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February 9, 2021

Mr. Dzung Hoang
Director, Division of HITECH and MMIS
Centers for Medicaid and CHIP Services
Data Systems Group
90 Seventh Street, Suite 5-300 (5W)
San Francisco, California 94103-6706

Dear Mr. Hoang:

The Hawaii Department of Human Services (DHS) Med-QUEST Division (MQD) is submitting this Implementation Advanced Planning Document (IAPD) to evolve and enhance the Hawaii Prepaid Medicaid Management Information System (HPMMIS) by developing an integrated data and analytics module and maturing the data governance processes of Medicaid data sources that will contribute data to the module.

As the single state agency duly authorized to administer the Medicaid program, DHS is requesting \$24,188,450, of which 90% Federal enhanced match is \$21,769,605, between FFY2021 - FFY2022.

The proposed integrated data and analytics module will enable analytic activities that are currently unfeasible for the state, including comprehensive evaluation of the state's waiver authorities (e.g. 1115 and 1915(c) waivers); evaluation of the state's managed care quality strategy; enhancement of managed care health plans oversight; evaluation of healthcare disparities; enhancements in program integrity capabilities and litigation support; standardized reporting to CMS; and predictive analyses of population enrollment and health to support better member, provider, and care management.

Mr. Dzung Hoang
CMS Transmittal Letter-Hawaii Analytics IAPD
February 9, 2021
Page 2

We greatly appreciate CMS' guidance and assistance with developing this request. Please contact Ranjani Starr (rstarr@dhs.hawaii.gov) with any questions or if you need additional information. We look forward to working with you on this request and thank you for your support and prompt attention.

Sincerely,



Judy Mohr Peterson, PhD
Med-QUEST Division Administrator

Attachments

c: Robert McCarthy, CMS
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IMPLEMENTATION ADVANCED PLANNING DOCUMENT (IAPD)

Enterprise Data Governance and Development of an Integrated Data and Analytics Module Within the Hawaii Medicaid Enterprise Environment



February 2021

Table of Contents

SECTION I: EXECUTIVE SUMMARY	3
SECTION II: RESULTS OF ACTIVITIES INCLUDED IN THE APD.....	4
SECTION III: STATEMENT OF NEEDS AND OBJECTIVES.....	5
3.1 PROJECT NEEDS.....	5
3.2 OUTCOMES	5
SECTION IV: STATEMENT OF ALTERNATIVE CONSIDERATIONS/FEASIBILITY STUDY.....	7
4.1 COST BENEFITS ANALYSIS.....	8
SECTION V: PERSONNEL RESOURCE STATEMENT	9
5.1 STATE PERSONNEL RESOURCES.....	9
5.2 CONTRACTOR RESOURCES	13
SECTION VI: PROPOSED ACTIVITY SCHEDULE	14
SECTION VII: PROPOSED BUDGET.....	16
7.1 TOTAL BUDGET BY FFY	16
7.2 DDI BUDGET BY FFY	17
SECTION VIII: COST ALLOCATION PLAN FOR IMPLEMENTATION ACTIVITIES.....	18
SECTION IX: SECURITY, INTERFACE, DISASTER RECOVERY, AND BUSINESS CONTINUITY PLANNING.....	18
SECTION X: REQUIRED FEDERAL ASSURANCES.....	19
Appendix A: System Diagram.....	20
Current System Diagram (Hawaii Medicaid Enterprise Environment):	20
Future System Diagram (Hawaii Medicaid Enterprise Environment).....	21
Appendix B: MITA CERTIFICATION	22
Appendix C: MITA STATE SELF ASSESSMENT (SS-A)	23
Appendix D: RFI PROCESS AND TECHNICAL REQUIREMENTS GATHERING	24
APPENDIX E: PROJECT GOVERNANCE AND PROCUREMENT ACTIVITIES	33
APPENDIX F: DETAIL OF ALL DDI ACTIVITIES.....	36

SECTION I: EXECUTIVE SUMMARY

The State of Hawaii through the Med-QUEST Division (MQD) of the Department of Human Services (DHS) is requesting enhanced federal financial participation (FFP) to evolve and enhance the Hawaii Prepaid Medicaid Management Information System (HPMMIS) by developing an integrated data and analytics module and maturing the data governance processes of Medicaid data sources that will contribute data to the module.

MQD's key goals are to build a system that will evolve the Hawaii Medicaid Enterprise (HME) capacity for analytics by consolidating multiple data sources into a single integrated analytic platform, enhancing the data through groupers and advanced measures, and co-locating advanced analytic tools with the data. The proposed integrated data and analytics module will enable several analytic activities that are currently unfeasible for the state, including comprehensive evaluation of the state's waiver authorities (e.g. 1115 and 1915(c) waivers); evaluation of the state's managed care quality strategy; enhancement of managed care health plans oversight; evaluation of healthcare disparities; enhancements in program integrity capabilities and litigation support; standardized reporting to CMS; and predictive analyses of population enrollment and health to support better member, provider, and care management.

The proposed integrated data and analytics module will reside within the HME environment and will link data from HPMMIS, the Medicaid eligibility determination system (Kauhale On-Line Eligibility Assistance (KOLEA)), the Hawaii Health Data Center (HHDC) and other existing and new Medicaid data sources. Documenting and standardizing Medicaid data sources will make them interoperable and developing a centralized, integrated data module will allow Medicaid analysts to access multiple data sources through a single analytic interface.

This modular design and development process will support MQD's incremental approach to system development, promote reuse of existing assets, and enable functionality to be accessed as it becomes available.

With this IAPD submission, DHS is requesting the following total FFP for Federal Fiscal Year (FFY) 2021 through 2022.

Phase		DDI	M&O	Totals
FFY1 2021	FFP 2021	\$9,895,707	\$0	\$9,895,707
	State 2021	\$1,099,523	\$0	\$1,099,523
	Total	\$10,995,230	\$0	\$10,995,230
FFY 2022	FFP 2022	\$11,873,898	\$0	\$11,873,898
	State 2022	\$1,319,322	\$0	\$1,319,322
	Total	\$13,193,220	\$0	\$13,193,220
Total (FFY2021-FFY2022)	FFP (21-22)	\$21,769,605	\$0	\$21,769,605
	State (21-22)	\$2,418,845	\$0	\$2,418,845
	Total	\$24,188,450	\$0	\$24,188,450

SECTION II: RESULTS OF ACTIVITIES INCLUDED IN THE APD

No activities to report, as this is a new request.

SECTION III: STATEMENT OF NEEDS AND OBJECTIVES

3.1 PROJECT NEEDS

Currently, MQD's data sources are disconnected from one another and inadequately documented; the data are raw and not enhanced with groupers or advanced measures to facilitate analytics; and appropriate tools are not available to the agency support enhanced analytics. This limits how the data can be pulled together for analytics and reporting and diminishes MQD's ability to engage in comprehensive, data-driven decision making. Fragmented data also complicates access since each separate database requires a high degree of technical proficiency to maneuver or combine. Consequently, Medicaid analytics are currently limited to simple, auto-generated static reports or reliance on a single person to generate custom queries from a single database at a time and manually combine these data to generate linked datasets, a process that is time-consuming and fraught with risk of data errors.

3.2 OUTCOMES

Below are the Program outcomes that will result from the proposed work, the metrics and data that will be used to track progress against the outcomes, and the state personnel and contractors that will be responsible for the outcome.

Outcome	Metrics	Contractors						
		State Staff	Int. Platform	Data Gov.	PMO	IV&V	KOLEA	HHIE
Promote Medicaid data interoperability and reuse by establishing enhanced data governance processes and open documentation to improve policy decisions.	<ol style="list-style-type: none"> Number of the following data sources for which data dictionaries, data quality processes, and data access rules are developed or revised within the first two years: <ul style="list-style-type: none"> Medicaid Beneficiary/Eligibility Medicaid Enrollment Medicaid Claims and Encounters State Employee Eligibility State Employee Premium Data State Employee Claims LTSS Risk and Eligibility Actuarial Risk Scores MCO Quality Data Member-Level Data Reports Provider-Level Data Reports Member Attribution Table T-MSIS Utilization of the above developed/updated data dictionaries and data quality documents by Medicaid analysts, by month 							

Outcome	Metrics	Contractors						
		State Staff	Int. Platform	Data Gov.	PMO	IV&V	KOLEA	HHIE
Provide comprehensive views of Medicaid beneficiaries over time, across settings, and across programs	1. Development of standardized master person index across all Medicaid data sources within the module to enable comparative analytics.							
Improve monitoring and reporting of Medicaid program compliance with CMS requirements	1. Number of the following reports produced within the first two years, using the integrated data and analytics module: <ul style="list-style-type: none"> Disparities analyses, as required by the state's managed care quality strategy per 42 CFR § 438.340(b)(6) Utilization of primary care services, as required to evaluate the 1115 Waiver per 42 CFR § 431.424 that includes comparative analytics to assess policy impacts. Data quality validation of Medicaid encounters and provider data per 42 CFR § 438.818 and 42 CFR § 438.242 							
Develop a single, streamlined analytic module that contains data from various Medicaid data sources to improve usability and enhance productivity.	1. Amount of time it takes a Medicaid analyst to develop a cross-dataset enrollment or utilization query and produce a report to the legislature. 2. % change in utilization of analytic platform, month over month, within the first year after it is fully implemented. 3. Medicaid analysts' satisfaction with accessing all data via the new analytic module.							

SECTION IV: STATEMENT OF ALTERNATIVE CONSIDERATIONS/FEASIBILITY STUDY

The proposed data governance and integration effort is the most feasible and efficient way to achieve necessary Medicaid functionality and outcomes.

DHS posted two Request for Information (RFI) solicitations to understand the market for services and solutions to support the future integrated module and its data governance needs. This informed the identification and pricing of key technical requirements for the module and the preferred approach to data documentation and governance. For more information on the RFI processes and technical requirements gathering, see Appendix D.

DHS identified the following three options for the location and architecture of the future integrated data and analytics module.

- Option 1: Embed Future Module within KOLEA Shared Services Platform
- Option 2: Embed Future Module within HPMMIS Environment
- Option 3: Develop a New Environment for Module and Leverage New/Existing Tools as Cost Effective

Below is a summary of the stakeholder feedback received regarding the three options. In the diagram, green checkmarks represent relative advantages of the proposed options whereas "X's" represent disadvantages.

Option 3 was identified as the most viable and desirable option. This option involves developing an integrated module in a new, separate environment within the HME which leverages the most cost-effective new or existing tools and technology.

The first option of embedding the module within the KOLEA Shared Services platform was also considered since it had two benefits.

Option 1: Embed within Shared Services Platform	Option 2: Embed within HPMMIS Environment	Option 3: New Platform Environment with New/Existing Tools
Tools and components within the platform are only available to data within the KOLEA environment and are not all being used. This environment and its components may be unstable.	X Server is currently ageing and existing HPMMIS and data warehouse can be hard to navigate	X Would allow for greatest flexibility, but we should try to leverage existing tools if they already exist
Some MQD staff are familiar with the platform and its analytic tools and could potentially support their use	✓ Limited staffing at AHCCCS to support additional data integration	X May need some contracted support to stand up and maintain this option, especially if using new tools
The technology stack and all of the analytic components are expensive, and may not all be necessary	X There is no person matching tool available within this environment, and no plan to implement one in the future	X Would allow us to develop an environment that can accommodate data that comes (and remains) in different formats
Heavy reliance on non-state resources to maintain the system and tools	X Would give AHCCCS too much control over what functionality/tools/architecture is available to HI. Would put all HI integrated data at the whim of Arizona business decisions	X Would reduce privacy concerns with co-mingled data sources as all data sources would enter into data sharing agreements, as necessary
This environment has historically had poor documentation	X This environment has historically had poor documentation	X
There may be privacy concerns about moving clinical (e.g. HHIE) and non MQD (e.g. commercial data held by the HHDC) into this environment	X There may be privacy concerns and governance concerns about sharing non-MMIS data with the MMIS vendor/environment	X
Strong data security	✓ Strong data security	✓

4.1 COST BENEFITS ANALYSIS

MQD conducted a cost benefits analysis comparing the two options that remained at the conclusion of the alternative considerations phase.

As demonstrated in the table below, Option 3 is the most economical and efficient way to support Medicaid's need to integrate multiple data sources and provide advanced analytic capabilities to Program staff. Building this module within the KOLEA Shared Services Platform (Option 1) would be more expensive and contractor-intensive and would not leverage existing infrastructure efficiently.

	Option 1: Embed Future Module within KOLEA Shared Services Platform		Option 3: Develop a New Environment for Module and Leverage New/Existing Tools as Cost Effective	
	Capacity	Est. Cost (FFY2021)	Capacity	Est. Cost (FFY2021)
New Data Intake and Modeling	Medicaid would need to partner with subject matter experts representing various Medicaid data sources to design, develop, intake and map data into KOLEA environment. Data would need to be mapped in one specific format to be ingested properly with the existing solution.		Medicaid would need to partner with subject matter experts representing various Medicaid data sources to design, develop, intake and map data into new environment. Environment will accept data in multiple formats.	
Data Security and Privacy	Oracle security configuration will likely cost more as it is established and we would be forced to adapt to their structures and configuration. Will need to establish mechanism by which non-MQD data can be secured so that it can be co-located within KOLEA environment.		Can develop custom data security provisions as requirement of new integrated analytic platform	
Data Tools and Enhancements	KOLEA Shared Services platform tools are bundled and would require acquisition of new tools, license seats and/or development of new instances to meet technical requirements of integrated module. NOTE: May also be incompatible with preferred data tools or enhancements		Only those data tools and enhancements that have been identified as necessary technical components of the integrated module, will be acquired. Estimated cost is based on median of RFI responses	
Technical Support Staff	Oracle consultants would need to provide data mapping, technical support, and training for new environment and tools, given the complexity of tools and platform.		Technical support would be provided by UHstaff who have already piloted the HHDC	
Hardware	Medicaid would need to purchase additional hardware to account for computing needs and storage capacity		Integrated data platform module will be hosted on a cloud platform, included in the price of the data tool.	
Project Management	Medicaid will need PMO with technical understanding of Oracle to oversee project and provide licenses to staff.		Medicaid will need to identify and secure project management resources to oversee project	
DHS/MQD Staff Capacity	Some existing Medicaid staff could support this work		Several new Medicaid positions would need to be filled to support this work	
Timeline	Would require re-negotiation of existing Oracle licenses		Can begin immediately	
TOTAL		\$16,482,200		\$12,552,220

SECTION V: PERSONNEL RESOURCE STATEMENT

5.1 STATE PERSONNEL RESOURCES

State staff include personnel from MQD, the University of Hawaii (UH), and the Arizona Health Care Cost Containment System (AHCCCS).

State Staff Title	Description of Responsibilities	Project Hours/Year	Cost with Benefits
Health Analytics and Informatics Administrator (MQD)	<ul style="list-style-type: none"> Frames the vision for all data governance and integrated module goals Oversees project direction, implementation, and strategic alignment with MQD priorities Serves as liaison to agency principals and steering committees, as necessary Enforces compliance issues as necessary 	1,040	
Program and Contracts Financial Coordinator (MQD)	<ul style="list-style-type: none"> Oversees all Vendor contracts Serves as liaison to State procurements office 	1,560	
Senior Healthcare Analytics and Research Coordinator (MQD)	<ul style="list-style-type: none"> Oversees development and implementation of analytic functionality within the integrated module Oversees development of data products and dashboards within the integrated module 	1,560	
Healthcare Statistician (MQD)	<ul style="list-style-type: none"> Oversees quality and error checking on all system components Leads data quality assurance efforts on behalf of Medicaid Validates data within module against other Medicaid sources 	1,040	
Senior Research Analyst (MQD)	<ul style="list-style-type: none"> Serves as subject matter expert on Medicaid Managed Care data Supports data quality assurance efforts Support cross-validation across all Medicaid data sources Validates data within developed reports and dashboards 	1,560	
Informatics Specialist (MQD)	<ul style="list-style-type: none"> Serves as lead on Medicaid use cases and business priorities, for report development Ensures that new data products are accurately developed according to defined specifications. 	1,560	
Secretary/Admin Assistant(MQD)	<ul style="list-style-type: none"> Coordinates resources, communications, and scheduling Supports invoicing and contract management 	520	
MQD Division Chief (MQD)	<ul style="list-style-type: none"> Ensures that project is aligned with agency goals Lead Federal liaison 	104	
KOLEA Chief (MQD)	<ul style="list-style-type: none"> Provides strategic direction as needed Provides oversight of data governance work as it relates to KOLEA data 	104	
Systems Office Chief (MQD)	<ul style="list-style-type: none"> Provides strategic direction as needed Ensures that work is aligned with requirements and goals of the Systems office and state MITA-SSA 	104	

HIT Chief (MQD)	<ul style="list-style-type: none"> Provides strategic direction as needed Ensures that the work is aligned with the requirements and priorities of the State Health IT Plan 	104	
Business Analyst (MQD)	<ul style="list-style-type: none"> Supports the Integrated Data and Analytics Module Vendor in data intake Supports Project Management Office Vendor as needed Supports Independent Verification and Validation Vendor as needed 	520	
Technical Interface Specialist (MQD)	<ul style="list-style-type: none"> Coordinates data transfer and exchange between Medicaid data sources Serves as subject matter expert/data contact on platform data sources Provides support to data governance work, including development of data documentation and data quality issue remediation 	1,040	
Data Governance Director (MQD)	<ul style="list-style-type: none"> Oversees data governance vendor Oversees implementation of determined data governance policies, procedures, standards, roles and responsibilities Executes and oversees Memorandums of Understanding and Data Use Agreements on data shared with or from integrated module 	2,080	
Analytics Manager (UH)	<ul style="list-style-type: none"> Oversees application of business processes and data enhancements Oversees implementation of data enhancements and groupers Oversees data model integration with analytic tools Design analytic capabilities Develop and conduct complex analytics and predictive modeling Work with data engineering team to build data pipelines, adapt data models, add additional data sources Develop submission specifications 	2,080	
Senior Developers (UH)	<ul style="list-style-type: none"> Participates in visioning sessions for data source integration and data product development Develops complex data analytic modeling within integrated module Supports application of business processes and data enhancements Builds data products Participates in quality assurance processes 	4,160	
Junior Developers (UH)	<ul style="list-style-type: none"> Participates in visioning sessions for data source integration and data product development Support mapping of data to analytic tools Supports the development of data products Develops and implements code to apply claims versioning methodologies and other business processes and enhancements, as needed Develops code to attribute patients to primary care providers, as needed Helps develop data marts and flags Support development of standard reporting and analyses 	8,320	

Technical Writer (UH)	<ul style="list-style-type: none"> • Develop documentation of procedure user manuals, processes, reference guides, white papers, and related publications • Develop processes for maintaining documentation throughout its lifecycle • Create training for staff on utilizing the data and tools correctly 	2,080	
BI Developer (UH)	<ul style="list-style-type: none"> • Supports technical development of data products and dashboards for Medicaid purposes and use cases, including presentations, publications, white papers, and other related communications • Create design templates for presentations, maps, infographics, dashboards, other public communications 	2,080	
IT Systems Lead/Architect (UH)	<ul style="list-style-type: none"> • Test mapping and functionality of the developed analytic engine • Oversee the architecture development and implementation by the Integrated Data and Analytics Module vendor • Oversee the integration of the various technical components by the Integrated Data and Analytics Module vendor 	2,080	
Security and Technical Specialist (UH)	<ul style="list-style-type: none"> • Implement system security, including audits, monitoring systems • Develop processes to investigate and report security incidents • Develop processes for system maintenance, including updates, backups • Create oversight processes to manage system operations, infrastructure, and business processes • Develop processes to provide support to system users for technical troubleshooting 	8,320	
Data Engineer/ Informaticist (UH)	<ul style="list-style-type: none"> • Consult with MQD staff to optimize data model for BI and analytic tools and reporting • Create and automate the mapping of the MQD data within the module, including integration of data enhancements and reference tables • Oversee the master person matching algorithm development by the Integrated Data and Analytics Module vendor • Develop quality checks on incoming and additional data as directed by MQD • Develop processes to identify, communicate, and resolve all data anomalies and errors 	8,320	
Web Application Developer (UH)	<ul style="list-style-type: none"> • Develops and designs public-facing website for communications, analytic reporting, intake portals • Develops website analytics, conducts testing and refining technical web requirements 	2,080	

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Project Director (UH)	<ul style="list-style-type: none"> Serves leadership role and liaises with MQD on project direction Serves as liaison to MQD staff on data collection issues, onboarding of new data submitters, and need for additional data Provides strategy and acts as single point of contact for all HHDC data collection and analytics activities and response to public inquiry, interview, or press release 	2,080	
Data Governance and Compliance Manager (UH)	<ul style="list-style-type: none"> Oversees implementation of data governance policies and processes Oversees development of agreement and legal review processes Oversees development of data release process Works with data submitters, technical data teams, and SMEs to develop data processes, security, and other governance tasks Develop processes to resolve regulatory compliance issues 	2,080	
Data Governance Specialist (UH)	<ul style="list-style-type: none"> Establishes data governance policies, guidelines, processes Implements data sharing protocols and assists in facilitating the data sharing process Develop communication materials to coordinate data release processes Develops and maintains data dictionaries, including processes for regular review 	2,080	
Data Coordinator (UH)	<ul style="list-style-type: none"> Implements processes for communications with data submitters regarding data collection efforts, changes to the data submission guide, data quality reports, quality metrics, and other submitter-related issues 	2,080	
Project Manager (UH)	<ul style="list-style-type: none"> Establish project plan and ensures that the project meets project milestones and stays on time and on budget Assigns tasks and coordinates work amongst the team members, recruits and onboards new staff Provides regular status reports and facilitates regular meetings with agency leadership to report on overall project status, risk, and opportunities 	2,080	
Administration Manager (UH)	<ul style="list-style-type: none"> Oversees human resources for the team, including job postings and hiring Manages administrative functions, including contracts management Facilitates contract execution, procurement 	2,080	
Administrative Support (UH)	<ul style="list-style-type: none"> Coordinates resources, communications, and scheduling Supports invoicing and contract management 	2,080	
Data Governance Staff (AHCCCS/AODA)	<ul style="list-style-type: none"> Supports data governance for HPMMIS data in the analytics platform including data quality cleanup and issue investigation/resolution Manages a data governance committee and supports the build and implementation of a data governance charter for HPMMIS 	2,080	

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Leadership & Support Staff (AHCCCS/AODA)	<ul style="list-style-type: none"> Oversight of data governance activities for HPMMIS including documentation of the entire process of data receipt, validation, entry, storage, integration, reporting, and export 	2,080	
Sr. Warehouse Developer (AHCCCS/ISD)	<ul style="list-style-type: none"> Support the development of a data extract out of the HPMMIS data warehouse environment Establish and implement standardized reporting from managed care plans on reporting requirements to support data feeds to analytic platform (See Exhibit B: Medicaid Reports Table; Medicaid Provider Attribution Report; Medicaid Provider Value-Based Contracting Report) Supports data transfer into integrated module 	2,080	
ISD Leadership & Support Staff (AHCCCS/ISD)	<ul style="list-style-type: none"> Oversight of ISD activities to support the analytics platform including data extract development, data transport to the platform, receipt and mapping of standardized managed care reports, and export of report data to the platform. 	2,080	
Total State Personnel			\$5,718,220

More information on project governance and procurement activities can be found in Appendix E.

5.2 CONTRACTOR RESOURCES

The table below provides a listing of the estimated contracts that the state may engage with.

Contractor	Description of Services	Annual Cost
Project Management Office	<ul style="list-style-type: none"> Ongoing communication with all data sources Facilitate weekly team meetings to track and oversee data collection, processing, and analytic tasks Identify and document use cases and data needs; prioritize and direct team towards deliverables. Contracted vendor oversight Team building; coordination across vendors 	
IV&V Vendor	<ul style="list-style-type: none"> Periodic reviews of module development that may include site visits, interviews with project team and stakeholder and review of vendor deliverables 	
Integrated Data and Analytics Module Vendor	<ul style="list-style-type: none"> Design, develop and implement integrated data and analytics module that can ingest, process, link and provide access to data, including: <ul style="list-style-type: none"> Providing secure data collection portal Providing secure database infrastructure Monthly or quarterly ETL All data quality checks Implementation of MPI solution Claims versioning Data enhancements Data mapping across data sources Business intelligence tool development Metadata processing Fulfilling approved data requests 	

Data Governance Vendor	<ul style="list-style-type: none"> Perform initial assessment of existing data governance processes. Establish a data ownership and accountability hierarchy. Ensure that all MQD data sources have updated documentation and that the documentation is shared as appropriate with all those who access and receive the data. Establish rules and procedures for all MQD data sources for who can access the data, for what use cases, and how the data is shared 	
Hawaii Health Information Exchange	<ul style="list-style-type: none"> Determine what HHIE data can be shared with integrated module to advance Medicaid business needs and use cases. Develop data extract out of the HHIE data warehouse environment. Supports data governance for HHIE data. Supports data transfer into integrated module. 	
KOLEA Contractor Support	<ul style="list-style-type: none"> Develop data extract out of the KOLEA data warehouse environment Provide data governance for KOLEA data Supports data transfer into integrated module 	
Systems Architect	<ul style="list-style-type: none"> Technical lead for all module design, development, and implementation Oversees all technical processes of integrated platform, including data intake and modeling, mapping to analytic tools, and testing system Oversees building of module architecture and data configuration 	
Data Acquisition	<ul style="list-style-type: none"> CMS Research Identifiable Files through State Agency Request Program 	
Hardware/Software	<ul style="list-style-type: none"> Necessary hardware and software 	
Total Contractors		\$7,475,000

SECTION VI: PROPOSED ACTIVITY SCHEDULE

The table below provides the project activity schedule for the first year of the project.

Project Milestone	Estimated Start Date	Estimated Finish Date
Complete project planning – All contracts in place and ready to begin data governance and development of module	12/1/2020	3/31/2021
Initial assessment of MQD data governance needs completed, recommendations made and agreed upon	4/1/2021	6/30/2021
Visioning of data sources for integration completed	4/1/2021	6/30/2021
Module's business rules and data enhancements built, tested and operational	4/1/2021	7/30/2021
HHDC historic data normalized and configured for integration into module	4/1/2021	7/30/2021
Finalize format of data/data extracts and frequency of transfer into integrated module	4/1/2021	7/30/2021
Enhanced data governance processes implemented for priority level data sources	4/1/2021	7/30/2021
Data/data extracts from HPMMIS, KOLEA, and HHDC delivered to integrated data module	8/1/2021	9/30/2021
Module's business rules and data enhancements built, tested and operational	8/1/2021	9/30/2021

Project Milestone	Estimated Start Date	Estimated Finish Date
Data in integrated module mapped to analytic tools and capabilities are tested	10/1/2021	12/31/2021
4 new Medicaid data products (reports/dashboards) developed and accessible	10/1/2021	12/31/2021
Integrated module refreshed with new data monthly or quarterly	10/1/2021	Ongoing
Analytics and data products refreshed with new data	10/1/2021	Ongoing

For a detailed overview of all DDI activities, please see Appendix F.

SECTION VII: PROPOSED BUDGET

MQD is proposing the following budget to perform all data governance and module development and implementation activities outlined in this proposal. This budget assumes that work can begin on December 1, 2020, with ten months remaining in FFY2021.

- FFY2021: \$10,995,230; Federal funds requested: \$ 9,895,707
- FFY2022: \$13,193,220; Federal funds requested: \$11,873,898

In each year, the portion of costs attributed to design, development and implementation are requested at 90%. DDI work is expected to continue through the entirety of FFY2022. The table below shows the requested project budget by federal and state share expenses, for each federal fiscal year.

7.1 TOTAL BUDGET BY FFY

MMIS Medicaid Summary	MMIS CMS Share (90% FFP)	State Share (10%)	MMIS CMS Share (75% FFP)	State Share (25%)	MMIS CMS Share (50% FF)	State Share (50%)	MMIS MEDICAID TOTAL FFP	State Share Total	MMIS MEDICAID TOTAL (TOTAL COMPUTABLE)
	2A+B†		4A+B†		5A, B&C†				
FFY2021	\$ 9,895,707	\$ 1,099,523	\$ -	\$ -	\$ -	\$ -	\$ 9,895,707	\$ 1,099,523	\$ 10,995,230
FFY2022	\$ 11,873,898	\$ 1,319,322	\$ -	\$ -			\$ 11,873,898	\$ 1,319,322	\$ 13,193,220
Total	\$ 21,769,605	\$ 2,418,845	\$ -	\$ -	\$ -	\$ -	\$ 21,769,605	\$ 2,418,845	\$ 24,188,450

7.2 DDI BUDGET BY FFY

Expense	FFY2021		FFY2022		90% FFP Project Total	
	Federal Share	State Share	Federal Share	State Share	Federal Share	State Share
State Personnel	\$ 4,289,008	\$ 476,556	\$ 5,146,398	\$ 571,822	\$ 9,435,407	\$ 1,048,379
Contracted Services						
Project Management Office (PMO)	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]
Independent Verification and Validation (IV&V) Vendor	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]
Integrated Analytic Platform Solution	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]
HHIE	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]
State of Hawaii Personnel Services	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]
KOLEA Staff	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]
Data Governance Vendor	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]
Other Costs						
Data Acquisition Fees	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]
Hardware/Software, Travel, Training	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]
Total	\$ 9,895,707	\$ 1,099,523	\$ 11,873,898	\$ 1,319,322	\$ 21,769,605	\$ 2,418,845

Project work is expected to begin on December 1, 2020, with 10 remaining months in federal fiscal year 2021. All work performed in these ten remaining months of FFY2021, as well as all work performed in FFY2022 will be related to design, development, and implementation. In other words, DDI is projected to last for approximately 1 year and 10 months.

During this DDI phase, MQD and its contracted staff will oversee the development and implementation of the required data governance enhancements and development, testing, and implementation of the integrated data and analytics module. Data sources will be planned, ingested, validated, processed, mapped and configured to Enterprise-wide business intelligence and reporting tools. State and contracted staff will then work collaboratively to develop new dashboards and reports to respond to Medicaid business needs and use cases.

SECTION VIII: COST ALLOCATION PLAN FOR IMPLEMENTATION ACTIVITIES

Hawaii is requesting enhanced FFP for **all costs** associated with developing and implementing an enhanced data governance framework for MQD data sources, configuring the HHDC for integration, and developing an integrated data and analytics module within the HME. Since all project components are for the sole benefit of the Medicaid Program, there will be no cost allocation.

Priming existing Medicaid data for interoperability and developing an integrated module within the HME environment aligns with CMS final rule 42 CFR Part 433 and the State Medicaid Directors Letter of April 2018.[†]

MQD's ability to perform this data governance and integration work at relatively little cost is due to the considerable *prior* investments made by state, federal, and other data sources. In all, these prior investments have totaled more than \$9 Million.

In addition to the requested enhanced matching funding, non-Medicaid sources will continue to contribute resources to the HHDC, contributing at least another \$1.8M worth of work into the database over the next two years.^{††}

SECTION IX: SECURITY, INTERFACE, DISASTER RECOVERY, AND BUSINESS CONTINUITY PLANNING

The work supports Hawaii's business continuity effort. There is no change to the system security on HPMMIS. The Integrated Data and Analytics Module Vendor will be held to the following contractual agreements related to security and disaster recovery for the proposed module:

- **Disaster Recovery Plans.** Contractor shall submit disaster recovery plans and procedures to the State.
- **Privacy and Security Breach Notification.** Contractor must adhere to all applicable federal, state, and local laws and regulations regarding privacy and information security. Contractor must notify DHS immediately, but in no case in more than twenty-four (24) hours, upon becoming aware of any actual or reasonably suspected unauthorized access to or disclosure of data or security incident affecting any module component or supporting infrastructure.
- **Failure Recovery.** Contractor must provide for a recovery from a failure (information technology, telecommunications, or related or comparable failure) in the minimal possible period with minimal loss of data.
- **Failover Capacity.** Contractor must ensure that, in the event of a failure (information technology, telecommunications, or related or comparable failure) of any operational and technical module components, Contractor has arranged for failover/contingency capabilities that ensure minimal disruption to operations.

[†] State Medicaid Directors Letter #18-005. April 18, 2018. <https://www.medicaid.gov/federal-policy-guidance/downloads/smd18005.pdf>

^{††} Six submitters will continue to invest approximately \$150,000/year to comply with data submission and data quality requirements of the HHDC.

As required by CMS' Enhanced Funding Requirements, DHS will:

- Implement and/or maintain an existing comprehensive Automated Data Processing (ADP) security and interface program for ADP systems and installations in the administration of the Medicaid Program; and
- Have disaster recovery plans and procedures available.

SECTION X: REQUIRED FEDERAL ASSURANCES

Procurement Standards (Competition / Sole Source)

SMM, Part 11	Yes
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45 CFR Part 95.615	Yes
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45 CFR Part 92.36	Yes
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Access to Records, Reporting and Agency Attestations

42 CFR Part 433.112(b)(5) – (9)	Yes
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45 CFR Part 95.615	Yes
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SMM Section 11267	Yes
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Software & Ownership Rights, Federal Licenses, Information Safeguarding, HIPAA Compliance, and Progress Reports

45 CFR Part 95.617	Yes
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42 CFR Part 431.300	Yes
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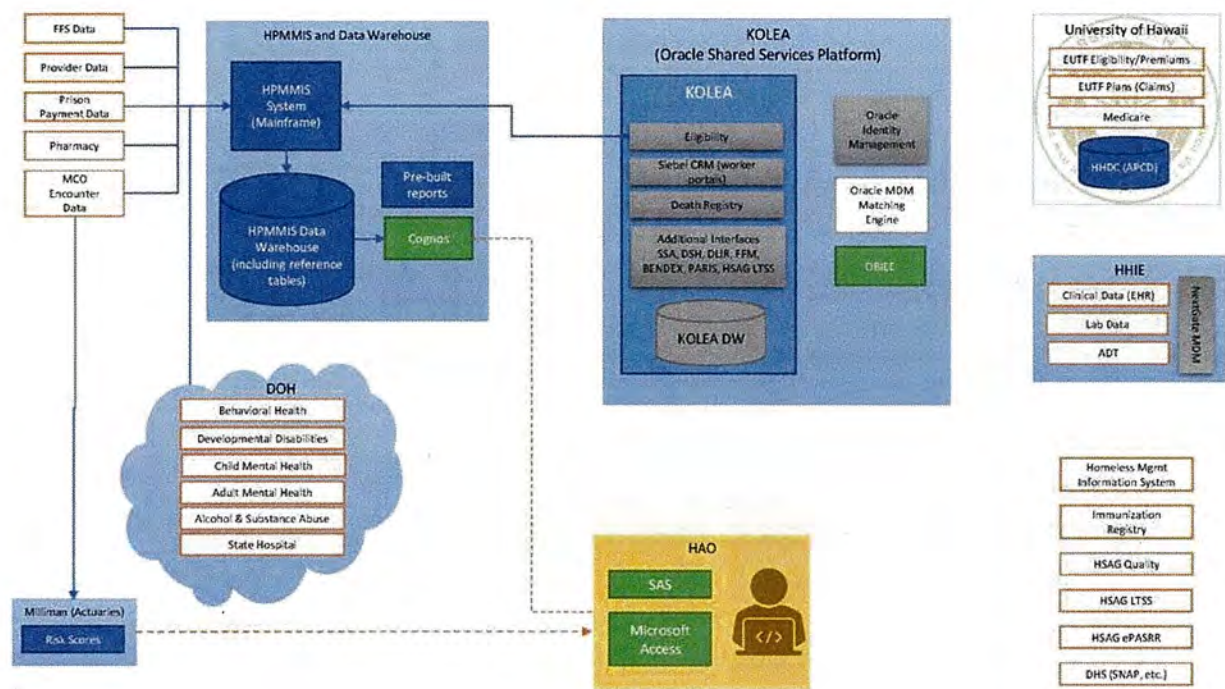
45 CFR Part 164	Yes
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Independent Verification and Validation (IV&V)

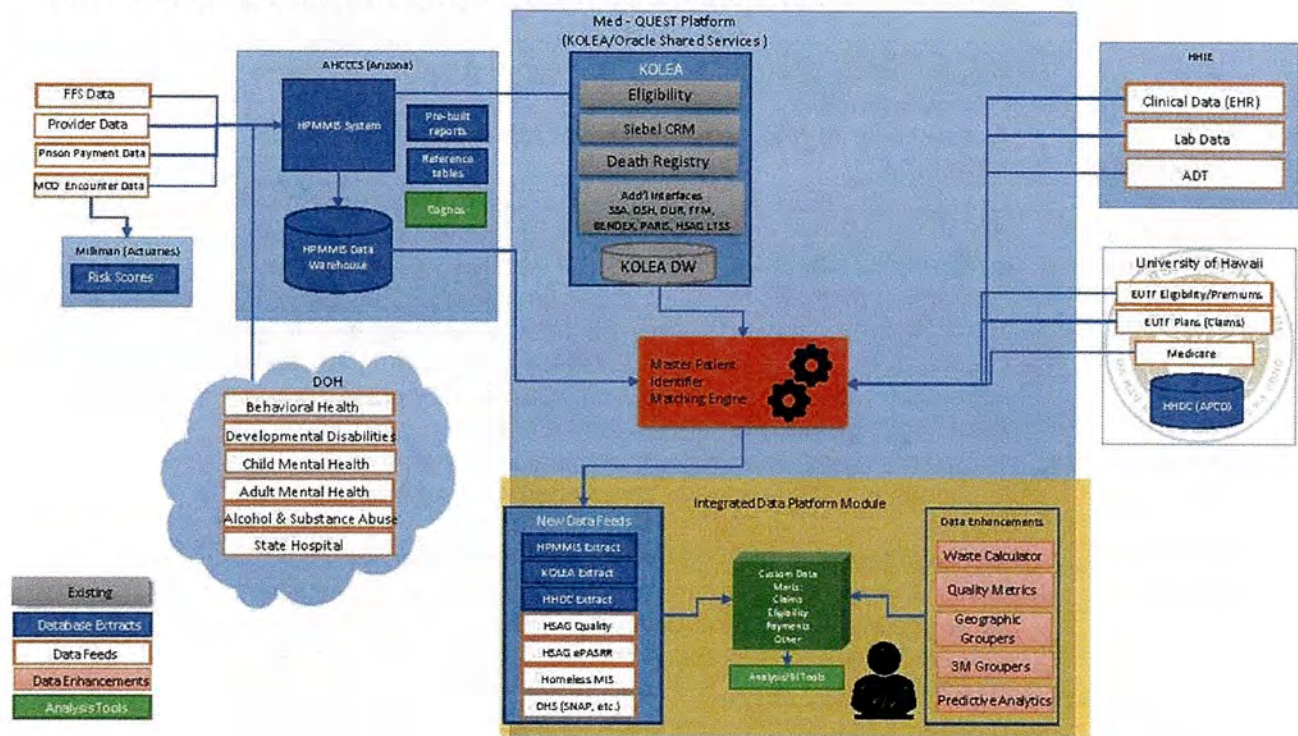
45 CFR Part 95.626	Yes
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Appendix A: System Diagram

Current System Diagram (CURRENT Hawaii Medicaid Enterprise Environment):



Future System Diagram (FUTURE Hawaii Medicaid Enterprise Environment)



Appendix B: MITA CERTIFICATION

The proposed module is consistent with the CMS Enhanced Funding Requirements: Seven Conditions and Standards (MITS-11-01-v.10), as part of the MITA-compliant Medicaid IT Enterprise:

Table B.1: Alignment with CMS Seven Conditions and Standards for Enhanced Funding

Condition	Description	Integrated Module
Modularity	Provide a modular, flexible approach to systems development, the separation of business rules from core programming, and the availability of business rules in both human and machine-readable formats.	✓
MITA Compliance	Comply with HI MITA-SSA as part of MITA-compliant MMIS system.	✓
Industry Standards Compliance	Ensure alignment with, and incorporation of industry standards to include: HIPAA security, privacy and transaction standards, accessibility standards; the HITECH Act; HHS guidance on encryption methods for electronic health information; CMS terms and conditions for research identifiable files; and HI laws regarding the electronic transmission of data and PHI; ICD-10 (new International Statistical Classification of Diseases codes); and state standards for information and technology systems.	✓
Leveragability	Promote sharing and reuse of Medicaid technologies (i.e. Business Intelligence tools) and systems within and among states.	✓
Business Results	Support accurate and timely processing of data in a highly automated system. Support and enable effective and efficient business processes, producing and communicating the intended operational results with a high degree of reliability and accuracy.	✓
Reporting	Produce data, reports, and performance information that would contribute to program evaluation, continuous improvement in business operations, transparency and accountability.	✓
Interoperability	Ensure seamless coordination and alignment between the Medicaid systems within the Enterprise.	✓

Appendix C: MITA STATE SELF ASSESSMENT (SS-A)

In 2019, DHS hired Cognosante Consulting, LLC to conduct a Medicaid Information Technology Architecture (MITA) Version 3.0 State Self-Assessment (SS-A) to document MQD's existing information technology systems and develop recommendations for advancing MITA maturity. Notably, the MITA SS-A confirmed the current limited availability of standardized health data across the HME environment and identified the development of a centralized data repository as a recommendation for enhancing MITA maturity across all 10 MITA Medicaid Business Areas.

MITA 3.0 SS-A Recommendations

The following table lists the high-level recommendations that came out of the MITA 3.0 SS-A and the Medicaid Business Areas which they would mature. The highlighted recommendations are those that the proposed data governance and integrated module would mature.

MITA 3.0 SS-A Recommendation	BR	CM	CO	EE	FM	ME	OM	PE	PL	PM
Automate and streamline processes and business logic where possible	X	X	X	X	X	X	X	X	X	X
Integrate behavioral health data and treatment within medical framework		X								
Case management tracking system should be utilized/shared by multiple business units		X			X	X		X		
Establish MQD clinical data repository		X				X		X		
Data analytics: Improve, leverage, mature analytic and reporting capabilities		X		X	X	X	X	X	X	X
Data Management Strategy: Address data sharing, standardization, data needs, data repository	X	X	X	X	X	X	X	X	X	X
Expand enterprise content management system	X		X	X	X	X	X	X	X	X
Implement electronic attachments for claim submissions					X		X			
Enable/enhance the use of the encounter data for actuarial and program integrity purposes		X					X	X		
Enhance data in HPMMIS Data Warehouse, establish business rules, improve data accessibility		X		X	X			X		X
Enhance KOLEA for member eligibility and enrollment processes				X	X		X		X	
Expand utilization of Enterprise Service Bus to share contractor and partner agreement information needed for management, monitoring, and reporting	X	X	X	X	X	X	X	X		X
Establish a Master Person Index (MPI) to help link data across different systems		X		X	X	X	X	X		X
Log communications with business relationship agreement partners	X		X							
Perform categorical risk assessments during provider eligibility and enrollment processes				X						
Implement a centralized self-service portal to allow members and providers to access own data	X	X	X	X	X	X		X	X	
Update service delivery model based on Organizational Transformation assessment				X						
Create a SharePoint list of all business relationship agreements	X		X							
Improve technology and system performance	X	X	X	X	X	X	X	X	X	
Provide training related to new program policies and/or changes to processes	X	X	X	X	X	X	X	X	X	X

Legend:

BR = Business Relationship Management	ME = Member Management
CM = Care Management	OM = Operations Management
CO = Contractor Management	PE = Performance Management
EE = Eligibility and Enrollment Management	PL = Plan Management
FM = Financial Management	PM = Provider Management

Appendix D: RFI PROCESS AND TECHNICAL REQUIREMENTS GATHERING

MQD released an RFI to collect information on the product offerings, capabilities, skills, and experience of prospective information technology vendors who could support the integrated data and analytics module. In total, 45 vendors provided written responses.

A review committee was convened to evaluate the responses. Members included staff from MQD HAO, HHDC, other state agencies, and two consulting firms representing different domains of expertise (e.g., IT infrastructure, data security, database administration, analytics, etc.). Potential technical support staff and end users of the future module were also included in the group.

Integrated Data and Analytics Module RFI Review Committee

Committee Member	Role/Organization/Agency	Areas of Expertise
Vince Hoang	Chief Information Security Officer, State of Hawaii	<ul style="list-style-type: none"> IT infrastructure Data security and privacy
Mark Choi	Department of Human Services Enterprise Officer	<ul style="list-style-type: none"> IT infrastructure Data security and privacy
Derek Vale	Chief, Health Systems Management Office, DOH	<ul style="list-style-type: none"> IT infrastructure Data security and privacy
Ranjani Starr, Alfred Herrera, David Fouse	Administrators and Analyst, HAO	<ul style="list-style-type: none"> Operations and program management Procurement Analytics
Sean Okamoto, Andrew Yeh, Ana Tualupe, Thomas Pali and Team	Administrator and Analysts, HHDC	<ul style="list-style-type: none"> IT infrastructure Data integration Database administration Analytics Data security and privacy
Kurt Kresta, Sarah Allen	Office of Financial Integrity, MQD	<ul style="list-style-type: none"> Analytics Fraud and waste detection
Elizabeth Ellis, Steve Carey, Tanya Bernstein and Team	Consultants, Freedman HealthCare	<ul style="list-style-type: none"> IT infrastructure Data security and privacy Procurement Analytics
Steven Hurlbut, Ashley Underwood	Consultants, Business Solution Technologies	<ul style="list-style-type: none"> Data governance

Each response was independently evaluated by at least two members of the RFI review committee using a standard rubric. The committee then met to debrief on all responses. Additional information was solicited from 22 of the vendors via email. Thirteen vendors were invited to meet with the committee to further explain their capabilities.

The RFI review committee identified 17 core components for the future module. The table below describes the functionality and required technical features of each of these required components, as agreed upon by the Committee at the conclusion of the RFI process.

Component	Function	Technical Requirements
Domain 1: Back End Data Aggregation, Mapping, and Processing		
Technology Platform	Host environment for module	<ul style="list-style-type: none"> Platform must be FedRAMP, HIPAA certified and cloud-based Platform must support secure, remote access Platform must support different levels of user access Platform must support Development, Testing, and Production environments
Intake Portal	Environment for data submitters to upload data to	<ul style="list-style-type: none"> Module must include tools to track data submissions, track movement of data through ETL process, output automated data quality reports, and support issue resolution processes
Database	Securely store data	<ul style="list-style-type: none"> Database must support automated ingestion of data in varied formats Vendor must provide MQD access to all data sent to the module, at all points of the data processing cycle Module must include a sandbox for analytic staff to model the data, run ad hoc queries, and store and retrieve code and data outputs
ETL Solution	Enable automated extraction, transformation, and load of each data source into database, as well as data quality checks	<ul style="list-style-type: none"> Clear and detailed documentation on vendor's ETL process and QA protocols; business rules and definitions must be provided Option for MQD to further configure, customize, and enhance ETL and QA processes ETL design must support easy resubmission of interrupted, incomplete, or failed processes
User Management Solution	Enable permission-based access to various data layers	<ul style="list-style-type: none"> Solution must include established processes for provisioning, managing, and auditing varying levels of access to data Solution must support multi-factor authentication Solution must support different data/environment access permissions, such as by role, group, attribute, and data type Solution must integrate with Active Directory/LDAP
Domain 2: Record Matching		
Master Person Index (MPI) Solution	Match records from different data sources at the person-level; assign an externally referenceable ID to ensure individual is longitudinally identified across all sources	<ul style="list-style-type: none"> Matching logic must be tried-and-tested Clear and detailed documentation on MPI logic; business rules and definitions must be provided Option for MQD to further configure and customize logic to enhance record match rates and accuracy Prefer module to provide access to external reference databases (e.g. credit data, utility-type data, public records, postal service data) to enhance record match rate Prefer module vendor to offer data cleaning assistance (e.g. automated detection and auto/manual resolution of spelling abbreviations and incomplete address data)
Domain 3: Data Enhancements		
Data Enhancement Tools	Enhance data via application of advanced categorization logic, e.g. condition-based, procedure-based, therapeutic, utilization-based, or episodic	<ul style="list-style-type: none"> Module must include flags and grouper logic to expediate analyses Clear documentation of business rules for non-proprietary enhancement logic, with option for MQD to further configure and customize logic Module must allow MQD to leverage all their existing grouper licenses

Component	Function	Technical Requirements
	groupers and risk score algorithms	
Quality Rules Engine	Generate quality measures based on established specifications	<ul style="list-style-type: none"> Prefer tool to support reporting for common quality measure sets, e.g. NCQA HEDIS Administrative Measures, CMS Medicaid Core Set Measures, AHRQ Quality Measures
Data Masking and Virtualization Solution	Support build of deidentified and limited data sets	<ul style="list-style-type: none"> Module must enable the creation of tokens or replacement of confidential data with fictitious yet preferably realistic data Module should support different obfuscation for different classes of users; assignment of user-specific masking keys increases data security
Program Accountability Tools	Support fraud and abuse detection, program integrity monitoring, and analyses to reduce use of low-value services	<ul style="list-style-type: none"> Tools to support program accountability activities Clear documentation of business rules, definitions, and logic for non-proprietary tools, with option for MQD to further configure and customize logic Module must allow MQD to leverage all their existing program accountability software licenses
Domain 4: Documentation		
Metadata Management Tools	Collect and store information that describes various facets of each data source to track data lineage and improve its usability	<ul style="list-style-type: none"> Tools must enable tracking of data and data transformations through each step of the processing pipeline (i.e. ETL, quality assurance, MPI enrichment, data enhancements) Tools must allow users to track processed data back to the original source
Documentation and Data Governance Tools	Centralized documentation, source code, and reference table storage and access	<ul style="list-style-type: none"> Tools must manage version control tracking Module should include access to standard reference tables (e.g. ICD-10, NDC, SNOMED) to facilitate data interpretation Data governance functions must be managed via inbuilt tools in a seamless automated fashion, requiring minimal manual manipulation. Must include Data Governance functions to enable adherence to MQD policies for data security, quality, assurance, data intake and release
Domain 5: Analytics		
Predictive Analytics / Advanced Data Tools	Enable predictions based on data via application of customizable, advanced statistical models/machine learning	<ul style="list-style-type: none"> Tools must leverage analytic languages familiar to MQD, e.g. R, Python, SAS Automation and/or optimization to facilitate and expedite advanced queries and modeling Module must include a sandbox for analytic staff to model the data, run ad hoc queries, and store and retrieve code and data outputs
Business Intelligence Tools	Enable retrieval, analysis, transformation, and report of data	<ul style="list-style-type: none"> Tools must be flexible and suitable for analysts with varying levels of technical proficiency, i.e. offer option to run queries and develop custom reports using code <u>and</u> build/customize reports using drag-and-drop functionality <u>and</u> gather data insights via 'ready-to-use' reports and dashboard BI tool must ideally allow for saving, re-using, and sharing queries; allow for creation of new groupings variables and flags; and enable transformation of underlying data with newly created variables/flags.

Component	Function	Technical Requirements
Data Visualization Tools	Enable creation, publication, and dissemination of dashboards, static reports, and interactive reports	<ul style="list-style-type: none"> Tools must be flexible and suitable for analysts with varying levels of technical proficiency, i.e. offer option to run queries and develop custom reports using code and build/customize reports using drag-and-drop functionality and gather data insights via 'ready-to-use' reports and dashboard Reports must be exportable into third-party solutions such as PowerBI, Tableau, or PowerPoint for additional modification Users must be able to share analytic outputs with colleagues who are not on the platform in a secure manner
Domain 6: Secure Storage		
Security and Disaster Recovery	Protect the data and enable business continuity	<ul style="list-style-type: none"> Clear documentation of data security architecture design and plan Architecture design must support a zero-trust security framework Established Service Level Agreements (SLA's) for max downtime and data recovery Clear documentation delineating the shared security responsibilities among vendor(s) and MQD Established planned downtime window and incremental and full data back-ups schedules Regular and scheduled testing of backups Compliance with all applicable privacy and security regulations, e.g. HIPAA and NIST 800-53 Attestation to specific compliance standards, e.g. ISO, SOC2, HITRUST Completion of a third-party security assessment prior to loading of any PHI into system
Domain 7: User Training and Technical Support		
Training and Technical Support	Enable state staff to maintain and optimize the solution over time, across all domains	<ul style="list-style-type: none"> Module vendor to provide detailed knowledge transfer and user training plan to enable independent, optimized use of all available technical components Module vendor to specify level of MQD staffing (FTE) and skill sets required Module vendor to specify any custom training that is required

Phase 2 Requirements Analysis – Data Governance for Module

Phase Two of the analysis included stakeholder interviews and an RFI to evaluate the data governance needs of the future module and to identify market solutions to support these needs.

Stakeholder Interviews

Two rounds of stakeholder interviews were conducted with staff overseeing current MQD data sources. The interviews assessed general knowledge of data governance principles, existing data governance practices for each data source, and data governance needs for the future module.

Stakeholders Engaged in Data Governance Requirements Analysis

Name	Role	Data Source
Meredith Nichols	Deputy Director, MQD	Various

Marivic Baitlon	Systems Officer, MQD	Various
Ranjani Starr	Health Analytics & Informatics Administrator, HAO	Various
Haidee Shaw	System Specialist	HPMMIS
Holly Bryant	System Specialist	HPMMIS
Sarah Sautter	Data Governance Manager	AHCCCS
Emerald Adams	IT Project Manager	KOLEA
Sean Okamoto	Project Manager	HHDC

Below is a summary of key learnings and recommendations from the interviews:

Domain	Recommendation / Learning
Data Governance Knowledge	<ul style="list-style-type: none"> Stakeholders identified a need to establish a more mature, shared knowledge of data governance principles and to support the implementation of a strong, centralized data governance framework for the future module.
Data Governance Practices	<ul style="list-style-type: none"> The primary focus of data governance practices has been security and data access. New data governance processes should also establish and maintain data quality so that there is a "single source of truth" across MQD data sources. Current practices were primarily created out of necessity, on an ad hoc basis. They vary across data sources. For example, data dictionaries have been established for some, but not all datasets. Existing data dictionaries vary in format and content. There is no standardization of data governance practices across all MQD data sources. The data governance framework for HHDC is the most mature among the HME data sources. Existing HHDC practices can inform the development of a centralized data governance framework for the future module.

Request for Information

MQD also released an RFI to collect information on the capabilities of existing data governance tool vendors and data governance framework implementation service providers to support the data governance needs of the future module. Nine vendors responded to the RFI.

A Committee of representatives from MQD HAO, the HHDC, and a consulting firm with data governance expertise evaluated the responses. Four vendors were selected to meet with the committee to further discuss their service offering or to demonstrate their product.

Data Governance Implementation RFI Review Committee

Committee Member	Role	Agency / Organization
Ranjani Starr	Health Analytics & Informatics Administrator	HAO
Alfred Herrera	Program & Contracts Financial Coordinator	HAO
Sean Okamoto	Project Manager	HHDC
Steven Hurlbut, Ashley Underwood, and Rick Singleton	Consultants	Business Solution Technologies

The RFI responses and subsequent conversations helped the Committee identify requirements and priorities to support successful data governance for the future integrated data and analytics module.

Data Governance Requirements and Priorities

Domain	Requirements	Priorities
Data Quality	<ul style="list-style-type: none"> Data integrated into the module must be clean and accurate. A data dictionary must be created and maintained to facilitate use of available data. 	<p>Identify resources to support source systems in preparation for and throughout module implementation and deployment</p> <ul style="list-style-type: none"> Proactively address data quality issues in source systems to prepare data to be fed into module Manage processes to extract data from source systems to feed into module Investigate and address any data quality or extract issues identified <p>Ensure quality of data coming into the platform</p> <ul style="list-style-type: none"> Fortify data quality and extraction from source systems with additional staff Utilize ETL process to ensure quality of data coming into the module, as opposed to completing separate data cleansing projects within source systems; coordinate with staff supporting source systems to resolve any identified data quality issues within the source systems Define acceptance criteria for interfacing data into the new module Maintain a Business Glossary and Data Dictionary for the module to identify master data and metadata, and to track the system of record (SOR) for each key business data element identified
Data Access	<ul style="list-style-type: none"> Access to data from the module must be centrally managed. Different types or levels of access must be accommodated. 	<p>Put access controls in place to manage, protect, and utilize data within the module</p> <ul style="list-style-type: none"> Define a consistent process for defining access rights (e.g. who gets to see what data and in what format, and at what layer/sensitivity) each time access is granted Ensure consistency in application of security and access Set up granular Attribute-Based Access controls, in addition to Role-Based Access Implement data classification Implement data masking capability Monitor and audit access
Data Request & Release	<ul style="list-style-type: none"> Request for data (i.e. access to tables, data extracts, or reports) must be centrally managed. Release of data must be centrally managed. Data masking is a requirement for data release. 	<p>Create standard procedures for data going out of the platform and balance security with accessibility</p> <ul style="list-style-type: none"> Create standard policies, procedures, and supporting processes that are consistent and defensible for all internal and external users to request data Create an application for data access Establish approval process with tiered level of review depending on type of user, type of data requested, and the level of review the data has gone through prior to release Define clear rules for what data can be released and in what format data can be provided, for example, when to provide direct system access, reports, underlying data, summarized data, etc.
Other	<ul style="list-style-type: none"> Add staffing to source systems to support Data Governance needs and data requests from the 	<p>Dedicated staff will ensure that the Integrated Analytic Platform project has support to provide timely responses for/to:</p> <ul style="list-style-type: none"> Data extracts Data quality issue resolution Source system expertise and documentation

Domain	Requirements	Priorities
	integrated analytic platform <ul style="list-style-type: none"> Collaborate closely with source data owners to build trust and collective knowledge. 	Lay the framework for improved data ownership and knowledge <ul style="list-style-type: none"> Include owners and stewards of each data source in the module development and management processes Create a clear communication plan, particularly as it relates to data management and access Include data governance and data management concepts in module end-user trainings

Phase Three of the analysis consisted of a series of stakeholder interviews conducted in the fall of 2019. Stakeholders included MQD HAO staff and representatives from other state agencies, the research community, and security and data privacy professionals.

Stakeholders Engaged in Alternative Considerations for Location of Module

Stakeholder	Role/Organization/Agency
Vince Hoang	Hawaii Chief Information Security Officer
Mark Choi	Hawaii Office of Info. Management and Technology
Derek Vale	Chief, Health Systems Management Office, DOH
Judy Mohr Peterson	Director (Administrator), MQD
Meredith Nichols	Deputy Director (Assistant Administrator), MQD
Bryce Fujii	Hawaii Office of Enterprise Technology Services
Kurt Kresta and Team	Office of Financial Integrity, MQD
Phan Sirivattha and Marivic Baitlon	Systems Office, MQD
Mike Sisson, Daniel Lippert, Carolinne Shaffer	HPMMIS Administrators
Norman Okamura, Sean Okamoto and Team	Hawaii Health Data Center (APCD) Administrators
HAO Analysts	Analysts, HAO
Chien-Wen Tseng and Victoria Fan	Physician Researchers, Hawaii Pacific Health and UH
Francis Chan and HHIE team	Hawaii Health Information Exchange
Ranjani Starr	Administrator, HAO
Lara Nitta, Derek Mizuno	EUTF

A key purpose of the analysis was to decide on the location and architecture of the future integrated data and analytics module, and in turn, the impact on data sharing, security, and data access for Medicaid staff. MQD proposed the following three options for the future architecture of the module. Stakeholder were encouraged to discuss the relative advantages, disadvantages, or considerations that they saw with each, as well as propose alternative solutions if they saw fit.

In addition to refining the list of environments for the future data module, several key recommendations emerged from the first phase of the requirements analysis:

1. *Data Completeness:* All data sources that can support Medicaid analytics should be considered for integration, and as much data as possible should be captured.

2. *Data Security and Permissions:* The State Chief Information Officer and other representatives from the Office of Information Management and Recovery and MQD articulated a desire for cloud-based solutions to promote efficient disaster recovery and align with best practices in information security. This recommendation aligned only with Option 3 (the current Shared Services platform is on-site at MQD). Additionally, clear user permissions for the analytic platform need to be established and enforced.
3. *De-Identification:* Several stakeholders identified the desire to de-identify the data as early in the integration process as possible, using a reliable identity matching solution to strip the data of direct personal identifiers and replace them with a platform-wide ID to support longitudinal analyses. There was also a discussion of whether further data masking/virtualization was necessary to ensure that end users could not reverse engineer the de-identified data, given Hawaii's fragmented geography and population. Finally, there was also a desire to maintain the direct identifiers for limited, approved downstream uses.
4. *Data Quality:* Stakeholders were interested in exploring ways in which the future solution could provide an additional layer of data quality validation, before moving the data into production on the integrated platform. This idea was particularly important to the research community. Ideas included running the fully processed clinical and HPMMIS claims data through additional open-source data quality checks used by other States and/or obtaining data quality software to use against the data.
5. *Data Access to Accommodate All Skill Levels:* Stakeholders differed in how they said they would prefer to access data in the future data and analytic module. Data access methods ranged from using pre-built, filterable reports and dashboards to answer high-level questions pertaining to Medicaid membership, utilization, and trends; to having access to data cubes in combination with a business intelligence tool able to query across multiple data sets; to full ad-hoc query access to all data elements across all data sets using code such as Python, R, or SAS.
6. *Documentation and Transparency:* Comprehensive documentation is necessary so that end users understand what all data elements mean, what data sources they came from, if/how they were derived or calculated, and what data quality processes they have gone through. This included a strong preference for methodologies and software solutions that are evident and can be configured, as opposed to "black box" solutions.
7. *Customization and Flexibility:* Many stakeholders spoke about the desire to add to, edit, or scale the data module as needed – without being beholden to any vendor. This also includes only acquiring technology components and/or analytic tools that are necessary to achieve the intended functionality.
8. *Data Governance:* Stakeholders articulated the importance of normalizing and properly mapping all incoming data so that correlated data elements align, and data is de-duplicated and modeled in a simple, straightforward way. Moreover, stakeholders expressed the importance of developing a process of regularly refreshing data and accommodating resubmissions.
9. *Data Sharing:* Nearly all stakeholders championed the idea of integrating Medicaid data sources in order gain a more comprehensive view of the individual and family unit to support Medicaid business and analytic needs. That being said, all stakeholders also

agreed that comprehensive data sharing agreements would have to be executed between MQD and other state agencies, in order to identify exactly what data was being shared and in what format and frequency; what the allowable uses of the data would be; how the data would be securely stored; and who would retain ownership.

These nine recommendations will be embedded into the project plan and all procurements for the future Integrated Data and Analytics Module.

APPENDIX E: PROJECT GOVERNANCE AND PROCUREMENT ACTIVITIES

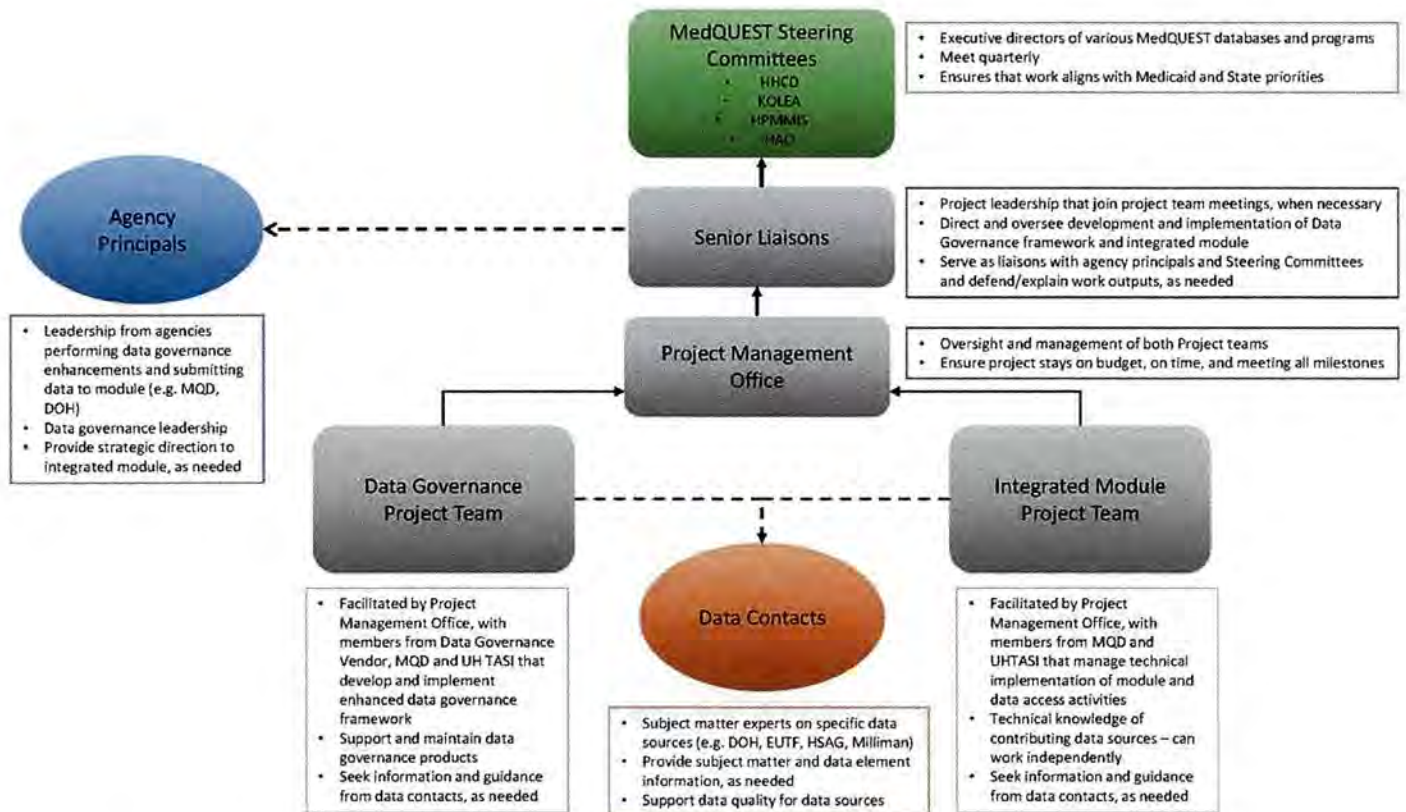
The Health Analytics and Informatics Administrator of MQD will provide overall project direction for the data governance and integrated module development and implementation work, with strategic oversight from the MQD Division Administrator.

There will be two managing bodies for the day-to-day implementation of the proposed new work. The work of both teams will be tracked by the Project Management Office Vendor.

The **Data Governance Project Team** will function as the managing body for the data governance enhancement work, responsible for identifying the data governance needs for MQD data sources that will be contributing data to the integrated module and then developing and implementing the enhanced data governance processes. The Data Governance Project Team will include state staff and contractors and will meet regularly facilitated by the Data Governance Vendor during the design, development, and implementation phase only. Once the DDI phase is complete, the scope of the Data Governance Vendor will diminish significantly as data governance processes are maintained by MQD, UH, and source data systems themselves.

The **Integrated Module Project Team** will function as the managing body for the development and implementation of the integrated data and analytics module, responsible for managing the technical implementation of the integrated module, providing oversight to the Integrated Data and Analytics Module Vendor, providing technical knowledge of the contributing data sources, and seeking additional information and guidance from the Data Contacts, as needed. The Integrated Module Project Team will include representatives from MQD and UH and will meet regularly, facilitated by the Project Management Office Vendor.

The two managing bodies will be joined on a regular basis by senior MQD team members to ensure progress against articulated MQD goals and will confer with Data Contacts, as needed, for additional subject matter expertise related to specific MQD data sources.

Project Organization Chart**PROCUREMENT ACTIVITIES**

Upon approval of the proposed work, the State of Hawaii, through MQD, will request CMS approval to issue several competitive Request for Proposals (RFP) for the contractors listed below. Responses will be evaluated based on the relative merits of each proposal, in addition to price. Each contract will have an initial two-year term (e.g. January 1, 2021 – December 31, 2022) and will be deliverables-based with strict acceptance criteria and service level requirements. The State will go back out to competitive procurement – or select a “runner up” - at the end of the initial contract term or sooner if Contractor's performance is subpar.

Data Governance Vendor

The Data Governance Vendor will be responsible for establishing the processing and overseeing the MQD data governance enhancements. This includes facilitating all meetings of the Data Governance Project Team, making final recommendations on the data governance framework that needs to be prioritized, and establishing and overseeing the rules and procedures for how data is documented, defined and shared; how data quality is validated and by whom; and, how data is properly secured in motion and at rest. The Data Governance Vendor will also be responsible for advising on and, if acquired, assisting with the

implementation of any necessary technical tools to ensure that data governance processes run smoothly and efficiently, as necessary.

Integrated Data and Analytics Module Vendor(s)

The Integrated Data and Analytics Module Vendor(s) will provide and maintain all the technical architecture, required technical components and analytic features of the future integrated data and analytics module. The required scope of work and requirements will ensure that the integrated module can securely ingest, standardize and align data across sources; provide enhanced analytic and reporting capabilities to MQD; produce dashboards and interactive reports; and, promote data sharing and use within MQD. The Integrated Data and Analytics Module Vendor may be one single vendor or may be multiple vendors.

Project Management Office Vendor

The Project Management Office Vendor will ensure integration between the Data Governance and Integrated Module Project team. The PMO Vendor will facilitate all meetings of the two teams, provide operational support for all activities related to design, development and implementation of the data and analytics module and associated data governance framework, and ensure that the data and analytics module and the associated data governance framework meet all project milestones. The Project Management Office Vendor will also provide subject matter expertise on Medicaid reports in use by other states, oversee communications related to the newly integrated data and analytics platform and facilitate conversations with stakeholders to advise on new data products and reports.

Independent Verification and Validation Vendor

The Independent Verification and Validation Vendor will provide third-party oversight of the Integrated Data and Analytics Module implementation to ensure that all work is being completed on time, on budget, and to the highest quality standards. This will include identifying software or hardware defects, providing recommendations to reduce the likelihood of preventable technology complications, and in-depth review of test processes, practices, and outcomes.

APPENDIX F: DETAIL OF ALL DDI ACTIVITIES

Define To-Be Data Governance Framework

The project will begin by refining the data governance requirements analysis previously performed (see Section 4.2 *Phase 2 Requirements Analysis – Data Governance for Module*) to identify which data sources require which data governance improvements in order for them to be successfully integrated within the data and analytics module. Core data sources that will be considered during this activity include HPMMIS, KOLEA, and the HHDC and the following questions will be considered for each:

- How data elements within the data source are defined and documented, and by whom
- How data quality within each data source is validated and maintained, and by whom
- How the data source is currently accessed, and by whom
- How the data source is currently shared, for what purposes, and with whom
- How the data source is secured
- The right technical tools that would support the above processes, if needed

Figure 1. Data Governance Maturity Model



At the conclusion of this review, MQD will prioritize the data governance processes that would add the most value to the future data and analytics module, tailored to the maturity of each core data source. The final product will be a document outlining the MQD data governance improvements to implement. Based on preliminary information, MQD anticipates 2-3 Medicaid data sources will require standardization, review, and resolution of data element definitions/documentation to support integration with the data and analytics module. MQD will also conduct visioning sessions for the data governance framework that will apply to the integrated data and analytics module itself, including the development of a robust data access and release process.

During this data governance framework review, project team members with key roles include:

- *Data Governance Vendor:* Will draft the final recommendations for the data governance framework to be implemented. This will include identifying and facilitating conversations with any additional stakeholders and defining and documenting the required data management policies and processes. The Data Governance Vendor will also provide necessary orientations to all relevant data security, privacy, and antitrust laws and oversee development of policies and procedures that follow these laws.

- *Project Management Office Vendor*: Will oversee the data governance vendor in the development of the final data governance implementation plan. This will include working with MQD to identify stakeholders for additional interviews, procuring any necessary additional documentation related to existing processes, and ensuring that the data governance planning work remains on schedule as related to the development of the integrated data and analytics module.
- *MQD Health Analytics & Informatics Administrator, MQD Chief, KOLEA Chief, Systems Office Chief, HIT Chief*: Will provide strategic direction for the data governance framework, approve the final recommendations, and sign off on the implementation protocols.
- *MQD Technical Interface Specialists*: Will serve as subject matter experts on specific data sources and provide feedback on data governance questions under consideration.

Data Governance Implementation

Informed by the data governance recommendations, the Data Governance Vendor, in close collaboration with MQD and other state staff who can represent each data source, will implement the recommended data governance processes for the integrated platform module and other identified data sources necessary to support the integrated platform module. This will include establishing policies and procedures for how data is documented, defined and shared; how data quality is validated and by whom; rectifying data quality and inconsistency issues within HPMMIS legacy data as needed; establishing protocols for how data is accessed and shared by MQD staff and external entities; ensuring that data is properly secured in motion and at rest; and utilizing technical tools to ensure that processes run smoothly and efficiently, as necessary.

During this activity, project team members with key roles include:

- *Data Governance Vendor*: Assist MQD and the Data Governance Project Team to implement the identified Data Governance framework including policies, procedures, and practices required to support Data Governance for the integrated platform and source systems as identified. Sample activities include but are not limited to: assisting MQD in facilitating the execution of data use agreements; working with the technical team to establish and maintain up-to-date data dictionaries for all MQD data assets that will be integrated; developing request forms for internal and external Medicaid data requests; and, directing and overseeing data quality improvements as necessary. The Data Governance Vendor will also support MQD staff in monitoring changes to applicable federal, state, and departmental data security policies and regulations.
- *Project Management Office Vendor*: Oversee the Data Governance Vendor in implementing the identified data governance framework, including all policies and procedures in alignment with the overall project plan.
- *MQD Technical Interface Specialists, UH Data Governance Staff*: Establish and maintain updated data dictionaries for each data source as directed by the Data Governance

Vendor; perform data cleansing and data quality improvements as identified; serve as leads on data quality issue remediation.

- *MQD Health Analytics & Informatics Administrator and UH Staff:* Direct and oversee development and implementation of the data governance framework. Develop and maintain a Data Dictionary for the integrated data and analytic module which includes a full description of each element and how it was derived.
- *KOLEA, AHCCCS Staff:* Will support the implementation of the data governance implementation by providing and maintaining documentation of data elements, how they were derived, and advising on their alignment to other similar elements across other MQD data sources, as needed.
- *MQD Health Analytics & Informatics Administrator, MQD Chief, KOLEA Chief, Systems Office Chief, HIT Chief:* Responsible for final acceptance of implemented protocols .

Education, Training and Communication to Support Data Governance and Organizational Change

MQD will ensure that appropriate Medicaid staff and all contractors understand the existing data governance processes and how to properly implement them. This strong knowledgebase will ensure that key stakeholders continue to play an active, engaged role in the newly matured data governance framework. This education and training will be provided in two parts:

- Formal Orientation. The Data Governance Vendor will provide an initial orientation to MQD's new data governance processes, to be delivered in small group sessions that are tailored to different audiences with a live presentation component followed by Q&A. Training will encourage open dialogue to facilitate consensus building, ensure shared understanding, and support peer-to-peer learning.
- Centralized Repository: The Data Governance Vendor along with other contractors and MQD staff will stand-up a regularly updated, centralized repository of information which will provide links to all updated data dictionaries, forms, issue logs, communication matrices, information regarding policy changes, and other relevant documents.

Data governance teams for each data source will meet on a regular basis; at least bi-weekly during the implementation phase to establish and implement these education and training channels.

During this activity, project team members with key roles include:

- *Data Governance Vendor:* Will provide the formal orientation to MQD staff and oversee the development and implementation of the centralized data governance document repository.
- *MQD technical interface specialists, UH Data Governance Staff, AHCCCS staff, KOLEA staff:* Participate in training sessions and contribute to the centralized repository.

Data Planning to Prepare for Data Source Integration

Building off of the list of essential data sources already identified, MQD staff will meet on a regular basis to finalize the list of data sources for integration and plan for implementation with

associated data source stakeholders. Questions that will be considered and addressed in this planning and development work will include the following:

- Whether a data dictionary exists that is good enough condition to begin the mapping work (i.e. assuming that enhancements to the data dictionaries will be made as part of the data governance framework implementation).
- The format of the planned extracts transferred to the integrated data and analytics module, and the approximate size.
- The frequency of data extract transfers.
- The mechanism of data extract transfer.
- Whether historical data is available and can be transferred to establish a benchmark.
- Identification of the data contacts/subject matter expert(s) for the data source.
- Whether a data use agreement must be executed and by whom.
- The immediate Medicaid use cases and/or reporting requirements that the data source can support.
- The existence of common keys that could tie the Medicaid data source to others (e.g. Medicaid beneficiary ID, social security number, name, address, telephone number, etc.).
- What data quality checks the data has already passed through and in turn, which additional data quality checks would be appropriate.

The prioritization of data sources for integration will be identified and derived from the answers to the questions above and with strategic oversight from MQD managers and division chiefs. MQD envisions this to be an agile process based on Medicaid's needs and the development queue outlined by the selected Integrated Data and Analytic Module vendor. Depending on the source, data may come directly from HPMMIS, KOLEA, the HHDC, the submitters, and other state agencies or programs.

During the planning phase, project team members with key roles include:

- *MQD and UH Staff:* MQD and the UH team will be responsible for leading this data planning work. UH will work with individual data sources to understand their data and plan for submission to the Integrated Data and Analytic Module. MQD staff will be responsible for executing all applicable legal documents including Data Sharing and Use Agreements. Together, both MQD and UH will prioritize data sources for integration, providing subject matter expertise on specific data sources to the Integrated Data and Analytic Module Vendor, as necessary.
- *Project Management Office Vendor:* Responsible for facilitating meetings to finalize and prioritize data sources for integration, developing and maintaining project plans and timelines, maintaining the data source integration queue, and providing supporting oversight to the Integrated Data and Analytic Module Vendor.
- *Integrated Data and Analytic Module Vendor:* Provide guidance on the number of data sets that can be integrated at any given time, the format that data should arrive in, the preferred mechanism of secure data transfer, the common keys that will be necessary for optimal person matching, and all other related technical questions.
- *AHCCCS, KOLEA, HHDC, and HHIE staff:* Work closely with MQD, UH, and contracted vendors to design data extracts that meet Medicaid use cases. Provide subject matter expertise on HPMMIS, HHIE, and eligibility determination system data to determine the

most appropriate data for inclusion in extracts to the integrated module, the frequency of extracts, the format of extracts, and the data transfer mechanism. Execute data sharing agreements, as necessary.

Data Collection, Processing, and Mapping

The Integrated Data and Analytics Module Vendor will provide the technology, software, and functionality to securely intake the data from all data sources, stage it, run it through a master person matching tool, perform data quality checks, and perform source to target mapping. UH will be responsible for overseeing and refining all data quality checks, person matching algorithms, and all other processing code. UH will also be responsible for advising on the normalization and linking of data across sources.

Integrated Data and Analytic Module Vendor Tasks

The Integrated Data and Analytics Module vendor will be responsible for the following development and implementation tasks:

- Design, develop, test, and implement a secure cloud-based platform, including configuring and managing the operating system, storage, memory, security, and integrating and maintaining all software tools and licenses.
- Develop and install a secure mechanism for data transfer related activities which includes the following functionality:
 - Allow data sources to securely transmit all necessary data to the module.
 - Allow data sources and MQD and University of Hawaii staff to track the progress of data submissions and view data quality reports and feedback.
 - Encrypt all data in motion and at rest in accordance with HIPAA and the HITECH act, including:
 - A process for handling data files that are submitted without appropriate encryptions
 - Encryption of data during upload and any subsequent transmission using FIPS 140-2 compliant cryptographic controls in accordance with NIST Special Publication 800-52
 - Encryption of data at rest in accordance with NIST Special Publication 800-111
 - Allow a mechanism for staff from various data sources to report data submission problems or ask questions
 - Has a configurable data intake architecture which permits ad-hoc edits based on waivers, format modifications, and other logic or business rule variations, as approved by MQD
- Perform extract, transform, and load (ETL) processes on received data.
- Provide and implement a master person identification tool to track individuals longitudinally across data sources and time.
- Run all data through automated Level 1 and Level 2 data quality checks, as appropriate, based on the data planning work and provide the reporting output to UH and the data sources.
- Develop a process to transform data into Limited Data Sets (LDS) and integrate with Master Person Identification processes for particular use cases.
- Perform source-to-target mapping, which consists of integrating data from all Medicaid data sources in varying formats with data received from any non-exclusively-Medicaid data sources such as the HHDC, the Homeless Management Information System, the HHIE, and Medicare (CMS), including defining and documenting the link between data sources;

- Prepare data for analysis by designing and developing new data structures used to facilitate analytics across platforms.

UH Tasks:

- Request and receive Medicare data through the State Agency Request Program.
- Oversee the ETL process.
- Oversee and advise on the logic used to implement the master person identification tool, ensuring that all direct person identifiers are secured.
- Oversee all Level 1 and Level 2 data quality checks.
- Support source-to-target mapping, including advising the Integrated Data and Analytic Vendor on the common keys and logic for aligning and joining data sources.
- Collaborate with the Integrated Data and Analytic Module Vendor on ways to optimize how data within the module is configured to support Medicaid use cases.
- Collaborate with the Integrated Data and Analytic Module Vendor on the design of the module's architecture to ensure that it is maximally aligned with Medicaid use cases.

Data Governance Vendor

The Data Governance Vendor will be responsible for the following activities:

- Work with the UH to develop and maintain a Data Dictionary for the integrated data and analytic module and defining a data lineage tracking mechanism including a full description of each element and how it was derived and has changed.
- Ensuring that all necessary updates to the data source documentation, based on data quality checks, are made.
- Collaborate with the Integrated Data and Analytics Module Vendor and UH on identifying the common keys and logic for aligning and joining data sources together.
- Collaborate with the Integrated Data and Analytic Module Vendor on documenting the link between data sources.

AHCCCS, KOLEA, HHIE Staff Tasks:

The staff from the various data sources will be responsible for developing the data extracts that will be transmitted to the module, performing quality assurance, and providing documentation. Specific activities include:

- Creating and transmitting the agreed upon fully processed data extracts to the integrated module.
- Providing the necessary agreed-upon documentation to accompany the data extracts which provides a description of the contents of the file and data model. Examples may include: the relationship between data tables (e.g. key fields linking tables); examples of how certain tables and fields may or may not be linked for various analyses; and a visual schematic of the data model.
- Assisting with data quality issue resolution.

Application of Business Rules and Enhancements

After the data normalization and configuration process, the Integrated Data and Analytics Module Vendor will coordinate with vendors who provide various groupers, specialized calculators, quality measure rules, and risk scoring and disease staging algorithms, to apply various enhancements to the integrated data and optimize for Medicaid use cases and business needs. These enhancements will be provided within the module by the Integrated Data and Analytics Module Vendor, with oversight from the UH and MQD teams. Enhancements include, claims versioning, applying Medicaid program hierarchies, establishing groupers (e.g. disease,

utilization and episode), conducting risk scoring, flagging coordination of benefits claims, classifying providers by specialty, and providing tools that support reporting for common quality measure sets (e.g. NCQA HEDIS, CMS Medicaid Core Set Measures, etc.). MQD prefers that these value-added elements be open source so that detailed documentation for all methodologies is available, calculations can be replicated, measure variants can be explored, and comparisons can be drawn.

Integrated Data and Analytics Module Vendor

The Vendor will submit all methodologies for data enhancements to MQD and UH for approval prior to implementation and update documentation on an annual basis. Enhancements planned to be applied to the data within the integrated module are as follows (additional tasks may be specific to the datasets prioritized for integration):

- Provide risk scoring and groupers (disease, staging, utilization, episode, etc.).
- Identify claims that may be adjudicated multiple times (claims versioning) and ensure that the fully processed data captured in the module reflects the most current adjudication for each claim, based on each submitter's specific processes for identifying versions of each claim.
- Provide a quality rules engine that supports Medicaid reporting and evaluation of managed care plans on common quality measure sets (e.g. NCQA HEDIS, CMS Medicaid Core Set Measures, AHRQ Quality Measures).
- Protect data as needed, with encryption, tokenization, or other suitable obfuscation technique, as determined by MQD and UH.
- As proposed by UH and MQD, apply custom groupers to data (e.g. classification of providers by taxonomy code using the National Plan and Provider Enumeration System (NPPES); mapping the state's populations into sub-county geographic groupings, etc.)
- Identify Coordination of Benefit (COB) claims and combine these with claims from the primary payer to reflect a "total paid" category.
- Contextualize Medicaid data with eligibility categories (e.g. Aged, Blind & Disabled (ABD), etc.), and participation in specific programs (e.g. Long-Term Services and Supports (LTSS), etc.).
- Attribute patients to providers and settings.
- Generate flags in the data that allow expedited analysis (e.g. readmissions, emergency room visits, mental health claims, substance abuse claims, etc.).

UH Tasks

Work collaboratively with MQD to review, recommend, and approve data enhancements (both on Medicaid and non-Medicaid data) and perform quality assurance checks to verify that value-added outputs have been accurately applied. UH will also meet with MQD and the Integrated Data and Analytics Module Vendor staff to review existing enhancements, identify the need for additional metrics, and identify and propose new methodologies, as needed and at least annually.

MQD Tasks

Oversee the development of custom data enhancements and advise on the development of additional enhancements, at least annually.

Quality Assurance and Data Source Communication

Various tests will be conducted at each step in the workflow to ensure data is correct upon receipt from data sources, is properly processed and linked within the integrated module, and is configured correctly to support Medicaid use cases. While the Integrated Data and

Analytics Module Vendor will be responsible for running the data through the various tiers of data quality checks, UH will be responsible for advising the Vendor on which data quality checks are appropriate, where data quality checks need refinement, and will serve as the liaison between data sources to troubleshoot and resolve identified data quality issues. Oversight will be provided by MQD and the Project Management Office Vendor.

Integrated Data and Analytics Module Vendor

Perform quality tests on newly received data, prior to its integration into the module. As part of this work, the vendor will perform the following:

- Develop a data quality plan, subject to MQD approval, to ensure that all data processed and stored in the integrated module is as complete and accurate as possible, and that deficiencies are documented and communicated. At a minimum, this plan will include:
 - Level 1 checks comprised of automated data intake validation scripts run against the data as part of the ETL process when the data files are received from sources, to ensure compliance with system requirements and approved waivers or exceptions.
 - Level 2 checks comprised of automated production-level checks for reasonableness of the received data (e.g. month-over-month trend analyses) that are implemented after files pass Level 1 checks.
- Collaborate with UH to design data quality reports verifying the completeness and accuracy of the data contained in the integrated module.
- Develop a web portal module to communicate data quality results back to submitters for review, attestation, and/or correction.

UH Tasks:

MQD staff will be responsible for overseeing data quality as performed by the Integrated Data and Analytics Platform Vendor, reviewing the output of the data quality checks, and working with data submitters to troubleshoot and resolve identified data quality issues. As part of this work, UH will perform the following tasks:

- Based on the data planning work, inform the Integrated Data and Analytics Platform Vendor which Level 1 and Level 2 checks are appropriate for each data source.
- Oversee all Level 1 and Level 2 data quality checks, provide feedback to data sources as appropriate and work with data sources to troubleshoot and resolve all data quality issues.
- Provide ongoing communication to data submitters to apprise them of relevant project changes
- Advise on additional data quality checks that may be warranted.

MQD Tasks

Advise on the development of additional data quality checks and provide project updates to data sources, as needed.

Development of Analytics, Medicaid Reports and Dashboards

The newly integrated data module will be accessible to Medicaid analysts with varying technical skill levels in a number of ways, including: programming languages such as Python, R; SAS; an Enterprise-wide Business Intelligence tool that allow for the development of custom queries using drag-and-drop functionality and scripting; and pre-built, filterable reports and dashboards to answer high-level questions pertaining to Medicaid membership, utilization, costs, and trends.

All access to the integrated module, its data, and its functionality and reports will be based on strict, role-based permissions for all users.

The Integrated Data and Analytics Module Vendor will be responsible for developing the analytic environment, mapping the data to the Business Intelligence tool and all pre-built reports, and providing training and technical support on the Business Intelligence tool. The vendor will also be responsible to provide certain custom analytic reports and dashboards for MQD's use and reuse in the platform. In addition to implementing these activities, the Vendor will be responsible for ensuring the analytic environment and tools meet the following requirements as part of the MITA-compliant Medicaid IT enterprise:

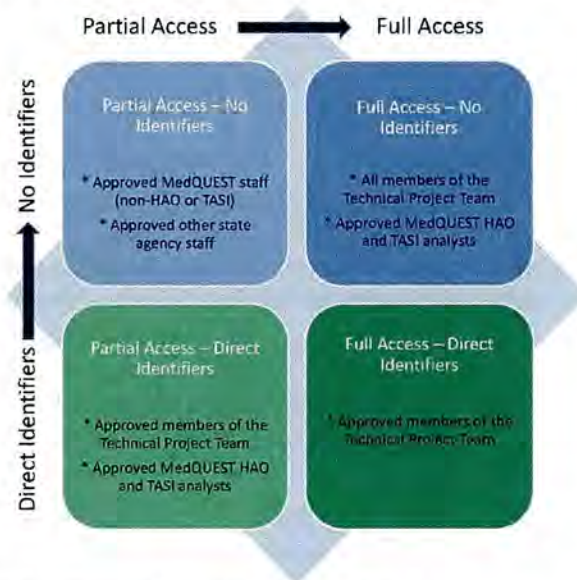
- CMS conditions and standards.
- Capability to protect access to beneficiaries' data through role-based permissions for MQD users.
- Direct access to the processed data.
- Direct access to all Medicaid value-added elements.

UH will be responsible for producing ad-hoc reports, dashboards and analytic products as directed by MQD to fulfill Medicaid business needs and priorities.

Integrated Data and Analytic Module Vendor Tasks:

The Integrated Data and Analytic Module Vendor will collaborate closely with MQD and UH to perform the following:

- Establish appropriate role-based permissions within the integrated module analytic environment, including at a minimum, the following permission levels.
 - *Full Access – Direct Identifiers*
 - *Partial Access – Direct Identifiers*
 - *Full Access – No Identifiers*
 - *Partial Access – No Identifiers*
- Map all fully-processed data to the Business Intelligence Tool, pre-built reports, or any other analytic or data products using the established data model, allowing for the capability to refresh content at least monthly using the updated data extracts sent to the integrated module;
- Develop several pre-built reports that meet Medicaid's most fundamental business and priority areas, as advised by MQD and UH team. The Vendor built reports and dashboards will be available for MQD and UH staff to copy, modify, and distribute as needed.



UH

UH staff will be responsible for the following:

- Oversee the configuration of the analytic environment, including testing that the data is accurately and optimally mapped to the Business Intelligence tools and pre-built reports for required analytic capabilities.

- Facilitate conversations with identified Medicaid stakeholders to understand the types of additional reports/dashboards/data marts that are needed to fulfill Medicaid business needs and priorities.
- Provide recommendations for the measures to be included in each additional report/dashboard/data mart.
- Develop additional, ad-hoc reports and dashboards within the analytic environment, as identified by stakeholders.
- Work with MQD to ensure there is analytic continuity between the methodologies used within the Integrated Data and Analytics Module and other state initiatives.

MQD will be responsible for overseeing the conversations, recommendations for, and development of additional ad-hoc reports and dashboards.

Project Management and Operational Support

In addition to supporting all the DDI tasks outlined above, the Project Management Office Vendors' responsibilities will include the following:

- Facilitate regular meetings with MQD, UH, the Integrated Data and Analytics Module Vendor, and other identified stakeholders to track and oversee data collection, processing, and all analytic tasks.
- Provide regular updates on project status and identified risks to MQD and other identified stakeholders.
- Communicate with MQD and other agency leadership to continually reflect on and refine their vision for the integrated module.
- Support MQD's oversight of all contracted vendors by tracking their budget against the milestones, deliverables, and work quality. Support all other account management work, as requested by MQD.
- Support ongoing communication with all data sources.
- Track project status to achieve Medicaid analytic goals in a timely, and efficient manner.
- Facilitate completion of all required CMS documentation, including monthly project status reports and submission of all annual IAPD updates, revised budgets, and other supporting documentation as needed.
- Provide subject matter expertise on how to integrate and configure the module to best leverage the data for the Medicaid Program.
- Serve as liaisons to MQD and other state agency principals to translate MQD's vision for data-driven decision making and integrated analytics into daily operations and easily accessible analytic functions.
- Support all communication efforts and presentations regarding the Integrated Platform.

MQD staff will provide oversight of the full project, strategic decision making and coordination with State leadership.

DEPARTMENT OF HEALTH & HUMAN SERVICES
Centers for Medicare & Medicaid Services
7500 Security Boulevard, Mail Stop S2-22-16
Baltimore, Maryland 21244-1850



March 18, 2021

Judy Mohr Peterson, PhD
Med-Quest Division Administration, Department of Human Services
P.O. Box 339
Honolulu, HI 96809-0339

RE: HI-2021-02-10-MMIS-IAPD-Analytics-FFY2021-2022

Dear Dr. Peterson:

This letter is in response to Hawaii's submission dated February 10, 2021, requesting that the Centers for Medicare & Medicaid Services (CMS) review and approve the State's Enterprise and Integrated Data Analytics Module Medicaid Management Information System (MMIS) Advance Planning Document (APD) to support work related to the State's Medicaid Enterprise System (MES).

Hawaii's APD requests \$24,188,450 initial funding for the analytics system. The State's current data sources are disconnected for one another and inadequately documenting raw data and the appropriate tools are not available to the State to support enhanced analysis.

This funding requested also includes a specific focus on the outcomes of: promote Medicaid data interoperability, provide comprehensive views of Medicaid beneficiaries, improve monitoring and reporting Medicaid data, and develop a streamlined analytic module that contains data from various Medicaid data to improve usability and enhance productivity.

CMS approves Hawaii's APD effective February 10, 2021, in accordance with Section 1903(a)(3) of the Social Security Act, 42 CFR 433, Subpart C, 45 CFR 95, Subpart F, and the State Medicaid Manual, Part 11. CMS is authorizing expenditures under this APD, in an amount not to exceed the approved Project Medicaid Detailed Budget Table (MDBT) in Appendix A. Authorization of federal funding for this project will expire on September 30, 2022. This approval letter supersedes any prior MMIS State's Enterprise and Integrated Data Analytics Module APDs for the Federal fiscal years (FFYs) approved within Appendix A.

Please note: CMS is approving this state Medicaid IT project and the associated funding; however, this APD approval does not constitute approval of any Medicaid program policies. Medicaid program policies must be reviewed and approved through the appropriate state plan amendment or waiver processes.

CMS' Consolidated MDBT in Appendix B includes approved funding for all MMIS Planning, Implementation, and Operational APDs for the listed FFYs.

This project is subject to all the requirements specified under Appendix C, which includes federal regulations and additional information about the State's responsibilities concerning activities described in the APD. The funding and scope of work approved in the APD are subject to these requirements. **Failure to comply with the federal requirements and State responsibilities in Appendix C is subject to FFP disallowance.**

Transformed Medicaid Statistical Information System (T-MSIS) Compliance

On August 10, 2018, CMS issued State Health Official (SHO) Letter 18-008, outlining T-MSIS data reporting requirements for state Medicaid and CHIP programs (<https://www.medicaid.gov/Federal-Policy-Guidance/downloads/SHO18008.pdf>). As discussed in the CMCS Informational Bulletin (CIB) dated March 18, 2019 (<https://www.medicaid.gov/federal-policy-guidance/downloads/cib031819.pdf>) and subsequent T-MSIS guidance, Hawaii's is required to maintain monthly production submissions of T-MSIS data files and continue to resolve T-MSIS data issues.

As of the November 1, 2020 T-MSIS reporting period, Hawaii is compliant with T-MSIS requirements. Specifically, Hawaii has data quality issues in two (2) T-MSIS Priority Items (TPIs), which meets the requirement to reduce data quality issues to no more than two (2) TPI categories.

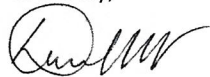
Timely, accurate, and complete T-MSIS data submission continues to be a CMS priority and is even more critical to national analyses of Medicaid and CHIP services, activities, and expenditures during the COVID-19 Public Health Emergency. To comply with T-MSIS Data Quality Assessment criteria, CMS requests that States continue to submit monthly T-MSIS data and continue, as much as possible, to work towards the recommended timelines for resolving TPIs. CMS will continue to measure and report on T-MSIS data quality issues, and provide ongoing technical assistance to states. Please review Appendix C (T-MSIS) of this APD response, which further details ongoing requirements for T-MSIS Data Quality compliance.

The State must obtain CMS' prior approval for APDs, Requests for Proposals (RFPs), contracts, and contract amendments as specified in regulations at 45 CFR 95.611. Per 45 CFR 95.611(d), CMS has 60 days to review and respond to a state's APD submission. Failure to submit an Annual APD or APD-Update in a timely manner may put the State at risk of having a gap in approved FFP. The State is reminded that funding for each Federal fiscal year expires on September 30 of the corresponding FFY. An Annual APD or APD-Update can be submitted at any time, however it must be approved by CMS before the funding expires to ensure there is no gap in approved FFP.

Formal submissions of MMIS program areas APDs, RFPs, and contracts should be sent to the CMS dedicated MMIS electronic mailbox: MedicaidMMIS@cms.hhs.gov with a cover letter addressed to Dzung A. Hoang, Director, Division of State Systems.

If you have any questions, please contact the Medicaid Enterprise Systems (MES) State Officer, Robert McCarthy, at 206-615-2505, or by e-mail at robert.mccarthy@cms.hhs.gov.

Sincerely,



Dzung A. Hoang, Director
Division of State Systems

CC:

Edward Dolly, CMS/CMCS
Dzung Hoang, CMS/CMCS
CAPT Samuel Schaffzin (USPHS), CMS/CMCS
Nicolas Aretakis, CMS/CMCS
Eugene Gabriyelov, CMS/CMCS
CAPT Willie Tompkins (USPHS), CMS/CMCS
Debbie Simon, CMS/CMCS
John Castro, CMS FMG Lead

Appendix A
Hawaii's – MMIS Analytics – Project Medicaid Detailed Budget Table*
 Covers Federal Fiscal Years (FFYs) 2020 - 2022 (ending September 30, 2022)

	MMIS CMS Share (90% FFP) DDI	State Share (10%)	MMIS CMS Share (75% FFP) DDI	State Share (25%)	MMIS CMS Share (75% FFP) M&O	State Share (25%)	MMIS ENHANCED FUNDING FFP Total	State Share Total	MMIS ENHANCED FUNDING TOTAL COMPUTABLE
	2A† + 2B†	--	2A† + 2B†	--	4A† + 4B†	--			
FFY 2021	\$9,895,707	\$1,099,523	\$0	\$0	\$0	\$0	\$9,895,707	\$1,099,523	\$10,995,230
FFY 2022	\$11,873,898	\$1,319,322	\$0	\$0	\$0	\$0	\$11,873,898	\$1,319,322	\$13,193,220

	MMIS CMS Share (50% FFP) DDI	State Share (50%)	MMIS CMS Share (50% FFP) M&O	State Share (50%)	MMIS NOT ENHANCED FUNDING FFP Total	State Share Total	MMIS NOT ENHANCED FUNDING TOTAL COMPUTABLE
	2A† + 2B†	--	5A†+5B†+5C†	--			
FFY 2021	\$0	\$0	\$0	\$0	\$0	\$0	\$0
FFY 2022	\$0	\$0	\$0	\$0	\$0	\$0	\$0

	MMIS ENHANCED FUNDING FFP Total	MMIS NOT ENHANCED FUNDING FFP Total	TOTAL FFP	STATE SHARE TOTAL	APD TOTAL COMPUTABLE
FFY 2021	\$9,895,707	\$0	\$9,895,707	\$1,099,523	\$10,995,230
FFY 2022	\$11,873,898	\$0	\$11,873,898	\$1,319,322	\$13,193,220

*Funding amounts described here are summarized by FFY; however, funding is only approved to be used in accordance with the approval dates described in this letter.

Appendix B
Hawaii's – MMIS APD – Consolidated Medicaid Detailed Budget Table*
 Covers Federal Fiscal Years (FFYs) 2020 - 2022 (ending September 30, 2022)

	MMIS CMS Share (90% FFP) DDI	State Share (10%)	MMIS CMS Share (75% FFP) DDI	State Share (25%)	MMIS CMS Share (75% FFP) M&O	State Share (25%)	MMIS ENHANCED FUNDING FFP Total	State Share Total	MMIS ENHANCED FUNDING TOTAL COMPUTABLE
	2A† + 2B†	--	2A† + 2B†	--	4A† + 4B†	--			
FFY 2021	\$21,057,172	\$2,339,686	\$440,963	\$146,988	\$13,881,168	\$4,627,056	\$35,379,303	\$7,113,730	\$42,493,033
FFY 2022	\$15,062,933	\$1,673,659	\$1,145,197	\$381,732	\$371,022	\$123,674	\$16,579,152	\$2,179,065	\$18,758,217
FFY 2023	\$677,993	\$75,333	\$0	\$0	\$0	\$0	\$677,993	\$75,333	\$753,326

	MMIS CMS Share (50% FFP) DDI	State Share (50%)	MMIS CMS Share (50% FFP) M&O	State Share (50%)	MMIS NOT ENHANCED FUNDING FFP Total	State Share Total	MMIS NOT ENHANCED FUNDING TOTAL COMPUTABLE
	2A† + 2B†	--	5A†+5B†+5C†	--			
FFY 2021	\$0	\$0	\$765,042	\$765,042	\$765,042	\$765,042	\$1,530,084
FFY 2022	\$0	\$0	\$1,007,419	\$1,007,419	\$1,007,419	\$1,007,419	\$2,014,838
FFY 2023	\$0	\$0	\$609,754	\$609,754	\$609,754	\$609,754	\$1,219,508

	MMIS ENHANCED FUNDING FFP Total	MMIS NOT ENHANCED FUNDING FFP Total	TOTAL FFP	STATE SHARE TOTAL	APD TOTAL COMPUTABLE
FFY 2021	\$35,379,303	\$765,042	\$36,144,345	\$7,878,772	\$44,023,117
FFY 2022	\$16,579,152	\$1,007,419	\$17,586,571	\$3,186,484	\$20,773,055
FFY 2023	\$677,993	\$609,754	\$1,287,747	\$685,087	\$1,972,834

*Consolidated funding amounts described above are summarized by FFY; funding is only approved to be used in accordance with the approval dates described in this letter.

†MBES Line Item	
2A	MMIS- Design, Development or Installation of MMIS: Cost of In-house Activities
2B	MMIS- Design, Development or Installation of MMIS: Cost of Private Contractors
4A	MMIS- Operations of MMIS: Cost of In-house Activities
4B	MMIS- Operations of MMIS: Cost of Private Contractors
5A	MMIS- Mechanized Systems, not approved under MMIS procedures: Cost of In-house Activities
5B	MMIS- Mechanized Systems, not approved under MMIS procedures: Cost of Private Contractors
5C	MMIS- Mechanized Systems, not approved under MMIS procedures: Cost of Interagency Activities

FFP rates for specific activities and costs can be found at 76 FR 21949, available at <https://federalregister.gov/a/2011-9340>

Appendix C

This APD project is subject to the federal regulations and State responsibilities as follows:

- 42 CFR 433, Subpart C, “Mechanized Claims Processing and Information Retrieval Systems”
- 45 CFR 75, “Uniform Administrative Requirements, Cost Principles, and Audit Requirements for HHS Awards”; and Subpart D, “Procurement Standards”
- 45 CFR 95, Subpart F, “Automatic Data Processing Equipment and Services—Conditions for Federal Financial Participation (FFP)”
- 42 CFR 457.230, “FFP for State ADP expenditures”
- State Medicaid Manual (SMM), Part 11
- SMD Letter #16-004 Re: Mechanized Claims Processing and Information Retrieval Systems-Enhanced Funding, and SMD Letter #16-009 Re: Mechanized Claims Processing and Information Retrieval Systems-APD Requirements, which contain additional details on specific FFP rates for qualifying activities

Approved Funding

The amounts allocated per Federal fiscal year in Appendices A and B cannot be reallocated between Federal fiscal years, even within the period of this letter’s approval, without submission and approval of an APD-Update. Only actual costs incurred are reimbursable.

Systems Software

All software development receiving 90 percent FFP must be state-owned and in the public domain in accordance with 42 CFR 433.112(b)(5) and (6) and 45 CFR 95.617. Federal regulations under 45 CFR 95.617(c) specify that 90 or 75 percent FFP is available for the license for proprietary software, but no FFP is available for the development of that software.

Per 45 CFR 95.617, the Department reserves a royalty-free, nonexclusive, and irrevocable license to reproduce, publish, or otherwise use and to authorize others to use for Federal Government purposes, such software, modifications, and documentation.

Data Safeguarding and Data Breach Reporting

The State’s MMIS projects and operations are subject to federal regulations at 42 CFR Part 431, subpart F, “Safeguarding Information on Applicants and Beneficiaries,” and the Administrative Simplification provisions under the Health Insurance Portability and Accountability Act (HIPAA) requirements as specified in 45 CFR Part 160 and Part 164. Further, the State is bound by the requirements in section 1902(a)(7) of the Social Security Act, which require states to provide safeguards that restrict the use or disclosure of information concerning applicants and beneficiaries to purposes directly connected with the administration of the Medicaid program.

In the event of data breach, the State must immediately report the incident to the CMS IT Service Desk by email at cms_it_service_desk@cms.hhs.gov, or call the 24/7 CMS Service Desk phone number: 1-800-562-1963.

T-MSIS

Should the State’s Medicaid Enterprise Systems fail to maintain and produce all federally required program management data and information, including the required T-MSIS eligibility, provider, claim, and managed care encounter data, in accordance with all applicable regulations and sub-regulatory guidance and the

approved APD for this effort, or fails to do so under a subsequent compliance plan, FFP may be reduced, suspended or disallowed as provided for in Federal regulations at 45 CFR § 95.612. Per the State Health Official (SHO) Letter 18-008 dated August 10, 2018¹ and subsequent T-MSIS guidance, the State must:

- Maintain monthly production submissions of T-MSIS data files, and
- Work in good faith to resolve data quality issues as defined by the T-MSIS Priority Items or other alternative Data Quality criteria established and communicated by CMS.
 - States assessed as Red (6 or more open TPI categories), will target Data Quality issues in fewer than two TPI categories across TPIs 1-32.
 - States assessed as Yellow (two or more open TPI categories), will target Data Quality issues in fewer than two categories across TPIs 1-32.
 - States assessed as Blue (0-2 open TPI categories), will work with CMS to set reasonable targets for improved Data Quality.

All states are expected to collaborate with CMS to improve the landscape of T MSIS data quality, if the categories listed here do not apply.

Throughout this project, the State should ensure that any changes implemented within Medicaid Enterprise System(s) (MES) would not result in any degradation in the level of accuracy, completeness or timeliness of the State's T-MSIS data submissions. Product delivery timelines should incorporate impacts from ongoing maintenance of T-MSIS, Large System Enhancements and/or other system changes (i.e. a software code freeze, to ensure there are no delays in T-MSIS Data Quality work. For States and Territories implementing large system enhancements and other projects with system implementations that may impact T-MSIS reporting, CMS provides guidelines to ensure there is no data degradation:

<https://tmsis2.atlassian.net/wiki/spaces/STATE/pages/476676323/Projects+that+Impact+T-MSIS+Reporting+--+Standard+Operating+Procedure>. The State is expected to complete parallel testing with CMS before implementation of new system capabilities.

If you need access to the T-MSIS State Support Site, please contact the CMS T-MSIS Help Desk at T-MSIS_Helpdesk@cms.hhs.gov. CMS expects the State to consider and incorporate T-MSIS requirements in every phase of the Software Development Life Cycle (SDLC) as applicable for any changes to state systems that impacts T-MSIS data reporting.

¹ <https://www.medicaid.gov/Federal-Policy-Guidance/downloads/SHO18008.pdf>