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How APIs can help achieve better outcomes in Medicaid: Best Practices and Guiding Principles

I. Introduction

To better serve Medicaid patients, industry and government stakeholders alike are currently seeking to improve the interoperability of state-based Medicaid information technology (IT) systems. Within the federal government, the Medicaid Information Technology Architecture (MITA) initiative, sponsored by the Centers for Medicare and Medicaid Services (CMS), was developed to help achieve this goal by fostering integrated business and IT transformation across the Medicaid enterprise to improve the administration of the Medicaid program.

The Medicaid Technology Alliance (MTA) brings together industry and government stakeholders at the federal and state levels to develop best practices and innovative approaches to advance Medicaid technology. MTA is a group of states, vendors, consultants, associations, federal representatives, and other interested parties with a common interest in advancing modern Medicaid technology practices and developing a path for ensuring that state program goals and business objectives are successfully implemented in their operations and technology. The Alliance utilizes technical expertise, real-world experience, regulatory knowledge, and public policy understanding to assess current regulatory frameworks and issues and, as appropriate, develop consensus proposals and suggested best practices to ensure consistency across the Medicaid Industry.

Released on March 4, 2019, the Interoperability and Patient Access proposed rule from CMS is proposing Medicaid Managed Care organizations, Medicaid fee-for-service plans, state Medicaid agencies, state FFS CHIP plans, and state managed care CHIP programs, among other things, provide medical information to consumers via open (that is, standards-based, non-proprietary) application programing interfaces (APIs) that allow the consumer to access their information through a third-party application of their choice "without special effort" as defined in 21st Century Cures. If the proposed rule is finalized in its current form, payers and technology vendors will be required to implement APIs in order to comply with the proposed federal interoperability requirements. However, the utility of APIs extends beyond regulatory compliance. The interoperable ecosystem enabled by APIs will help state Medicaid vendors, payers, and providers to pursue value in Medicaid.

The MTA supports the journey toward an outcomes-based environment that promotes value for patients, governments, and businesses. The appropriate implementation of communication protocols, such as the use of APIs, can accelerate benefits to technological capabilities and organizational assets, business process and activities, and strategic outcomes. The Medicaid Technology Alliance has developed the following whitepaper to support the use of APIs to comply with the proposed federal interoperability requirements, and to provide context around how the use of APIs is a foundational first step on the road to achieving outcomes-based business and program objectives and better care for patients. This paper discusses core principles, key concepts, and best practice recommendations for the implementation of APIs.

Specifically, the goals of the paper are to:

- Describe how APIs can be used to comply with federal interoperability goals;
- Describe how interoperable technology can enable value in Medicaid; and
- Operationalize the move to an outcomes-based environment.

This will be achieved by:

- Promoting modularity, scalability, and re-usability of technology solutions;
- Leveraging open APIs to achieve outcomes-based business and program objectives;
- Making good use of available data and promoting access to existing data from disparate data sources; and
- Recognizing potential challenges, roadblocks, and opportunities.

II. Interoperability & Patient Access Proposed Rule

Overview

On March 4, 2019, the Centers for Medicare and Medicaid Services (CMS) released a proposed rule that would require holders of health information (providers pursuant to the Promoting Interoperability Program and Medicare Advantage, State Medicaid Fee for Service (FFS), Medicaid Managed Care, some CHIP, QHPs, and Federal Employee Benefit Program) to provide two types of health information to consumers enrolled in their programs via open application programing interfaces (APIs) by January 1, 2020 for Medicare and QHPs and July 1, 2020 for Medicaid FFS, Medicaid MCO, and CHIP plans.

The two types of information that CMS is proposing to require are:

1. Information specifically about the individual such as their current and past medical conditions and care received; encounters with capitated providers; provider remittances; enrollee cost-sharing; and clinical data, including laboratory results (where available).
2. Information that is of general interest and should be widely available, such as plan provider networks, claims and encounters, the plan's formulary, and coverage policies.

As noted, this information must be available through open (that is, standards-based) application programing interfaces (APIs) that allow the consumer to access their information through an application without special effort. The base for this open/standards-based API is the Health Level 7 (HL7®) Fast Healthcare Interoperability Resources (FHIR®) standard. Proprietary APIs that may have been acceptable for certification to the 2015 Edition CEHRT program for providers or in use by various payers will not meet the requirements in this regulation for open and available access. Further, CMS is requiring that the regulated entities publish their APIs in a publicly available page so that third-party applications can map to them. Fees for accessing this information would mean that the regulated entity does NOT meet the relevant requirements.

Through improved interoperability, some of the outcomes that CMS is hoping to promote include avoiding duplication of services, reducing the redundancy of step-therapies, and promoting general coordination of care for individuals. As such, payers will be required to establish a "Coordination of Care Transaction." Payer and claim information about a specific patient would be required to be moved, at enrollee request, when an enrollee moves from one payer to another and then integrated into the new payer's systems. In addition,

consumers should be able to gather their information in any application they choose through the invocation of the individual right of access in the Health Insurance Portability and Accountability Act (HIPAA).

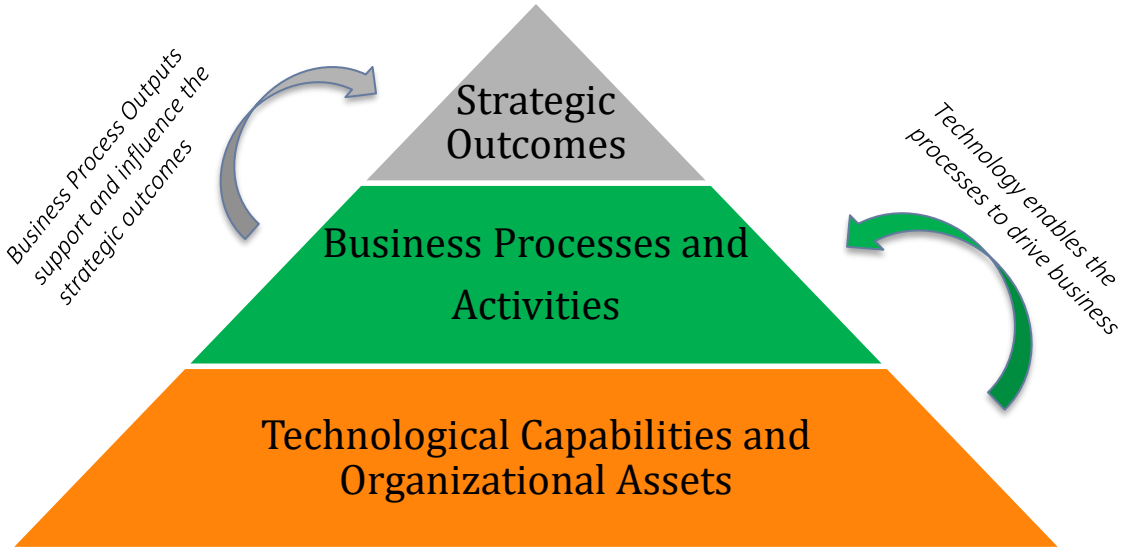
Journey to an Outcomes-Based Environment

MTA is supportive of the direction that CMS is proposing toward the use of open APIs to improve interoperability. We believe that the journey toward an outcomes-based environment that promotes value for patients, governments, and businesses will require agreement on an initial communication standard, which would be dictated by CMS should the proposed rule be finalized as written. MTA believes that the use of standards-based APIs will provide a necessary foundation for future infrastructure and communications dynamics that will promote value and the achievement of outcomes-based business and program objectives. The rest of this paper details a framework for implementation of APIs that can promote compliance with the CMS proposed rule and provide a foundation for moving beyond compliance to an outcomes-based environment.

III. Outcomes

Types of Outcomes

The Medicaid industry continues to embrace the "Quadruple Aim" as a compass to optimize health system performance. The Quadruple Aim focuses on enhancing the patient experience, improving population health, reducing costs and improving the health care provider experience. While it is logical and quite essential to focus on these eventual strategic outcomes, it is necessary to decompose these strategic outcomes into clear objectives and goals for the different aspects of the Medicaid operations. At the same time, it is crucial to distinguish between outputs and outcomes. An outcome is an effect the Medicaid program produces related to the patient or beneficiary they serve. An outcome is measurable and time-limited, although it takes a while to measure and determine its full effect. The outputs, on the other hand, are direct results of day-to-day activities and broader processes. For instance, the outputs of a customer service program are the number of calls received and processed, and the outcome of a customer service program is an improvement in the patient/customer satisfaction. The following diagram illustrates an elementary value chain model relationship between the inputs, outputs, and outcomes.



Outcome Interdependencies

The goal here is to establish a framework that demonstrates relationships among inputs, outputs and outcomes. It is important to acknowledge that the relationships between inputs, outputs may be direct (cause and effect) in certain instances and in other cases there is more of a co-relationship between the output and the outcome. However, **the objective is to create a "line of sight" so that technical leadership, as well as key program decision-makers, can understand how and to what extent key technical inputs and activities—and efficiencies in those activities—enable progress in program outputs and outcomes.**

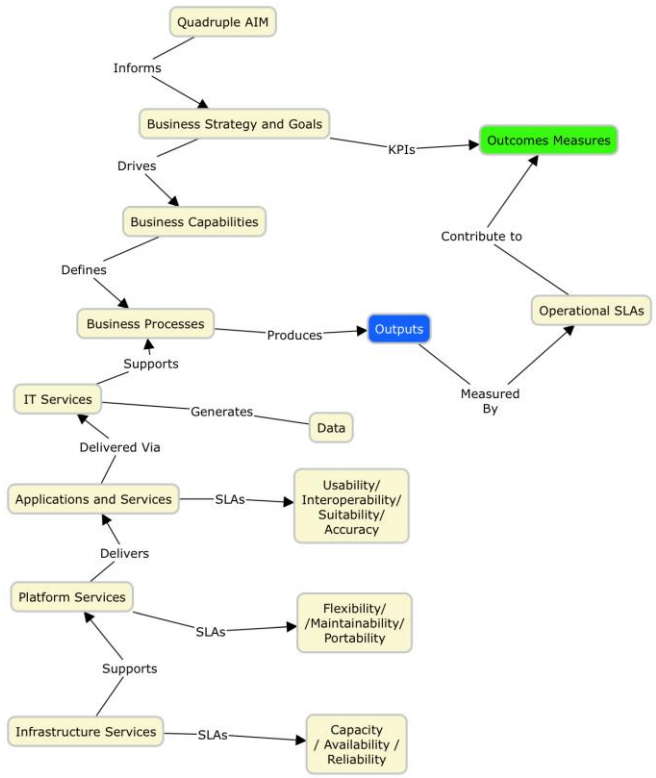
The business process and activities are measured through Key Performance Indicators which typically fall into the following categories. Using the same example of customer service, we provide an example of a typical measure under each category.

1. **Productivity**: The amount of work accomplished per relevant unit of time and resources applied. For customer service business process, it could be the number of calls handled per customer service representative.
2. **Cycle Time and Timeliness**: The amount of time required to produce a product or service. For customer service business process, it could include first pass call resolution, or wait time for a customer in the customer queue.
3. **Quality**: Error (defect) rates and complaints related to a product or service. For customer services business process, it includes the percentage of customer requests addressed in the first pass.
4. **Compliance**: Compliance with applicable requirements and standards. For customer service business process, it includes managing the security and privacy of the customer information.
5. **Cost**: This includes direct and indirect total and per unit costs of supporting the business operation/service. For customer service business process, it could be the total staff cost per call (direct) and entire infrastructure (indirect) cost per call which will include the cost of maintaining the system and infrastructure.

As illustrated in the above case, all the measures are output measures that help assess the efficiency and effectiveness of the business process. As we all will acknowledge, a good performance model ensures that a

given organization or a program is not just hyper-focused on a specific measure or a dimension but is balanced through a series of measures across different categories.

The following diagram illustrates the overall relationship and linkage between the strategic outcomes of Quadruple AIM to the outputs of technological capabilities, time, wait time Operational SLAs under regular load as well as peak load.



The model outlines how the Quadruple AIM informs the business strategy and goals of a Medicaid organization:

1. The business strategy and goals are then measured using a specific Key Performance Indicator (KPI). For example, the strategy of improving patient experience informs Medicaid Program Administration to establish goals of improving patient satisfaction with its services (i.e., outcome measure reported as a KPI).
2. The business goal then drives the needed capabilities around patient satisfaction and is realized through business processes. For example, a customer service help desk business process includes a series of activities such as call intake, issue tracking, etc.
3. Operational SLAs (e.g., percentage of first pass resolution, average wait time for a help desk request) measure the business process and its activities.

The model also outlines how technology can enable business processes, activities, and outputs:

1. The operations of a business process (e.g., the customer service help desk) are impacted by the IT services/systems that support it.
2. The IT service may include the underlying help desk software application, the underlying platform, and the hardware and cloud infrastructure. Each of these components directly or indirectly influence the ability of the customer service help desk to meet its operational SLAs. For example, a usable service desk system directly impacts the total time taken per customer request by a help desk agent. Similarly,

the uptime, response time, and scalability of the system influence the ability of the customer service help desk to meet the response time and wait time Operational SLAs under regular load as well as peak load.

As is evidenced by the model above, there are a variety of technological factors that will enable business processes, activities, and outputs, and thereby contribute to the eventual achievement of a variety of strategic outcomes related to the Quadruple Aim. MTA believes that the implementation of a common communication infrastructure across the Medicaid industry (as proposed in the CMS rule) is one of the first steps in achieving business and programmatic outputs and outcomes. We therefore believe that implementation of APIs is essential, though not sufficient, in driving toward these objectives and toward an outcomes-based environment. Following successful implementation of APIs and communication standards, more work will need to be done to align on a core set of business outputs and strategic outcomes to measure and assess across the Medicaid industry.

IV. Technical Requirements

Problem Statement and Proposed Hypothesis

The challenge in complying with CMS' interoperability goals is that the data are currently housed in multiple disparate legacy systems. This problem is compounded when trying to be in compliance with the proposed CMS rule that requires application programming interfaces (APIs) to allow third-party applications to interface with claims data.

Data are often held in multiple formats within legacy applications that do not easily translate between systems. This leads to the need to duplicate data across disparate systems, which causes inaccuracy of information and poor quality data. Legacy systems do not utilize single source data easily, so duplicated data may not be kept in synch, which can cause a business to work with data that are out of date or inaccurate. Aggregating this information to put in an API will be difficult given the wide array of legislative, program, regulatory, and technical initiatives states are implementing at any one time.

Our proposed hypothesis is the following:

If you want to achieve a set of defined state business outcomes and be in compliance with the proposed CMS rule, it is recommended as a first step to have a technology framework that is optimized to support the mobility of data, the use of industry standards for file formats and definitions, and non-proprietary Application Programming Interfaces (APIs) for transforming data across disparate systems. It's also important to reduce the burden on states and vendors by having reusable testing mechanisms to validate common web services across states. This approach would include creating partnerships to identify and then leverage a baseline set of interfaces and other technology requirements that would be common across states and would include a minimum number of state-specific requirements that may be needed to meet a state's Medicaid program objectives. These interfaces would be *entirely* driven and developed by the private sector and would hopefully be supported by appropriate state and federal policies.

Defining Technical Requirements

With the move to modularity (one of the seven CMS standards and conditions) for many state MMIS environments, and the implementation of open APIs across all holders of health information (per the CMS proposed rule) it is important to ensure that the technical requirements seek to support the capability to extract and transform data from legacy systems and make it available to new solutions in industry standard canonical format.

Technical Requirements need to support the flow of data between disparate systems, utilizing a single set of standards for the data. The technical framework should be non-proprietary with a focus on data mobility, with the flexibility to embrace innovation at any point in time. To support data flexibility, it is recommended that the technical contractor include a design pattern, such as a canonical model, to communicate between different data formats to support enterprise application integration. This enterprise design pattern includes common data naming, definition and values within a data framework.

Since the nature of MMIS solutions utilizes data from different functional areas including provider data, member, plan, and claims data, it is key to ensure that all of this information can move across the enterprise especially as the needs of the business change over time. Key to this effective movement of information involves message-based integrations which can be supported through web services. The move to cloud technology and web services will provide states the flexibility to achieve their business outcomes without heavy investment in infrastructure or costs associated with ongoing maintenance and operations of their systems.

Measuring technical requirements

The measuring of technical requirements is driven by a mix of Service Level Agreements and technical capabilities. While this white paper does not propose what infrastructure a state must have, it does recommend certain architectural principles to be included to ensure that the underpinning framework does not become a legacy solution that will soon become outdated, losing the opportunity to leverage the evolution of technology over time.

We propose two categories to measure a state's technical infrastructure: **Core baseline** and **state customizations** to the core baseline standard. We strongly believe the use of common, industry accepted, non-proprietary technologies and web services should help dramatically decrease the number of state-specific customizations that are needed. **NOTE: Each of these interfaces would be developed, maintained, and built by private industry and incorporated into a Core baseline standard via the development of key partnerships with willing participants.**

For example, the **Core baseline** could include concepts such as the following:

- **Security:** This would be based off of Federal and state requirements, aimed at protecting Member information such as Protected Health Information and Personally Identifiable Information; as well as meets federal requirements such as Minimum Acceptable Risk Standards for Exchanges (MARS-E), which is a set of 357 security controls that are defined with proof points.
- **Flexibility:** State architectures could include the technical capability to add and capture data easily as the state program requirements change without having to write custom code. As an example, this includes the ability for non-technical state resources to add data fields to applications or reports that would not require custom code.
- **Infrastructure:** A state's infrastructure should be based on industry standards and also support service models, such as Cloud Services, Software as a service, Business process as a Service and Platform as a Service. These models take away the required investment in hardware and provide the state the ability to remain current with its requirements and the evolving growth of IT. This should support the business outcomes, allowing the state to use its investments in driving better business outcomes and less time in the underpinning IT infrastructure and its maintenance.

- **Non-proprietary APIs:** APIs can be built based on industry standards so that vendors and service delivery teams can simplify the integrations between disparate systems and provide data liquidity. MTA's supports the direction that CMS takes in its proposed rule for holders of health information to utilize non-proprietary APIs built based on the industry recognized standard Health Level Seven's (HL7) Fast Health Interoperability Resources or FHIR. Technology *interfaces* rather than technology *systems* have the opportunity to become an important way in which systems are overseen in the future thus helping to achieve maximum flexibility for states and product vendors.

The key technical measures should focus on the state Medicaid program objectives, while tying back to the business goals set by the state or federal requirements. For example, sending T-MSIS files is a federal requirement. Would there be an opportunity to use the same T-MSIS file layout and technical standard for other parts of the Medicaid technical enterprise to achieve additional state-specific business objectives? Many states are using their data warehouses for transmitting these files today and could very easily reuse this data transport mechanism to achieve additional state business outcomes. The same concept would apply for sending quality data or Electronic Visit Verification data to CMS or receiving data from MCOs. It's anticipated using these reusable transport mechanisms (e.g., common APIs), states would find a myriad of applicable use cases by which to leverage the information for their own purposes.

Implementing required non-proprietary, industry consensus and standards-based interfaces, such as the APIs proposed under the CMS proposed rule, will ensure all states and vendors will begin at the same starting point with the states only augmenting them state customizations, if needed. As previously noted, implementation of non-proprietary APIs will not achieve all business outputs and strategic outcomes, but it is a necessary foundation to provide the necessary core baseline.

Assessing technical requirements

Technical requirements may also be assessed *across* the Health and Human Services enterprise rather than just taking a Medicaid-centric approach to avoid duplication. A vendor would be able to provide proof points and common APIs to meet the proposed rule requirements and to ensure that this addresses the full solution.

Another opportunity for streamlining the compliance process with the CMS proposed rule is to look *across* the entire technology solution and not repetitively against each component of the system. The assessment may request relevant proof points to support the set of requirements.

If it is possible through the requirements traceability matrix to cross walk what system technical requirements are needed across multiple requirements, then the focus can be to simplify the implementation of the APIs by only providing the proof point evidence once showing this support instead of duplicating this effort against each use case.

V. Re-usability & Modularity

Definitions

Understanding the elusiveness of establishing good definitions for modularity and reusability, we will attempt to define these terms within the context of this white-paper, the MMIS final rule, and the proposed CMS rule. Both terms continue to remain important to CMS to avoid vendor 'lock-in', to empower beneficiaries with

access to their own health data, and to reduce the overall cost to the state of technology solutions over the long-term.

Under 42 CFR Part 433 [CMS–2392–F] Medicaid Program; Mechanized Claims Processing and Information Retrieval Systems (90/10) final rule, the definitions under section § 433.111 were amended as follows:

"Open source" means software that can be used freely, changed, and shared (in modified or unmodified form) by anyone. Open source software is distributed under Open Source Initiative-approved licenses that comply with an open source framework that allows for free redistribution, provision of the source code, allowance for modifications and derived works, free and open distribution of licenses without restrictions and licenses that are technology-neutral.

"Proprietary" means a closed source product licensed under exclusive legal right of the copyright holder with the intent that the licensee is given the right to use the software only under certain conditions, and restricted from other uses, such as modification, sharing, studying, redistribution, or reverse engineering.

"Service" means a self-contained unit of functionality that is a discretely invokable operation. Services can be combined to provide the functionality of a large software application.

"Shared Service" means the use of a service, including SaaS, by one part of an organization or group, including states, where that service is also made available to other entities of the organization, group or states. Thus the funding and resourcing of the service is shared and the providing department effectively becomes an internal service provider.

"Module" means a packaged, functional business process or set of processes implemented through software, data, and interoperable interfaces that are enabled through design principles in which functions of a complex system are partitioned into discrete, scalable, reusable components.

"Commercial Off the Shelf" (COTS) software means specialized software (which could be a system, subsystem or module) designed for specific applications that is available for sale or lease to other users in the commercial marketplace, and that can be used with little or no modification.

"Software-as-a-Service" (SaaS) means a software delivery model in which software is managed and licensed by its vendor-owner on a pay-for-use or subscription basis, centrally hosted, on demand, and common to all users

Each of these are listed in the final rule as being the foundation by which CMS will assess the distribution of future federal matching dollars associated with state technology projects. For any of these technology frameworks to work effectively on their own and with each other, a flexible, non-proprietary set of APIs are needed to transmit and manage data across these systems and services. Thus, key to the definition of the word *modularity* are the words *interoperable interfaces* and *reusable components.*

In the context of this paper, the word reusability means multiple states will be able to use the same non-proprietary APIs to exchange data between systems and can remain agnostic as to where that data is stored, whether that's in their current MMIS legacy system, in a COTS-based product, as an outsourced third-party service, or embedded within a contracted or outsourced Managed Medicaid system. Reusability also involves the opportunity for states to reuse the same testing capabilities related to the common set of APIs across systems thus reducing the time required to develop and test the interfaces.

Task-based services are more reusable than functional services or components thus it may be easier to leverage a national baseline approach for those more focused components. Generally, these more focused components (i.e., provider management, member management, etc.) are applicable no matter which standard is used. Priority must be given to identify whether the specific service or module is meant to be used internally as a stand-alone component or if the data within those modules is to be shared with other modules within or outside the HHS enterprise.

There is a need to ensure consistency across the attributes and process that each state takes to build and test their interfaces but it's also important not to be overly prescriptive in a specific module or standard by which those interfaces should be developed. For example, it would be appropriate for all states to use a non-proprietary, open RESTful standard like FHIR but it would be inappropriate for all states to use the same version of the standard given the evolving nature of standards over time. Therefore, the core baseline FHIR standard proposed by CMS will provide the necessary direction for successful innovation and implementation of successful systems across the state enterprise.

Leveraging APIs

Advancement in technology has resulted in a rise of systems – from desktop systems to smart devices and embedded technology. We expect that APIs will be developed that can be reused across systems, including mobile and smart devices

As systems mature, any industry should strive for integrated ecosystems rather than standalone solutions. These ecosystems could be developed using the same set of APIs within their applications with these APIs being made available for external consumption. The key advantage such ecosystems offer is to foster an environment of disruptive innovation and faster time to market, which leads to improved outcomes.

Existing data standard formats should be reused whenever possible. APIs will use existing data standards such as various EDI transactions, HL7 V2, CCD, and FHIR for data exchange for easy adoption by the industry. We recognize that existing data standards do not exist for all data types. For these data types, there may be existing data standards that can be leveraged and reused to exchange data. For example, there is no existing standard for exchanging provider data. Rather than developing a new standard or relying on canonical models for different data formats, the specific loop segment structure in EDI transactions can be used and enhanced, as required.

Testing

One of the key challenges in developing and vetting new use-cases and solutions is around the process of acquiring and de-identifying data to support testing. To facilitate integrated business and IT transformation, test data could be made available to states and their vendors. This would expedite the process of implementing new systems and provide a reusable resource that meets privacy and compliance requirements.

To further improve the speed to bring new systems to market, we propose a reusable development and testing sandbox.

VI. Conclusion

The Medicaid enterprise is dedicated to pursuit of the Quadruple Aim for the benefit of patients, providers, regulators, and developers alike. Integral to achieving value for the entire Medicaid enterprise is a foundation for interoperability and a common communication standard across stakeholders, sectors, and levels of

government. The CMS proposed rule on interoperability and patient access provides for such a communication standard and foundational infrastructure via their proposed requirement for health information to be made available to patients via open APIs utilizing the HL7 FHIR standard. As described throughout this paper, APIs provide a foundation for innovation that can lead to an outcomes-based environment for Medicaid technology. In particular, the interoperability and efficiencies that API implementation can provide can pave the way for simplification and streamlining of the Medicaid technology procurement processes. More work remains to be done to create an environment based on outcomes, including the assessment of outcomes metrics and alignment around a core set of outcomes that can be selected from by states to achieve their own business and programmatic objectives. However, we believe the implementation of non-proprietary APIs is an essential and critical first step on this journey. The framework described here for the implementation of APIs is intended to promote compliance with CMS' proposed interoperability objectives and pave the way for future progress and efficiencies on the path to an outcomes-based environment.

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