

**Rethinking Management Information Systems for Scaling up Employment Outcomes**

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**Abstract**

People with intellectual disability, autism, and other developmental disabilities have successfully demonstrated their ability to work in the general labor market. Yet their employment rate remains substantially lower compared to the general population without disabilities. Scaling up the employment outcomes of this population requires improving the effectiveness and efficiency of employment support systems. To this end, this paper recommends supporting employment support providers rethink how they use their management information systems (MIS): from primary tools that automate billing and compliance, to tools that track metrics for continuous quality improvement. Since federal and state funding policies are the main factors shaping how MIS are currently used, this paper recommends that federal and state policy guidelines be issued to enable employment support providers leverage their MIS for improving effectiveness and efficiency, and thus scale up employment outcomes of job seekers.

In *The Underachievement of Supported Employment: A Call for Reinvestment*, Mank (1994) observed that, although in the previous decade thousands of adults with disabilities engaged in supported employment, the large majority of people with disabilities remained unemployed. Today, over 25 years later, Mank's observation remains true. In the past decades, the employment rate of adults with cognitive disabilities has remained at about 23%, compared to 72% for adults without disabilities (Winsor et al., 2019). People with disabilities who work tend to earn wages considered inadequate for achieving economic self-sufficiency (Hiersteiner et al., 2018; Wehman et al., 2018).

Clearly, employment support systems must change if the goal is to scale up the employment outcomes of people with disabilities (Harkin, 2012; National Institute on Disability, Independent Living, and Rehabilitation Research [NIDILRR], 2019). An area of focus that has not received adequate attention is leveraging data for increasing the employment support systems' effectiveness and efficiency (Graham et al., 2013; Nord et al., 2013). *Effectiveness* refers to achieving intended outcomes, whereas *efficiency* refers to achieving these outcomes with minimal effort (Sharahi & Abedian, 2009).

A necessary step for increasing the effectiveness and efficiency of employment support systems is to ensure that standards of effective employment supports described in the literature are implemented with fidelity (Bond et al., 2011; Fixsen et al., 2005; Hall et al., 2016; Sudsawad, 2007). Unfortunately, human services often struggle with implementation. As Bhattacharyya et al. (2009) pointed out, "...there is a large gap between what is known and what is consistently done..." (p. 491). The rehabilitation literature confirms a need for improving the fidelity of implementation of standards of effective employment supports across disability populations (Bond et al., 2011; Fixsen et al., 2005; Hall et al., 2016; Sudsawad, 2007).

For example, in our past research we found that when employment consultants (e.g., employment specialists, job developers, employment support professionals, etc.) look for jobs, they often rely on classified ads or cold calling rather than networking as recommended in the literature (APSE, 2020; Callahan, 2003; Griffin et al., 2007). Moreover, contrary to recommendations from the literature, interactions with job seekers' families and circles of friends are minimal. This is true even though these connections are critical both for getting to know job seekers and for expanding the network of businesses who might hire (Butterworth, Migliore et al., 2012; Migliore et al., 2010; Migliore, Butterworth et al., 2018).

To bridge the gap between the known standards of effective employment supports described in the literature and the services delivered, a necessary first step is to establish a system that tracks the implementation of the practices described in the literature and uses the data to share actionable information for continuous quality improvement (Caldwell & Kaye, 2016; Mank, 2016). Fortunately, recent advancements in data analytics, computing power, cloud-based data storage, artificial intelligence, and the ability to access the internet from mobile devices can help with collecting and leveraging data for decision-making that leads to improving organizational effectiveness and efficiency (Nguyen, 2016; Schmit & Rosenberg, 2017; Valacich & Schneider, 2018). Indeed, leveraging data has increasingly become a factor in assisting people's lives, work, and play. For example, data enables travel, online shopping, wellness, fitness, and social media (Fritz et al., 2015; Westerman et al., 2014). New business models have emerged that did not exist before cloud computing, including Uber, Lyft, Airbnb, and Blockchain (Bersin, 2016; Westerman et al., 2014).

Local, state, and federal agencies across the nation have taken notice and are increasingly embracing initiatives to digitalize and use data to inform governance, decision-making, and

service delivery (Allard et al., 2018; Mank, 2016; Weigensberg et al., 2012; White House, 2014). For example, Results for America (2019), a national initiative for promoting data-enabled public policies, documented an increase from 88 to 125 in the number of data-enabled public policies adopted by states across the U.S. since 2018. Employment providers are increasingly embracing technology by adopting management information systems (MIS) software. However, they tend to use their MIS primarily for billing and compliance reporting (Attaliades, 2019; Olshansky, 2019) rather than for tracking and improving standards of effective employment supports.

The purpose of this article is to highlight a need for federal and state policies that enable employment support providers to rethink their MIS to better leverage data for improving the fidelity of implementation of standards of effective employment supports, increasing the employment support providers' effectiveness and efficiency, and thus scaling up employment outcomes for job seekers with disabilities. We define MIS, describe how they are currently used, highlight the unintended consequences of data tracked for billing purposes, identify key metrics that matter for scaling up outcomes, explore options for rethinking MIS, and highlight policy implications. We use the generic term "job seeker" when referring to a job seeker with intellectual disabilities, autism, and other developmental disabilities, unless otherwise specified.

### **What Are MIS and How Are They Currently Used?**

Valacich and Schneider (2018) define management information systems (MIS) as "...interrelated components working together to collect, process, store, and disseminate information to support decision-making, coordination, control, analysis, and visualization in an organization..." (p. 16). MIS can vary along a continuum from handling simple to complex information, based on the needs of an organization. Consequently, MIS can use simple data tracking and data reporting tools such as paper and pencil and spreadsheets or more advanced electronic reporting software.

In this article, MIS refers to electronic documentation software that employment support providers use primarily for automating billing and compliance reporting.

For billing purposes, employment support providers typically track billable hours, milestone outcomes, or a hybrid of the two, as required by their funding agencies (Butterworth, Kennedy-Lizotte et al., 2012; Hall et al., 2011; Winsor et al., 2017). Tracking billable hours requires that employment consultants report the number of hours—usually in increments of 15–30 minutes—spent delivering specific authorized services to each job seeker. Examples of services include assessment, job development, and job coaching after hire (Butterworth, Kennedy-Lizotte et al., 2012; Winsor et al., 2017). Outcome-based funding models typically require that employment consultants report the achievement of specific milestones regardless of how much time was invested providing services. Examples of milestones include completing assessment, submitting an individualized plan of employment, hire, and retention after hire (McGrew et al., 2005; O'Brien & Revell, 2005). Finally, hybrid funding systems may require tracking a mix of metrics that measure both time spent providing authorized services and the achievement of specific milestones (Hall et al., 2011; Karakus et al., 2011).

Employment support providers often use their MIS for compliance purposes as well as for other management purposes. For example, employment consultants may enter descriptive text—often called service notes—with details about challenges, successes, or incidents related to the service provided. They can review service notes later to ensure a seamless continuation of services. Supervisors can use service notes to evaluate the quality of services delivered and provide guidance, or service notes can be examined during auditing. MIS may also be used to track job seekers' progress, including date of application for receiving employment support services, date of each job interview, date of hire, businesses visited, and job seekers'

demographics. Finally, MIS can be used to document employment consultants' professional development training received, work hours, outcomes, or other personal information.

### **Unintended Consequences of Data Tracked for Billing Purposes**

Data collected for billing purposes—a common practice in fee-for-services payment systems (Hall et al., 2014)—have inherent unintended consequences that can undermine the integrity of the data if used for quality improvement. The challenges reside in the billable services tracked, the billable rates, the billing structure, and a need for billing multiple funding agencies.

In an ideal world, billing protocols reward the delivery of quality services. In practice, that is not always the case. For example, the literature recommends that, after hire, employment consultants facilitate natural supports from co-workers. Natural support is recommended because it promotes the person's inclusion in the workplace, job satisfaction, and job retention (Hagner et al., 2014; Mank et al., 1999; Sandow et al., 1993; Wehman & Kregel, 1995). However, billing protocols typically reimburse on-site job coaching rather than facilitating natural supports from co-workers. The unintended consequence is that some employment support providers may be less likely to promote natural supports (NCD, 2018). As a result, while the data entered in the MIS may accurately represent the delivery of job coaching services, the data are not necessarily reflecting the support needs of job seekers who could have benefitted from natural supports.

Besides identifying billable services, billing protocols set the rates and number of authorized hours that can be billed for. For example, a funding agency might authorize up to 60 hours of job development services per job seeker (Butterworth, Kennedy-Lizotte et al., 2012; Winsor et al., 2017). A challenge of this approach is that, if the rate is adequate, this protocol includes an intrinsic incentive to provide up to the threshold of 60 hours of job development regardless of job seekers' real support needs. The opposite could also be true; some employment

consultants might subconsciously steer their efforts to provide only up to 60 hours of job development, even if a job seeker would benefit from more supports. In either case, the 60-hour threshold, rather than the job seeker's support needs, may unintentionally drive the amount of job development services delivered and reported. As a result, the data collected may not accurately reflect an individual's need for job development support, making the data less suitable for making decisions about quality improvement.

In some cases, employment consultants must report billable hours in relation to a job seeker's progression through broad categories of services including assessment, job search, and supports after hire. However, activities like assessment may be ongoing, including during job search. Yet because a job seeker may already be in the job search phase, those assessment activities are not reported as assessment. As a result, the MIS may underestimate the amount of actual assessment services delivered while over-reporting the amount of job search services. Similar patterns may occur with other categories of billable services.

Some employment support providers receive funding from multiple funding agencies within a state or across multiple states including state intellectual and developmental disabilities (IDD) agencies, vocational rehabilitation programs, foundations, or other county, state, or federal agencies. Since each of these agencies may have different billing requirements, employment support providers often must track different types of data for billing the various funding agencies. Unfortunately, tracking different metrics for different funding agencies makes entering data, processing data, and using data more complex. It also adds fatigue in data entry, which in turn increases the risk of data inaccuracy. Ultimately, tracking different metrics for different funding agencies limits the potential for MIS to generate data for decision-making aimed at improving effectiveness and efficiency (Caldwell & Kaye, 2016; Stanford Medicine, 2018).

### **Metrics that Matter**

Identifying metrics that matter is a key initial step toward rethinking the use of MIS for better leveraging data for quality improvement. In this article, *metrics that matter* are measures that inform decision-making aimed at increasing the effectiveness and efficiency of employment support providers. These metrics can be organized into three main groups: (a) metrics that document the fidelity of implementation of known standards of effective employment supports, (b) intervening factors, and (c) outcomes.

Metrics that document the fidelity of implementation refer to variables that track the fidelity of implementation of the standards of effective employment supports described in the literature (Bellamy & Melia, 1991; Callahan, 2003; Griffin et al., 2008; Parent et al., 1993; Wehman et al., 1998). Examples include the extent to which employment consultants get to know job seekers through observation in workplaces rather than reviewing personal records, or the extent to which employment consultants look for jobs through networking and job negotiation rather than browsing job ads (Cardy, 2016; Granovetter, 1995; Griffin et al., 2007; Petner-Arrey et al., 2016; Phillips et al., 2009; Riesen et al., 2015; Stensrud et al., 2009). The Association of People Supporting Employment First (APSE, 2020) consolidated these standards of effective employment supports into universal employment competencies that are used to certify employment consultants' ability to successfully and efficiently support job seekers in their pursuit of employment. Increasingly, state IDD agencies that fund employment support services are requiring that staff competency is documented through either the APSE Certified Employment Support Professional credential (CESP) or ACRE certified training, which builds on the APSE universal employment competencies (ACRE, 2020). Examples of constructs for measuring staff competency include the following: (a) interviews with the job seeker and others



familiar with their abilities and work history, (b) community-based work assessments, (c) informational interviews, (d) developing and implementing a job analysis, and (e) fostering co-worker relationships and workplace connections (APSE, 2020).

Intervening factors are elements that are not under the direct control of employment support providers, yet they may influence outcomes. Examples include the demographics of job seekers (education, past work experience, family support, residential supports, support needs) or job seekers' past experiences with the employment support system (Riesen et al., 2014; Rosenthal et al., 2012; Wehman et al., 2015). The characteristics of employment consultants are other intervening factors influencing employment outcomes. Examples include employment consultants' education, tenure, and attitudes (Corbière et al., 2014; Fabian et al., 2011). Finally, intervening factors include the socioeconomic characteristics of the regions where employment support providers operate. Examples include a growing economy vs. recession, rural vs. urban settings, and availability of transportation (Fogg et al., 2011; Matthews et al., 2009).

Outcomes are key metrics for assessing effectiveness and efficiency of employment support providers individually and across programs and states for continuous quality improvement (Bond et al., 2012; Caldwell & Kaye, 2016). Examples include the annual number of job seekers who gain integrated employment per employment consultants' full-time hours worked, earnings and work hours of the job seekers hired, and the number of days it takes for job seekers to gain employment after applying for support services. Other key outcome metrics, less frequently tracked, include job satisfaction, social inclusion in the workplace, job retention, progress toward financial self-sufficiency, and career advancement of the people who gained employment (Butterworth et al., in press; Becker et al., 2011; Bond et al., 2012).

### **Rethinking Management Information Systems**

In this section, we expand on how MIS could be leveraged for improving the effectiveness and efficiency of employment support systems through supporting employment consultants, employment providers, job seekers, families, and through enhancing research.

MIS could support employment consultants by tracking and visualizing the implementation of the APSE universal employment competencies (APSE, 2020) for them to review, discuss, set goals, and take action. In earlier research, employment consultants who received data-based feedback reported that feedback was appreciated and useful. A participant stated: "...I find that [the data-based feedback] causes me to pause for a moment and reflect on how I am spending my time, energy and resources..." (Migliore & Nye-Lengerman, 2019). In addition to providing feedback, MIS could be used to deliver personalized learning materials (e.g., tips, short videos, or short articles) to employment consultants' mobile devices. These notifications would serve both as reminders about implementing the standards of effective employment supports and guidance about how to implement them. For example, if data submitted into the MIS show that an employment consultant tends to invest limited time networking for job development, the MIS could push content to the employment consultant's mobile device with reminders about the importance of networking for expanding the network of employers as well as with tips about how to network. This approach is grounded in the concept of *learning in the flow of work*—also known as "performance support" or "adaptive learning" (Association for Talent Development, 2017; Bersin, 2018; Buchem & Hamelmann, 2010; Dillon, 2017; Gottfredson & Mosher, 2011). A major advantage of learning in the flow of work is that learning opportunities are delivered in moments of need, can be consumed on-the-go, are frequent, and are contextualized within the workflow. Personalizing the learning content to the

employment consultants' learning needs makes learning more relevant, improving retention and anchoring content learned in earlier in-class or online training courses (Gottfredson & Mosher, 2011; Hong et al., 2007; Knowles et al., 2012).

As Raynor et al. (2017) pointed out, "...The intractable problem of low employment for youth and young adults with intellectual and developmental disabilities cannot be solved by one agency alone..." (p. 307). MIS could help with coordinating services across employment support providers and other human services. Better coordination and resource-sharing among programs has been recognized as key for improving employment outcomes (Hall et al., 2018; U.S. Government Accountability Office, 2012; Wehman et al., 2018). For example, Carpenter and Daly (2019) reported positive outcomes of a collaborative of 38 employment support providers who regularly shared job lead information with the intent of leveraging synergies and maximizing the quality of job matches. Moreover, after addressing protection of confidentiality, MIS could be set up to interface with other human services (e.g., residential or day programs) to leverage contextual information about services received by the job seekers in the present or past and to streamline supports. For example, some job seekers may go through multiple cycles of finding a job, losing the job, and then reapplying for services, not necessarily with the same service provider. Or job seekers may receive multiple job offers, but never close on any of them for a variety of reasons. Having access to that background information would provide important context for employment consultants when planning for assisting these job seekers. The ability of different agencies' electronic systems to interface with each other is known as *interoperability* and it is a recent advancement in the information technology industry (Cyr et al., 2019). Interoperability of MIS would also allow for tracking longitudinal outcomes including career

advancement, reduced dependence on welfare, and improved health and quality of life outcomes that otherwise are hard to capture after employment support services end.

The literature is clear that job seekers should be involved as active partners in the pursuit of their employment goals (Barrow et al., 2017; Shogren et al., 2016; U.S. Government Accountability Office, 2012). MIS could be designed to allow job seekers' access to dashboard data that describes in plain language the services they receive, progress towards goals, and areas that need attention. MIS could also provide a space for safe communication between job seekers and their support professionals, as well as other job seekers who can play a mentoring role. For example, the MIS could provide an easy way to request assistance, provide feedback, or receive reminders about appointments with employment consultants or other stakeholders. Personalized learning content (e.g., tips, short videos, short articles) could be pushed to job seekers' devices about improving communication with co-workers and supervisors, understanding workplace cultures, handling challenges, navigating transportation, and using job search strategies. More advanced MIS could handle Social Security paperwork, thus addressing concerns that often keep people with disabilities and their families from pursuing higher-paying jobs or even accepting jobs in the first place (Delin et al., 2012; Hoff, 2011; Rosenthal et al., 2012).

Families play an important role in job seekers' lives (Anderson et al., 2017; Francis et al., 2014; Jones & Gallus, 2016; Meadan & Snodgrass, 2018). However, when families want to help, often they find themselves disoriented navigating a complex system with limited or confusing information about available services (Almutairi, 2016; Kramer et al., 2018; U.S. Government Accountability Office, 2012). MIS could be set up to make families' involvement easier by providing a safe space for communication with employment consultants and other relevant stakeholders with the goal of augmenting the effectiveness of the services provided to job

seekers. For example, with permission from job seekers, families could have access to MIS for communication and for monitoring and supporting the job seeker's progress and outcomes. Also, MIS could push learning materials to families to educate them about how they can coordinate with employment consultants and job seekers to navigate the employment support system.

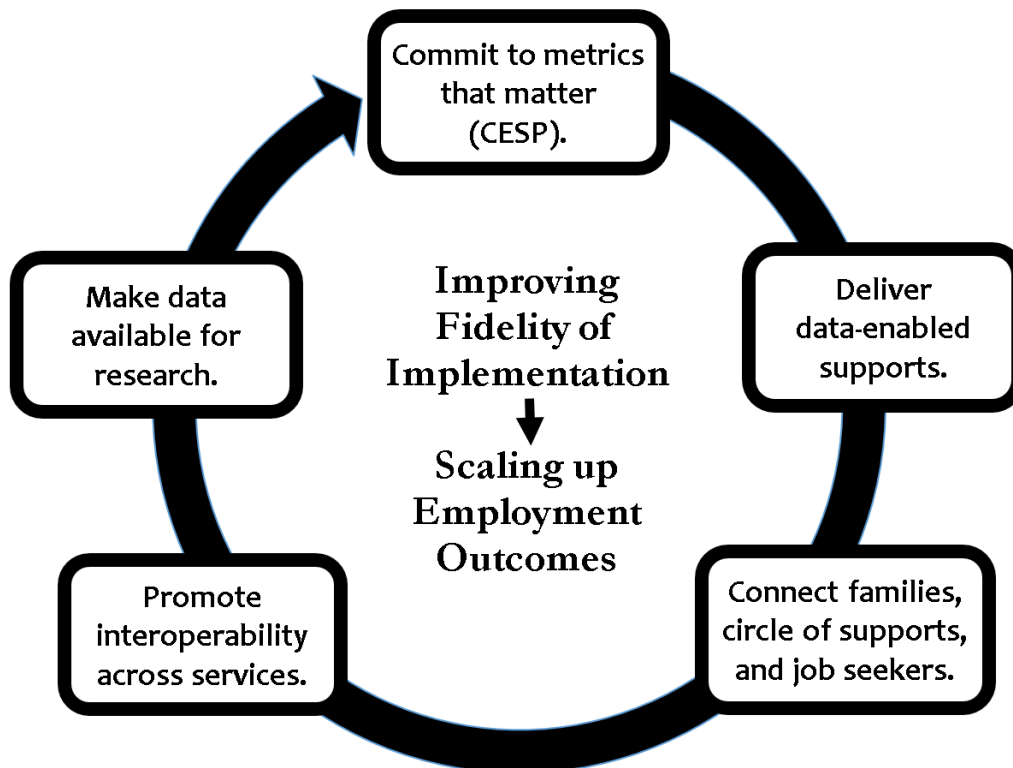
Using secondary data for research purposes is well established in the health care industry and is recommended in human services as well (Balogh et al., 2019; Stanford Medicine, 2018; Wagner et al., 2019; Weigensberg et al., 2012). Unfortunately, this practice is limited or non-existent in the field of developmental disabilities services. Improved standardization of metrics across employment support providers and states would generate a repository of data that, after de-identification, could be available for research. Researchers could use these data to monitor state-level implementation of effective standards of employment supports, establish benchmarks and guidance for employment support providers, and monitor correlation between intervening factors and outcomes (Fox et al., 2002; Hall et al., 2014; Mank, 2016; U.S. General Accountability Office, 2009). Using large datasets for research is an effective approach, compared to traditional research methods that typically rely on small sample sizes and have higher cost (Allard et al., 2018; Hotz et al., 1998; Valacich & Schneider, 2018).

### **Policy Implications**

In this paper, we contend that scaling up the employment outcomes of job seekers with disabilities requires improving the effectiveness and efficiency of employment support systems. A key step toward this objective includes rethinking how employment support providers leverage their MIS data. Currently, they use their MIS data primarily for automating billing and compliance reporting as regulated by federal and state funding agencies. However, we argue that these data are not the best data for informing continuous quality improvement. Therefore, we

described a set of recommendations for rethinking how to leverage MIS for continuous quality improvement and thus supporting employment providers improving their effectiveness and efficiency. The nature and complexity of this transformation, however, requires that federal and state level agencies—not individual employment providers—take action. Specifically, federal and state policy should create guidelines to help with developing a new MIS framework grounded on (a) a commitment to tracking metrics that matter for continuous quality improvement, (b) the ability to deliver data-enabled performance supports to employment consultants, (c) the ability to better integrate input from job seekers and families, (d) interoperability of MIS across human services, and (e) the ability to leverage data for research (Figure 1).

**Figure 1. Rethinking management information systems**



Metrics that matter for informing continuous quality improvement should be research-based and recognized nationally. The APSE/CESP universal employment competencies (APSE, 2020) are the best available source of metrics meeting these requirements. They represent decades of research on employment support practices consolidated in a set of principles used for certifying both the knowledge of employment consultants and the quality of training for employment consultants, nationally. As a result, a growing number of states' funding agencies require that employment consultants be APSE/CESP certified as a condition for their organizations to receive funding (ACRE, 2020). Therefore, a logical next step is to monitor the fidelity of implementation of these APSE/CESP universal employment competencies when assisting job seekers. However, without federal and state policy guidance, it is unlikely that employment support providers will be able to spontaneously adopt these metrics to track adherence of services to research-based practice.

Data-enabled performance supports delivery refers to making it easier for employment consultants to receive data-enabled feedback about their degree of implementation of best practices, reflect on implementation, set goals, and take actions aimed at improvement. At a more advanced level, MIS could push personalized learning content (e.g., short videos, short articles, tips) to employment consultants as both reminders and instruction for how to implement the standards of effective employment supports. The content could be tailored to the learning needs of each employment consultant, based on their performance data.

Connecting job seekers and families with the employment providers through an integrated information-sharing platform, after protecting personal information, is important for increasing their engagement and support. MIS could display dashboards to keep job seekers,

family members, and others in their support circles informed about progress and next steps, facilitate rapid communication, provide access to critical information, and share resources to help job seekers and family members collaborate with employment consultants. This redesign, however, requires federal and state policy that supports data transparency at the individual level, and establishes rules for access by data element, while simultaneously protecting the confidentiality of individual information and guaranteeing data security.

Ensuring interoperability of MIS across human services means that the MIS of one employment provider can communicate with the MIS of other employment support providers, state IDD agencies, state vocational rehabilitation programs, residential programs, education, and other human services. Interoperability of MIS would allow for increased ability of streamlining services, minimizing duplication of services, leveraging synergies across services, and thus accelerating the job seekers' achievement of employment. However, without federal or state level support, individual employment support providers have limited or no ability to design their MIS with interoperability in mind.

Leveraging data for research means making the MIS data available to the public, after de-identification. If MIS track metrics that measure adherence of practice to research-based standards of effective employment supports, these data would have relevance for research including, for example, investigating the extent to which job seekers receive services that adhere to the recommended national standards of employment supports at the county, state, and national levels, and longitudinally. The findings would help enhance continuous improvement of the recommended employment support practices. However, without federal and state agencies' guidance about setting MIS to address these research goals, it is unlikely that the information gathered by MIS across the nation will be put to use for research.



### **Conclusion**

If the employment outcomes of people with intellectual disabilities, autism, and other developmental disabilities are to increase, the effectiveness and efficiency of the support systems must improve. An important step in this direction involves taking full advantage of MIS for tracking the implementation of research-based standards of employment supports and leveraging the data for informing continuous quality improvement. Due to the complexity of the endeavor and the many stakeholders involved, federal and state agencies need to take the lead in issuing policy guidance around leveraging MIS for continuous quality improvement.

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