearly better WITH the North Star initiative.

For Students Pursuing Career Licensure under the North Star Initiative:

- Path to Career Shortened by 6 to 12 Months
- Path to Peak Earnings Shortened by 12 to 24 Months
- Lifetime Earnings Increased by 14 to 19%
- Likelihood of Career Derailment Reduced by 12 to 19%
- Societal Contribution Increased by 13 to 29%

As discussed earlier, the simulation engine uses ranges of viable probabilities in simulating up to 250,000 possible futures. Therefore, the most likely outcomes are expressed in ranges. The figures seen in the sub-branches of the screen shots are the upper ends of those viable outcome ranges. An example of a different way to phrase this could be: “Path to Career Shortened by up to 12 months for North Star graduates pursuing career licensure.”

Figure 3: What is the expected value to a student?
(College Readiness Part 1)



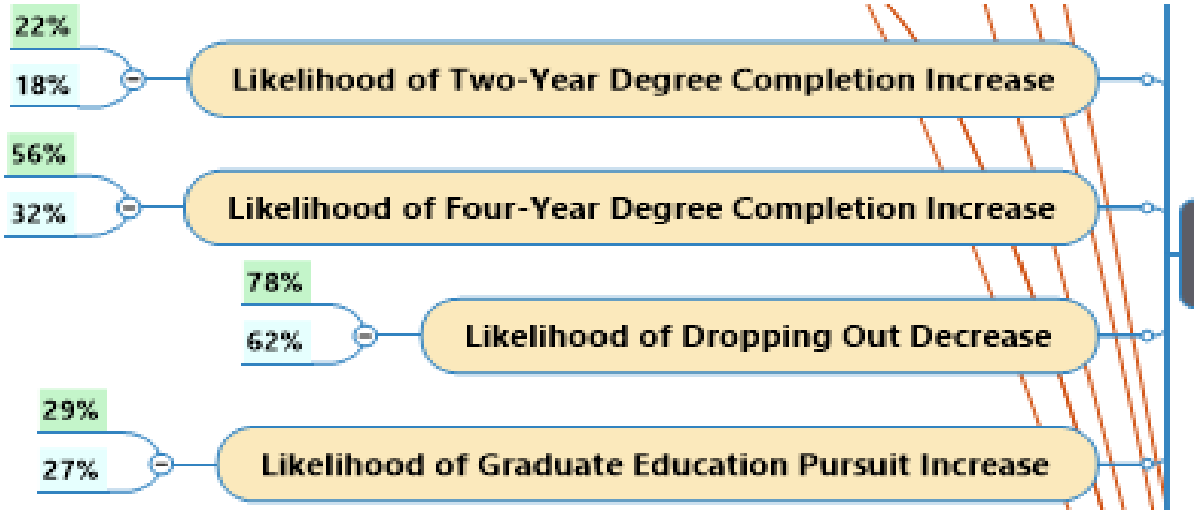
In these branches of the scenario model, the five College Readiness outcomes listed were simulated WITH (upper sub-branches) and WITHOUT (lower sub-branches) the North Star initiative. As the green shading indicates, in each case, the outcomes were clearly better WITH the North Star initiative.

For Students Pursuing College Readiness through AP/IB or HCC:

- Path to Career Shortened by 6-12 Months
- Path to Peak Earnings Shortened by 18 - 24 Months
- Lifetime Earnings Increased by 21 to 98% (See Notes)
- Likelihood of Career Derailment Reduced by 12 – 26%
- Societal Contribution Increased by 11 to 34%

As can be seen when the two different sides of the scenario model are compared, the potential outcomes for North Star graduates pursuing college readiness are slightly better than those for North Star graduates pursuing career licensure. This is further discussed later in this report. The important message here is the fact that, in both college readiness and career licensure options, the potential outcomes for North Star graduates are significantly better than those for "Non-North Star" graduates.

Figure 4: What is the expected value to a student?
(College Readiness Part 2)



In these branches of the scenario model, the four likely college readiness impacts of the North Star initiative listed (Students pursuing AP/IB or HCC) were simulated WITH (upper sub-branches) and WITHOUT (lower sub-branches) the North Star initiative. As the green shading indicates, in each case, the outcomes were clearly better WITH the North Star initiative.

- Likelihood of Completing a Two-Year Degree Increased by 18 to 22%
- Likelihood of Completing a Four-Year Degree Increased by 32 to 56%
- Likelihood of Dropping Out Reduced by 62 to 78%
- Likelihood of Pursuing Graduate Education Increased by 27 to 29%

As can be seen, the greatest college readiness impact of the North Star initiative for students pursuing AP/IB or HCC is seen with a highly significant reduction of dropping out. Also significant are the Four-Year Degree completion and Graduate Degree pursuit likelihoods.

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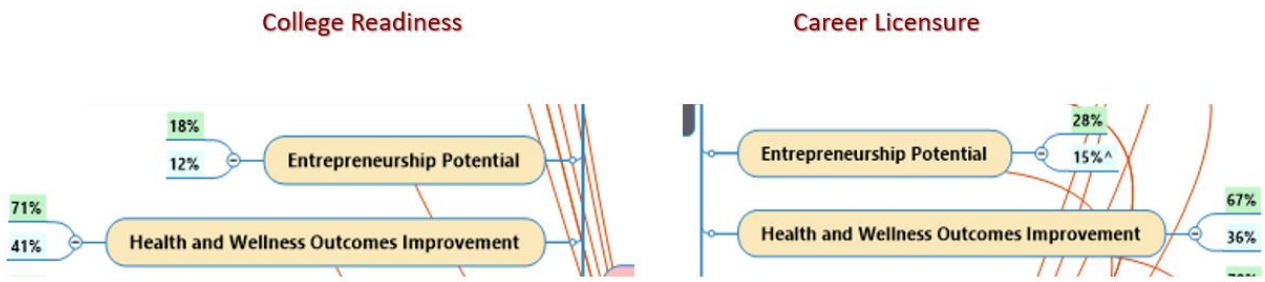
Figure 5: What are the changes in career outcomes?



In these branches of the scenario model, the four likely career outcomes (two for College Readiness and two for Career Licensure) were simulated WITH (upper sub-branches) and WITHOUT (lower sub-branches) the North Star initiative. As the green shading indicates, in each case, the outcomes were clearly better WITH the North Star initiative.

<u>For Students Pursuing Career Readiness through Licensure:</u>

- Likelihood of Entrepreneurship Increased by 15 to 28%
- Likelihood of Health/Wellness Outcomes Improved by 36 to 67%

<u>For Students Pursuing College Experience (AP/IB or HCC):</u>

- Likelihood of Entrepreneurship Increased by 12 to 18%
- Likelihood of Health/Wellness Outcomes Improved by 41 to 71%

It is interesting to note that Likelihood of Entrepreneurship is somewhat higher for students pursuing Licensure than those pursuing College Experience. This is in line with the expectations that many college degrees provide a path to employment-oriented careers. Licensure provides a clearer path to self-employment. Conversely, Health and Wellness outcomes are slightly better for students pursuing College Experiences. Some of this can be attributable to higher prevalence of health insurance and health care access by college graduates.

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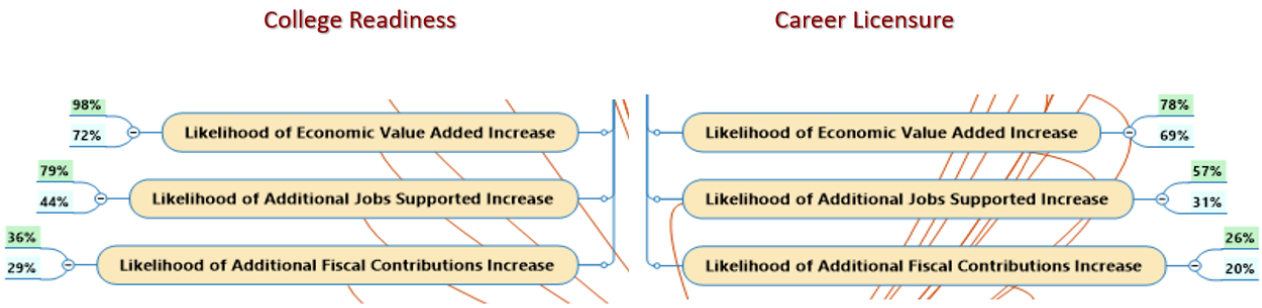
Figure 6: What are the added economic and employment outcomes?



In these branches of the simulation, the six added economic and employment outcomes career outcomes (three for College Readiness and three for Career Licensure) were simulated WITH (upper sub-branches) and WITHOUT (lower sub-branches) the North Star initiative. As the green shading indicates, in each case, the outcomes were clearly better WITH the North Star initiative.

<u>For Students Pursuing Career Readiness through Licensure:</u>

- Likelihood of Economic Value Added Increased by 69 to 78%
- Likelihood of Additional Jobs Supported Increased by 31 to 57%
- Likelihood of Additional Fiscal Contributions Increased by 20 to 26%

<u>For Students Pursuing College Experience (AP/IB or HCC):</u>

- Likelihood of Economic Value Added Increased by 72 to 98%
- Likelihood of Additional Jobs Supported Increased by 44 to 79%
- Likelihood of Additional Fiscal Contributions Increased by 29 to 36%

Here, we see that students pursuing College Experience exhibit a slightly higher economic impact (Value Added) than students pursuing Career Licensure. This is in line with findings from other similar studies and is explained by the higher lifetime earnings of college graduates. Consequently, college graduates tend to support more jobs (Employment Impact) and pay more taxes (Fiscal Impact).

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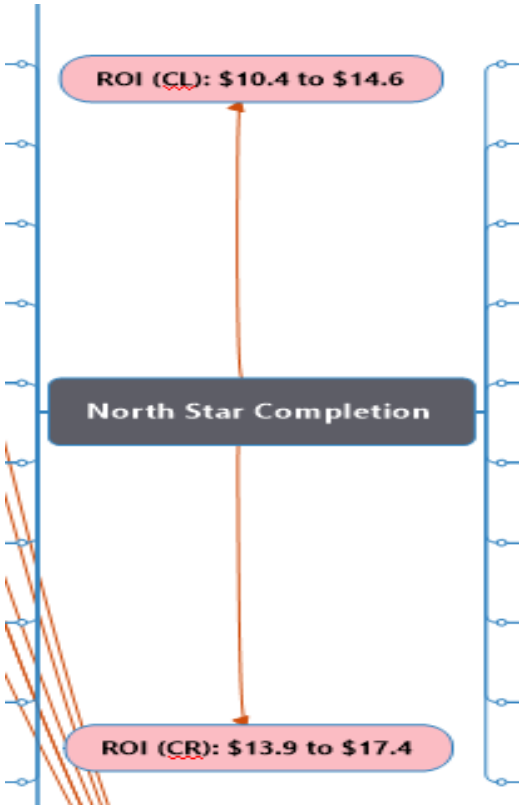
Figure 7: What is the ROI on each public dollar invested in North Star?



These two branches of the simulation are dedicated to the Return on Investment (ROI) for each public dollar invested in the HCPS North Star initiative. One branch estimates the ROI for students pursuing Career Readiness through Licensure and the other for students pursuing College Experience.

For Students Pursuing Career Readiness through Licensure:

ROI = $10.4 to $14.6

For Students Pursuing College Experience (AP/IB or HCC):

ROI = $13.9 to $17.4

These numbers are the most important performance measures for the future North Star graduates. It is abundantly clear that the North Star initiative will be well worth the public investment in it over the career lifetimes of the North Star graduates.

Additional Potential Benefits of the North Star Initiatives

What are Some Non-Quantifiable North Star Benefits?

In addition to the findings derived from the scenario model, the BEACON team examined some additional potential benefits of the North Star Initiative. These additional potential benefits are supported by BEACON's previous research on the economic value of K-12 education in Maryland.

Reduced Likelihood of Reliance on Government Benefits:

The completion of the program is likely to reduce the completers' needing various "Transfer Income" type of government benefits (Unemployment Benefits, Temporary Assistance to Needy Families, Supplemental Nutrition Assistance Program).

As mentioned in the notes section of the previous slide, this finding was derived from a previous study conducted by BEACON on behalf of the Maryland Association of Boards of Education.

Reduced Likelihood of Substance Use Diseases:

Based on a review of the current literature on the subject, we can assume that the completion of the North Star program is likely to reduce the completers' falling prey to various substance abuse diseases or disorders.

This finding was derived from literature reviews that were done for previous studies conducted by BEACON on behalf of several Maryland county health departments.

Reduced Likelihood of Incarceration:

Based on a review of the current literature on the subject, we can assume that the completion of the North Star program is likely to be correlated with a reduction of incarceration rates.

This finding was derived from a literature review that was part of a previous study conducted by BEACON on behalf of the Maryland Association of Boards of Education.

Increased Likelihood of Generational Benefits:

Based on a review of the current literature on the subject, we can assume that the completion of the North Star program is likely to be correlated with an increase in these non-quantifiable benefits (reduction of reliance on government benefits, reduction in incarceration rates, and increases in educational attainment) in subsequent generations within the completers' families.

This finding was derived from a previous study conducted by BEACON on behalf of the Maryland Association of Boards of Education.

Differential Economic and Workforce Development Advantages for Harford County:

The North Star initiative that enhances the ability of the County to prepare a "Trained and Trainable Workforce" is an excellent "selling point" for Harford County.

CONCLUSIONS

Based on the simulation of viable future outcomes, it is clear that the HCPS North Star initiative is a worthwhile endeavor with a very high probability of improving student college readiness and career licensure outcomes. The high estimated return on investment (ROI) figures calculated are further evidence of the high potential for the success of this initiative. As always, when public school systems invest in positive student outcomes, there needs to be a parallel effort to retain these successful students in the jurisdiction (or recruit them back at a later date) so the benefits of these outcomes do not "leak out" to other jurisdictions over time.

Finally, it is important to note that the lifetime impact of the HCPS North Star initiative on underrepresented students will be highly significant. This prediction is supported by robust research on the subject.

In a February 2020 news release, the *American Institutes for Research Policy (AIR)* summarized findings from three AIR-led studies that collectively found that Early College High School initiatives had lasting benefits and high returns on investment. In particular, these studies showed that the impact of Early College on high school graduation and college enrollment did not differ significantly based on gender, race/ethnicity, family income, first-generation college-going status, or pre-high school achievement. The impact on earning a college degree was stronger for female, minority, and lower income students than for their counterparts.

Similar findings could also be found in an earlier report:

"Dual enrollment programs are increasing college enrollment and completion by giving K-12 students a head start on higher education or job preparation — but low-income students and those in underrepresented racial and ethnic groups have far less access to such programs. Yet if colleges partner with K-12 schools to actively recruit underrepresented students and provide them with high-quality instruction and advising, they can close equity gaps in access and help those students get on a path to college and career success in high school."

Those are the findings of "The Dual Enrollment Playbook: A Guide to Equitable Acceleration for Students," a new report released in October 2020. The report was co-authored by Elisabeth A. Barnett, John Fink, and Davis Jenkins, from the *Columbia University Teachers College's Community College Research Center*, together with Gelsey Mehl and Joshua Wyner of *The Aspen Institute*.

APPENDIX A: Glossary

Career Derailment: Unplanned interruptions or major detrimental modifications to an individual's career progression.

Economic Impact Analysis: An economic impact analysis typically measures or estimates the change in economic activity between two scenarios, one assuming the economic event occurs, and one assuming it does not occur. This can be accomplished either before or after the event (ex-ante or ex-post).

Employment Impact: Employment impact measures the increase in the number of total employees in the local region. Instead of measuring the economic impact solely in terms of money, this measure presents the impact on the number of jobs in the study area.

Lifetime Earnings: Lifetime earnings are total accumulated earnings over 50 years from age 20 to age 69.

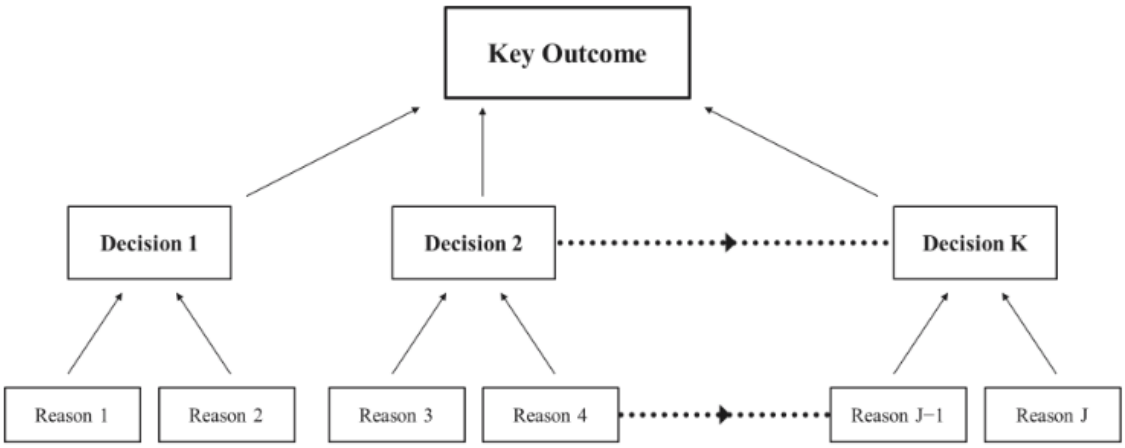
Return on Investment (ROI): Return on Investment (ROI) is a performance measure used to evaluate the efficiency of an investment or compare the efficiency of a number of different investments. ROI tries to directly measure the amount of return on a particular investment, relative to the investment's cost.

Scenario Analysis: Scenario analysis is a process of analyzing future events by considering alternative possible outcomes. This type of analysis does not try to show one exact picture of the future. Instead, it presents several alternative future developments.

Simulation Model: Simulation models aim to replicate the workings and logic of a real-world system by using statistical descriptions of the activities involved.

Societal Contribution: An economically quantified estimate of an individual's contributions to society beyond their immediate labor income impact. These contributions include service activities, civic engagement, artistic and/or scientific accomplishments, etc.

APPENDIX B: The Cascading Outcomes Approach



NOTE: This approach was used by the BEACON team to fine-tune the simulation model for this study to conduct the scenario analysis. A current version of this approach can be seen in *Social Science and Contemporary Social Problems* (2019, August 21), retrieved from:

https://items.ssrc.org/from-our-archives/social-science-and-contemporary-social-problems/

and in a schematic developed by Monica P. Bhatt et al., *Scope Challenges to Social Impact*, NBER Working Paper 28406, (January 2021), retrieved from:

https://www.nber.org/system/files/working_papers/w28406/w28406.pdf