Return on Investment Analysis of New Mexico SUN PATH Program

SUN PATH
New Mexico Skill UP Network
Pathway Acceleration in Technology & Healthcare

Bureau of Business & Economic Research
THE UNIVERSITY *of* NEW MEXICO

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CONTENTS

TABLES AND FIGURES

ACKNOWLEDGEMENT

EXECUTIVE SUMMARY

The University of New Mexico's Bureau of Business and Economic Research (BBER) was commissioned by the Santa Fe Community College, SUN PATH to estimate the SUN PATH' program's return on investment on the New Mexico economy. The SUN PATH program aims to expand and improve healthcare career pathways through an increase in attainment of degrees and certificates and through the creation of a strong linkage between educational institutions and employers. This report presents the results of the analysis on the SUN PATH program and outlines the data and methods used to arrive at these results. In addition, this report presents the results of economic impact analysis of SUN PATH operations in New Mexico. The main highlights of the study are:

- The New Mexico SUN PATH program has helped a total of 3,166 participants who enrolled in various certificate programs that aim to prepare them for a more lucrative career path in the healthcare sector.
- By the end of Spring semester of 2017, a total 1,787 participants completed at least one certificate program. Out of total, 9% (or 167) participants completed more than one certificate program.
- It is expected that by the end of 2018, a total of 4,440 participants will be enrolled in the program and out of which 2,660 will complete at least one certificate program and by the end of 2019, a total of 1,609 will be employed in New Mexico's healthcare sector.
- Our analysis shows that the SUN PATH program participants' average annual earnings are $25,992 which are $7,985 higher than the earnings of a typical New Mexico high school graduate.
- The highest earning certificates are nursing ($44,340/year), respiratory therapy ($36,913), physical therapy ($36,913), occupational therapy ($36,913), EMT-intermediate ($36,295), surgical technician ($34,163), and health information technology ($33,173). The lowest paying certificates are home health aide ($18,216), pharmacy technician ($18,219), nurse aide ($18,321), nursing assistant or CNA ($19,854) and personal care tech ($20,442).
- An estimated increased future earnings for the 1,609 certificate holders employed in New Mexico's healthcare sector (after high school graduation) from 2017 through 2028 is $132 million. The highest earnings accounted for by nursing (40%) followed by EMT-basic (13%), EMT-intermediate (9%) and respiratory therapy (4%) and nursing assistant (4%).
- Although SUN PATH program is expected to spend $15 million, the total cost of the SUN PATH certificate program is estimated to be $41 million. Total costs include participants costs on tuition and fees and opportunity cost of their time ($20 million), faculty and staff wages and salary ($8.5 million) and the SUN PATH program expenditures of $15 million.
- The return on investment of SUN PATH program is estimated at 2.22 which means that every $1-dollar investment in the program will produce additional $2.22 in New Mexico Economy.
- Economic impact of $15 million SUN PATH expenditures is as follows: $27.5 million in total economic output, 68 jobs (for four years) and $12.1 million in wage and salaries in New Mexico.

1 INTRODUCTION

Skill UP Network: Pathways Acceleration in Technology and Healthcare (SUN PATH), a consortium of eleven community colleges[1] funded by the US Department of Labor, works to address the constraints of a limited labor force capacity and inefficiency of career pathways to Allied Health, Health Information Technology (HIT), and Emergency Medical Services (EMS) in New Mexico. According to SUN PATH, the main goals of the program are to 1) expand and improve healthcare career pathways that align with the needs of employers; 2) increase attainment of degrees, certifications, and industry recognized credentials; and 3) create strategic alignment between education, workforce, and employers resulting in improved employment outcomes, retention, and average earnings. Santa Fe Community College (SFCC) is the lead agency of the program that administers and coordinates grant activities; and facilitates linking of these educational institutions with other stakeholders including employers. Over the first three years of its four-year funding cycle 3,166 individuals have participated in SUN PATH programs; 1,787 participants have completed at least one certificate program; and nearly half of program graduates are now employed.

SUN PATH has undertaken a series of independent program evaluations. In support of program evaluations, the Bureau of Business & Economic Research (BBER) at the University of New Mexico conducted a broader analysis of the US Department of Labor supported SUN PATH program's return on its investment (ROI) for the State. The purpose of measuring ROI is to measure the rates of return on money invested in the SUN PATH program. Although higher educational attainment and skill development may have higher rate of return to a society due to positive externalities[2] than the personal gain to student participants through increased future earnings, BBER has focused on only one criteria – increased future earnings associated with certificate programs. The SUN PATH program will continue until early 2018 and the anticipated outcomes are yet to be realized. Therefore, BBER combined both ex-post evaluative estimation where participants have already completed the certificate program and started working; and ex-ante forecast which predicts how many more participants will be enrolled in the certificate program and how much additional earning they will be making in future. BBER has used wage record data of participants for the ex-post evaluation of participants and the results obtained from this analysis will be applied to the future participants. It is an attempt to assess the value of money for the state. The decision to

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[1] These are: Central New Mexico Community College (CNM), Eastern New Mexico University (ENMU)-Roswell, ENMU -Ruidoso, Mesalands Community College, New Mexico State University (NMSU)-Alamogordo, San Juan Community College, Santa Fe Community College (SFCC), University of New Mexico (UNM) -Gallup, UNM -Los Alamos, UNM -Taos, and UNM -Valencia.
[2] These externalities include better personal health, increased efficiency in job search and other personal choices, greater social equity, more cohesive communities, crime reduction, expanded technological possibilities in science, medicine, and industries, etc.

invest in an intervention like SUN PATH requires a judgment of whether the expected results justify the costs.

1.1 Healthcare Sector in New Mexico

1.1.1 Net Job Growth Concentrated in Healthcare Sector

Since 2010, a large percentage of net job growth has been mainly concentrated in the healthcare industry in New Mexico. According to the Bureau of Labor Statistics Quarterly Census of Employment and Wages (QCEW), healthcare and social assistance industries, which accounts for 17% of all the jobs in New Mexico, provided nearly two of every three jobs added during the period six-year period.

Figure 1 shows the net job growth between 2010 and 2016 in the healthcare and social assistance sector in New Mexico. Within the industry, there have been net job gains in ambulatory health care services (7,914 new net jobs), social assistance (6,003 new net jobs), and hospital services (2,963 new net jobs). There has also been a marginal decrease in net jobs in nursing and residential care workers (a loss of 53 jobs), much of which came from declines in residential mental health employment.

Figure 1. Net job growth in the healthcare and social assistance industry in New Mexico (2010-2016).
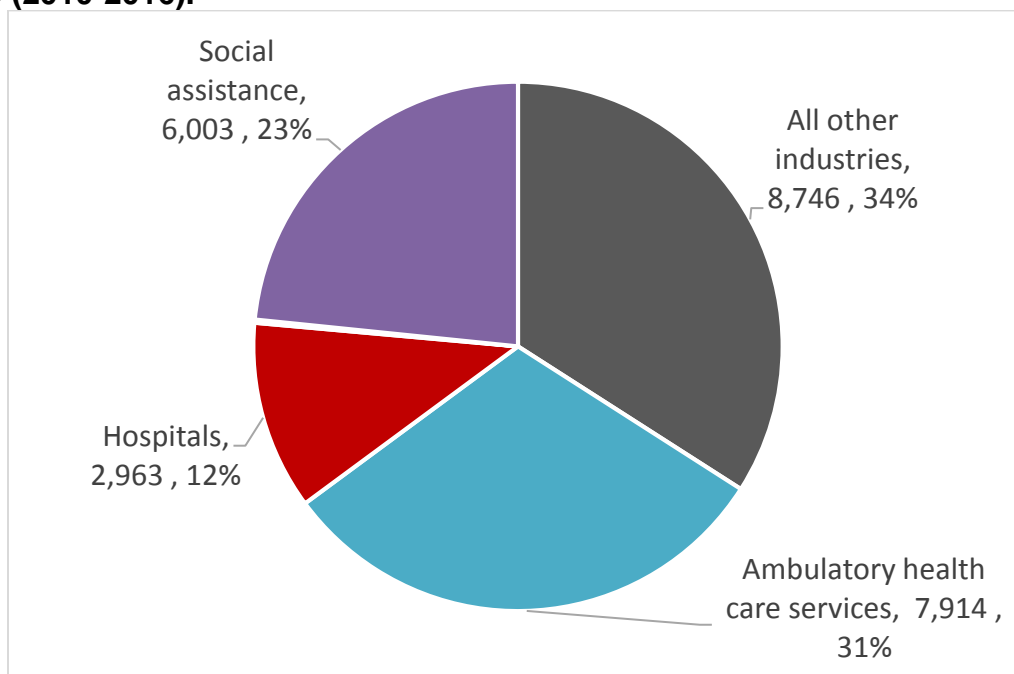
Source: Quarterly Census of Employment and Wages (QCEW), U.S. Bureau of Labor Statistics

Much of the job growth in the healthcare industry has been concentrated in the urban areas of the state. Using data from the Bureau of Labor Statistics Occupational Employment Statistics (OES) survey, the largest concentrations of healthcare jobs are located in Albuquerque (40,150 jobs), Las Cruces (6,710 jobs), Santa Fe (4,550 jobs), and Farmington (4,380 jobs). Just over one-quarter of all healthcare employment (17,910 jobs) is located in the rural areas.

1.1.2 Healthcare Employment Trends

We would expect the employment trends in healthcare to continue into the future. According to national projections from the Bureau of Statistics Employment Projections (EP) healthcare and social assistance employment is expected to increase by 10% between 2014 and 2024. The only areas for which more rapid growth is expected are computer and mathematical occupations (13.1% growth) and in personal care and services (13.2% growth).

Within healthcare, employment in the community and social services industry, including counselors and social workers, is expected to grow by 10.5%. Healthcare practitioners and technical occupations, such as physicians, dentists, and therapists, can expect a net jobs gain of 16.4%. Significantly, the sharpest gain is expected in lower-wage healthcare support occupations, projected to increase by 23% by 2024.

1.1.3 Entry-Level Healthcare Educational Requirements

Employment in healthcare industries is often associated with occupations such as physicians and others requiring high levels of education. However, most jobs expected to be added by 2024 will require no more than a postsecondary nondegree award, such as a certificate for nursing assistants. Figure 2 presents entry-level educational requirement for healthcare occupation. An Associate's or Bachelor's Degree will meet educational requirements for another 31% of new jobs. A Master's degree will be required for another 10% of new jobs, and only 9% of new jobs in the healthcare industry will require a Doctoral or professional degree, such as an MD.

Figure 2. Entry-level educational requirements for healthcare occupations.
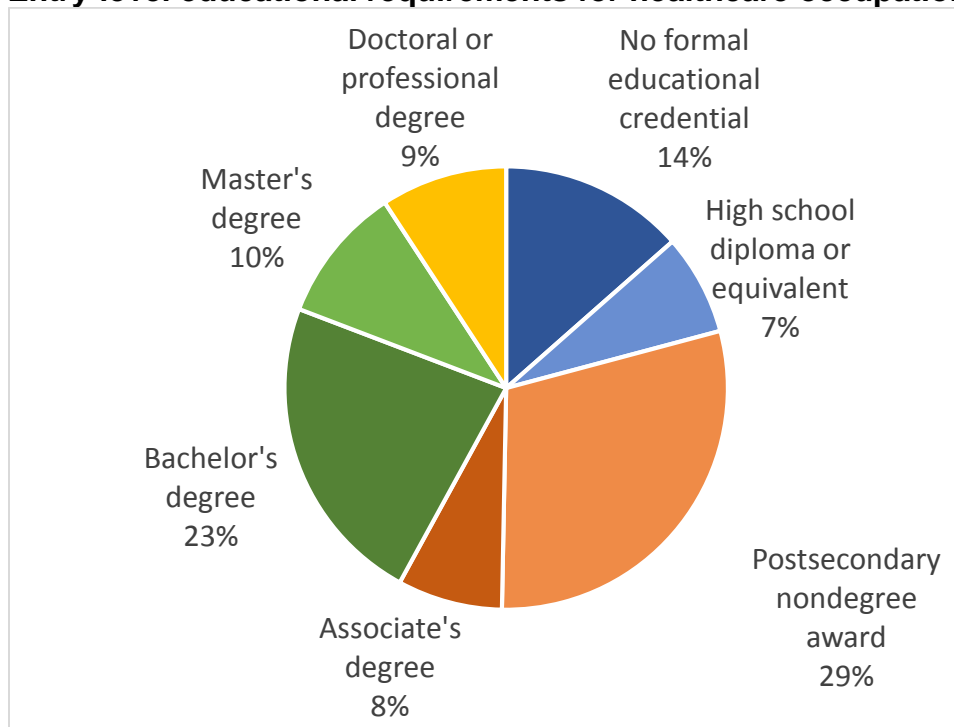
Source: Occupational Employment Statistics, U.S. Bureau of Labor Statistics.

1.1.4 Medicaid Transfers and Future Growth in Healthcare Employment

Under the Affordable Care Act (ACA), the federal government covered 100% of the costs of individuals enrolled under Medicaid expansion during the period 2014 through 2016. Thereafter, the federal share of costs of new enrollees is to be phased down to 90% by 2020.

According to the U.S. Bureau of Economic Analysis, the adoption of Centennial Care, New Mexico's expanded Medicaid program, brought $2.3 billion in federal funds to the state. These dollars funded much of the recent growth in healthcare employment in New Mexico. Assuming that ACA, and Medicaid expansion in particular, remains in place the state will continue to receive the support of federal dollars.

However, further growth of Medicaid funding will likely slow, weighing against the continued rapid growth of employment in the healthcare sector. First, enrollment in the state's Centennial Care program has begun to plateau, and the increase in federal transfers has begun to flatten as a result. In addition, over the next few years, New Mexico will assume more of the cost sharing, reducing the flow of federal dollars into the state. The decline in federal transfers was evident in the first quarter of 2017, as shown in Figure 3. At the same time, cost sharing will require that New Mexico allocate as much as $160 million per year to fund Centennial Care. Given the fiscal challenges in the state, the demands of Centennial Care may crowd out other state expenditures, likely including those that support healthcare employment.

Figure 3. Growth in Medicaid Transfers to Personal Income.
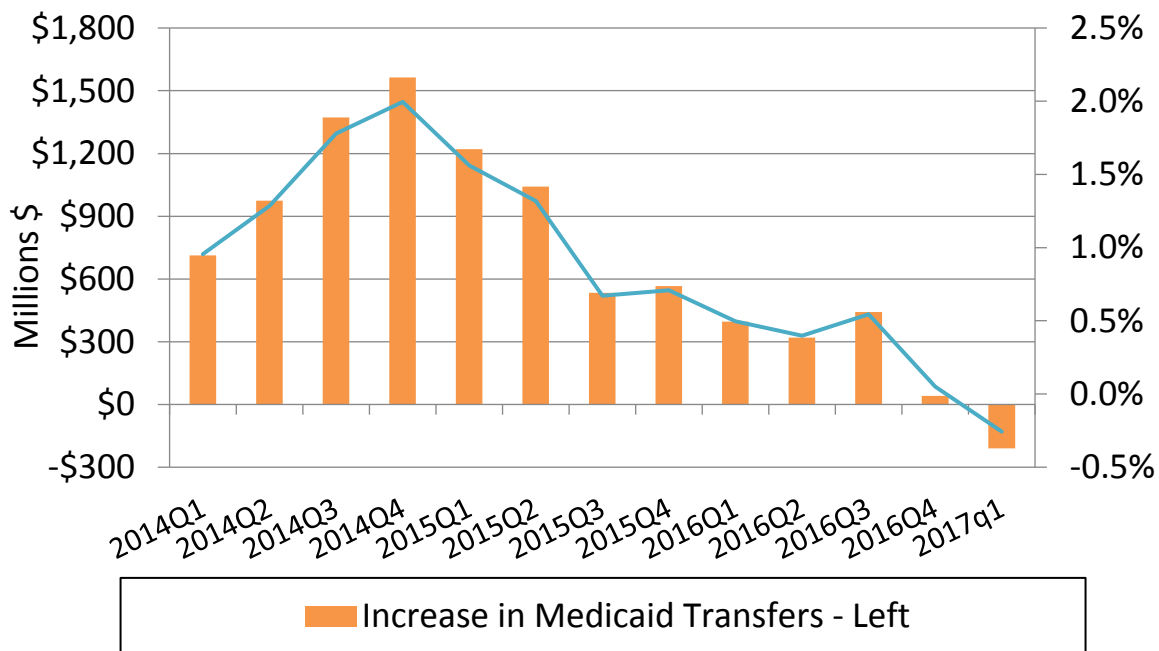
Source: U.S. Bureau of Economic Analysis Personal Current Transfer Receipts.

This study drew on reliable data sources and employed the best available scientific methods. The results of these analyses are detailed below and demonstrate that the SUN PATH program represents a significant benefit and contribution to the economy of New Mexico. This report presents ROI of the program in New Mexico as well as the economic impact of the SUN PATH program on New Mexico's economy, measured in terms of jobs, wages & salaries, and economic output.

2 METHODOLOGY

ROI is one of the most used criteria to estimate the attractiveness of an investment. ROI is represented as a ratio of the expected financial gains of a project divided by its total costs. As a formula it appears as: ROI=(net benefits/total cost).

There are two dominant theories to investigate return to education. The first one is the human capital theory which considers education as an investment that helps increase the productivity of graduates in the future which results in increased future wages. The second theory is the signaling theory which hypothesizes that education serves as a signal for higher quality of prospective job candidates. This theory assumes that potential employers take higher education as a positive signal for the productivity and motivation of individuals. BBER has used the human capital theory to estimate the ROI of the SUN PATH program. In this analysis, benefit is defined as the expected increased earnings of participants who completed one or more certificate program from any of the New Mexico SUN PATH program supported schools. The cost of the program includes 1) SUN PATH expenditures on employee compensation, purchases of goods and services, and tools & equipment 2) Opportunity cost of participants' time as well as tuition and fees paid by the participants 3) Faculty and staff salaries paid by the participating colleges. The main assumptions of the study are presented below:

2.1 Assumptions of the Study

1. When we want to know the causal effect of a program like this on New Mexico's economy, we need to compare two states of the economy: the economy in which the SUN PATH program intervention occurred and the economy in which it did not. The economy without the SUN PATH program is a counterfactual one. BBER makes a heroic assumption here. If the New Mexico SUN PATH program did not exist, then many participants who completed certificates might not be able to do so. As a result, their wages, we assumed, will remain flat in the future.
2. Since many certificate programs offered by various schools were already in existence before SUN PATH's intervention, how much of participants enrollments, participant skills quality, participants skills matching with the employer needs, participants employability are attributed to SUN PATH is not identifiable. Therefore, BBER used SUN PATH's program outcomes figures (as it reported, such as number of enrollment, number participants who completed at least one certificate and participants who completed a certificate joined the workforce) to measure the effects of the program. To estimate the ROI of the SUN PATH program, BBER used three components of cost - participants cost, faculty & staff wages/salary and SUN PATH program expenditures. This was done because the increased earnings were the result of costs incurred by not only SUN PATH but also by students and colleges.

3. The skills learned by the participants will start becoming obsolete[3] after five years of their completion of the certificate; however, the participants continue to benefit from the increased earnings in future years. Therefore, BBER estimated return on investment of future earnings of participants for only 10 years expecting the reduced earnings associated with obsolescence of skill before 10th year and remaining increased earnings after 10 years will cancel each other.
4. The discount rate of the future earnings is assumed to be the same as the future earnings growth. Therefore, BBER used undiscounted flow of future earnings of participants to estimate the benefits.
5. The cost of the participants such as tuition, fees, books & supplies, room & board varies. The opportunity cost of participants also varies. However, BBER attempted to estimate an opportunity cost as well as the tuition and fees which is as follows: The average duration to complete these certificate program is approximately 7 months. If we assume the opportunity cost of participants to be the average earnings of high school graduates for 7 months ($10,463[4]) and average cost of college (including tuition and fees) is $2,024[5]. Per person cost of the certificate program would be around $12,500. The total cost of completing the certificates for 1,609[6] students would be nearly $20 million.
6. We used the assumption used by SUN PATH that 61% of the participants who completed program will be employed in New Mexico. BBER further assumed that those who will be employed will continue to live and work in New Mexico for at least 10 years.
7. Benefits in terms of increased earnings are estimated for the "average" participant for each certificate program.
8. Prior to receiving the certificate and joining the workforce, many participants may be qualified to receive income support such as unemployment insurance, TANF, food stamp, Medicaid, etc. because of their low-income status. Once they complete the certificate and join the workforce, they may not be qualified to receive these

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[3] Skills obsolescence may happen due to the wear of skills, technological development, organizational change, etc. Please see "When do skills become obsolete, and when does it matter?" by Jim Allen, Rolf van der Velden and "The economics of skills obsolescence: a review" by Andries De Grip and Jasper Van Loo. The first study shows that "a fourth of the skills obtained in tertiary education were obsolete seven years later". Skill obsolescence is measured by half-life, a concept taken from nuclear physics. The half-life of professional as defined by Dubin (1972) is "the time after completion of professional training when, because of new developments, practicing professionals have become roughly half as competent as they were upon graduation to meet the demands of their profession." Various researchers have estimated half-life of professionals between 5 to 12 years. Please note that each certificate may have different half-life. We assumed 10 years in this study.

[4] Based on BBER estimation using participants earning data.

[5] Average cost was estimated based on CNM tuition and fee as provided by SUN PATH Coordinator, CNM. Appendix A Presents the tuition and fees by certificate program at CNM.

[6] Estimated number of participants who are already employed or will be employed by the end of 2019 when they have enough time to search job of their field of certificates. Please see detail in Section 3.2.

supports. Increased earnings of the participants may result not only in saving of federal, state and local dollars but may increase the tax dollars that go to the coffer of these government entities. Due to lack of data, BBER could not delve into this aspect of the SUN PATH program's impact any further, possibly resulting in an underestimation of the benefits associated with the program.

2.2 Data and Data Sources

2.2.1 SUN PATH Expenditure data

The New Mexico SUN PATH program started at the end of 2014 and is expected to last until March 2018. Total budget of the New Mexico SUN PATH program is approximately $15 million of which approximately 9% was spent during 2014/15, 34% was spent in 2015/16 and 30% was spent in 2016/17 and remaining 27% percent is being spent during 2017/2018. During the entire project period of 4 years, the program is expected to generate 45 new direct jobs. Approximately 58% ($8.7 million) of the funding is expected to be spent on employee compensation.

Table 1 New Mexico SUN PATH Expenditures by Year

Exepnditure items	2014/15	2015/16	2016/17	2017/18	Total
Employee compensation	$584,215	$2,881,181	$2,736,825	$2,470,017	$8,672,238
Goods and services	$471,077	$1,736,542	$1,717,230	$1,542,887	$5,467,736
Tools and equipment	$244,169	$494,882	$48,152	$72,686	$859,889
Total	$1,299,461	$5,112,605	$4,502,207	$4,085,591	$14,999,864

Source: New Mexico SUN PATH Program

2.2.2 Student Data and Descriptive Statistics

New Mexico SUN PATH provided most of the data needed for this analysis. Student data from the beginning of the SUN PATH program (which is the last quarter of 2014) to the Spring semester of 2017. Student data includes many variables such as student's age, gender, race and ethnicity, the academic program in which the student was enrolled, educational attainment, and college where she/he enrolled. SUN PATH program also provided BBER with the quarterly wage record data of students who either already completed the certificate program or who are currently enrolled in the program. Since BBER is estimating return on investment for the entire duration of the SUN PATH program, future enrollment is yet to happen. However, the SUN PATH program has outcome targets and associated student enrollment projection for the future. In addition to participants who completed a certificate program, BBER utilized future student enrollment projection data to estimate the ROI of the entire program. This shows that there is a speculative component of the data which may create some margin of errors in the results of our analysis.

By the end of Spring semester of 2017, a total 3,222 students participated in the program. Most of the participants (74%) are female and remaining 26% are male. Figure 4 displays the program distribution by race, as identified by the student. Nearly half (46%) participants are Hispanic/Latino. The second highest percentage of racial composition is consisting of white 30% followed by American Indian or Alaska Native 17%, multiple races 3%, African American 2%, Asian 2% and 0.1% Hawaiian/Pacific Islander.

Figure 4. Students' racial background (N=3,222)
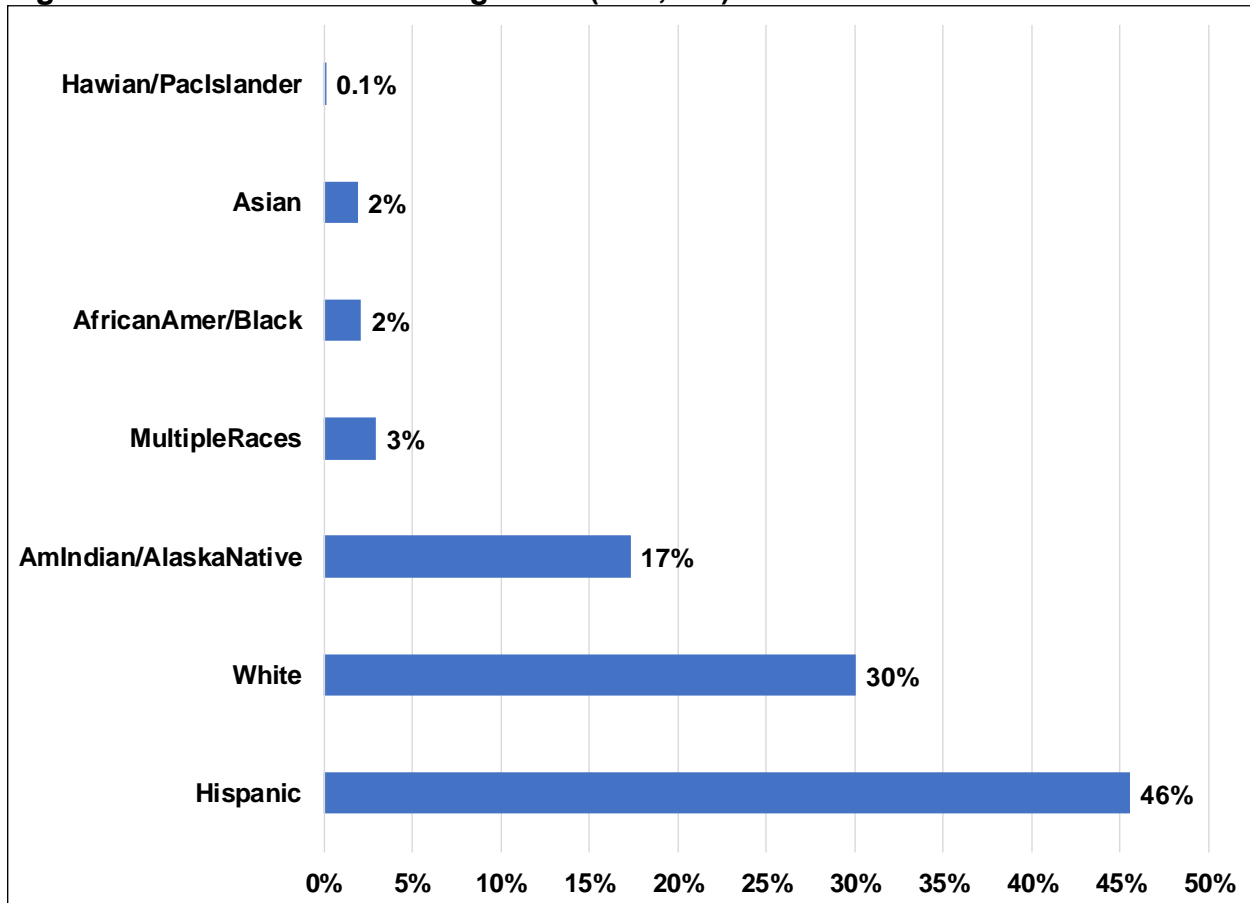
Figure 5 presents the educational attainment of participants prior to the enrollment in the certificate programs. The highest percentage (42%) of participants have completed high school followed by 2-year college (10%), associate degree (9%), first year college (8%), 3-year college (8%) and GED (7%). Majority of participants either completed high school (42%) or completed GED (7%). More than 5% of the participants have a vocational degree and more than 7% of participants have either a bachelor's or master's degree. This shows higher value of health care certificate program for some students who have a bachelor's or master's degree.

Figure 5 Educational attainment of participants (N=3,166)
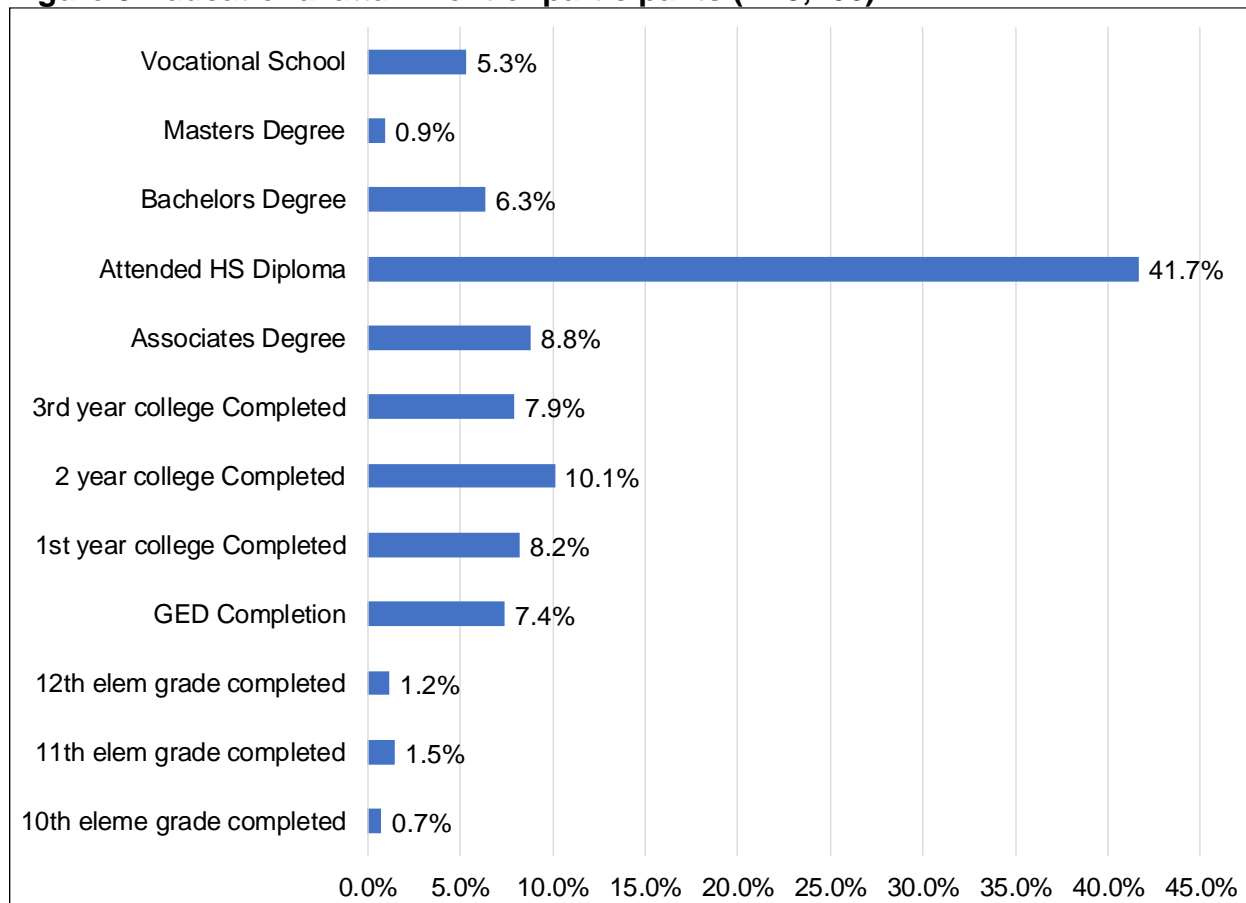
Figure 6 shows the distribution of student participation in each of the certificate program offered by the SUN PATH program. More than two third (68%) of the participants enrolled in an Allied Health program such as nursing assistant, certified nursing assistant, nursing and phlebotomy. About 28% of the participants enrolled in an emergency medical service program such as EMT-basic and EMT intermediate and EMT-community health worker. The remaining 4% of the participants enrolled in health information related certificate programs such as basic health information technology, medical coding, and electronic health information.

Figure 6. Student participation by program (N=3,222)
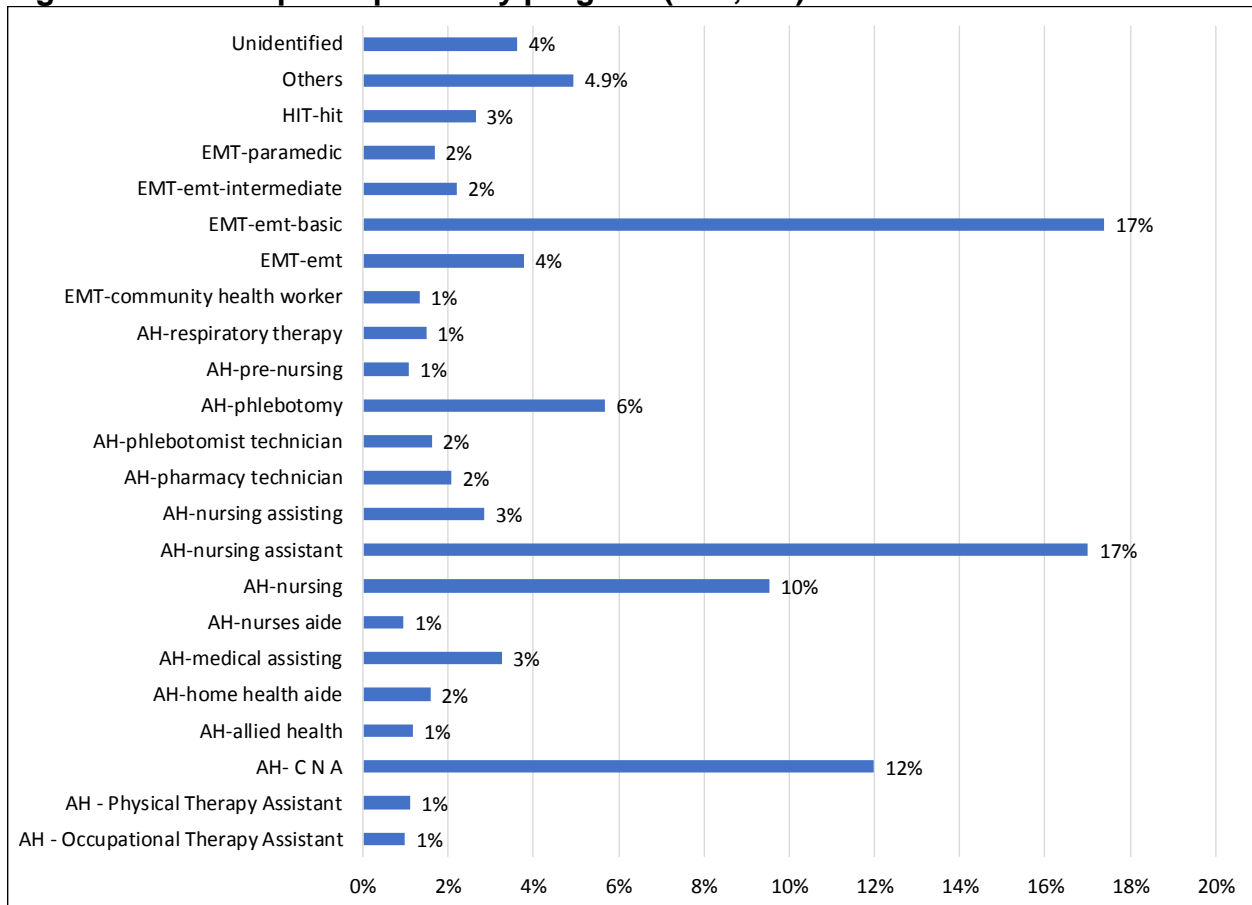
Figure 4 shows the share of participant enrollment at each of the 11 colleges in the SUN PATH program. CNM has the highest share (26%) followed by SJCC (17%), SFCC (14%), ROS (11%), UNMG (11%), and UNMV (9%).

Figure 7. Share of student enrollment by school (N=3,222)
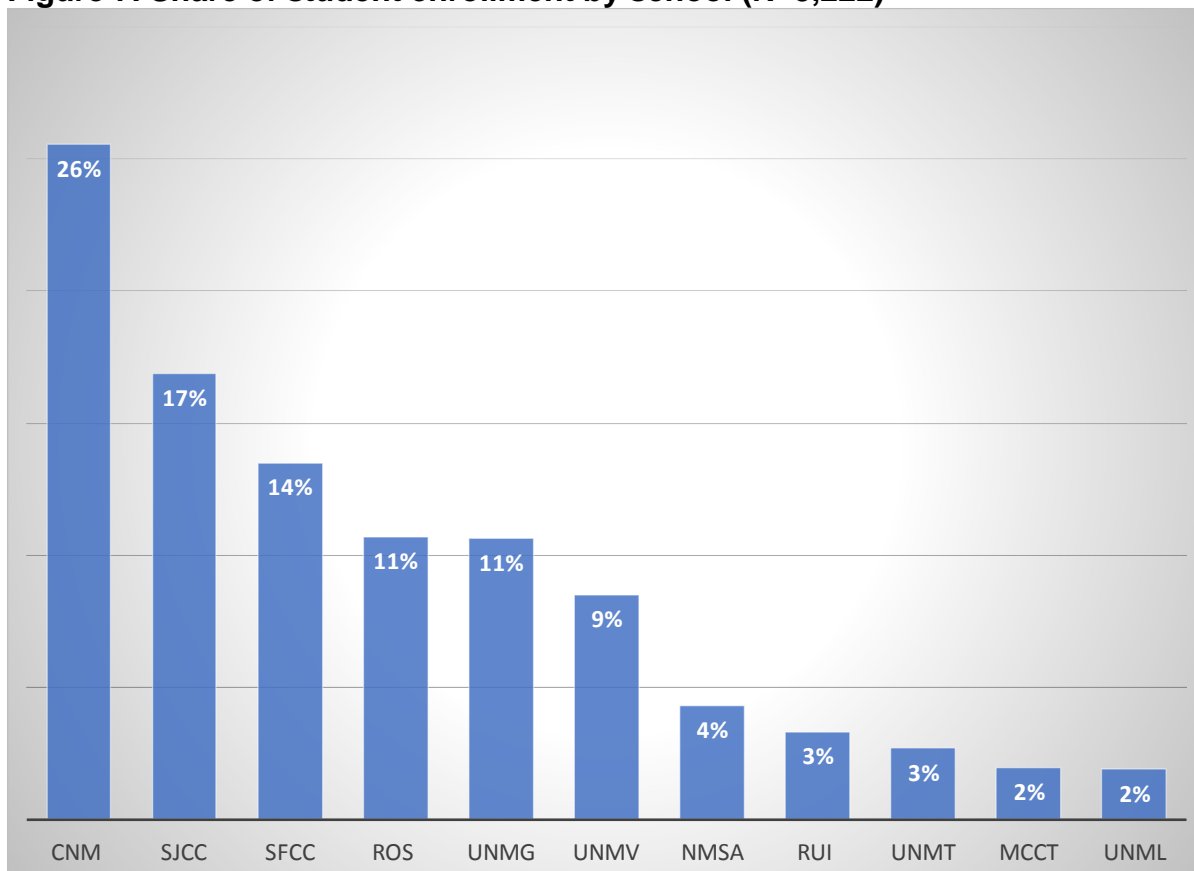
2.3 Empirical Estimation of Returns to Certificate Programs

To estimate the value of certificate in New Mexico economy, BBER used Jacob Mincer's earning function type model which is one of the most widely used models in this kind of analysis. In this model, it is assumed that earnings are a function of experience, educational attainment, age, gender, etc. Using participant wage record data and their demographic data, BBER estimated post-certificate earnings of participants. Please note that although 1,787 participants completed at least one certificate only data on 601 participants was complete enough to be included in this analysis. Table 2 presents the variables, variable definitions and the mean value of each variable used in the model. The average 2014 annual wage of participants who received a certificate in later years was $17,180. The average age of participants who completed a certificate was 29. There were 71% female and 29% percent male participants. The average educational attainment was 13 years of schooling which is slightly higher than the high school level. The latest wage (which include wage earned in 2016 or/and 2017) of participants who completed a certificate was $22,407 on average. Other variables that were included in the model were dummy variables whose mean value represent the proportion of participants receiving each degree. As you can see in Table 2, we created 12 dummy

variables to investigate the existence of wage differences among various certificate-holding participants as compared to CNA-holding participants. Since the number of participants in certain certificate categories are very low it was not practical to get a statistical rigor with such low counts. To address this issue we combined similar earning categories into one. For example, we combined EMT-basic, EMT-emt, EMT-first responder prehospital professional to create *EMT_basic_dum* variable. Similarly, we combine physical therapy assistant with respiratory therapy to create *AH_Respi_Dum*. Another reason to combine different certificate into one is that there is no basic difference in them. For example, *AH_NA_CNA_Dum* a combined dummy variable representing Certified Nursing Assistant, nursing assistant or nursing assisting certificates which are essentially the same certificate.

Table 2 Variables, Variable Definitions and Mean Values

Variable	Variable Definition	Mean
Annual_Ave14	Wage in 2014 ($)	17180
Age	Age	29
Age_Sq	Age Squared	901
Gender_1male	Gender 1 for male	0.29
Edu_level	Educational attainment	13.03
AH_NA_CNA_Dum	1 for Nursing Assistant/Assisting or CAN, 0 for others	0.43
EMT_Basic_Dum	1 for EMT-basic, 0 for others	0.30
AH_Plebo_Dum	1 for plebotomy, 0 for others	0.08
AH_Nursing_Dum	1 for nursing, 0 for others	0.05
EMT_Intermed_Dum	1 for intermediate EMT, 0 for others	0.02
AH_Pharma_Tech_Dum	1 for Phermacy Tehchnician, 0 for others	0.02
HIT_Dum	1 for health information technology	0.02
AH_PersonalCare_dum	1 for personalcare, 0 for others	0.01
AH_Respi_Dum	1 for respiratory therapy, 0 for others	0.01
AH_MedAssisting_Dum	1 for medical assisting, 0 for others	0.02
AH_AH	1 for allied health, 0 for others	0.01
AH_Home_H_Aide	1 for home health aide, 0 for others	0.02
Year_completed	Certificate completed year	2015.83
Latest_wage	Latest wage ($)	22407.80

Source: BBER estimation based on SUN PATH data

3 RESULTS

3.1 Econometric Results

Data on various explanatory variables relating to the 601 participants who completed at least one degree was used to explain their wages. Table 3 presents the coefficient results from linear and log-linear regression models. The wisdom of using log transformed wage as a dependent variable is to tame and create a better fitted model having a higher R-square value. However, we found that log-linear model has a significantly lower explanatory power as reflected by its R-square value[7] of 0.18 than the linear model which has higher R-square value of 0.37 which is more than the double the R-square of log-linear model. Having indicated this, our results are based on the linear model coefficients presented in Table 3. The coefficient *Annual_Ave14* is 0.39 and statistically highly significant. Controlling, age, gender, certificates and year completed, for every dollar they earned before joining a certificate program is associated with 39 cents in wages after the completion of the certificate. *Age* variable's sign is positive and is statistically significant. As expected age squared (*age_sq*) variable is negative and statistically significant. This shows that, for young people, additional years of age will add value to their wages whereas for older age people additional age becomes a liability for them. The prime age for earnings is 38 years and earnings become zero at the age of 77. Since there was no data on participants' past experiences prior to joining the certificate program, age variable serves as proxy of experience in this case. The coefficient of *Gender_1male* variable is 2769 and is statistically significant. This means that controlling other factors, male participants earn $2,769 more than the women participants annually. The variable representing educational attainment level (*Edu_level*) is not statistically significant. Controlling for their certificates, age and gender, educational attainment has no statistically significant separate impact on their earnings.

The dummy variable for Nursing (*AH_Nursing_Dum*) came out to be statistically highly significant and participants with nursing degree earned $24,486 more than that of CNA certificate holders. The respiratory therapy and physical therapy assistant variable (AH_Respi_Dum) has a coefficient of 17059 and is statistically significant. That means that the respiratory therapy and physical therapy assistant made $17,059 more than the CNA certificate holders. The other higher earning certificate is EMT-intermediate and participants with this certificate earned $16,441 more than the CNA certificate holders. The dummy variables representing EMT-basic, AH-Phlebotomy, AH-Pharmacy tech, health information technology, and AH-medical assisting were found to be statistically

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[7] R-square value measure the degree to which a dependent variable is explained by the explanatory variable. 0.37 R-square means 37% of the variability present in dependent variable (i.e. wages) is explained by the model.

insignificant. However, using wage record data[8] together with the regression results, BBER estimated the average annual earnings of participants with each certificate category.

Table 3 Coefficient Estimates from Linear and Log-Linear Regression Models

Variables	Linear Model		Log-Linear Model	
	Coefficients	p-value	Coefficients	p-value
Intercept	4796087	0.001	285.57	0.0007
Annual_Ave14	0.39	<.0001	0.0000	<.0001
Age	645.2	0.0867	0.0499	0.0215
age_Sq	-8.3	0.107	-0.0007	0.0261
Gender_1male	2768.9	0.034	0.1259	0.0938
Edu_level	167.9	0.6796	-0.0043	0.8548
EMT2_Basic_Dum	3341.4	0.0128	0.1016	0.1878
AH_Plebo_Dum	2214.4	0.2509	0.1231	0.2675
AH_Nursing_Dum	24486.0	<.0001	0.7426	<.0001
EMT_Intermed_Dum	16441.0	<.0001	0.6606	0.0011
AH_Pharma_Tech_Dum	-1635.1	0.6719	0.0489	0.8258
HIT_Dum	4427.1	0.2036	0.2333	0.2444
AH_PersonalCare_dum	588.0	0.8891	0.1125	0.6431
AH_Respi_Dum	17059.0	0.0065	0.7364	0.041
AH_MedAssisting_Dum	4392.1	0.2309	0.1358	0.5199
AH_AH	3395.5	0.4753	0.1709	0.5326
AH_Home_H_Aide	-2555.1	0.4559	-0.1957	0.3213
Year_completed	-2379.7	0.001	-0.1374	0.001
Summary statistics	R Square=0.37 N=601		R Square=0.18 N=601	

Source: BBER estimation based on SUN PATH data

Table 4 presents estimated annual wage by certificate program and the additional wages earned over those of an average high school graduate. The above linear wage model estimated $17,937 as annual average earnings of an average high school graduate who is 19 years old. All other certificate categories are compared with this typical high school graduate's earnings.

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[8] Earnings of participants who completed Home Health Aide, Nurse Aide, Medical Laboratory Technician, pre-nursing, surgical technician, first responder prehospital professional, electronic health information and medical coding were estimated using wage record data. Econometric model did not produce reliable estimate of annual earnings of participants completing these certificates mainly due to low counts of those categories. Therefore, BBER used average of latest earnings of those participants. As a result, our estimation may have suffered from upward or downward bias without controlling age, experience, gender, educational attainment, etc. However, due to the low number of participants on those categories, our estimation of future earnings should not be impacted significantly.

The highest earning certificate category is nursing ($44,340) followed by respiratory therapy assistant, occupational therapy assistant, physical therapy assistant ($36,913), EMT-intermediate ($36,295), surgical technician ($34,163), HIT-medical coding ($33,173), and first responder prehospital professional ($32,350). Please note that many higher earning certificates required longer time to complete them. Participants holding certificates in home health aide, nurse aide, nursing assistant/nursing assisting are a few of the lowest paying jobs (Table 4).

Table 4 Estimated Annual Wage by Certificate Program and Wage Differences After High School

Certificate program	Estimated annual wage	Additional wage after high school
AH-allied health	$23,249	$5,313
AH-C N A	$19,854	$1,917
AH-ekg technician	$18,219	$282
AH-home health aide	$18,216	$280
AH-medical assisting	$24,246	$6,309
AH-medical laboratory technician	$27,880	$9,943
AH-nurses aide	$18,321	$385
AH-nursing	$44,340	$26,403
AH-nursing assistant	$19,854	$1,917
AH-nursing assisting	$19,854	$1,917
AH-Occupational Therapy Assistant	$36,913	$18,976
AH-personal care attendant	$20,442	$2,505
AH-personal care technician	$20,442	$2,505
AH-pharmacy technician	$18,219	$282
AH-phlebotomist technician	$22,068	$4,132
AH-phlebotomy	$22,068	$4,132
AH -Physical Therapy Assistant	$36,913	$18,976
AH-pre-nursing	$26,902	$8,966
AH-radiographic technology	$24,246	$6,309
AH-radiologic technology	$24,246	$6,309
AH-respiratory therapy	$36,913	$18,976
AH-surgical technician	$34,163	$16,226
EMT-community emt	$23,195	$5,259
EMT-community health worker	$24,246	$6,309
EMT-community paramedic	$23,195	$5,259
EMT-emt	$23,195	$5,259
EMT-emt-basic	$23,195	$5,259
EMT-emt-intermediate	$36,295	$18,358
EMT-first responder prehospital professional	$32,350	$14,414
EMT-paramedic	$23,195	$5,259
HIT-Electronic Health Information	$33,173	$15,236
HIT-hit	$24,281	$6,344
HIT-medical coding	$33,173	$15,236
IT:cyber security certificate	$24,281	$6,344

Source: BBER estimation based on SUN PATH data

3.2 Estimation of Future Earnings

As we mentioned in key assumptions of the study in the methodology section, our analysis resulted in estimated future earnings and cost for the "average" participant. To estimate future earnings, we need information on future employment and time period

over which the earnings may accrue. In this case we assumed that skill will start becoming obsolete after 5 years and will become 50% obsolete at the 10th year. BBER assumed that the reduction of increased earnings of participants after 5th year will be compensated by remaining 50% skills endured after 10th year.

To estimate the future employment of participants who completed or will complete certificates we used participants enrollment data provided by New Mexico SUN PATH program. Table 5 presents the participants' enrollment by certificate and year. In 2015, a total 1,006 participants enrolled in various certificate programs. This number grew to 1,640 in 2016 and 1,794[9] in 2017. A total of 4,440 participants have enrolled or will be enrolled by the end of 2017. The highest number of participant enrolled for EMT-basic (825) followed by nursing assistant (656), nursing (499), phlebotomy (272) and medical assisting (183).

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[9] This also includes projected participants enrollment number.

Table 5 Number of Participants by Certificate and Year

Certificates	2015	2016	2017*	Total**
AH-allied health	19	10	11	40
AH-C N A	114	185	193	492
AH-ekg technician	-	-	2	2
AH-home health aide	20	16	26	62
AH-medical assisting	36	78	69	183
AH-medical laboratory technician	13	1	4	18
AH-nurses aide	3	23	13	39
AH-nursing	156	161	182	499
AH-nursing assistant	184	216	256	656
AH-nursing assisting	10	85	66	161
AH-Occupational Therapy Assist	-	33	20	53
AH-personal care attendant	-	3	2	5
AH-personal care technician	18	13	45	76
AH-pharmacy technician	18	21	62	101
AH-phlebotomist technician	14	38	37	89
AH-phlebotomy	43	105	124	272
AH -Physical Therapy Assistant	13	2	10	25
AH-pre-nursing	8	31	20	59
AH-radiographic technology	15	13	10	38
AH-radiologic technology	8	1	5	14
AH-respiratory therapy	30	8	32	70
AH-surgical technician	6	9	11	26
EMT-community emt	-	1	-	1
EMT-community health worker	10	31	43	84
EMT-community paramedic	-	-	4	4
EMT-emt	22	62	59	143
EMT-emt-basic	158	326	341	825
EMT-emt-intermediate	15	77	69	161
EMT-first responder prehospital p	7	-	-	7
EMT-paramedic	14	46	21	81
HIT-Electronic Health Information	1	2	9	12
HIT-hit	36	30	31	97
HIT-medical coding	14	8	14	36
IT:Cyber Security Certificate	1	4	3	8
Unidentified	-	1	-	1
Grand Total	1006	1640	1794	4440

Source: SUN PATH

* 2017 enrollment include both actual and projected numbers

** Some participants may have enrolled more than one times

Not all participants who enrolled will complete the certificate program. Table 6 shows how the participant's enrollment, completion and employment data is estimated. SUN

PATH outcome data (actual and target enrollment and completion data) shows that only 66% of participants completed the certificate program and only 61% percent participants who completed program are expected to be employed. In other words, only 40% of the participants who enrollment for a certificate program are employed or will be employed. Please note there were only 91% of non-repeating participants in those certificate program. Therefore, when we estimated the number of unique participants who completed the program we multiply enrollment number by this factor (91%) to each certificate category.

Table 7 presents the number of employees created or to be created from SUN PATH participants. After discounting for repeated participants (which is 9%), BBER estimated number of employed participants by multiplying by percentage of employed participants (which is 40%). Out of 1,006 participants who enrolled in 2015, only 366 were employed in 2017 (please see Table 5 and Table 7). Similarly, out of 1,640 and 1,794 participants who enrolled in 2016 and 2017 only 594 and 649 participants will be employed in 2018 and 2019, respectively. Cumulative employed participants in 2018 and 2019 would be 960 and 1,609, respectively. BBER assumed that the 1,609 estimated employed participants will remain the same until 2028.

Table 6. Total Number of Participants, Participants who Completed or will Complete Certificate Program and Number of Participants Who Completed are Employed or Would be Employed

Certificate program	Total Participants	No. of participants who completed certificate program	No. of participants who are employed or would be employed
AH-allied health	40	24	15
AH-C N A	492	295	179
AH-ekg technician	2	1	1
AH-home health aide	62	37	23
AH-medical assisting	183	110	66
AH-medical laboratory technician	18	11	7
AH-nurses aide	39	23	14
AH-nursing	499	299	181
AH-nursing assistant	656	393	238
AH-nursing assisting	161	96	58
AH-Occupational Therapy Assistant	53	32	19
AH-personal care attendant	5	3	2
AH-personal care technician	76	46	28
AH-pharmacy technician	101	61	37
AH-phlebotomist technician	89	53	32
AH-phlebotomy	272	163	99
AH -Physical Therapy Assistant	25	15	9
AH-pre-nursing	59	35	21
AH-radiographic technology	38	23	14
AH-radiologic technology	14	8	5
AH-respiratory therapy	70	42	25
AH-surgical technician	26	16	9
EMT-community emt	1	1	0
EMT-community health worker	84	50	30
EMT-community paramedic	4	2	1
EMT-emt	143	86	52
EMT-emt-basic	825	494	299
EMT-emt-intermediate	161	96	58
EMT-first responder prehospital profes	7	4	3
EMT-paramedic	81	49	29
HIT-Electronic Health Information	12	7	4
HIT-hit	97	58	35
HIT-medical coding	36	22	13
IT:cyber security certificate	8	5	3
Total	4,439	2,660	1,609

Source: BBER estimation based on SUN PATH data

Table 7 Employment Projection of Participants by Year

Certificate program	2017	2018	2019	2020
AH-allied health	7	11	15	15
AH-C N A	41	108	179	179
AH-ekg technician	0	0	1	1
AH-home health aide	7	13	23	23
AH-medical assisting	13	41	66	66
AH-medical laboratory technician	5	5	7	7
AH-nurses aide	1	9	14	14
AH-nursing	57	115	181	181
AH-nursing assistant	67	145	238	238
AH-nursing assisting	4	35	58	58
AH-Occupational Therapy Assistant	0	12	19	19
AH-personal care attendant	0	1	2	2
AH-personal care technician	7	12	28	28
AH-pharmacy technician	7	15	37	37
AH-phlebotomist technician	5	19	32	32
AH-phlebotomy	16	54	99	99
AH -Physical Therapy Assistant	5	6	9	9
AH-pre-nursing	3	14	21	21
AH-radiographic technology	5	10	14	14
AH-radiologic technology	3	3	5	5
AH-respiratory therapy	11	14	25	25
AH-surgical technician	2	5	9	9
EMT-community emt	0	0	0	0
EMT-community health worker	4	15	30	30
EMT-community paramedic	0	0	1	1
EMT-emt	8	31	52	52
EMT-emt-basic	57	175	299	299
EMT-emt-intermediate	5	33	58	58
EMT-first responder prehospital profess	3	3	3	3
EMT-paramedic	5	22	29	29
HIT-Electronic Health Information	0	1	4	4
HIT-hit	13	24	35	35
HIT-medical coding	5	8	13	13
IT:cyber security certificate	0	1	3	3
Total	366	960	1,609	1,609

Source: BBER estimation based on SUN PATH data

Based on the employment projection presented in Table 7 and estimated increased annual earnings of participants by certificate program (as presented in Table 4), BBER estimated increased annual earnings for year 2017 through 2028. The estimated annual increased earnings in 2017 is $3 million, in 2018 is $7.4 million and 2019 is $12.1 million. The same increased earnings ($12.1 million) is expected to accrue every year during 2020 to 2028. A cumulative total $132 million increased earnings of SUN PATH participants is expected by the end of 2028. Please note that nearly 40% of the increased earnings is expected to be received by nursing certificate holders. The remaining highest earning certificates are EMT-basic (13%), EMT-Intermediate (9%),

Respiratory Therapy (4%) and nursing assistant (4%). These high percentages in select certificates are accounted for by either high number of participants or higher increased earnings or both.

Table 8 Increased Annual Earnings and Projected Increased Future Earnings

Certificate program	Increased annual earnings ($)	Increased earnings (in thousand dollars)				
		2017	2018	2019	2020 to 2028	Cumulative Total
AH-allied health	$5,313	$37.2	$58.4	$79.7	$717	$893
AH-C N A	$1,917	$78.6	$207.1	$343.2	$3,089	$3,718
AH-ekg technician	$282	$0.0	$0.0	$0.3	$3	$3
AH-home health aide	$280	$2.0	$3.6	$6.4	$58	$70
AH-medical assisting	$6,309	$82.0	$258.7	$416.4	$3,748	$4,505
AH-medical laboratory technician	$9,943	$49.7	$49.7	$69.6	$626	$795
AH-nurses aide	$385	$0.4	$3.5	$5.4	$48	$58
AH-nursing	$26,403	$1,505.0	$3,036.4	$4,779.0	$43,011	$52,331
AH-nursing assistant	$1,917	$128.5	$278.0	$456.3	$4,107	$4,969
AH-nursing assisting	$1,917	$7.7	$67.1	$111.2	$1,001	$1,187
AH-Occupational Therapy Assistant	$18,976	$0.0	$227.7	$360.5	$3,245	$3,833
AH-personal care attendant	$2,505	$0.0	$2.5	$5.0	$45	$53
AH-personal care technician	$2,505	$17.5	$30.1	$70.1	$631	$749
AH-pharmacy technician	$282	$2.0	$4.2	$10.4	$94	$111
AH-phlebotomist technician	$4,132	$20.7	$78.5	$132.2	$1,190	$1,421
AH-phlebotomy	$4,132	$66.1	$223.1	$409.0	$3,681	$4,380
AH -Physical Therapy Assistant	$18,976	$94.9	$113.9	$170.8	$1,537	$1,917
AH-pre-nursing	$8,966	$26.9	$125.5	$188.3	$1,695	$2,035
AH-radiographic technology	$6,309	$31.5	$63.1	$88.3	$795	$978
AH-radiologic technology	$6,309	$18.9	$18.9	$31.5	$284	$353
AH-respiratory therapy	$18,976	$208.7	$265.7	$474.4	$4,270	$5,218
AH-surgical technician	$16,226	$32.5	$81.1	$146.0	$1,314	$1,574
EMT-community emt	$5,259	$0.0	$0.0	$0.0	$0	$0
EMT-community health worker	$6,309	$25.2	$94.6	$189.3	$1,704	$2,013
EMT-community paramedic	$5,259	$0.0	$0.0	$5.3	$47	$53
EMT-emt	$5,259	$42.1	$163.0	$273.4	$2,461	$2,940
EMT-emt-basic	$5,259	$299.7	$920.3	$1,572.3	$14,151	$16,943
EMT-emt-intermediate	$18,358	$91.8	$605.8	$1,064.8	$9,583	$11,345
EMT-first responder prehospital professional	$14,414	$43.2	$43.2	$43.2	$389	$519
EMT-paramedic	$5,259	$26.3	$115.7	$152.5	$1,372	$1,667
HIT-Electronic Health Information	$15,236	$0.0	$15.2	$60.9	$549	$625
HIT-hit	$6,344	$82.5	$152.3	$222.1	$1,998	$2,455
HIT-medical coding	$15,236	$76.2	$121.9	$198.1	$1,783	$2,179
IT:cyber security certificate	$6,344	$0.0	$6.3	$19.0	$171	$197
Total		$3,097.7	$7,435.2	$12,155.2	$109,396.8	$132,085.0

Source: BBER estimation based on econometric model and student data provided by SUN PATH

3.3 Estimation of Return on Investment (ROI)

The estimated net increased earnings associated with the SUN PATH program participants is $132 million which is treated as a benefit of the program. This benefit was the result of costs incurred by the various stakeholders. These costs can be split into three general components. First component is participants' cost which consists of opportunity cost of the participants to complete the certificate program and the tuition and fees paid to complete those certificates. The total estimated cost for the participants

is $20 million (as presented in assumption 5 in Methodology section). The second component of the cost is the $15 million expenditure made by the New Mexico SUN PATH Program from 2014 through 2018. The third component of cost is the faculty and staff salary supported by participating colleges. The total annual cost of the 55 faculty and 11 staff members wages or/and salaries is $5.8 million[10]. Combining all of these cost components, the total cost of the program is approximately $41 million[11].

Having estimated all the components of return on investment analysis, we used the following formula to estimate ROI of the New Mexico SUN PATH program.

$$ROI = \frac{Total\ Benefits - Total\ Costs}{Total\ Cost}$$

$$ROI = \frac{\$132.085\ million - \$41\ million}{\$41\ million} = \frac{\$91.085\ million}{\$41\ million} = 2.22$$

The ratio of 2.22 shows that for every $1 invested in the SUN PATH certificate program (including participants expenditures), 2.22 additional dollars would be generated or expected to be generated in New Mexico's economy. In other words, a 222% return on investment is expected to be achieved by the program.

As we mentioned in our assumptions BBER treated all the participants' increased earnings as the benefit of the SUN PATH certificate program. This assumption exaggerates the attribution of benefits to the program (increased earnings) because if there were no SUN PATH program, some of the participants would have completed those certificates and would be able to find jobs in New Mexico and get their increased earnings any way. If only 17% of the increased earnings (which is obtained by total cost divided by net benefit; $15M/($132-$41M) =16.5%≈17%) of the SUN PATH participants is attributed to the SUN PATH program, ROI would be 1 or 100% which means the SUN PATH program's return is fully covering its cost.

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[10] This estimation was obtained from SUN PATH Program Director. Given that average duration to complete a certificate program is 7 months and 15%-20% of faculty time is spent on SUN PATH certificate program, the annual salary should be enough to cover the cost of the instruction required to complete certificate program.

[11] Please note that this estimation of cost may not include the cost of instructional materials, cost of academic support activities, and student services. We also left out the positive externalities associated with education in general such as personal health, increased efficiency in job search and other personal choices, greater social equity, more cohesive communities, crime reduction, expanded technological possibilities in science, medicine, and industries, etc. Since our analysis accounted for the participants opportunity cost which is sizable, the return on investment ratio based on opportunity cost may fall into a more conservative side of the spectrum.

3.4 Economic Impact of New Mexico SUN PATH Program

Table 9 presents the direct, indirect, induced and total economic impacts of the New Mexico SUN PATH program's operation expenditure on the state of New Mexico. The program directly employed an average of 45 people and paid $8.8 million in wages and salaries. Total economic impact for the state of New Mexico is $27.5 million in economic output with 68 jobs and $12.1 million in labor income. These are a net gain to the New Mexico economy because money came from outside of the state, i.e. federal government.

Table 9 Economic Impacts of US Department of Labor's Funding of $15 Million to New Mexico SUN PATH (Federal Fiscal Year 2014 through 2017)

Impact Type	Employment*	Labor Income	Output
Direct	45	$8,819,371	$14,999,864
Indirect	8	$1,208,675	$5,633,969
Induced	14	$2,105,476	$7,276,288
Total	68	$12,133,523	$27,541,950

Source: BBER estimation using New Mexico IMPLAN model 3.1

*Employment numbers represent an average employment for 4 years

4 CONCLUSION

This study used regression-based econometric methods for determining the return on certificate programs, controlling for age, gender, and educational attainment. The increased earnings of each certificate program over that of the average high school graduate was estimated. The results of our analysis show that the increased earnings of nurses were the highest followed by respiratory therapy assistant, physical therapy assistant and occupation therapy assistant, EMT-intermediate, HIT, pre-nursing and community health worker. However, to complete a certificate in these fields requires a longer duration and tougher screening criteria to enter into the program.

A total of 4,440 participants have participate or will participate in the program and out of which 2,660 have completed or are expected to complete at least one certificate program. Out of those who completed or will complete a certificate program, 60% (1,609 participants) are expected to get jobs in New Mexico in their chosen area. To estimate the increased future earnings of the participants, BBER estimated the number of participants in each certificate program and multiplied by the estimated increased earnings for 2017 through 2028. BBER estimated $132 million in increased earnings of participants -which is used as a benefit to estimate the ROI.

As far as cost of the program is concerned, BBER estimated the average cost of tuition and fee as well as the opportunity cost of the student when they enroll in a certificate program. The average cost of tuition and fees is estimated at $2,024 to complete an average certificate program. BBER assumed the opportunity cost of a participant to be the average earnings of a high school graduate. BBER further assumed that the average duration of an average certificate program is 7 months and thus the opportunity cost for 7 months is $10,463. These average tuition and opportunity costs lead to a per person cost of completing an average certificate program of approximately $12,500. The total cost of completing certificates for 1,609 students would be nearly $20 million. The total cost of the program is $41 million including the $15 million in funding from the Department of Labor and $8.5 million wages and salaries of faculty and staff associated with participating colleges.

The return on investment of the program is estimated to be 2.22. For every $1 investment in the SUN PATH certificate program, participants will realize a benefit of $2.22 in increased earnings.

Additionally, BBER's estimation of the economic impact of the $15 million funding from U.S. Department of Labor is significant to the State. The New Mexico SUN PATH program directly employed an average of 45 people with $8.8 million wages and salaries (in four years) that support 22 jobs with $3.3 million wages and salaries in New Mexico and produce total economic impact of $27.5 million.

Due to data limitations, BBER could not isolate the SUN PATH impacts on participants enrollment, certificate completion, job matching, better decision on career choices, job satisfaction, improving employers' bottom line, etc.; however, our findings indicate a significant return could be achieved with a relatively small cost if educational institutions better align their activities with students' and employers' needs. Moreover, the return on investment analysis provided does not take into account economic impact of the large number of students that will benefit after SUN PATH ends as a result of the restructuring and realigning of systems and programs that effectively trained and employed healthcare students across the state. Exploring and attempting alternative ways of engaging with stakeholders such as students, instructors, and employers may require some extra resources, it is worth it in both short and long-term. Colleges need to be agile and responsive to employer's and students needs so that they can keep up with the needs of the economy and avoid over or under supplying of any specific certificate type. It cannot be assumed that similar increased earnings will be produced in the future if colleges continue producing the same certificate fields discussed in this report.

Appendix A SUN PATH Program Cost at CNM

Program Name	# of Credit Hours	# of Semesters to Complete	Cost of Tutition ($40 per credit)	Academic Transfer Tutiton Costs (if applicable- $54 per credit)	Program Fee(s)	Technology Fee ($8 per credit hour)	Registration Fee (Per semester)	Total Cost (range)
Home Health Aide	2	1-2	$80	$0	$5	$16	$45-$90	$146-$191
Nursing Assistant	7	1	$280	$0	$193	$56	$45	$574
Phlebotomy	10	1-3	$400	$0	$206	$80	$45-$90	$731-$776
Patient Care Technician	16-22	2	$640-$880	$0	$184	$128-$176	$90	$1,042-$1,330
Pharmacy Technician	31	3	$1,000	$540	$196	$248	$135	$2,119
Nursing	68-69	6-8	$0	$3,672-$3,726	$881	$544-$552	$270-$360	$5,367-$5,519
HIT	66-68	6-8	$1,560	$1,188	$105	$528-$544	$45-$225	3426
EMT-Basic	13	1	$400	$162	$306	$104	$45	$1,017
EMT-Intermediate	26-27	3	$800	$324-$378	$328	$208-$216	$90	$1,750-$1,812
EMT-Paramedic	67-70	6-8	$2,200-$2,320	$648	$1,339	$536-$560	$270-$315	$4,993-$5,182
Community Health Worker	10	1-3	$400	$0	$144	$80	$45-$135	$669-$759
Average total cost (used middle value)								$2,024

Source: SUN PATH Program Coordinator, CNM

The New Mexico SUN PATH TAACCCT project provides equal opportunities (EO) to all applicants without regard to race, color, religion, gender, sexual orientation, gender identity or expression, national origin, age, disability, genetic information, marital status, amnesty, or status as a covered veteran in accordance with applicable federal, state and local regulations.