

Wage & Employment Outcomes Data

A Primer for Colorado Education and Workforce Partners



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Purpose and Background

Purpose of this resource

Learners invest significant time and resources in education and training, and programs increasingly have a responsibility to provide transparent evidence about career opportunities and potential returns on that investment.

But focusing on wage and employment outcomes represents a shift for much of the educational data community, as job placement and wages have not always been seen as within scope for program outcomes - outcomes have historically focused on program access and completion. Not only are institutional goals and accountability systems evolving, but employment outcomes are increasingly in discussion to guide funding eligibility, determine what programs to adopt, and to better understand what leads to economic mobility for learners. With increased focus on what happens to the individuals after they complete a program, cross-system data becomes increasingly important. Wage and employment outcomes are one important way evidence-informed decisions can be made on investments, and programs can benefit from having the strongest possible evidence of placing individuals in family living wage jobs.

Underlying wage and employment outcomes data systems, however, are often opaque to many of the key end users who rely on them, including intermediaries, pathway partnerships, community-based organizations, colleges and training providers, and funders. As Colorado shifts towards evidence-based decision making that includes quantifiable wage and employment outcomes in addition to programmatic access and success data, there's a deep need for our broader community to better understand the underlying data, processes, state systems, analytical sense-making, and usage of these outcomes data. Partners of all technical abilities have a reasonable need to better understand how data outcomes translate into credible program learning and storytelling, and how to make more informed, efficient decisions about scaling strategies that work.

This primer represents an effort to bring a basic translation of the data and processes that make wage and employment outcomes for education and training programs possible in Colorado. The history, progress, state systems, analytical methodologies, and best practice guidance surrounding the data are all important increasingly important as more and more programs focus on building wage and employment evidence.

Background

Wage and employment outcomes for education and training programs have received significant public attention recently given the data implications surrounding major shifts in federal policy (including [HR1](#) and [Workforce Pell](#)), but states across the country have long been building the groundwork for connecting their data systems to support outcomes and evidence. [Data Quality Campaign](#) has supported state efforts and connecting leaders across the country as projects come to scale for years and have valuable national perspective.

Here in Colorado, there is a history of policy and systems that have made progress towards connecting education data to wage and employment outcomes to measure the impact of our programs on our learners. A lineage of reports including [CWDC's Talent Pipeline Report](#) and [CDHE's ROI Report](#) have long made the connection between programs and outcomes, while legislative milestones have made incremental progress over the last two decades towards more connected data. The Colorado Department of Higher Education (CDHE) has published two excellent comprehensive reports that detail the long history of state agency progress in [Colorado's Longitudinal Data Landscape Report](#) and [Charting Colorado's Longitudinal Data Future](#).

In recent years, the [Colorado Evaluation & Action Lab at DU](#) has been a trusted source of cross-agency data connection, analysis, and research, with [The Linked Information Network of Colorado \(LINC\)](#) serving as the primary service provider for connecting the data for all research purposes. LINC securely connects and de-identifies data across systems, resulting in research-ready data without personal identifiers. The Lab played a primary leadership role in this effort due to its strong expertise in data sharing best practices and a shared value of prioritizing relationships, making connections, and building sustainable processes in state government.

Demonstration projects have also provided proof of concept and generated meaningful outcome data for programs. [CEEMI](#), in partnership with the Colorado Evaluation & Action Lab (Colorado Lab), launched the [Colorado Wage Outcomes Results Coalition \(CO WORC\)](#). WORC has created dashboards that demonstrate earnings trajectories and provide insight into whether programs meet defined goals of economic recovery, stability, and/or mobility based on their target population and program model.

But a major milestone was achieved in 2024 with the passage of [HB24-1364](#) that catalyzed the implementation of [Colorado Data Connections](#) (or COdata, for short). COdata is the statewide longitudinal data system (SLDS) designed to securely bring together data from residents' educational and professional experiences and serve as the source of understandable information that supports decisionmakers in their efforts to improve education and workforce outcomes. Guided by a formal charter and governance board of state agency leaders, COdata ensures data is protected and used responsibly through strict privacy standards and the legal frameworks required for state agencies to collaborate securely. By defining clear roles for leaders, the charter ensures COdata stays focused on its primary goal: creating better education and career outcomes for all Coloradans.

Over the last few decades, the evolution of Colorado's reports, policy, legislation, structures, and tools that leverage wage and employment outcomes for education programs has taken different approaches, but in many ways the underlying data has largely remained the same. Let's take a closer look.

Understanding the Data

There are some fundamental aspects of education-to-workforce data that are helpful to understand when considering the feasibility and usage of wage and employment outcomes for education and training programming.

Connections

To generate a clear understanding of program outcomes, 3 basic things need to be known: who are the individuals, what was their program experience, and what are their employment outcomes. The challenge, however, has been that the needed data has been held by multiple state agencies that don't have common unique identifiers or system IDs for individuals that allow records to be matched across those silos. In short, The Colorado Department of Education (CDE) stewards all public K12 educational data, The Colorado Department of Higher Education (CDHE) administers data related to those students who participate in postsecondary programming in Colorado, and The Colorado Department of Labor & Employment (CDLE) governs all the necessary wage and employment data via Unemployment Insurance filings. These 3 state agency systems each have a piece of the larger puzzle but, in most cases don't have a unique ID to match to their partner agencies. To connect the data, identity resolution is an inherent focus for LINC, WORC, COdata, and all historical iterations of using data across state systems. Identity resolution, though challenging, can only be approached when the governance structures, legal frameworks, and data sharing agreements have been established and executed amongst needed partners, often a more formidable challenge than the technical data matching process - a major success of COdata to date is ensuring this fundamental work lays the foundation for the technical work to proceed.

Data System Parameters

It's also important to consider what the parameters are of the relevant state data systems. CDE will only have data for Colorado's public school students and will be limited to what is collected via submissions at the state level. CDHE will naturally only have data for those students that, at some point, have taken postsecondary credit in Colorado. CDLE might have the most significant parameters when considering learner outcomes, though, as Unemployment Insurance is the dataset used for wage and employment but is only collected for employees of Colorado employers - federal employees, entrepreneurs, Coloradans who move out of state, and anyone else who does not pay Unemployment Insurance in Colorado will not be represented in CDLE's Unemployment Insurance dataset. An individual that cannot be found in CDLE's UI data, therefore, is not necessarily unemployed; rather, the null has another significance in that the individual's employment status is truly unknown. System constraints are critical to consider when using data to generate meaningful outcomes.

Timing and Methodologies

In addition to identity resolution and system parameters, there are also important process and methodological considerations in wage and employment outcome data. First, timing of measurement is important. Sufficient time must be allowed for individuals to participate in and/or complete a program, which could be anything from a few weeks for short term certifications to many years for college degree completion. Additionally, CDLE's Unemployment Insurance data has a submission and processing lag of about 6 months, meaning that any wage and employment outcomes data would need that amount of time to be available once an individual starts their job.

Once sufficient consideration has been given to timing, analytical methodology must also be determined, starting with the right questions: Are participants experiencing higher employment and improved wages compared to their peers? Are participants accessing increased earnings over time? Are participants employed in their field of study/training? Ensuring the right questions are asked from the beginning will help align the proper methodology for answering those questions and ensuring that the findings are not misleading or, worse, harmful. Sound interpretation of the findings is also critical, leveraging the expertise and perspective of research and data professionals. For example, the *Ashenfelter Dip* is an important concept in using wage data. The "Dip" refers to a temporary drop in earnings that often occurs just before someone enters a job-training or workforce development program. A typical pattern looks that would indicate economic mobility would show normal earnings → earnings decline → training/upskilling → earnings recovery → higher earnings. If too short of a timeline is looked at for participants, the dip and earnings recovery periods could lead to erroneous conclusions. This is just one of many nuances to the data that impact meaningful and responsible use of wage and employment data.

In summary, making meaning of wage and employment outcomes data requires a unique combination of state education and employment data knowledge, careful planning and evaluation strategy, and methodological expertise. For all these reasons, reaching out to the leaders and experts at COdata and The Colorado Evaluation & Action Lab at DU is a good first step when considering a wage and employment outcomes data project. In the following section, some basics for getting started thinking about data collection and evaluation are provided.

Data Use Considerations

Below are some basic best practices to consider when thinking through how wage and employment outcomes might support your program impact storytelling.

Place outcomes data within a broader evaluation plan

Employment and earnings measures are one part of a comprehensive evaluation and need to be structured into a more comprehensive data collection and storytelling context. A strong evaluation plan may include:

- A theory of change describing how the program is expected to affect people and communities
- A logic model connecting context, activities, outputs, and short-, medium-, and long-term outcomes
- A research agenda that identifies the questions the evaluation will answer
- A feasibility study that tests whether the available data and methods can answer those questions
- Qualitative data that includes participant and community perspectives
- An independent evaluation partner when rigor, credibility, or specialized expertise requires one

Set a goal to engage program partners throughout the development and implementation of an evaluation plan. Data collection and evaluation are opportunities to build trust, create shared understanding, and build commitment to a long-term vision.

Create a clear data collection plan

Plan early for the information needed to match program records with wage and employment data:

- Whenever possible, use data that partners already collect through core systems to reduce burden and improve consistency
- Define required and optional data elements
- Confirm which data each partner already has and what may require new collection
- Document definitions, formats, responsibilities, quality checks, and submission schedules
- Review relevant state or program templates when developing the collection process, like the template developed for the [Opportunity Now Grants](#), which is a great structure to start with

Assign data stewardship

Identify a qualified person or team to oversee data collection, cleaning, documentation, transfer, matching, and working with evaluation and state agency partners, if need be. This role may be filled by internal staff, a partner organization, or a contractor. Begin relationship-building early - trusted collaboration is essential to a successful data project.

Plan ahead

As mentioned above, Colorado wage records are based on Unemployment Insurance payroll filings and are not immediately available - build reporting delays into the evaluation timeline. As a practical planning assumption, wait at least two quarters—approximately six months—before requesting outcomes data. Most payroll information is received and processed within several months after a quarter ends, while some records arrive later. Even after a six-month wait, a participant may be employed but absent from the available records because of late or incorrect employer reporting. Administrative wage records also do not capture every form of work. They may exclude people working out of state, some family businesses, self-employment, independent contracting, gig work, and other earnings generally reported on a 1099 rather than a W-2. Treat “not found” as “not observed in the available records,” not as proof that a participant is unemployed.

Build relationships

Successful data projects require early engagement with the people who collect, manage, interpret, authorize, and use the information. Depending on the setting, this may include program staff, institutional research, information technology, senior leadership, legal counsel, faculty, learners, families, and community organizations. For many partners, using wage and employment outcomes represents a significant shift in practice. Explain the purpose, benefits, limitations, and safeguards clearly and consistently. Expect this to be an ongoing conversation rather than a one-time request.

Ensure legal, privacy, and data sharing requirements are met

Note: This guide provides general planning information and is not legal advice. Organizations should consult qualified legal, privacy, and security professionals regarding their specific circumstances. Legal compliance and data security are priority considerations, be sure to:

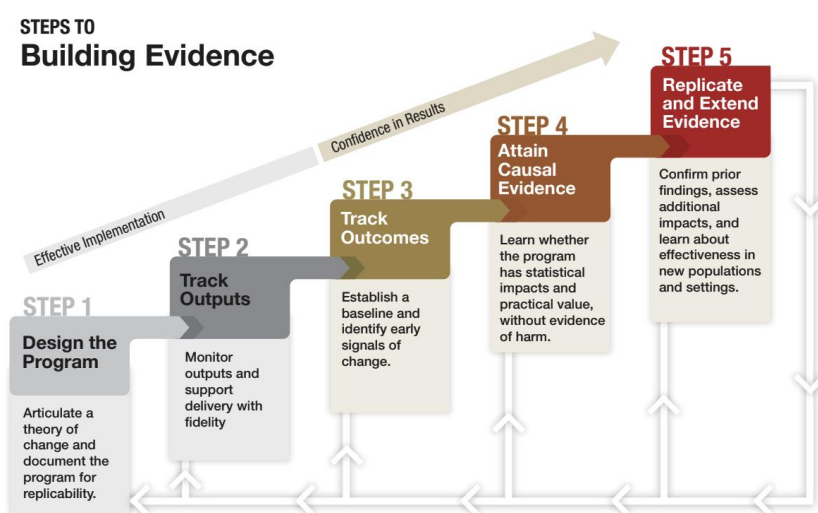
- Engage institutional research, privacy, security, and legal teams as early as possible
- Establish data-sharing agreements that define purpose, permitted uses, roles, retention, security, and disposal
- Determine whether Institutional Review Board (IRB) review or other approvals apply
- Use secure, FERPA-compliant collection, transfer, and hosting practices when education records are involved
- Collect and share only the information necessary for the approved purpose
- Report results at an aggregate level that protects individuals and avoids re-identification

Data use reminder

Data should be used to ask and answer better questions. The goal of data, like any scientific inquiry, is to determine truths, not validate opinions. Strong decisions combine credible evidence with context, community voice, equity considerations, and professional expertise.

Building Evidence

Colorado's Steps to Building Evidence informs effective implementation and grows confidence in results that a given workforce development program is driving economic mobility and meaningful career opportunities for Colorado learners. The steps to building evidence are iterative, and the spirit of evidence building is to build the learning over time.



Expanding Colorado's capacity to have consistent longitudinal data that illustrates the change in employment outcomes associated with each program is the foundation for an evidence-informed workforce development ecosystem. Employment outcomes can be used to inform strengthening implementation and prioritizing causal studies that can build confidence in the results and establish a evidence base of promising and proven practices.

Translating Evidence for Action

Interpret the Results by Considering:



Establishing an Evidence Base



Opportunities to Engage

Follow COdata

Visit [Colorado Data Connections](#) to follow statewide longitudinal data system updates, learn about governance activities, and explore available public resources.

Join the Better Data for Better Decisions Coalition

The Better Data for Better Decisions Coalition brings together education and workforce organizations across Colorado to support a statewide longitudinal data system that enables informed decision-making. The coalition works to advance a relevant, accurate, and user-centered system aligned with the goals and opportunities of K–12, postsecondary education, and the workforce. Contact Stefan Richarz at stefan@attainmentnetwork.org to get involved!

Discover the PSEO Coalition

The [PSEO Coalition](#) generates, analyzes, and shares employment data that demonstrates the value of higher education. This data is publicly available through a dashboard on the U.S. Census Bureau's website.

Learn more with IHEP

[IHEP](#) promotes smart use of data by identifying trends in higher education data collection and reporting at the federal, state, and institutional levels, supporting a culture of data-use on campuses through our research, trainings, and communities of practices, and calling for the modernization of our postsecondary data.

Check out the WORC Dashboards

CEEMI, in partnership with the Colorado Evaluation & Action Lab (Colorado Lab), connects earnings data to help answer questions for training providers that are not administered by state system partners. The [WORC Dashboards](#) demonstrate earnings trajectories and give insight into what happens to program participants after completion. This demonstration project builds stronger evidence for programs as a component of a more rigorous evaluation.