

Reimagining the Workforce and Labor Market Information System for the 21st Century

Workforce Information Advisory Council Recommendations

November 2024

Executive Summary

The 14 Workforce Information Advisory Council (WIAC) members are national leaders who represent the public sector producers of workforce and labor market information (WLMI) and users from the public and private sectors; state, local, and tribal governments; and businesses and organized labor. Each WIAC member observes that, as a system, WLMI does not currently rise to the challenge of providing subnational information that can inform their constituencies' decision-making in a rapidly changing labor market. Additionally, experts from the federal statistical system, the National Academy of Sciences, the American Statistical Association, Congress, and scholars alike have called for a dramatic reimagining of WLMI that both meets the challenges and harnesses the tools available to us in the 21st Century.

In recent decades, the nation has endured one of the deepest recessions in its history, the COVID-19 pandemic, rapid technological change, the automation of jobs previously conducted by human labor, and economic globalization. Each of these ushered in large economic shifts that actors at all levels – individual career seekers, educational institutions, economic development organizations, state, local, and tribal governments – were left with no alternative but to navigate as best as they could without timely, localized, and actionable WLMI, sometimes with deleterious effects to whole swaths of the American population and economy. At the same time, these past decades have brought with them the greatest increase in the volume of data in human history, tremendous advancement in computing technology, and new statistical and data science methodologies that can be brought to bear to address this lack.

This document contains a series of bold recommendations that promise to transform the WLMI system by addressing the challenges it currently confronts and taking advantage of the unique opportunities made possible through recent technological and methodological advancements. They are founded on the premise that the U.S. Secretary of Labor (Secretary) must play a leadership role in initiating this much-needed transformation. While it is possible to consider these recommendations as independent of one another, these recommendations, taken together, provide a concrete and practical roadmap to build the foundation for a reimagined WLMI system that is:

- **Timely:** Providing up-to-date information to inform real-time decision-making
- **Localized:** Offering granular data at subnational levels to address regional variations

- Actionable: Delivering innovative insights that can be readily applied by the data's consumers

The WIAC calls upon the Secretary to:

1. Strengthen and ensure the long-term sustainability of the National Labor Exchange and its Research Hub to provide localized and granular information.
2. Incentivize and elevate innovative processes, practices, and products to provide constantly timely and actionable information.
3. Test the use of new data sources to produce localized information.
4. Test the potential to measure the impact of local labor market shocks by funding states in partnership with university partners or private sector vendors to produce localized information.
5. Improve the accessibility of federal statistics for advanced analytical use to provide actionable insights.

By embracing these recommendations and adhering to principles of transparency, responsiveness, granularity, and commitment to ongoing investment and innovation, the Secretary can lead the transformation of the WLMI system that empowers data consumers to navigate the complexities of our modern labor market effectively.

The Challenge

The pace of change in the economy is accelerating, caused by demographic shifts in the labor force, government investments, and rapid technological advancements. Available WLMI tools are unable to help us capture and quantify how these changes affect demand. As a result, labor market analysts are unable to help career seekers, employers, labor unions, government agencies, and education/training providers to make timely, local, and actionable education, career, policy, and strategic program decisions. The WLMI system needs new data sources, methodologies, and tools to inform the public, equip public and private sector decision-makers, and evaluate the effectiveness of workforce and educational investments.

The Opportunity

The WIAC also recognizes that the WLMI system is at a unique moment in time enabling it to meet these challenges in ways that were previously unimaginable. Compute power is many orders of magnitude greater and far less costly than it was merely a decade ago, enabling governments to manage and quickly analyze ever larger amounts of data. Artificial intelligence (AI) technology has advanced to the point where it is now possible and realistic for governments to use methods like machine learning and natural language processing to generate insights and create tools to solve pressing problems. Finally, more data is generated than ever through smart devices, the cloud, and the internet, some of which can serve as the ingredients for generating useful insights about the labor market in close to real-time.

Goal

The WIAC calls for a transformation of the WLMI system into one that leverages existing survey and administrative data in new ways, blends them with other data sources, and applies new methodologies to produce and communicate timely, local, and actionable insights on labor market trends.

Findings

The WIAC members observe critical limitations of the current WLMI system, including:

Current data are not useful for local WLMI purposes

- The current WLMI system, which relies on administrative data and large-scale surveys administered by the federal statistical system, provides an authoritative overview of the national economy. For more populous states, it provides reliable aggregate estimates of labor force participation, employment and unemployment, job openings and turnover, and wages at the state, but not the local level. For smaller geographies, however, and for the millions of important decisions made by current and potential consumers of labor market data, the current system cannot provide adequate insight into local or regional labor market dynamics.

- Local data is essential for equipping decision-makers in the workforce ecosystem. Businesses rely on local data to inform site-selection decisions. Training providers rely on information about local employment growth and skill needs to inform investments in workforce training. WIOA funding is distributed on the basis of differences in local labor market data so high-quality data are essential. To support these systems, it is essential that the national WLMI system produce data that is relevant to these local contexts. Most key WLMI data comes from surveys which have become more expensive and difficult to conduct successfully over recent years.¹ For example, the Current Population Survey's (CPS) response rate reached a high of 92 percent in 2010 and decreased dramatically to 69.6 percent in 2024.² As the cost of survey administration rises and response rates fall, the data available to state, local, and tribal areas becomes increasingly less reliable as a basis for making informed decisions. CPS data is a nearly exclusive source of information about unemployment for individuals, but even for an entire state the volatility of the survey is such that the U.S. Bureau of Labor Statistics (BLS) methodology is to produce 12-month smoothed production estimates. The current BLS recommendation is to publicly release 3-month smoothed analytical estimates of the 12-month smoothed production estimates.
- For use at a more granular level, such as exploring differences in unemployment experience by demographic groups, regional differences in unemployment within a state, reasons for unemployment or non-participation in the labor force, or for determining the skills of the unemployed population as a target for economic development, this survey data is neither timely (relying on a 12-month average), representative (because sample sizes for smaller areas and groups will be lucky to show even one unemployed person), or reliable (because the margin of error is so large as to instill little confidence in the underlying data). In addition, national labor force surveys use methods and concepts developed almost 100 years ago.³ Simply put, current methodologies are inadequate for WLMI users who need more timely, local, and actionable data. In addition, there is very limited data on credential and skill requirements, and what data is available is usually national, not local. This leaves economic developers, employers, and individuals without the tools they need to make informed decisions as they participate in a rapidly changing labor market.

Timeliness and quality of administrative records and products produced with them have not improved

- Lags in the communication of data degrade its utility. While some lag is unavoidable, delays in data availability limit the utility of that data once it is produced. For example, the latest Occupational Employment and Wages Statistics (OEWS) published in April 2024 are

¹ Meyer, B.D., W.K. Mok, and J.X. Sullivan, Household surveys in crisis. *Journal of Economic Perspectives*, 2015. 29(4): p. 199-226.

² Casselman, B., Reliability of U.S. economic data is in jeopardy, study finds. *New York Times*, July 9, 2024.

³ Card, D., Origins of the unemployment rate: the lasting legacy of measurement without theory. *American Economic Review*, 2011. 101(3): p. 552-557.

estimates for May 2023 – the most current data was already nearly one year out-of-date at publication and will be nearly two years old when it is updated in 2025 to reflect 2024 data.

Nontraditional sources of data have not been sufficiently explored and valued

- There are many approaches to capturing information about labor market skill demands, including private sector services that analyze online job postings. While these services demonstrate technical capabilities, the WIAC believes that workforce data systems serving the public must be governed by public sector priorities. A public framework ensures that decisions about data collection, access, and use are driven by workforce development goals, educational planning, and broad economic opportunity - rather than commercial interests. This approach best serves the diverse needs of job seekers, employers, educators, and policymakers while maintaining focus on workforce system objectives.
- Several states use education data linked to workforce data to measure and characterize the supply of skills in the labor market. This is a valuable source of alternative information about the supply of skills that workers possess and such sources should be further explored to create a more robust WLMi system.
- The U.S. Census Bureau has been developing a Post-Secondary Employment Outcomes (PSEO) Explorer dashboard, but the data included in that effort significantly lags other sources. Moreover, the Census Bureau’s differential privacy approach limits the utility of this data for decision-making, especially at the local level. Finally, the PSEO business model does not enable state, local, and tribal governments to work with the underlying data to develop tools that are responsive to the unique needs of their data consumers.

THE EFFECTS OF TIMELY LOCALIZED INFORMATION ABOUT SKILLS IN DEMAND: A THOUGHT EXPERIMENT

TIMELINE	PERSON A	PERSON B
High School Graduation	Relies on outdated, anecdotal advice without regard to technological shifts and regional differences.	Finds information about the regional demand for data analytics, a field they were interested in.
Post-Secondary Studies	Applies to a nearby college and majors in business administration with a minor in international relations.	Applies to a college located in a regional technology hub and majors in data science with a minor in business analysis.
Post-Graduation Employment	After earning a degree in business administration, it is difficult to find meaningful employment in the region. Many entry-level business roles now require specific technical skills that the degree program didn’t provide. The individual starts working as a business analyst earning \$55,000/year while thinking about the next best move.	Graduates and lands a job as a junior data analyst at a tech startup near the university immediately after graduation earning \$80,000/year. The degree program equipped its graduates with the skills that employers in the region were seeking, including coding, statistical analysis, and data visualization.
Three Years Later	Unsatisfied with available opportunities, the individual consults local WLMi and finds demand for cybersecurity and tech support. Completes certifications and lands a position	Completes certifications in machine learning and big data technologies and takes on more complex tasks, earning \$90,000/year.

	as an entry-level security analyst earning \$65,000/year.	
Estimated Lifetime Earnings Assuming a 40-Year Career	\$4.1 million	\$6 million

This parallel view of two high school graduates’ career journeys highlights how initial career choices informed by localized, timely skill demand information can lead to compounding effects over time, both in terms of earnings and career advancement. It also shows that while Person A’s path to a satisfying career took longer and required additional investment, because they consulted WLMI, they were able to transition into a stable career in a field that was projected to grow in their region. Meanwhile, Person B’s early start in an in-demand field guided by localized labor market data allowed them to progress more quickly in terms of seniority as well as income. The large, estimated lifetime earnings differential illustrates the potential positive long-term impacts of informed decision-making on people’s lives.

Recommendations to Build a Foundation for Enhanced and Accessible WLMI Data

The U.S. Secretary of Labor should:

Invest in new and useful sources of data

1. Strengthen the coverage and accuracy of the National Labor Exchange (NLx), so that it can serve as a low- or no-cost foundation for near-real-time WLMI products providing timely, accurate, and local skills-based information.

The **National Labor Exchange (NLx)** is a partnership between the National Association of State Workforce Agencies (NASWA) and Direct Employers to operate an electronic network that connects employers and jobseekers across the U.S. The NLx has the potential to be a key foundational element in providing data that can support a near-real-time, geographically granular, and skills-based WLMI system, which is the primary goal of the NLx Research Hub, and to help data consumers better understand the nature and magnitude of demand as well as map the trajectory of changes in demand over time. As a publicly accessible job board, it can be a central source for online job advertisements that have a common data structure, which can then be used as a public source for essential data about labor market demand in near-real time. Application Programming Interface (API) connections using the data are already available through CareerOneStop. Direct access to NLx data is also made available through the NLx Research Hub. In particular, the WIAC recommends that the Secretary:

- a. Contract with a vendor to undertake a widespread marketing and adoption campaign to encourage full reporting of job listings;
- b. Coordinate with the U.S. Department of Commerce, U.S. Department of Energy, and other federal departments to ensure compliance with the requirement that all jobs made possible through federal funding, such as that which has been provided through the Bipartisan Infrastructure Law, the Inflation Reduction Act, and the CHIPS and Science Act, be listed on their state job boards and sent to NLx. This practice should be adopted as policy and be applied to other grant programs, whether based on existing or new programs;

- c. Include a line item in the U.S. Department of Labor’s budget that directly funds the NLx Research Hub’s maintenance, operations, and the expansion of its capabilities;
- d. Contract with the Research Hub, and either a public or private sector technology partner, to clean, parse, and standardize NLx data. This effort will make NLx data more accessible to natural language processing allowing for identification, extraction, and standardization of detailed work activities and the skills necessary to complete them so that the underlying data can be used to create products to serve state, local, and tribal needs;
- e. Issue a competitive grant opportunity to develop one or more proof-of-concept products using NLx, such as state, local, or tribal labor market information tools that can be used to identify the changing demand for skills as they emerge or decline for informed decision-making by individuals, organizations and firms, and government representatives;
- f. Support the provision of training and related capacity-building resources to help data consumers better leverage this data, and all tools created using the NLx should be open source and made available in a common repository; and
- g. Require that all state and local recipients of federal workforce dollars are sending all of their first-party state job board postings to NLx to increase its completeness and local application and provide a common foundation to build tools that WLMI consumers can use in any state, local, or tribal area.

2. Encourage, incentivize, and enable open, innovative, and actionable information, reports, and dashboards that result from collaborative work among and between the state partners in the Workforce Innovation and Opportunity Act (WIOA) and WLMI communities. A collaborative approach will ensure that advancements made by any individual state, local, or tribal government can be shared by all of them and lift the whole WLMI system.

a. In looking toward a modernized WLMI system, sharing not only finished products but also the processes used to create them empowers labor market analysts to build their own tools and replicate tools developed by others. BLS and the Employment and Training Administration (ETA) can model this practice by developing products that are replicable by outside users, as well as by including details on how to replicate the analyses they create.⁴ Open sharing of products and processes can serve to elevate how all state, local, and tribal areas provide WLMI, and not just the few with the resources to produce them.

This approach is emerging through existing efforts such as the Multi-State Data Collaborative (MSDC), which has empowered states to produce timely, local, and actionable products like the Unemployment to Reemployment Portal, Multi-State Post-Secondary Report, and the local impact of AI research investments. The MSDC has shown that states can have access to the tools and processes that other states have built, lowering the barriers to more effective data analysis. Solutions utilizing consistent, pre-defined

⁴ For an example, see how the FRED Blogs provide instructions on recreating the charts they build, as at <https://fredblog.stlouisfed.org/2024/07/gdp-per-capita-in-the-five-largest-european-economies/>.

structure across the states provide a common framework where common tools and common processes can be developed and shared across states.⁵

b. Further, the Secretary should recognize and encourage the adoption of innovative strategies by state, local, and tribal areas to produce timely, local, and actionable information. Examples of such successful strategies currently include the use of open-source software, the formation of data collaboratives, conducting training in advanced analytical and visualization techniques, and creating peer-to-peer data sharing and data analysis support groups. Vehicles for the Secretary to encourage adoption may include Workforce Data Quality Initiative grants, direct underwriting supporting the Multi-State Data Collaborative, and support for advanced data linkage, visualization, and analytics training.

c. The Secretary should fund a project that will enable and assist state, local, and tribal governments to replicate the machine-learning driven, online career navigation tools such as those implemented by Arkansas, Colorado, Hawaii, New Jersey, Rhode Island, and Virginia. The code and project management tools used to develop this application are available on a free, open-source platform that allows future product developers to replicate or adapt these tools.

3. Develop a national data sharing partnership with the U.S. Department of Transportation and their state counterparts to match and leverage demographic data collected from motor vehicle license applications with state payroll administrative data collected in the Unemployment Insurance (UI) program to enhance administrative data with much-needed demographic information and improve record matching throughout the system.

All states collect demographic data as part of their motor vehicle licensing program. Some states enter state-to-state data sharing agreements to leverage these data. A formal collective collaboration at the national level would assist states to more securely and effectively leverage these important data elements to serve customers in education, business, labor, and other workforce partners to better understand how access and outcomes may differ by age and sex. Those states that also collect race/ethnicity data are also able to measure and understand differences that may exist between sub-populations in their labor market experiences.

This effort could be accomplished using the BLS Wage Records Program as the data matching and leveraging vehicle if the data are shared back with the states. BLS already has the legal and technical infrastructure to support a collaborative like this for about 30 partner states.

Use new sources of data to produce WLMI that is local, timely, and actionable

4. Test the potential to produce new products that report the impact of local labor market shocks on skill demand and career transitions so that the WLMI system can proactively prepare to meet the needs of its constituents in the face of future challenges.

⁵ For example, the wage files used in the Census Bureau's Longitudinal Employer-Household Dynamics program, the Participant Individual Record Layout files used in WIOA programs, Unemployment Insurance Data Validation files used within the Unemployment Insurance program, and the Rehabilitation Services Agency 911 report used in Vocational Rehabilitation programs.

The test should, to the extent possible, be launched with other federal agencies and be structured as a multi-pilot WLMI development program. The test should be designed with clear goals and associated metrics. The evaluation of the results should be open and transparent.

The program should issue a call for proposals and fund up to four test cases representing different areas of focus such as different data sources, data types, scenarios, or end users. Interested private sector data providers could partner with a volunteer state to link their skills data to UI wage records (and possible State Longitudinal Data Systems (SLDS) data) and provide a report. Appendix A includes some suggested parameters for structuring the pilots and specifying their respective minimally viable products.

Projects could be encouraged to build upon the foundational elements recommended above including a more robust and machine-readable version of NLx, access to motor vehicle licensing data, as well as data sharing platforms.

The pilot projects should be evaluated based on clear and understandable metrics that:

- Provide timely, local, and actionable information about changing skill needs at the state level and sub-state regional level;
- Measure and communicate the impact of acquiring a given skill on earnings and successful advancement along career trajectories; and
- Document processes, linkages, and code in a replicable manner and make available as open source.

The evaluation of the products developed should be based on input from and evaluated by a relevant cross-section of the WLMI system's consumers and other interested parties – e.g., economic development organizations, unions, employers, education/training providers, workforce development boards, and career counseling practitioners – based on their most urgent needs and in what form this information should be communicated.

Make all local labor market data accessible

5. Ensure that the data already produced by BLS is made broadly available to the public through a robust, modern API. As new data sources are developed, these should also be made available through the API.

BLS currently has a wide range of data available to the public, accessible through its website to those who know the process of navigating the website. However, the ability for data users in the public to build a more user-friendly interface to BLS data is limited by the existing BLS API, which places significant limits on the ability of users to download data. While the entire OEWS data table is available for manual download, accessing the same data through the existing API would require a single user to request the maximum available data possible for 241 straight days to get all the available data.⁶ Having a robust API allows outside developers

⁶ https://www.bls.gov/developers/api_faqs.htm documents a 500 query-per-day and 50 series-per-query limit on the version 2.0 API. With 6,020,310 unique series IDs for a single year in the OEWS data alone. (<https://download.bls.gov/pub/time.series/oe/oe.series>), this will take 6,020,310 series ÷ 25,000 series per day = 240.81 days.

to build streamlined interfaces for data users, unleashing the creativity of non-federal staff, enabling the development of products like those that have been developed to leverage the U.S. Census Bureau's API.⁷

Conclusion: In light of the current challenges and opportunities, the WIAC urges the Secretary of Labor to champion a reimagined and innovative WLMI system that is timely, actionable, and local. Specifically, the Secretary should invest dedicated internal staff and resources toward the use of new data sources and WLMI products. To the maximum extent possible, the results of these efforts must adhere to the following principles:

- Transparency – WLMI consumers and partners must be able to examine in detail the methods by which new data products are developed;
- Open source – data products should be open source to allow replication and expansion of the WLMI system's capabilities;
- Accessibility – data consumers and partners must be able to utilize these new data products;
- Skills-focus – credentials and experience will always have a place in the labor market but it is what those credentials and experience represent in terms of skills that are critical to reducing friction in the labor market and progress along career pathways;
- Geographic granularity – ensure that the data are useful to decision-makers and relevant to local labor markets;
- Responsiveness – products should be developed with, rather than for, the system's consumer groups and should be evaluated for their effectiveness by them; and
- Methodological innovation – embrace the use of cutting-edge methodologies, new data sources, agile project management, and human-centered design.

⁷ See <https://walker-data.com/tidycensus/>, <https://walker-data.com/census-r/>.

Appendix A

Pilot Process

The pilots would build towards identifying a minimally viable product (MVP) that could be operationalized as a starting point for developing the WLMI system envisioned by the WIAC. The pilot could be accomplished in the following steps/sets of deliverables:

- 1) Test the potential of private sector data and other currently isolated administrative datasets being matched against UI wage records. This would involve:
 - a. Matching UI wage records to skills records at the individual and employer level;
 - b. Developing machine-learning or other statistical models for non-matched records; and
 - c. For states that have merged education/workforce records in an SLDS or similar environment, documenting the quality of the imputations with and without education data.
- 2) Examine the value of supplementing the existing O*NET with a more dynamic, flexible, continuously revised skills-infused occupation and industry taxonomy.
- 3) Produce a diagnostic report which benchmarks and documents the results to include:
 - a. Testing linkage quality and match rates by different industries, skills, and occupations; and
 - b. Documenting and making available the match code to allow select partners to conduct independent evaluations of the work.
- 4) Work with WLMI users and partner agencies to evaluate the potential to produce timely, local, and actionable evidence produced according to these techniques such as by:
 - a. Producing local skill-level information on earnings and employment for AI research-intensive employers if co-funded with the National Science Foundation (NSF).
 - b. Producing estimates of local skill demand and supply if co-funded with the U.S. Department of Education.
 - c. Producing information about workforce transitions resulting from local demand shocks like the CHIPS and Science Act or Inflation Reduction Act, that can inform timely and actionable policy decisions.

Minimally Viable Product

The pilot seeks to test methods of integrating novel datasets with common WLMI datasets such as wage records to produce new WLMI resources, particularly around skills, industries, and occupations and measure the degree to which such an approach can be used to create local area occupation/skills profiles.

An MVP could include the following elements:

- 1) Linking at least one novel data source with a traditional WLMI data source to provide more robust local, timely, and actionable dataset – examples of novel data sources include private data sources. Ideally, the MVP would:

- a. Link at least one private data source with UI wage records and at least one public data source with UI wage records, with the possibility of linking all three into a single enhanced data resource;
 - b. Include credential/micro-credential extraction and mapping; and
 - c. Regardless of source used, the two (or more) efforts would use both supply data in the form of worker resumes or profiles and demand data in the form of job posting data as well as employment projections;
- 2) A set of measurements and evaluations related to the success of these linkages such as:
- a. Match rates between data sources/elements using different confidence thresholds;
 - b. A distribution analysis that helps assess the completeness and validity of the skills mapped to worker/wage data;
 - c. A distribution analysis that assesses the completeness and validity of tasks for employers and the skills they demand; and
 - d. Precision and recall for the various machine learning models used in the production of the enriched data sources with a comparison of different approaches to identify the most promising models;
- 3) Comparison of new data sources to other external sources such as the state skills survey and O*NET; and
- 4) Evaluation of the new data sources for the value they create for each group of data consumers and other interested parties including students, families, and workers; employers; educators; elected officials; economic development organizations, journalists; unions; and local and state workforce development boards.