Virginia Department of Behavioral Health & Developmental Services

Data Quality Monitoring Plan Source System Report

September 28, 2023

Data Quality Monitoring Plan

Source System Report

Executive Summary

Originally processes associated with assessing data sources and data source systems for threats to data validity and reliability (including but not limited to a review of data validation processes, data origination, and data uniqueness) were a function performed by the Office of Epidemiology and Health Analytics (EHA), in the then Division of the Chief Clinical Officer (now the Division of Clinical Quality Management). Following the dissolution of EHA (January 2023), the Office Clinical Quality Management (OCQM) personnel and OCQM independent data system analyst consultants assumed the role of assessor.

Although it is not discussed in this report, it is important to note that while this report focuses on data source and data source system assessment, that is but one piece of the data validation process that DBHDS has established. A "comprehensive" process has been implemented to ensure awareness of data quality concerns. It includes the assessment process as well as the following steps:

- Measure validation which serves to ensure that all measures used as part of the DBHDS Developmental Disabilities (DD) Quality Management System (QMS) meet established specifications
- Data process documents which serve to document data origination, management and use, business area ownership, and data quality concerns and mitigating strategies employed to address them (for all datasets used to assess data, as part of the DD QMS).
- Data attestations that serve to attest to data source and data source system ability to produce valid and reliable data, with appropriate mitigation strategies.

This OCQM report is the first step in the process and serves as a component of DBHDS Developmental Disability Quality Management Plan. It highlights assessment improvements made and pending, assessment results and recommendations for additional enhancements for 10. data sources and data source systems, as indicated by data source and data source system reassessments and assessments conducted between March 2023 and July 2023, by OCQM personnel and data system analyst consultants.

In this assessment period, the Actionable Recommendations process was applied to new data source systems or source system modules (CONNECT, which replaced OLIS, and WaMS Waitlist, Regional Support Teams, and Customized Rate modules). This process included interviews with

Business Owners, information technology personnel and system users (as was possible); system shadowing (observation of users as they were using the system to input or export the data), and a review of the user interface, backend data tables, and user resource materials (e.g. business glossaries, data dictionaries, training materials, user manuals, etc.). Other assessments included a reassessment of areas where EHA or OCQM previously identified threats to data validity and reliability and recommended enhancements to address them. In this case, reassessment involved reviewing areas where EHA or OCQM noted concerns, determining progress made to date, and if solutions implemented met business area needs and successfully addressed EHA or OCQM recommendations.

However, it should be noted that there were a number of data sources that were not reviewed because they were: 1) retired (OLIS); 2) deemed valid and reliable through other means (National Core Indicators); 3) not deemed priorities due Department of Justice Settlement Agreement (DOJ SA) compliance indicators being in the 'Met' status, not to be confused with '*Met' status, (Intermediate Care Facilities, Post-Move Monitoring Workbook, and Monthly Training Center Discharge Report; 4) not being used for DOJ SA reporting (Crisis Data Platform; it should be noted that although PAIRS was reviewed DBHDS no longer uses it for DOJ SA compliance reporting); 5) determined to now no longer be needed due to a change in the expectations for DOJ SA compliance (Provider Reported Data); or 6) not slated for review for other reasons, as specified by the business area. Additionally, while the consultant was able to capture the enhancement made to the Individual and Family Support Program (IFSP), following its transition to WaMS, the consultant was unable to review the module because it was not actually in use (as the review period did not coincide with external stakeholder use of the system) and therefore system users could not be shadowed while using the system. All data sources and data source systems that were reviewed, in whole or in part, are detailed in the table below.

Table 1 below displays the source systems reviewed, the categories in which enhancement needs were identified (if applicable), and the replacement status for each system.

Table 1

Source System	Categories of Enhancement	Replacement Status
Avatar	Key Documentation, Data Validation, User Interface	Planned Replacement
Children in Nursing Facilities (CNF) Spreadsheet	Key Documentation, User Interface, Data Validation, Manual Data Processing	N/A
CHRIS-Serious Incident Report (SIR)	Data Validation, Key Documentation, User Interface	Planned Replacement
CHRIS-Human Rights (HR)	Data Validation, Key Documentation, User Interface, Manual Data Processing	Planned Replacement

Community Consumer Submission 3 (CCS3)	Data Validation	Planned Replacement
CONNECT	Data Validation, User Interface, Manual Data Processing	Complete
Consolidated Employment Spreadsheet	None	N/A
Protection and Advocacy Incident Reporting System (PAIRS)	Key Documentation, User Interface, Manual Data Processing	Planned Replacement
Quality Service Review (QSR)	Key Documentation, Data Validation	N/A
Regional Educational Assessment Crisis Habilitation (REACH)	Key Documentation, Data Validation, Manual Data Processing	In Transition to Crisis Data Platform
Support Coordinator Quality Review (SCQR)	Key Documentation	N/A
Waiver Management System (WaMS) Individual Support Plan (ISP) proper	User Interface, Key Documentation, Data Validation	N/A
WAMS Customized Rate Module	User Interface, Key Documentation	N/A
WaMS Individual and Family Support Program (IFSP) Module –	None	Complete
WAMS Regional Support Team (RST) Module	Data Validation, Key Documentation, User Interface Design	Complete
WAMS Waitlist Module	Key Documentation, User Interface, Data Validation	N/A

Data Source and Data Source System Assessment Results

This section of the report further details overall agency data quality concerns, data quality improvements, and additional recommendations. When reviewing this section of the report, the following definitions should be considered. Please see Table 2 below.

Table 2

Category of Improvement	Definition
Backend Structure	Processes for creating the structure and logic that receives requests from users and return the appropriate data back to the user
Data Validation	The process, activities and mechanisms used to ensure data accuracy and consistent application of business rules, resulting in quality data. It includes building checks into a data source or data source system, process or report to ensure the logical consistency of input, stored data, and output.
Key Documentation	Written documentation that is created, managed, and maintained that records data source and data source system essential processes related procedures for data inputs, outputs, and data ownership. Thes documents may include but are not limited to data dictionaries, process maps, business rules, standard operating procedures, business glossaries, data governance and data ownership.
Manual Data Processing	When a data entry, data cleaning, or data reporting is completed via a manual process
Training	Activity implementation or document development designed to educate the user, business area, and other stakeholders on processes, procedures or protocols
User Interface	The interactivity, design (look, usability and intuitive nature) of the data source or data source system while using the system. These may include user ability to input information or get it out of the system, use of navigational components used to move through each area of the system, informational components designed to understand system constraints and the interconnectedness of areas within the system for actions such as pre or auto population when the same information is needed in various areas of the system.,

Data Quality Opportunities for Enhancement

Findings from the DQMP fell under the following headings: Data Validation Controls, Key Documentation, Manual Data Processing and Manual Data Processing, and User Interface and

Backend Structure. In this section, a brief synopsis of findings per category has been provided. For more specific details regarding findings per data source and data source system, detailed in Table 1 above, please review the respective 2023 data source and data source system assessments completed by OCQM personnel or OCQM data system analyst consultants.

Data Validation

Eight data sources and data source systems had a combined total of 20 duplicated data quality issues (meaning that findings can apply to multiple data sources or data source systems) related to lack of or malfunctioning data validation controls. In general, data validation findings indicated an overall challenge with development and application of data validation controls that prevent the entry of erroneous data. Findings fell into the following subcategories: 1) inability to ensure data uniqueness; 2) ability to enter data after a point when the record should have been closed (posthumous data entry); 3) inability to clearly define field or tool options; 4) inability to define field parameters within the system such as date ranges, restrictions on numeric values; and 5) records over ridden by new data entered. Findings considered outliers, because they were not documented as findings for more than one data source or data source system were: (related to unalphabetized drop down options, lack of data validation controls at the point of data origin (for CSB EHRs), and the lack of validation tools (at the DBHDS central office level) to ensure data validity and reliability before data is submitted to DBHDS as final. However, the greatest area of impact would be in business area and the Office of Information Technology (OIT) collaboration in addressing challenges with ensuring data uniqueness and providing clear field definitions and parameters, as it is in these areas where most findings occurred.

Key Documentation

Nine data sources and data source systems had a combined total of 24 duplicated data quality issues (meaning that findings can apply to multiple data sources or data source systems) related to lack of or outdated key documentation. In general, key documentation findings indicated an overall challenge with development and maintenance of key documentation. Findings fell into the following subcategories: 1) lack of or incomplete business rules or advanced business rules; 2) no data dictionary; 3) no comprehensive system guidance 4) lack of or incomplete business glossary or glossary of terms;

Findings considered outliers, because they were not documented as findings for more than one data source or data source system were: the lack of communication processes to alert service providers of changes to the data file structure or its delivery and the need to enhance processes to better capture unsubmitted ISPs. However, the greatest area of impact would be in business

area, system vendor, and OIT collaboration in addressing challenges with the establishment and maintenance of comprehensive system guidance, business practices/operations, business glossaries, and data dictionaries.

Manual Data Processing

Five data sources and data source systems had a combined total of seven duplicated data quality issues with manual data processing (meaning that findings can apply to multiple data sources or data source systems) In general, manual data processing findings indicated an overall challenge with manual work; specifically, the presence of manual processes to categorize narrative responses, enter and clean data and revert records. The finding considered an outlier, because it was not documented as a finding for more than one data source and data source system was the need to manually maintain fields, where drop downs are used. However, the greatest area of impact would be in business area, system vendor, and OIT collaboration in addressing challenges with automating processes that currently require manual data entry, analysis, or cleaning and record revert, as it is in these areas where most findings occurred.

User Interface and Backend Structure

Six data sources and data source systems had a combined total of 35 data quality duplicated issues (meaning that findings can apply to multiple data sources or data source systems) with user interface. In general, user interface and backend structure findings indicated an overall challenge with data source and data source system operational efficiency. Findings fell into the following subcategories: 1) data, form, or record duplication; 2) system redundancies (obsoleteness); 3) premature system timeout 4) lack of needed data elements that are missing elements or missing data; and 5) need to embed/prepopulate data into other areas of the system or in attachments or ensure data capture (connecting data between data sources or source systems).

Findings considered outliers, because they were not documented as findings for more than one data source and data source system were: lack of conditional logic and role definitions; inconsistent data saving functions; delays in system responsiveness to user commands; incongruence between search algorithms and user input; lack of field guidance embedded within the system; record modification tracking lacks needed information; and a lack of navigation access to correct system errors. However, the greatest area of impact would be in business area, system vendor, and OIT collaboration in addressing challenges with premature system timeout, duplication, and identifying mechanisms to connect data cross and within data

source systems that can prepopulate in other areas where the same information is needed. as it is in these areas where most findings occurred.

Data Quality Improvements

Quality improvements reported to and observed by DBHDS data system analyst consultants fell into the following categories: Data Validation, Key Documentation, Manual Data Processing, and User Interface and Backend Structure. In this section, a brief synopsis of general improvements per category has been provided. For more specific details regarding progress per each of the data sources and data source systems assessed, please review the respective 2023 data source and data source system assessments completed by OCQM personnel or OCQM data system analyst consultants. Six data sources and data source systems have implemented or plan to implement system, process or documentation enhancements (including CHRIS: HR and SIR sides of the system, Avatar, CNF, REACH, CCS3, WaMS and WaMS IFSP). It should be noted that there would not be progress noted for new data source systems or modules, as this was the first time that they were assessed. There was a combined total of 34 duplicated enhancements and 25, planned enhancements (meaning that progress can apply to multiple data sources or data source systems) that have already been implemented.

Data sources and data source systems demonstrated progress as indicated below:

- Data Validation: 1) developing or enhancing unique identifiers; 2) embedding field/element parameters and guidance within the system; 3) elimination of record, form, and data duplication; 4) addition of restrictions to data elements so that they cannot be modified by end users. There was a total of 10 implemented enhancements; with five additional enhancements planned for later implementation.
- Key Documentation: 1) developing data dictionaries; business rules, comprehensive systems operations documentation, business glossaries, and guidance for field clarifications and 2) documenting requirements for data entry to ensure a mutual understanding of business processes and operations and system use between system users and business owners. There was a total of 18 implemented enhancements and six planned enhancements.
- User Interface and Backend Structure: While there were no discernable patterns, it should be noted that there were five implemented enhancements and 10 planned enhancements.
- Manual Data Processing: While there were no discernable patterns, it should be noted that there was one implemented enhancement and two planned enhancements.

- Training: While there were no discernable patterns, it should be noted that there was one implemented enhancement and one planned enhancement.

Data Quality Recommendations

OCQM data system analyst consultants observed that there had been several advancements, in most cases. In other cases, there were new opportunities, to address threats to data quality, identified and acknowledgements that previous recommendations had not been completely addressed as of yet. Progress towards achievement is detailed above in the "Data Quality Improvements Section." Data quality recommendations made by the OCQM data system analyst consultants fell under the following headings: Data Validation, Key Documentation, Manual Data Processing, User Interface and Backend Structure, and Training. In this section, a brief synopsis of recommendations, resulting from this year's assessment process, per category, has been provided. For more specific details regarding recommendations per data source and data source system assessed, please review the respective 2023 data source and data source system assessments completed by OCQM personnel or OCQM data system analyst consultants. . There was a combined total of 123 duplicated recommendations (meaning that recommendations can apply to multiple data sources or data source systems). Data sources and data source systems demonstrated enhancement needs as indicated below.

Data Validation

Eight data sources and data source systems received recommendations regarding the need to establish or enhance data validation controls. There was a duplicated total of 33 recommendations that fell into the following subcategories: 1) develop mechanisms to ensure data uniqueness at the individual (service recipient) and user level; 2) establish mechanisms to prevent record, data, or form duplication.; 3) establish mechanisms to prevent data from being overwritten; 4) establish field parameters to ensure data accuracy; and 5) establish mechanisms to prevent posthumous data entry. Recommendations considered outliers, because they were not documented as recommendations for more than one data source and data source system were: 1) ensuring data capture or API integration 2) establishing data reconciliation mechanisms to track form completeness and ensuring that prerequisites for form completion are completed before the final submission; and 3) establishing mechanisms for assessing data accuracy and making corrections before data submission and identifying and alerting users to data inaccuracies and inconsistencies.

Key Documentation

Nine data sources and data source systems received recommendations regarding the need for key documentation development or enhancement. More specifically there was a duplicated total of 36 recommendations that fell into the following subcategories:, the development or enhancement of: 1) data dictionaries; 2) processes for cleaning and monitoring data; 3) business glossaries; 4) business rules; and 5) comprehensive systems documentation. Recommendations considered outliers, because they were not documented as recommendations for more than one data source and data source system were: 1) ensuring congruence between CSB and DBHDS data capture processes: 2) tool guidance enhancement; 3) provision of methodology for determining the number of individuals and providers to be reviewed when conducting QSRs; 4) developing processes for de-duplicating and merging data; and 5) establishing processes for correcting errors.

User Interface and Backend Structure

Six data sources and data source systems received recommendations regarding user interface and backend structure development or enhancement needs. There was a duplicated total of 38 recommendations that fell into the following subcategories: 1) embedding business rules in the system to enhance data accuracy; 2) establishing, automating and embedding system alerts to alert users as to approval needs, prevent entering data posthumously, alert user to missing data; 3) reducing redundant (obsolete) fields and screens; 4) addressing system delay when issuing commands; 5) establishing or enhancing historical data logging and audit trails; and 6) enhancing user acceptance testing to test system load capabilities and ensure business area needs are met before the system "goes live" for all users.

Recommendations considered outliers, because they were not documented as recommendations for more than one data source and data source system were: 1) automating data transfer between screens within the same system (auto-population); 2) establishing conditional logic; 3) adding new fields to capture necessary information; 4) increasing system access to broaden the number of people who can clean the data; 5) enhancing field descriptions; 6) adding autosave features; 7) streamlining data look up and data collection (condensing multiple forms with similar data collection into one); 8) working with the system developer to address incongruence between the search algorithm and user input; and 9) increasing the turnaround time for corrected report generation, following user revision.

Manual Data Processing

Five data sources and data source systems received recommendations regarding the need to address manual data processing. There was a duplicated total of six recommendations that fell into the following subcategories: 1) reducing the number of narrative fields; 2) establishing automated mechanisms for data cleaning and loading; 3) reducing manual data entry through the introduction of keyboard shortcuts and smart defaults. There were not enough recommendations in this section to establish a pattern.

Training

Three data sources and data source systems received recommendations regarding the need to provide training (including CONNECT, PAIRS and WaMS Waitlist, RST, and CR modules). There was a duplicated total of eight recommendations that fell into the following subcategories: ensuring an understanding of appropriate system use standard operating procedures, and system field definitions and providing templates.

Conclusion

While opportunities for enhancement of data quality exist, DBHDS is well positioned to continue to advance, successfully, through the replacement of CCS3 with the Virginia Crisis Connect System (VCCS) its incident management systems (PAIRS and CHRIS), as expectations for system build out will include mechanisms designed to address identified data quality concerns. DBHDS has also developed processes for managing data quality concerns in their entirety or in part, while additional solutions are being stood up that aid the business area in meeting their needs with a focus on less manual data management. The DBHDS Division of Administration establishment of the Data Governance Plan and expectations for OIT to lead the process for data source system assessment; subsequently tracking progress to successful resolution, will serve to increase collaboration between the business area and OIT, thus strengthening processes designed to ensure effective, efficient and sustainable solutions. For this to occur, it is absolutely critical that OIT develop and implement processes for:

- Tracking identified threats to data validity and reliability, from identification to resolution; that there is communication with senior leadership about barriers to solution development (and subsequent direction as to resources needed to move forward with the best most plausible solutions)
- Communicating progress with stakeholders and

- Ensuring that there is a single source of truth for data source and data source system assessments, documented progress, and evidence that is accessible to the business area.

The greatest impact could also be seen in maintaining and enhancing the collaborative relationships that have been established between OIT and business areas and focusing on those areas where findings were significant such as ensuring data uniqueness; developing mechanisms that prevent duplication and prevent data from being over written; enhancement or development of comprehensive business and system operations documentation and ensuring mutual understanding (between business owners and system users) through the provision of training related to appropriate use of the data source systems and sources and embedding system guidance into the system.

DBHDS acknowledges that there are more enhancement needs to be addressed but DBHDS efforts thus far have and are demonstrating commitment to mitigating data quality challenges. The work completed thus far demonstrates a commitment to continuous data quality improvement. While this round of assessments resulted in additional recommendations it also noted a considerable number of enhancements planned and implemented.