



# Population Estimates Program 2024 Summer Research Positions

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Population Division  
U.S. Census Bureau



# 2024 Summer Research Positions

The Population Estimates Program of the US Census Bureau is currently accepting applications for paid summer research positions. We are seeking eligible candidates trained in demography or a related field of study to work on research projects between June and September 2024. We encourage current college or university students, postdoctoral researchers, or faculty members to apply. Also, experts, researchers, or consultants outside educational institutions are welcome to apply.

The research projects for the summer have been outlined in the accompanying packet. Each project has a proposed research plan and deliverables that are expected to be completed by the end of September 2024.

We are looking for motivated individuals with a passion for demographic research to join our team. Hired candidates will be expected to work diligently to ensure the timely completion of their projects. If you're interested in applying, please review the project proposals starting on page 6 and contact the sponsor(s) of the project(s) you're interested in to begin the application process.

## About the Population Estimates Program

The United States Census Bureau's Population Estimates Program (PEP) is responsible for producing annual population estimates for the United States, its states, metropolitan and micropolitan statistical areas, counties, cities, and towns, as well as for the Commonwealth of Puerto Rico and its municipios. Demographic components of population change, including births, deaths, and migration, are produced at the national, state, and county levels of geography. Additionally, housing unit estimates are produced for the nation, states, and counties. The program's population estimates are used in federal funding allocations, as survey controls, as denominators for vital rates and per capita time series, and as indicators of recent demographic changes.

Furthermore, the PEP program periodically produces population projections for the nation, which are updated to account for the most recent decennial census and updated information on births, deaths, and migration.

The Census Bureau's Estimates and Projections Area is responsible for executing the PEP operations and is located within the agency's Population Division. Every summer, the area's staff engages in research projects aimed at improving the quality of the population estimates and projections. However, this year, the PEP program's research efforts are being expanded due to the initiation of a budget initiative passed by Congress. As a result, the area is seeking to collaborate with external experts to make progress in the research effort.

# Position Information

The position is an Expected Service temporary appointment under the Schedule A(l) or Schedule A(o) hiring authority. Employees hired under this authority are eligible to work full-time or part-time for a maximum of 130 days. Candidates who qualify at a GS-11 level or higher will be approved to work remotely from their home address. These positions are not eligible for employee benefits, such as health insurance and retirement.

## Eligibility and Pay

To be eligible under the Schedule A(l) or Schedule A(o) authority, the applicant must be a US citizen and found eligible under the Office of Personal Management (OPM) 's qualification standard for the Statistician Series 1530.

### Basic requirements for the Statistician 1530 series include:

1. Degree: that included 15 semester hours in statistics (or in mathematics and statistics, provided at least 6 semester hours were in statistics), and 9 additional semester hours in one or more of the following: physical or biological sciences, medicine, education, or engineering; or in the social sciences including demography, history, economics, social welfare, geography, international relations, social or cultural anthropology, health sociology, political science, public administration, psychology, etc. Credit toward meeting statistical course requirements should be given for courses in which 50 percent of the course content appears to be statistical methods, e.g., courses that included studies in research methods in psychology or economics such as tests and measurements or business cycles, or courses in methods of processing mass statistical data such as tabulating methods or electronic data processing.

*or*

2. Combination of education and experience -- courses as shown in A above, plus appropriate experience or additional education. The experience should have included a full range of professional statistical work such as (a) sampling, (b) collecting, computing, and analyzing statistical data, and (c) applying statistical techniques such as measurement of central tendency, dispersion, skewness, sampling error, simple and multiple correlation, analysis of variance, and tests of significance.

The hourly rate for the position will be determined based on the General Schedule (GS) pay scale. The new hire's pay grade will be determined by OPM's qualification standards, which consider their education and experience. The GS pay scale accounts for the cost of living and adjusts wages accordingly, meaning the candidate's hourly rate will depend on the location of their duty station. As a result, hourly rates will vary depending on the region. The table below displays the hourly rate

range for the Washington, DC, pay region based on grade level, as well as each grade level's minimum education and experience requirements. To find hourly rates by locality, visit

<<https://www.opm.gov/policy-data-oversight/pay-leave/salaries-wages/2024/general-schedule>>

### Hourly Pay Rates by Education and Experience Requirements

Grade	Hourly Rate Range for DC Pay Region	Minimum Education and Experience
<b>Students or Non-Academic Experts, Consultants, and Researchers</b>		
GS-5	\$21.63 – \$28.12	Bachelor's degree
GS-7	\$26.80 – \$34.84	Graduate student leading to a master's degree or doctoral degree
GS-9	\$32.78 – \$42.61	Master's or equivalent graduate degree
GS-11	\$39.66 – \$51.55	Ph.D. or equivalent doctoral degree
GS-12	\$47.53 – \$61.79	Ph.D. or equivalent doctoral degree with some experience
GS-13	\$56.52 – \$73.48	Ph.D. or equivalent doctoral degree with substantial experience
<b>Academics Professionals on Faculty at a College or University</b>		
GS-14	\$66.79 – \$86.83	Ph.D. or equivalent doctoral degree



## Application Process

### To apply, take the following steps:

1. Review the research proposals packet starting on page 6 and identify the project you want to work on either independently or with a team.
2. Contact the project sponsor via email to express interest in the project. Attach resumes or CVs and unofficial transcripts for all applicants. See the contact information for the project sponsors below.
3. The project sponsor will then meet with you or the team lead to discuss involvement in the proposed project and the next steps.

### Project Sponsor Contact Information

Project Sponsor	Contact Information
<b>Population Estimates Branch (PEB)</b>	<i>Lauren Bowers, Chief</i> <b>Email:</b> lauren.bowers@census.gov <b>Phone:</b> 301.763.1135
<b>Population Evaluation, Analysis &amp; Projections Branch (PEAP)</b>	<i>Sandra Johnson, Chief</i> <b>Email:</b> sandra.leigh.johnson@census.gov <b>Phone:</b> 301.763.4217
<b>International Migration Branch (IMB)</b>	<i>Mark Gross, Chief</i> <b>Email:</b> mark.c.gross@census.gov <b>Phone:</b> 301.763.7785
<b>Local Government Estimates &amp; Migration Processing Branch (LGEMP)</b>	<i>Amel Toukabri, Chief</i> <b>Email:</b> amel.toukabri@census.gov <b>Phone:</b> 301.763.2624

# Research Project Proposals

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# Timelier Data Sources for the College Fix

*Sponsored by the Population Estimates Branch*

## Background

The Population Estimates Program (PEP) produces annual county population estimates by age, sex, race, and Hispanic origin. The current methodology includes an adjustment called the "College Fix," which applies a fixed age distribution for counties with many college-aged students. This adjustment prevents this population from erroneously aging forward within the cohort-component methodology. Instead, the college fix allows college-aged students living in off-campus housing to be replaced each year by newly incoming students, producing a more demographically reasonable age structure for this population. The adjustment is particularly needed because the sources used to directly capture domestic migration, namely tax data from the Internal Revenue Service, have proven less effective for capturing the migration of college-aged cohorts in and out of college counties.

Since its implementation, research to improve the College Fix primarily focused on county selection. The original method considered all counties with large college-age populations, but this proved ineffective for counties with large household populations. To solve this issue, PEP developed a probabilistic model to select counties where the College Fix would likely be effective.

## Proposed Research

PEP is looking for a researcher to evaluate the feasibility of using more current data sources for the College Fix - specifically, timelier data sources for the fixed age distribution, which currently uses 2000 Census data, and the selection model, which uses 2009-2013 5-year American Community Survey (ACS) data.

## Deliverables for Proposed Research

A report that includes results and recommendations for improvement for the following activities:

1. Research the feasibility of using timelier administrative records for fixed age distributions.
2. Assess the performance of the College Fix selection model using current ACS data.

## Proposed Work Plan

Below is a tentative work plan for the proposed project:

Month	Task
June	<ul style="list-style-type: none"><li>• Assess the performance of the selection model using the current ACS 5-year microdata</li><li>• Learn about the Census Bureau's administrative record data sources</li></ul>
July & August	<ul style="list-style-type: none"><li>• Complete performance assessment of the selection model</li><li>• Evaluate the feasibility of using administrative records for fixed-age distributions</li></ul>
September	<ul style="list-style-type: none"><li>• Complete research and produce the report by end of September 2024</li></ul>

# Measuring Movement Between Households and Group Quarters

*Sponsored by the Population Estimates Branch*

## Background

The current methods used to produce population estimates for states and counties do not have a mechanism to estimate the number of people moving between households and group quarters (GQ). To account for this movement, the method relies on raking – a means to control population totals and characteristics to those of a higher-level geography. This method introduces the risk of producing unrealistic demographic distributions due to the random nature of spreading data across different categories and geographies. PEP has found evidence that for some counties, age distributions are distorted by the rake for age groups more prone to moving in and out of GQs, such as young adult populations that move in and out of college dormitories.

To address this quality issue, the Population Estimates Program developed an age-specific model to estimate movement between the household and GQ population universes. We anticipate more reasonable age distributions for all counties using a method that accounts for age. We are currently limited by the fact that we know of no data that permits direct measurement of movement between households and GQs. If they were of sufficient quality, such data would enable us to produce more accurate estimates than we can obtain using the current raking method or a modeling approach.

## Proposed Research

PEP is looking for a researcher to help us locate data sources that capture movement between households and GQs and assess whether these data are suitable for quality testing. Such data sources could include administrative records that indicate if a person's living quarter is a household or GQ or tabulations of populations entering and leaving specific group quarter types, such as correctional facilities. This research will require some creativity, given that, to our knowledge, these data are not readily available.

## Deliverables for Proposed Research

1. Acquire data source(s) that capture movement between households and GQs
2. A report that summarizes the suitability of the acquired data sources for testing purposes

## Proposed Work Plan

Below is a tentative work plan for the proposed project:

Month	Task
June & July	<ul style="list-style-type: none"><li>• Learn about methods and research related to GQ and HH movement</li><li>• Locate and acquire data sources</li></ul>
August & September	<ul style="list-style-type: none"><li>• Analyze whether acquired data sources are suitable for testing</li><li>• Produce report by the end of September 2024</li></ul>



# Modern Demographic Methods for PEP's Data Quality Challenges

*Sponsored by the Population Estimates Branch*

## Background

Since its inception, the Population Estimates Program (PEP) has used formal demographic methods to estimate populations. The program utilizes mathematical models such as the cohort-component model to estimate national, state, and county populations and life tables to derive death rates and estimate emigration for the foreign-born population. PEP has an advantage in its ability to use high-quality federal administrative records such as IRS tax returns and vital statistics to produce the components of change (e.g., births, deaths, domestic migration) needed for the cohort component model. These robust data sources ensure that the mathematical models work as designed, eliminating the need for major adjustments due to missing or low-quality data.

However, despite the success of these methods, data quality challenges persist, particularly for subnational estimates. In response to an initiative approved by Congress to improve the quality of population estimates, PEP is exploring more modern demographic methods that may address the various data quality concerns identified by PEP and its stakeholders.

## Proposed Research

PEP is seeking a researcher to evaluate the current literature on demographic methods. The objective is to identify new methods to address PEP's data quality concerns. For instance, the researcher may explore probabilistic approaches, such as small area modeling or geospatial demography, or alternative approaches for employing population controls.

## Deliverables for Proposed Research

A report outlining new demographic methods that could address PEP's data quality challenges. Each identified method will be described in detail, along with an overview of its benefits and limitations. The report will close by summarizing the findings and providing general recommendations for implementing new methods to improve the quality of population estimates.

## Proposed Work Plan

Below is a tentative work plan for the proposed project:

Month	Task
June	<ul style="list-style-type: none"><li>Learn about the PEP's data quality challenges.</li></ul>
July & August	<ul style="list-style-type: none"><li>Review the literature on new demographic methods for estimating populations.</li></ul>
September	<ul style="list-style-type: none"><li>Complete research and produce the report by the end of September 2024</li></ul>

## Estimates Evaluation

*Sponsored by the Population Evaluation, Analysis, and Projections Branch*

### Background

Each decade, the Population Estimates Program assesses the accuracy of the estimates based on comparisons between the final series of estimates for the decade and the latest decennial census. Differences between the estimates and Census counts are typically interpreted as error in the estimates; however, there are several possible sources of error for the differences: errors in the previous census, estimation error in the components of demographic change, and error in the current census. Results from Estimates Evaluation are used to inform research and methodological improvements over the decade.

### Proposed Research

We are seeking assistance with our evaluation efforts and are looking for individuals to conduct comparisons between the Vintage 2020 estimates and the 2020 Census. The goal for this project is to describe differences between the two and to identify the most likely sources of these differences. Additional analyses could be done on earlier censuses and vintages of estimates to assess the stability of findings and to track patterns in the population over time.

### Deliverables for Proposed Research

The incumbent will be expected to prepare a summary report providing recommendations on areas of research for the population estimates program based on the results of their estimates evaluation. The summary report will detail comparisons made, differences between the estimates and the census, and the potential sources of these differences.

### Proposed Work Plan

Below is a tentative work plan for the proposed project:

Month	Task
June	<ul style="list-style-type: none"><li>Collaborate with Census staff to identify specific evaluations of interest</li></ul>
July & August	<ul style="list-style-type: none"><li>Conduct evaluations</li></ul>
September	<ul style="list-style-type: none"><li>Prepare a report summarizing findings and recommendations</li></ul>

# Assigning Race and Hispanic Origin to Projected Births

*Sponsored by the Population Evaluation, Analysis, and Projections Branch*

## Background

The US Census Bureau periodically produces long-term projections of the nation's population by demographic characteristics, including age, sex, race, Hispanic origin, and nativity. The projections are produced using the cohort-component model, which combines assumptions about trends in births, deaths, and international migration over time to project the future population. To produce population projections by demographic characteristics, the components of change must also include these demographic characteristics.

Our current method for projecting births applies age-specific fertility rates to the projected female population. Using this approach, we then make assumptions about which race and Hispanic origin categories of mothers and fathers are likely to partner and how different combinations of parents would classify the race and Hispanic origin of their child. These assumptions, which allow us to assign race and Hispanic origin to each projected birth, are based on decennial census data. They reflect the racial and ethnic composition at one point in time but are used to assign characteristics to births for the full duration of the projections.

## Proposed Research

We are seeking someone to help us design a new method for assigning race and Hispanic origin to births. Ideally, our updated approach will better reflect the increasing diversity of the population over time. Revisions to the method should be transparent and easily understood by data users, account for the complexities associated with race and Hispanic origin, and adhere to the standards for reporting race and Hispanic origin issued by the Office of Management and Budget.

## Deliverables for Proposed Research

The incumbent will be expected to prepare a summary report providing recommendations on a new approach with details on different methods and data sources considered, along with the pros and cons of each. The recommended approach should include sufficient detail to incorporate the new method into our production process.

## Proposed Work Plan

Below is a tentative work plan for the proposed project:

Month	Task
June	<ul style="list-style-type: none"><li>Knowledge gathering, including gaining familiarity with the current approach and understanding of its limitations</li></ul>
July & August	<ul style="list-style-type: none"><li>Research on different data sources and methods</li></ul>
September	<ul style="list-style-type: none"><li>Draft recommendation, including a description of data and methods and specs that can be used to implement the method in production programs</li></ul>

## State Projections

*Sponsored by the Population Evaluation, Analysis, and Projections Branch*

### Background

The US Census Bureau periodically produces long-term projections of the nation's population by demographic characteristics, including age, sex, race, Hispanic origin, and nativity. Our most recent series was released in 2023.

In the past, the Census Bureau also produced population projections for all 50 states and the District of Columbia. The last set of state projections was released in 2004. Though we have been unable to produce state projections for 20 years, demand for this product continues to grow. The Estimates and Projections Area regularly receives requests from data users for projections at lower levels of geography.

### Proposed Research

We are seeking someone to help us produce a consistent set of population projections for all states in the nation. The projections should be consistent with our national projections and include demographic characteristics, though not necessarily the same level of detail as is included in the national projections.

### Deliverables for Proposed Research

The incumbent will be expected to collaborate with Census Bureau staff to produce a set of state population projections. This will include evaluating input data, developing a methodology, producing projections, and evaluating the results for demographic reasonableness.

### Proposed Work Plan

Below is a tentative work plan for the proposed project:

Month	Task
June	<ul style="list-style-type: none"><li>• Solidify requirements for the projections, including characteristics detail, projection horizon, and methodology</li></ul>
July to September	<ul style="list-style-type: none"><li>• Develop projections</li></ul>

# Emigration Methodology Research

*Sponsored by the International Migration Branch*

## Background

The International Migration Branch (IMB) produces estimates of net international migration (NIM) on an annual basis. One of the main components for estimating NIM is emigration. Our current methodology relies primarily on the American Community Survey (ACS) and the residual method to calculate estimate emigration. Recent declines in survey response rates and other factors have an impact on the viability of our existing approach.

## Proposed Research

IMB is looking for someone to research recent developments in estimating emigration and how these approaches might be integrated into our methodology.

## Deliverables for Proposed Research

A report that includes results and recommendations from this investigation, including analysis of various approaches and their potential for inclusion in NIM methodology and estimates.

## Proposed Work Plan

Below is a tentative work plan for the proposed project:

Month	Task
June	<ul style="list-style-type: none"><li>• Learn about NIM methodology, emigration</li><li>• Identify and evaluate developments in emigration research</li></ul>
July	<ul style="list-style-type: none"><li>• Complete assessment of approaches</li></ul>
August & September	<ul style="list-style-type: none"><li>• Write up an analysis of approaches and recommendations for how to include them in NIM methodology.</li></ul>



# Adaptability in Net International Migration Methodology

*Sponsored by the International Migration Branch*

## Background

The International Migration Branch (IMB) produces estimates of net international migration (NIM) on an annual basis. Our current methodology relies primarily on American Community Survey (ACS) data on the foreign-born population. The ACS data available to IMB are lagged by one year. As a result, our current methodology is not responsive to shorter-term fluctuations in migration flows. However, during the COVID-19 Pandemic, we were able to successfully implement adjustments to our NIM estimates to account for the dramatic decrease in migration flows.

## Proposed Research

IMB is looking for a researcher to contribute to our ongoing research around making NIM methodology more adaptable to shorter-term fluctuations in migration flows. This would involve evaluating additional data sources and administrative records that could be employed to make adjustments to our estimates. Further, we need to develop a framework for how and when to implement adjustments.

## Deliverables for Proposed Research

A simulation of an updated methodological approach for the V2023 estimates. Additionally, a report that includes results and recommendations from the investigation of additional data sources and methodological approaches, a proposal for how additional data sources might be employed, and proposals for how and when to implement adjustments using these data sources and approaches.

## Proposed Work Plan

Below is a tentative work plan for the proposed project:

Month	Task
June	<ul style="list-style-type: none"><li>• Learn about NIM methodology, benchmarking, and COVID adjustments</li><li>• Evaluate outside data sources</li></ul>
July	<ul style="list-style-type: none"><li>• Complete assessment of outside data sources</li></ul>
August & September	<ul style="list-style-type: none"><li>• Create proposals for adjustment implementation</li><li>• Simulate new methodological approach</li></ul>

# Inclusion of Temporary Migrant Shelters in the NIM Component

*Sponsored by the International Migration Branch*

## Background

The International Migration Branch (IMB) produces estimates of net international migration (NIM) on an annual basis. Our current methodology relies primarily on American Community Survey (ACS) data on the foreign-born population living in households and group quarters (GQs). Recently, there has been a substantial increase in the number of recent international migrants who are housed in temporary emergency shelters. For example, school gymnasiums and hotels in some cities have been converted into temporary emergency shelters. The Census Bureau often does not consider these shelters to be GQs facilities because of their temporary status, and as a result, they are not included in the ACS sampling frame. Consequently, NIM's current methodology may not be adequately capturing this population.

## Proposed Research

IMB is looking for a researcher to contribute to our understanding of these living quarters and the populations living there. This would involve information gathering and quantitative analysis using available data sources on these types of living quarters (including things like location, tenure/permanency, capacity, inclusion criteria, etc.), the population living there (including things like population size, social/demographic characteristics, length of stay, etc.), and how this information might be incorporated into the NIM methodology. There is also potential for qualitative research to better understand the populations in these living quarters and their trajectories.

## Deliverables for Proposed Research

A report that includes results from the abovementioned analysis of temporary emergency shelters for migrants and recommendations on how to leverage available information or data sources for inclusion in NIM methodology and estimates.

## Proposed Work Plan

Below is a tentative work plan for the proposed project:

Month	Task
June	<ul style="list-style-type: none"><li>• Learn about NIM methodology, benchmarking</li><li>• Information gathering</li><li>• Evaluate available data sources</li></ul>
July	<ul style="list-style-type: none"><li>• Complete assessment</li></ul>
August & September	<ul style="list-style-type: none"><li>• Write up analysis of data sources and results; recommendations for how to include in NIM methodology</li></ul>

# Estimating County Populations Using the Housing Unit Method

*Sponsored by the Local Government Estimates and Migration Processing Branch*

## Background

The Population Estimates Program (PEP) of the Census Bureau uses the cohort-component model to estimate populations at the national, state, and county levels. To derive the components of change (e.g., births, deaths, domestic and international migration), PEP uses federal administrative records data, such as Internal Revenue Service tax returns, vital statistics, the Social Security Administration's database, and Medicare enrollment. This approach ensures the estimates are accurate and reliable without introducing major adjustments to compensate for the lack of consistency, completeness, and data reliability.

However, despite the effectiveness of the cohort-component method, there is interest in revisiting the research to assess the strength of the Housing Unit Method (HUM) for estimating county-level populations as a regular part of PEP's commitment to maintaining its high-quality standards. This research was previously conducted by the Housing Unit-Based Estimates Research Team (HUBERT) in 2007 to 2008, and PEP has relied heavily on the findings to make decisions about data and methods used to produce annual population estimates.

## Proposed Research

PEP wants to assess and update the HUBERT research to redetermine the validity of using the cohort-component method in lieu of the HUM for estimating populations at the county level.

## Deliverables for Proposed Research

A report that includes results from the analysis mentioned above. This report will contain an examination of the findings from the original HUBERT research to (1) identify the counties that were more accurately estimated using the HUM than the cohort-component approach; (2) identify the characteristics of the counties that the HUM better estimates; and (3) possibly use that information to classify all counties according to the method that is more accurate for each county type.

## Proposed Work Plan

Below is a tentative work plan for the proposed project:

Month	Task
June & July	<ul style="list-style-type: none"><li>Identify the counties that were more accurately estimated using the HUM than the cohort-component approach</li><li>Identify the characteristics of the counties that the HUM better estimates</li></ul>
August & September	<ul style="list-style-type: none"><li>Use the above information to classify all counties according to the method that is more accurate for each county type for possible application in estimates production and conclude the analysis</li><li>Write up the report</li></ul>

# Using the Imagery Enterprise Databases to Assist with HU Data Validation

*Sponsored by the Local Government Estimates and Migration Processing Branch*

## Background

The Census Bureau's Population Estimates Program (PEP) produces annual estimates of the number of housing units (HU) in the nation by various levels of geography. In this model, we add to the 2020 Census count of HU with estimated new residential construction and new mobile homes. From this sum, we subtract the estimated HUs lost. HU loss is one of the most difficult inputs to estimate. Presently, it is calculated by applying an annual loss rate to the housing stock and then adding an estimate of units lost due to natural disasters. The HU loss rates are derived from the 2009 and 2011 American Housing Survey at the regional level and vary by type and age of structure. PEP has benefited from the use of a variety of administrative data, such as records on destroyed HUs due to some type of natural disaster from the Federal Emergency Management Agency (FEMA) via requests for disaster assistance and local data provided by members of the Federal-State Cooperative for Population Estimates partnership program.

Nonetheless, our loss subcomponents are underestimated as not all individuals affected by a natural disaster apply for assistance, and the loss rates applied to the HU stock lack subregional variability. Despite PEP's access to the above administrative records sources, data quality challenges persist, particularly for subcounty HU loss estimates. Additionally, verifying the accuracy of existing permitted units or confirming unusually high-growth areas are among our challenges. Consequently, PEP is exploring alternative data sources and methods that may improve data quality.

## Proposed Research

PEP is looking into collaborating with experts to acquire customized tool(s) that support the use of imagery enterprise databases and training staff to use the tool that facilitates PEP's data review and validation processes.

## Deliverables for Proposed Research

Create a prototype of the tool using imagery enterprise databases.

## Proposed Work Plan

Below is a tentative work plan for the proposed project:

Month	Task
June - September	Build tool(s) to capture before and after high-resolution aerial imagery that could detect substantial housing construction, identify the number of HUs destroyed for major disaster areas that FEMA does not capture, and allow PEP staff to verify the accuracy of the local data received from state partners and other data sources. Train PEP staff to use the tool(s) built.