Building Knowledge in Colorado's New Department of Early Childhood

Recommendations for a unified early childhood system

Key Takeaways:

- First comes USE, then DATA, then TECHNOLOGY.

- Create a staffing model that reflects use, then data, then technology.

- If we want to bust silos in the field, we can't create them in our knowledge center.

- The best data are gathered through incentive, not exclusively compliance.

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Acknowledgements

Purpose

The purpose of this document is to provide knowledge building recommendations for the new Colorado Department of Early Childhood (CDEC). This document synthesizes information obtained from the Transition Advisory Group Data, Innovation, Technology, and Accountability subgroup, Colorado data and technology experts in the Departments of Education and Human Services, expertise from technical assistance groups supporting state-level early childhood data strategies, lessons learned from other states that built early childhood data and technology capacities, and personal expertise launching successful data partnerships and data integration solutions. This effort was commissioned by Gary Community Ventures to serve as a nonpartisan, objective set of recommendations.

The recommendations provided here do not delve into the nuts and bolts of technology (e.g., platforms, applications, integrations) to solve the challenges we face in the early childhood field. Committing to specific technology solutions now could set us up for potentially fruitless investments. Rather, the recommendations have been developed through the following process to offer a more comprehensive knowledge building strategy for the CDEC. The document is organized to reflect the information gleaned from each of these steps.

1. **Clarify the knowledge gaps** that require a knowledge building strategy supported by data and technology solutions

2. Lay out the core components of a **knowledge building strategy** and timeline for development

3. Build the **essential Knowledge Team** that needs to exist in the CDEC to accomplish the strategy

4. **Propose a funding strategy** for the knowledge building strategy and CDEC Knowledge Team

Key Takeaways

Key Takeaway #1: First comes USE, then DATA, then TECHNOLOGY.

It is tempting to jump right to technology when faced with knowledge gaps. We ask, "what can we build to solve this problem and how much does it cost?" This is a relevant question we need to answer, but it is premature. First, we need to assess, "what do we need to know, what knowledge are we missing, and who needs it?" as well as "what data can produce the information that's needed?" Skipping these critical stages of discovery inevitably results in technology solutions that don't solve the problem and inspires distrust and a lack of confidence in the organization that launched them. Data and technology should be built *in service* to the desired goals of the new CDEC. Therefore, we need to allow the intended USE of information to point to the necessary DATA, and lastly lay the best fitting TECHNOLOGY pipes to collect and move data where it needs to go to create knowledge. The amount of time spent to identify the *right* technology solution is worth the savings in correcting course down the line.

Key Takeaway #2: Create a staffing model that reflects use, then data, then technology.

Activating a Use → Data → Technology process is only successful if we create a staffing model well-suited to this commitment. This requires leadership that can see a business challenge and translate it into desired knowledge gained through data and technology solutions. This leadership role is often forgotten, leading to inappropriate expectations for program leaders to know exactly what data and technology solutions they need. Or worse, technology experts with a limited understanding of the business needs who build an expensive solution that misses the mark. A skilled translator between the business and technical teams with a well-formed support staff can make great progress toward effectively using data, managing data, and establishing responsive technology to facilitate knowledge gains.

Key Takeaway #3: If we want to bust silos in the field, we can't create them in our knowledge center.

The early childhood field is rife with well-intentioned policies and programs that were not developed under a single framework. This has inevitably overwhelmed families and providers who encounter hurdle after hurdle when trying to navigate through the systems intended to support them. The core mission of the new CDEC is to break down these siloes and use this monumental opportunity to create a unified system. We must extend this commitment to busting silos within our data and technology systems and the staff that support them. This means we need to be bold in our thinking about a desired state in which no knowledge barriers exist among our families, providers, and state agencies. Which lines can we erase among our data and technology systems that will allow knowledge to flow more freely? What additional capacities can be built *in a unified vision* so that we maximize funds and don't unintentionally create new silos? This requires constant awareness of where each solution fits in a broader landscape of early childhood data and technology infrastructure, what unique value it contributes, and any unintended consequences it might introduce.

Key Takeaway #4: The best data are gathered through incentive, not exclusively compliance.

Most of our administrative data systems exist because programs are publicly funded, and we must track how funds are being used. This has created a compliance culture where program staff associate the collection and reporting of data with oversight and accountability. Is this resulting in the most timely, accurate, and meaningful information being generated and rolled up to the state? Probably not. More likely, program staff are entering information when they find a spare moment in their hectic days right before the compliance reports are due. They aren't receiving back much value other than the relief of knowing they can keep the doors open until the next reporting cycle. This isn't to say that compliance reporting isn't necessary because it is. However, we can think more creatively about how to incentivize high-quality data collection with multiple benefits. For example, reporting slot availability for licensing purposes may not advantage programs, but what if we create a system where this information is shared directly with families who are good candidates for their program? What if this allows programs to reduce waitlists or vacancies because families have timely information about which programs have open slots for their children? This surely is an incentive for programs to update information accurately and regularly. Tying clear incentives to gathering data ensures we are working with the best information possible.

Early Childhood Knowledge Gaps We Need to Close

Before we delve into data and technology solutions, we need to start by acknowledging the common challenges faced by the early childhood field that haven't yet been addressed. Once these challenges are identified and organized, we can probe those challenges to surface where information gaps and failures in knowledge sharing are contributing to the dysfunction. Having a clear picture of these knowledge gaps allows us to clearly articulate what needs to be accomplished with knowledge building capacity. The CDEC Transition Advisory Group (TAG) synthesized common challenges in the early childhood field and developed the following principles that should guide the CDEC transition activities to address the common challenges

1. **Simplify** the family, provider, and workforce experience with a focus on **coherence for the field** and not around administration of individual programs and functions.

2. **Implement the state's unified plan to increase access** to quality early care and education slots, services, and supports which includes workforce recruitment, development, and retention.

3. **Maximize dollars** to achieve a unified vision.

4. **Sustain and strengthen cross-agency partnerships**

5. **Develop equitable and effective regulatory alignment**

6. **Develop robust data collection and analysis systems** to inform future strategies and guide decision making.

The TAG Innovative Data, Technology, Evaluation and Accountability subgroup held several sessions grappling with the knowledge gaps experienced by families and providers and what a desired system would accomplish. Table 1 organizes the learnings from these sessions about knowledge gaps and desired improvements within each of the TAG principles.

Table 1. Current knowledge gaps and desired knowledge gains in the future

Current State: Knowledge Gaps	Future State: Desired Knowledge Gains
Simplify the family, provider, and workforce experience with a focus on coherence for the field	
The onus is on families to figure out how to locate and enroll in services. Rather than share their needs, they must become experts on program offerings and decipher whether those programs meet their needs. Providers must wait for families to reach out to access their programs which can lead to inordinately long waitlists or slots left vacant.	Families need a **single point of entry** that allows them to express their needs and expectations. Families need to receive back a list of providers with open slots that meet their needs. Programs need to **receive enrollment inquiries** from families for whom they have available slots to avoid waitlists and vacancies.

Implement the state's unified plan to increase access

Families are underserved for reasons that are unacceptable. Language and literacy barriers as well as unfamiliar norms of system engagement can leave families "off the grid" and exacerbate barriers to a wider range of support services including early intervention and public assistance programs.

Families and providers deserve a **state system that leverages the data it collects** to assess which families aren't having their needs met, what is preventing access, and respond in a data-informed manner to support existing or prospective providers to meet demand.

Maximize dollars to achieve a unified vision

Families are required to independently navigate the complex eligibility and enrollment processes to obtain public funding for services and often leave money on the table or choose not to pursue high-quality care because they believe it to be unaffordable. Providers experience heavy frustration trying to manage multiple funding sources for a single child's slot, sometimes discontinuing acceptance of public assistance for tuition further exacerbating access issues.

The state needs to offer a centralized location where families can share their eligibility information once and **receive presumptive eligibility**, allowing use of the subsidy while the application goes through full review. This **gives providers a single state subsidy for each family** and allows the state to prioritize funding in ways that maximizes its reach to the most families.

Sustain and strengthen cross-agency partnerships

Families must find and enter completely different doors to locate "horizontal" public services that fall outside early childhood bounds such as housing, food security, medical coverage, and behavioral healthcare. When their needs aren't met by other systems, stress and concerns are absorbed by providers trying to fulfill all needs. The "vertical" cross-system connections at key transition points are also weak, causing batons to drop and critical developmental supports to be delayed or misaligned.

We need to extend the single point of entry concept to **connect families to the wider array of public programs** that meet their needs. **Families need to be prepared to help their children make transitions** through clear direction, consistent assessment and screening information, and action plans for how to seamlessly support children to meet their potential. This includes transitions specific to early intervention, Pre-K special education, and K-12 special education.

Develop equitable and effective regulatory alignment

Providers are frequently side-tracked into focusing on the disjointed requirements for their funding sources and regulatory bodies rather than wholly focusing on children and families. They are left to produce complex crosswalks of the various standards and reporting requirements resulting in a patchwork approach. This complexity places the focus on compliance rather than safe and high-quality programming that are the real intentions behind regulatory frameworks.

The state needs to move away from "alignment" and toward **a cohesive, singular framework of equitable and effective regularly requirements and accountability**. This requires major commitment from state and federal bodies to accomplish and therefore is a longer-term goal. A short-term goal is to improve provider experiences by helping to **produce common reporting tools** that ingest the necessary data from providers and pushes out the report products they are required to submit to their governing bodies.

Develop robust data collection and analysis systems to inform future strategies and guide decision making

There is wide variation in the data collected by providers on the ground regarding enrollment, available capacity, attendance, demographics of families, and important developmental information as children progress through their programs. Inconsistent data collection is further exacerbated by fragmentation in where the data ultimately live, making it virtually impossible to connect children's experiences across programs and to make data-

The state needs to create a centralized location where relevant data can be collected from programs serving children and families for clear purposes. This **centralized capacity can produce important knowledge for state leadership** as well as providers such as intelligence about cross-program participation, where there is demand relative to supply of services, the conditions of the workforce, and guidance about improved data collection

informed decisions on how to support children as they transition across programs. These same issues around variation in data collection and fragmentation of data systems arise regarding details of the workforce and providers serving children and families as well. State leaders are left to piece information together where possible and filling the holes with "educated guesses."

so these types of insights can become more powerful and accurate.

Strategy to Achieve Desired Knowledge

There are five recommended knowledge building solutions to accomplish in just under three years that would advance all the desired knowledge in the previous section. Overall, the entire knowledge building strategy is designed to make the family experience easier and more responsive, take the burden off providers to manage disparate state funding sources and compliance requirements, and give back to state leadership the data and intelligence necessary to inform smart decision making. Accomplishing these goals requires a layered set of solutions that have dependencies on one another.

First, the state needs to get its house in order by thoughtfully streamlining its data systems and creating the human and technical capacity that is *ready* for providers and families to join. Then providers need to both benefit from and contribute to the data landscape of the state so we begin to gather information that is essential for families to make educated choices of which programs to access. Once the key data ingredients (state and provider information) are accessible, families can experience a fully formed single point of entry to get what they need. This doesn't mean that families won't have improved experiences along the way, because they will. However, it is recommended that the CDEC only make promises it can keep along the way and offer the "north star" single point of entry for families when it is capable of functioning to its full potential.

While elements of the recommended solutions may currently exist, there is a significant and sustained investment required in new solutions and expansions. It should also be recognized that this strategic vision was being developed while the TAG was still making substantial decisions about which programs would move to the new CDEC and how they will operate. In an ideal world, the knowledge building strategy would follow these decisions. In the real world, what should be done sequentially must be done simultaneously. Therefore, there will most certainly be additional recommended solutions or enhancements that will be discovered as further decisions are made.

Process to Create an Effective Knowledge Solution

Before describing the recommended solutions, it is important to understand the necessary phases and skill sets needed to achieve the desired knowledge.

1. **Planning and Discovery:** This phase is focused on understand *what* information is needed, by *whom*, *when*, and for what *purpose*? It is essential for appropriate stakeholders (families, providers, state program leaders) to be present for this phase and contribute their best thinking because this will ensure the solution is user centered. It can also motivate non-state administered programs to onboard to the solution at a later point if this isn't already a requirement. It is the time to explore how existing knowledge assets, both within and outside of the CDEC, may be leveraged so the solution being designed is both efficient and fits within the larger landscape. The team should generate a mapping of

data needs to accomplish the anticipated uses – this does not need to be granular to the level of data elements, but rather data types and where they exist (or where they should be collected) to accomplish the goals. Ultimately, this phase should result in a set of requirements for the design team.

2. **Establishing Governance and Legal Framework:** This phase is essential yet often overlooked, which can result in an expensive technology solution with no ability to collect or use the data. The governance planning is designed to identify who has the authority to permit the use of data in the system, what uses are allowed and by whom, and what processes are in place to onboard additional data partners to the solution. The legal planning ensures that all appropriate laws and regulations governing the data have been considered and legal structures are in place to address them. If done well, these governance and legal frameworks should have many similarities across solutions and can be reused when new data partners want to join.

3. **Designing and Building the Solution:** Now we can talk technology. The appropriate design and build team should be selected once the planning and discovery phase is completed. This phase can overlap with the development of the governance and legal framework as they will feed off one another (i.e., legal restrictions may require a different design feature, design elements may require different terms in the legal framework). It is critical that internal CDEC technical staff be intimately involved in the design and build process to ensure the project is on track and stays true to the goals of the CDEC. The CDEC staff will also be aware of the other knowledge building activities and can make recommendations for alignment and collaboration across teams where appropriate to maximize investments. A consistent lesson learned from other states (and experiences in Colorado) is to ensure the design allows for the CDEC staff to incorporate and operate the solution after the build phase. It is not uncommon for an outside vendor to build a solution and essentially "hold it hostage" such that the state partner is unable to make its own enhancements or even gain access to the data should the vendor contract end. Clear ownership rights to the solution and data need to be included in the contracting process.

4. **Testing and Training:** Prior to system Go Live, the built solution must go through at least two stages of testing that cannot be shortcut. The first is to have the internal CDEC technical staff perform quality checks on the solution to ensure the information is being captured as expected and stored appropriately. The second is usability and accessibility testing with a diverse and representative group of willing participants in the field. This step ensures that the user is experiencing the system as intended, they aren't getting confused or frustrated during the experience, and the communication and built-in tutorials are effective. It's also critical that technology accessibility be assessed during testing to ensure there are not unintended barriers to access that are easily resolved during the build process. Throughout the design and testing period, the CDEC staff should be working in collaboration with the design team to develop training materials for end users of the system as well as potential intermediary partners (e.g., Early Childhood Councils, Family Resource Centers). These training methods should also be previewed with trusted partners to receive feedback before being finalized. The training should occur in the window before and after the solution Go Live target date.

5. **Sustainability and Enhancements:** The CDEC staff need to ensure a sustainability plan (funding, routine maintenance, staffing) to support the solution moving forward. It is anticipated, especially in this situation where multiple knowledge building activities are occurring, that each solution will be enhanced because another solution comes online and can be leveraged. It is the responsibility of the CDEC staff to keep tabs across knowledge building activities and recognize these opportunities to maximize the investments across solutions. Another important activity during this phase is to perform intentional check ins with end users over time to see how they are experiencing the solution and

whether there are common recommendations for enhancements. These can be important data points and providers can even come together and advocate for funding as needed with the legislature on behalf of the CDEC. Lastly, it is very wise to build in a set of metrics that will be used to assess how well the solution is meeting the desired goal and how much knowledge has been gained through implementation of the solution. This is evidence for sustainable funding.

Recommended Knowledge Solutions

The combined set of recommended knowledge solutions are presented in Figure 1. Anything in blue or orange represents a newly built solution or connection among solutions. The recommended approach is a hybrid of consolidated and federated data. Consolidating data means creating a single database that meets the operational needs of the program(s) for which the database was designed. The key is *operational needs of the program*, not the analytic or reporting needs. These analytic and reporting needs can be met through a federated data model. This means that data from source databases *relevant to analytics and reporting* are regularly fed to a data warehouse (centralized data hub). Selecting only the data fields necessary for analytics prevents overloading the system and creates a unified place where all programs can receive the analytic expertise and reporting tools necessary for their work. Lastly, there are portals (or system applications) that sit atop the databases and serve as interfaces for users (e.g., families and providers) to input the data necessary for both operation and analytic needs in a way that is easy and user friendly.

Figure 1. Recommended knowledge solutions (in blue and orange) and their dependencies on each other.
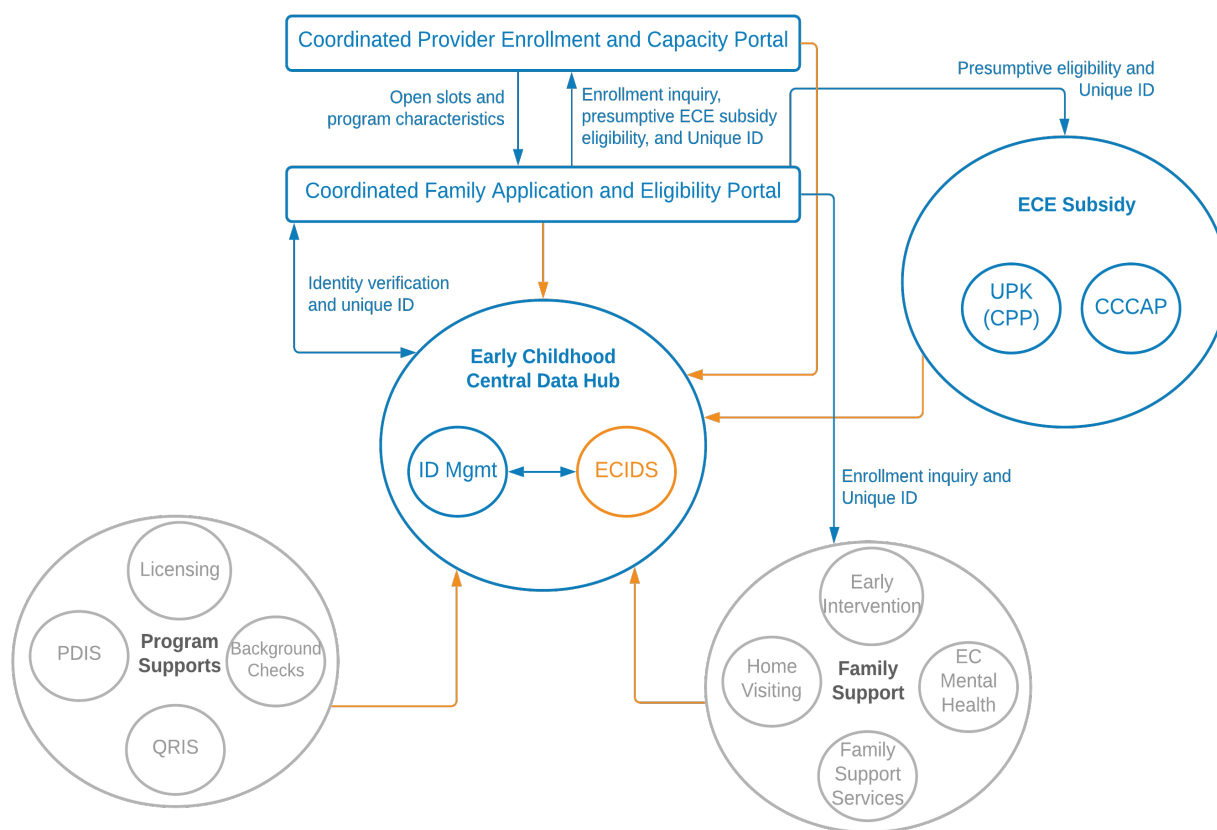
Early Childhood Integrated Data System (ECIDS)

> **Desired Knowledge Achieved:**
>
> The ECIDS is a centralized warehouse that holds the relevant data for research and analytics to create knowledge for state leadership and providers such as cross-program participation, demand relative to supply of services, and the conditions of the workforce. Effective use of data through the ECIDS uncovers ways that data can be improved so that insights become more powerful and accurate. The ECIDS provides common reporting tools that eases provider reporting requirements.

The ECIDS needs to be a centralized warehouse where data relevant to research, analytics, and reporting can be consolidated from each of the separate early childhood data systems. The ECIDS will bring in data from these other systems at a predefined interval (e.g., monthly, quarterly) depending on the use cases and timeliness required for them. It is important to understand that the ECIDS is not built to run day-to-day data operations of programs; rather, it is designed to support research and evaluation efforts, business analytics and dashboards, and compliance reporting.

At its best, the ECIDS can also serve as a sandbox space to test out data connections and data quality *that benefit operations* before more costly solutions are pursued. For example, a common unique identifier produced through the ECIDS using identity resolution methodology can be returned to the program source systems until Identity Management goes online. When the Identity Management solution (see below) is online, the ECIDS should transition from relying on the common identifiers produced through its internal solution and utilize the unique identifier produced through the Identity Management verification process. Once this transition occurs, it will be important to consider taking the personally identifiable information out of the ECIDS and retaining only the unique identifier and substantive data needed for ECIDS purposes. This ensures full confidentiality of data while retaining the more sensitive personal identifiers within the Identity Management solution.

The governance and legal frameworks are crucial for using the data gathered in the ECIDS. It is recommended that the ECIDS follow the Linked Information Network of Colorado (LINC)[1] governance and legal frameworks since the goals of the ECIDS and LINC are similar. It should also make clear the process for allowing ECIDS data requests from researchers. The ECIDS team needs to work closely with the CDE State Longitudinal Data System (SLDS) team that oversees the kindergarten to workforce longitudinal data. The governance design for both the ECIDS and SLDS should be flexible to include collaboration across these efforts should that door open at a future time.

Ultimately the ECIDS is expected to ingest information from a broad set of data partners within (e.g., UPK, CCCAP, Early Intervention, family supports, and provider supports) and outside CDEC (e.g., Denver Preschool Program, Head Start), but it is recommended that the initial build focus on the internal CDEC data partners. This will get it off the ground more quickly and will offer a tangible, working solution for outside partners to join rather than an abstract, unbuilt solution where they feel they are stepping into the unknown. The ECIDS planning and discovery phase should focus on a few high-priority research, analytic or reporting goals and make these the first demonstrations of the system. This allows the team to avoid becoming overwhelmed and instead make progress. Some priorities to consider include:

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[1] See LINC website for details: http://lincolorado.org.

1. **Producing baseline unique identifier for Identity Management:** The ECIDS can perform identity resolution across the historical records provided from data partners and this can serve as an initial identity registry in the Identity Management solution. This also allows for de-duplication of program participation counts right away.
2. **Establish eligibility methodology:** The ECIDS can provide the data that allows an analyst team to develop the methodology for presumptive eligibility for ECE subsidy programs. This methodology can automatically prioritize families to maximize dollars and will be essential for the Coordinated Family Application and Eligibility Portal.
3. **A "WIFM" (what's in it for me) project for providers:** National experts recommended producing reporting tools that benefit local providers such as compliance reporting. Having a clear example of what they can receive by partnering with the ECIDS can drastically speed up onboarding.
4. **Design and track metrics of knowledge building success:** The ECIDS alongside the CDEC analytic team can design metrics to track the success of the implemented knowledge building solutions. Reporting back this information to state leadership and the legislature can provide evidence for why continued funds are needed to support sustainability.

Identity Management

Desired Knowledge Achieved:

Identity Management is a foundational warehouse with an identity registry that ensures the right records get attached to the right person in the coordinated family application and eligibility portal, provider enrollment and capacity portal, and ultimately the ECIDS. This must be in place for those systems to operate most effectively. This capacity also allows the state to accurately assess cross-program participation in early childhood programs through de-duplicated records.

Dependency: Identity registry from ECIDS

Identity Management solves a different problem than the ECIDS common identifier. The ECIDS will include the ability to retroactively assign a common identifier and offers an identity registry for historical records prior to the launch of an Identity Management solution. An Identity Management solution can assess whether a person applying for a program is already in the Identity Management database *in real time* and assigns them the correct identifier through a person's verification of the record match. This is critical when you need near perfect accuracy in record matching to attach the right information to a family's portfolio (essential for direct care coordination).

Though there are different intentions between the ECIDS and Identity Management, we should not miss opportunities to have them benefit from one another. The CDEC team needs to align the governance and legal frameworks so partners start to become familiar with what to expect when joining a data partnership. The Identity Management solution should also inherit the identity registry produced by the ECIDS to serve as a foundational source of data. These two teams can also work together to build enduring data assets (e.g., updated geocoded Colorado address files, voter registry information) that can be

leveraged by both teams. They can also work toward a common standardized data model for key identifier and demographic fields among supported data partners to make future matching more accurate.

There are a couple state initiatives currently underway that are working toward this precise goal of statewide identity management services that should be leveraged rather than building from scratch:

1. **State Health ID Index:** The Office of eHealth Innovation (OeHI) alongside the Governor's Office of Information Technology have put significant funds and time into producing a statewide Master Patient Index and are hoping to expand this solution so it can become an enterprise solution for all state agencies. This solution is not in production.

2. **myColorado:** myColorado is the online digital ID service offered by the state and is starting to be considered as a referential source to perform identity management services. myColorado includes only adults and is not yet widely used by Coloradans, so this solution needs further exploration.

With all identity management services, children tend to be the most difficult population to produce a trusted referential data source. Their details tend to be included less reliably in source systems and most data sources used for validation (DMV, credit reports) tend to only cover adult populations. This needs to be carefully considered and may require legislative action to require inclusion of the most valuable data sources for validating child identity (e.g., vital records, immunization records).

Universal Pre-K (UPK) Data System

> **Desired Knowledge Achieved:**
>
> The UPK data system leverages Identity Management and consolidates the ECE subsidy programs and moves Colorado toward a single point of entry for families.
>
> *Dependency:* Identity Management

The UPK program timeline does not allow for other related solutions to be built ahead of time, such as the coordinated provider and family portals (see below). Therefore, the design and build of the UPK Data System needs to meet immediate needs but also intentionally looking toward future enhancements that will be possible once other solutions are online. For example, it is essential that the questions the UPK program asks of families in the application process reflect what is desired for the family application in the Coordinated Family Application and Eligibility Portal. It is an opportunity to benefit from that investment and ensure families aren't jarred by a different application approach later.

During the planning and discovery phase, it will be critical to determine the purpose of the UPK Data System (who needs to use it, why, and when?) and allow flexibility of thinking that is not dependent on what already exists in the field. Once this information is clearly defined, the team must then determine how the needs in the UPK Data System align with existing subsidy data systems including CCCAP and CPP. Does the CPP system meet all the desired goals of UPK's data needs? Or does it require functions more consistent with CCCAP? Alternatively, does neither system fit the bill and the CDEC needs to start anew? The UPK Data System should not simply look backward and inherit "business as usual." Doing so is likely to

cost the CDEC more at the end of the day and lead to poor user experience. Rather, the UPK Data System should look forward to what is desired and assess what existing assets should come along for the ride. It is also critical that the UPK Data System be built alongside the Identity Management solution (see below) so that a common CDEC unique identifier can be produced for each family from the launch of UPK.

During the testing and launch of the system, it is essential to ensure all data relevant to research, analytics, and reporting are pushed to the ECIDS. Any feedback obtained during user testing should be considered as useful feedback for the Coordinated Family Application and Eligibility Portal and shared with that design team. As previously mentioned, the UPK Data System should ultimately transition to leveraging the Coordinated Family Application and Engagement Portal (described below) when that solution is ready to Go Live. This will require close coordination between efforts, and it is important to have at least a couple CDEC staff actively working on both solutions.

Coordinated Provider Enrollment and Capacity Portal (Provider Portal)

Desired Knowledge Achieved:

The Provider Portal allows the Coordinated Family Application and Eligibility portal to guide families toward programs with availability that meet their needs, thus reducing the issue of waitlists and vacancies. This solution gathers the data necessary for the ECIDS to produce common compliance reports on behalf of providers. These data are also essential for the state to be able to assess standardized information about supply of quality programs.

Dependency: ECIDS

The Provider Portal offers a centralized place to update information easily and regularly on program characteristics, total number of slots, current slots filled versus open slots, and details about cost of care. It is also where providers can obtain enrollment inquiries from families who located the program through the Coordinated Family Application and Eligibility Portal (see below) and are interested in applying for enrollment. Providers will be incentivized to update this information regularly because they become "visible" to families interested in enrolling only if they indicate slot availability properly.

During the planning and discovery phase, the CDEC staff should use intelligence from other states like California that have achieved success gathering enrollment and capacity data from providers to understand what information they collected, how they defined features like slot availability and overall capacity. Learning how these states use the data will help ensure Colorado's system maximizes the value of this solution. It will be critical to include providers, state leadership, and the ECIDS team throughout the process. The CDEC needs to create a governance plan that includes these representatives so they can provide input during the design of the solution as well as recommendations for enhancements. The legal agreements should be standardized to make it easy for providers to onboard over time.

The CDEC technical assistance staff will need to take special care with providers so they understand this solution alone does not remove the burden of navigating the blending and braiding of funds (that requires the Coordinated Family Application and Eligibility Portal below). However, the information collected here is an essential first step to ultimately achieve that goal. Finally, the CDEC needs to ensure all data relevant to research, analytics, and reporting are pushed to the ECIDS solution.

Coordinated Family Application and Eligibility Portal (Family Portal)

> **Desired Knowledge Achieved:**
>
> With the foundation capacities of Identity Management and the Provider Portal, this solution creates one point of entry for families where they can express their needs and eligibility information and receive back presumptive eligibility for subsidies (to use immediately while full verification occurs). It allows the state to prioritize funding in ways that maximizes its reach to the most families. It removes the burden on providers to piece together funding streams and navigate multiple reimbursement systems, instead receiving a single state-covered subsidy amount for each family. It can help families find providers that have open slots and meet their needs. It also gathers the data needed by the state to assess which families aren't having their needs met and what is preventing access so the state can respond in a data-informed manner to support existing or prospective providers to meet demand.
>
> *Dependencies:* Identity Management, UPK Data System, and Provider Portal

It is recommended that this solution include as comprehensive a set of programs as possible, including subsidy programs (UPK/CCP and CCCAP), and family supports (e.g., Early Intervention, Home Visiting, Colorado Community Response). This ensures that the Identity Management solution produces a unique ID at this entry point that can be connected as families move on to enroll in specific programs. For ECE subsidy programs, this will be a more involved (behind the scenes) approach of assessing eligibility criteria and offering presumptive eligibility for a single state ECE subsidy. This means families will be able to move forward with their subsidy to enroll with providers while the state is finalizing verification of eligibility.

For other programs (e.g., Early Intervention, Home Visiting, Colorado Community Response) where enrollment eligibility depends on many other factors, this Family Portal experience will behave more like an initial screener where families are asked a few key questions that allow them to connect with the programs or providers via an enrollment inquiry. Through these enrollment inquiries, program and provider staff would receive all the relevant initial screening information provided by the family so they can follow up to continue the enrollment process. Not only does this streamline the experience for families and providers around enrollment eligibility, but it also ensures that programs can pick up the baton and enroll families while *retaining the unique identifier* in their data systems. This will be essential for programs to coordinate as needed for specific families and ultimately for the state to be able to look at cross-program participation.

The planning and discovery phase for the Family Portal will need to be done with great care and an inclusive set of families, providers, and state stakeholders to ensure that the many value propositions of this solution are known and documented. Colorado is already engaged with other states like Minnesota that are pursuing a similar solution, and it would be wise to grow this cross-state learning community where possible. As mentioned in the ECIDS section, the Family Portal and ECIDS design teams need to work together to build out the methodology to determine presumptive eligibility and to link family needs to provider program offerings with available slots. The Family Portal also needs to work closely with the design team for the UPK Data System to make sure it builds a family application that is consistent with (and can ultimately be subsumed by) the Family Portal application. This will avoid a jarring family experience when the UPK Data System transitions to using the Family Portal.

While Colorado Shines currently provides a look-up capability for families to locate relevant programs, it is not updated consistently and does not extend to offering a single enrollment inquiry that gets pushed to all programs of interest. This Family Portal solution should address this single point of connection to programs that meet the family's requirements and have slot availability. Additionally, the state has created PEAK, a centralized application and resource center for many public programs relevant to families with young children including food assistance (SNAP, WIC), health coverage (Medicaid, CHP+), cash assistance (TANF, LEAP), and early childhood (CCCAP, Nurse-Family Partnership). However, this portal still separates the user experience by program rather than a cohesive assessment of needs and many of the public assistance programs have more intensive eligibility processes. The planning and discovery phase for the Family Portal should include an exploration of what Colorado Shines and PEAK offer and what works and what doesn't. There is potential to for PEAK to leverage this Family Portal as the location where families land if they are interested in early childhood services, but it is recommended that users should be able to access the Family Portal independently without having to necessarily enter through PEAK.

It is essential to perform user testing with a diverse and inclusive set of families and providers who will receive the data in the coordinated provider portal to ensure these connected solutions operated as desired for all families. A major consideration is that not all families utilize technology fluently or have access to technology, so a thorough assessment of preferred modes of technology should be done. We already know that language and literacy barriers frequently hinder a family's ability to access services. The training and technical assistance phase should be extensive to ensure this solution is accessible to all families. Lastly, all data relevant to research, analytics, and reporting should be pushed to the ECIDS.

Figure 2. Proposed timeline for recommended knowledge solutions accounting for dependencies.
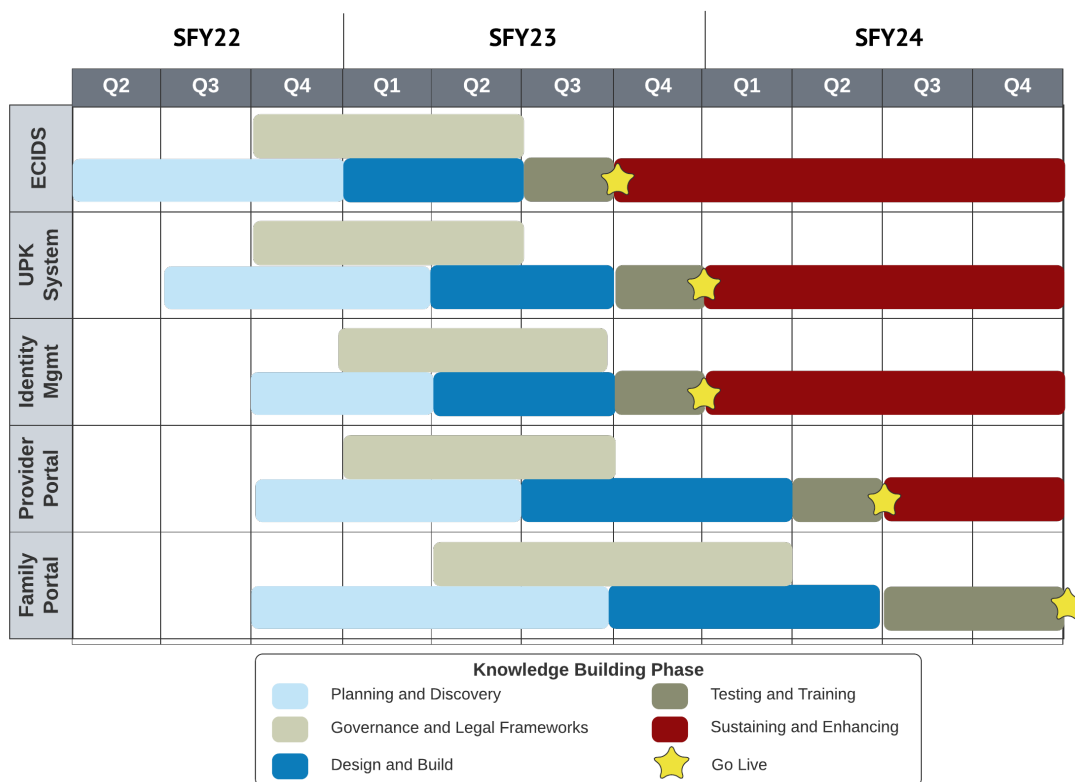
The Knowledge Office

All experts who contributed to this knowledge building strategy recognized that Colorado has a tremendous opportunity to let go of traditional "this is the way we do it" models of staffing and instead allow the goals of the CDEC to dictate the essential human capital. They recommended that the CDEC carefully construct an in-house staff model that reflects the strengths required to accomplish the work. Therefore, it is recommended that the CDEC creates and identifies a sustainable budget to maintain a Knowledge Office with the organizational structure provided in Figure 3. This structure is designed to break down the typical silos in knowledge building and centralize the human capital in a way that maximizes resources and produces more opportunity for collaboration across programs around knowledge building. Many of these positions or similar positions already exist redundantly across programs. The proposed structure recommends hiring based on *skill,* not program area, thereby offering these individuals a community of peers where they can learn from one another and produce the best knowledge for the CDEC.

Chief Knowledge Officer

The Chief Knowledge Officer (CKO) is a member of the CDEC's executive team who is responsible for the Department's knowledge building strategy. The Chief Knowledge Officer is not a technical role nor is it a programmatic role—it is a strategic and managerial role. This needs to be a person who can listen to program leadership and CDEC stakeholders as they express knowledge gaps and translate them into CDEC solutions. The CKO must be able to secure funding and activate the appropriate team members to improve intelligence in the Department and the early childhood field overall.

This might mean recognizing when data partnerships or data quality improvements are needed and activating the data management team. This may require developing insights from data already collected to inform policy and practice and activating the data use team to produce analytics that allow the right information to flow to leadership. In some instances, the issue is visibility into existing data and relying on the technology team to pipeline the data more effectively for ultimate use. It may require hiring new staff to achieve goals that can't be fulfilled by current capacity. Overall, it is the CKO's responsibility to identity the right data and technology to support the right information flowing the right people for the right purpose and making it happen.

Figure 3. Recommended Knowledge Office Organizational Structure

Knowledge Office

Chief Knowledge Officer

Data Use — **Data Management** — **Technology**

- Analytics, Research & Evaluation Director
  - Data Analytics Manager
    - Specialized Data Analysts
  - Research & Evaluation Manager
    - Research and Evaluation Collaborative
- Data Management Director
  - Data Governance Manager
    - Data Governance Committee
  - Data Managers
    - Data Quality Analysts
  - Data Privacy Analyst
- Technology Director
  - Enterprise Project Manager
    - Specialized Project Manager
  - Solutions Architect
    - Business Analyst(s)
  - Technical Assistance Coordinator
  - Systems Operations

Note. This is a recommended structure and is not comprehensive of all positions required to effectively operate the Knowledge Office long term. The Technology Systems Operation Team has not been defined because it is not yet decided whether this is best positioned within the CDEC or OIT.

Data Use Team

Role	Responsibility
Analytics, Research, & Evaluation (ARE) Director	The ARE Director is responsible for working with the CKO and CDEC program leadership to identify knowledge gaps that can be addressed through data use (research, evaluation and/or analytics). This role oversees two pathways of work to be responsive to these needs. The first is an internal team of analysts capable of producing knowledge for the day-to-day business and decision-making needs of the CDEC. The second pathway is focused on leveraging external expertise when research and evaluation support is needed to accomplish CDEC goals. In addition to meeting the current data use needs of the CDEC, the ARE Director must look forward to data use innovations that could benefit the CDEC and work to make them happen. The ARE Director is the point person for reporting to the CDEC leadership and Governor's Cabinet on analytics related to Wildly Important Goals.
Analytics Manager	The Analytics Manager works with the ARE Director to prioritize CDEC business analytics and oversees the appropriate specialized analysts doing the work. This role needs to make sure the analytics projects stay on task and meet deadlines while supporting the specialized analysts to troubleshoot when they hit challenges in the work. The Analytics Manager keeps track of the skills required to meet the CDEC analytic demands and supports the ARE Director to recognize when additional analysts are needed. This may require some support for analysts in external agencies such as the Colorado Department of Public Health and Environment that provides population-level estimates that are essential for early childhood work.
Specialized Analysts	The CDEC needs a centralized team of specialized analysts who bring deep expertise in analytic methodology that is needed across CDEC program areas. It breaks down program silos and maximizes dollars to build this stable of expertise centrally rather than program by program. Specialized analytic team members should be selected by expertise areas including (but not limited to) producing report functions for programs, performance analytics for CDEC and Governor cabinet goals, economic analytics for financial and workforce areas, geospatial analytics, and data visualization. This team should grow and change as CDEC needs shift.
Research & Evaluation Manager	The Research & Evaluation Manager works with the ARE Director to build a process for activating the external research community when CDEC research and evaluation projects need to be accomplished. This role manages the day-to-day relationships with external researchers and ensures the specific research and evaluation projects are staying on track and meet deadlines. This role also facilitates the contract process between the CDEC and external research organizations.

Data Management Team

Role	Responsibility
Data Management Director	The Data Management Director works with the CKO when CDEC knowledge gaps are occurring because the necessary data simply aren't suitable. The Data Management Director works to determine the causes of the data issues and works to correct them with the right members of the Data Management Team. If the issue is related to lack of (or strained) data partnerships with outside organizations or legal and regulatory barriers to data, this requires working with the Data Governance Manager to resolve it. If the issue stems from poor data quality or data simply not being collected at all, the Data Management Director will work with the Data Managers to correct the problem. This role is essential because it solves the common challenge where programs try to figure out data

	solutions for which they do not have the expertise. The Data Management Director should represent CDEC on Colorado's Government Data Advisory Board.
Data Governance Manager	The Data Governance Manager is responsible for working with the Data Management Director to resolve data access issues. If the issue is data partnership with outside organizations, the Data Governance Manager can work with those organizations to build a partnership around data and bring them into the Data Governance Committee to meet mutually beneficial data needs. If the issue is permission to access data within the CDEC's own programs, the Data Governance Manager should work with the Data Privacy Analyst to understand the barrier and how to overcome it. This role is responsible for creating and a process for accepting, channeling, and responding to data requests. The Data Governance Manager ensures the CDEC maintains and builds strong data partnerships, and that data access is achieved so the CDEC knowledge building goals can be met.
Data Privacy Analyst	The Data Privacy Analyst should work with the Data Management Director as a problem solver when the CDEC hits challenges or needs to be forward thinking about issues related to data access permissions. This person needs to have a strong understanding of the federal and state statutes and regulations governing the data of programs in the CDEC and the skills to tap into resources that can help overcome any challenges such as seeking federal or state guidance or working with the CDEC's Legislative Director to work toward data privacy statutory changes where possible. The Data Privacy Analyst should also be available to support knowledge building activities that require building legal agreements or consent forms so the appropriate data privacy issues are addressed.
Data Managers	The Data Managers are responsible for overseeing the availability and quality of data being collected in the CDEC data systems. The Data Managers should be assigned to data systems that have similar goals (e.g., one Data Manager focuses on child care subsidy programs while one focuses on child care provider data systems) or a Data Manager for each system if necessary. There will need to be a Data Manager devoted to ECIDS. They are the experts on these data and troubleshoot issues of data quality and data collection processes. These Data Managers are responsible for maintaining the metadata on their data systems so that potential users of the information understand what is being collected, why, and the quality of those data. Data Managers are also important assets when the CDEC needs new data to be collected and requires guidance about how and where to collect it, or when data across their systems could be standardized to improve cross-program data functions. Lastly, this role will need to perform regular data extractions and transformations when automated data transfers are not appropriate.
Data Quality Analysts	Data Quality Analysts help the Data Managers perform the details analytic duties related to data quality checks, metadata development/maintenance, and data improvement.

Technology Team

Role	Responsibility
Technology Director	The Technology Director works with the CKO to identify the technology solutions that need to be built or enhanced to meet the CDEC's knowledge needs. This role requires a strong understanding of what technology solutions are possible as well as what solutions are already in place in Colorado that could be leveraged. The Technical Director works closely with the Governor's Office of Information Technology to ensure the CDEC is receiving the support it needs from built technology solutions. This role is responsible for activating the solutions architect and business analysts when new solutions are needed. The Technology Director also oversees the Technology Project Management teams that are responsible for ensuring new technology solutions are built to meet the business needs of the end users and is the CDEC leadership responsible for addressing any major issues that are escalated by these Project Managers. The Technology Director regularly

	assesses what's working and what's not among the Technology team and makes recommendations to the CKO should changes need to be made.
Solutions Architect	The Solutions Architect is an essential role on the Technology team. This role has a deep understanding of how each CDEC technology solution serves the business needs of the Department and how those systems are designed. The Solutions Architect also understands how the multiple CDEC systems interconnect and all the dependencies involved. When the CDEC believes a new technology solution is needed, the Solutions Architect is responsible for conceptualizing where this fits into the broader CDEC technology landscape and making recommendations that leverage existing capacities to maximize dollars and alignment. This role also engages in the design and build phases of new technology to ensure the solution is engineered accordingly.
Business Analyst(s)	The Business Analyst supports the solutions architect to gather the detailed business requirements for new technology solutions and establishes a set of requirements. This person is responsible for drafting these specifications in Requests for Proposals.
Enterprise Project Manager	In a large department with many new technology solutions, an Enterprise Project Manager is essential for ensuring all technology projects are receiving the support they need to be successful. This role can recognize when a common challenge is experienced by most specialized project managers and make recommendations for broader CDEC process improvements that would avoid these challenges in the future. The Enterprise Project Manager can also identify where there are opportunities for collaboration across project teams and coordinate these efforts. This role is also responsible for managing all contracts and budgeting for the technology solutions underway.
Specialized Project Managers	Specialized Project Managers are assigned to individual CDEC technology projects and are responsible for ensuring all tasks of the project are being accomplished by the deadline. This role coordinates among the project teams and troubleshoots when challenges are hit. If larger challenges arise, the Specialized Project Manager escalates it to the Enterprise Project Manager for resolution.
Training and Technical Assistance (TTA) Coordinator	All built technology solutions will require some level of training and technical assistance (TTA) for end users. The TTA coordinator is responsible for working across CDEC technology project teams and designing a TTA plan that best fits each project. This includes identifying key stakeholders to engage in TTA development and delivery as well as the specific materials that need to be produced. Because the TTA coordinator has the advantage of looking across projects, this person can identify opportunities to streamline TTA efforts and create continuity in communications for stakeholders. This role is essential for supporting "train the trainer" opportunities such that families and providers receive training from trusted sources. The TTA Coordinator can also evaluate technology solutions for their accessibility to diverse populations of users and make recommendations to improve accessibility.

Essential Supports Outside Traditional Staffing Roles

Early Childhood Research & Evaluation Collaborative

The state can capitalize on the wide-ranging expertise in the research community to address critical knowledge gaps about how to better support families and providers. Rather than ad hoc connections, the state can build a standing collaborative to activate as needed for research and evaluation. This leaves the internal CDEC analysts to focus on business analytics for critical decision making and required reporting.

The CDEC needs to establish a formalized process for the Research & Evaluation Collaborative and potentially draft a charter that guides how the collaborative operates. The CDEC should leverage the expertise of Early Milestones and the Colorado Evaluation and Action Lab to build the collaborative as this

has been a strategy they have employed. The Research & Evaluation Collaborative should work with the relevant CDEC staff to co-design a research and evaluation agenda that meets the goals and priorities of the CDEC. Some priority agenda items include starting or continuing work such as:

- Offering evidence-informed guidance for a statewide early childhood (prenatal to 8 years) accountability framework
- Selection of evidence-based screening and assessment tools to offer providers
- Designing a research-informed process of gathering and sharing information that providers can use to support families' transition between systems in early childhood
- Conducting evaluations on CDEC-supported policies and programs
- Studying unaddressed challenges in the early childhood field (e.g., workforce preparation, factors preventing equitable access, factors discouraging providers from pursuing program licensing)

The CDEC should build in a sustainable set of funds to support research projects that are desired to move forward decision making. The Research & Evaluation Collaborative should also work together to pursue external funding where possible. The collaborative should leverage the ECIDS when administrative records are relevant to the project. This can be another source of funding for the ECIDS (collect project-specific fees to receive research data sets like LINC).

Early Childhood Data Governance Committee

One of the largest challenges to data use and data sharing progress is when there is no clear authority and decision-making body. The CDEC must design a Data Governance Committee that makes purposeful data sharing happen in ways that meet the goals of the CDEC and partner organizations. This committee should comprise representatives from programs within the CDEC as well as data partner organizations outside the CDEC and family and provider representatives. Members should include individuals who can contribute data expertise as well as individuals who can provide leadership authority regarding priority data sharing needs and permission to share data. This committee should also contribute input to the CDEC's knowledge building activities and help connect the needs of families and providers to these efforts.

Like the EC Research & Evaluation Collaborative, the Data Governance Committee should spend time planning and determining the goals of the committee and drafting a charter that guides the functions of this group. This committee has the potential to be a powerful voice when challenges and barriers arise around data use and data sharing. They can come together and present a shared recommendation for changes to statute or regulations that would help move forward desired knowledge building activities that are hitting walls. Also critical is to carve out performance expectations in the job roles of CDEC staff serving on the Governance Committee so this is not an "off the side of the desk" responsibility but sits squarely within their expectations.

Funding the Knowledge Building Strategy

- **Transition support:** If we want to meet the timeline outline in this document, we need to initiate the planning and discovery work before the core Knowledge Team is hired in the CDEC. This means that a one-time set of funds is required to support a trusted team to initiate the work and transition it to the Knowledge Team once the CDEC launches. It is estimated that the total cost for transition support is $150,000-$200,000.[2]
- **Design and build of solutions[3]:** This is a one-time infusion of funding for the design, build, test, and launch of the knowledge building solutions. This can't be perfectly estimated given that the planning hasn't occurred to identify the best design of the solutions, but a ballpark estimate of $15-20 million has been made to cover the recommended solutions through the Go Live period.
- **Knowledge Office:** There needs to be an annual budget to support the Knowledge Office staff as it is described in Figure 3 as well as any additional roles that may be required but have not yet been specified. The total annual salary and fringe cost for the specific positions included in Figure 3 is $3.2 million. It is not yet decided whether the CDEC would also hire members of the Technology Systems Operations team or if those roles would reside in OIT. If it is decided these roles should be in CDEC, those annual salary and fringe costs will need to be added.
- **Sustainability and Enhancement:** Beyond systems operation staff, there needs to be annual funding to sustain these new solutions (e.g., hardware, software, licenses) and enhance as desired in the future (e.g., onboarding new data partners, creating connections among solutions that weren't feasible during initial build). It is recommended that each solution add a 10% annual enhancement budget, totaling $1.5-2 million across all solutions.
- **Research and Evaluation Projects:** The CDEC needs an annual budget to support projects with the EC Research & Evaluation Collaborative. This should be focused on projects that generally benefit the CDEC (e.g., building a unified accountability framework or assessing cross-program participation and access issues) and can't otherwise be supported by specific program areas. It is recommended to include a budget of $500,000 to support an average of three projects a year.

Conclusion

Colorado is experiencing a history-making moment in state government with the launch of an entire state Department dedicated to the well-being of young children and their families. We have all the right ingredients in Colorado to make a bold step toward a cohesive, data-driven environment for early childhood. This includes a Governor whose administration is strongly dedicated to improving opportunities in early childhood, the funding to support the launch of UPK, a cross-system Early Childhood Leadership Commission that is effective at enacting change, and a devoted research community ready to bring actionable intelligence to the field.

We must work hard not to squander this opportunity and risk allowing the "tyranny of the urgent" to sweep us back into the status quo. This is our moment to be thoughtful and make informed decisions about how we build knowledge through data and technology solutions that are founded in what our early childhood field needs. This knowledge building strategy harnesses all the promising ingredients we have in Colorado to bring the best for our children and families.

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[2] This is in addition to the Preschool Development Grant funding for the ECIDS strategic planning.
[3] The planning and discovery phase of each solution will identify more specific budget estimates for each solution. This total number is estimated based on costs of similar scale solutions in previous projects.