Medicaid Information Technology Architecture:
An Overview

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The Medicaid Information Technology Architecture (MITA) is a roadmap and tool-kit for States to transform their Medicaid Management Information System (MMIS) into an enterprise-wide, beneficiary-centric system. MITA will enable State Medicaid agencies to align their information technology (IT) opportunities with their evolving business needs. It also addresses long-standing issues of interoperability, adaptability, and data sharing, including clinical data, across organizational boundaries by creating models based on nationally accepted technical standards. Perhaps most significantly, MITA allows State Medicaid Programs to actively participate in the DHHS Secretary's vision of a transparent health care market that utilizes electronic health records (EHRs), ePrescribing and personal health records (PHRs).

INTRODUCTION

This article provides an overview of CMS' MITA, an initiative designed to stimulate an integrated business and IT transformation affecting the Medicaid enterprise in all States. MITA includes an architectural framework, IT processes, and program planning guidelines that allow State Medicaid agencies to meet their unique local needs while adhering to an IT framework capable of sharing data across organizational silos and State boundaries.

MITA is designed to replace the MMIS that Medicaid Programs have relied on for more than three decades. Although the MMIS has continually evolved over the intervening 30 years with each State making modifications to fit their unique program needs—from adding decision support systems and Web portals to immunization registries, and online, real-time point-of-service devices in many pharmacies serving Medicaid beneficiaries, it has remained a claims-driven system. Providing States with the flexibility to design customized solutions to their information needs has, however, been a two-edged sword. While a highly customized MMIS may meet one program's particular needs, it has also resulted in a national collection of Medicaid systems so highly diversified that they cannot easily share data between MMISs, much less with data systems of other agencies within the same State. Thus, departments of public health that also provide care to Medicaid beneficiaries are typically at a loss to know what services their State counterparts in Medicaid have paid for on behalf of the same individuals. The limitations imposed on a State's ability to share health data across boundaries due solely to IT constraints has resulted in a fragmented understanding of the care history and costs associated with the beneficiary whom the agency is trying to help in the first place. Interoperability of system components has been a long-held, but seldom-achieved goal of people tasked with paying for these costly systems. If a system is built for one State and paid for with Federal tax dollars, major parts of it should be available for

other States to utilize without having to pay over and over again for essentially the same component. Yet, because of how the systems have been designed in the past, the ability to plug-and-play with system components has been more of a dream than a reality. MITA is designed to address these problems, and many others.

Quite apart from its Medicaid context, MITA is an important contributor to the rapidly expanding dialogue involving health information exchange (HIE) and health information technology (HIT). From its historical roots in the MMIS as a transaction-based, claims processing system, to its vision of an enterprise architecture capable of responding to the many disparate business needs of today's Medicaid Program, MITA makes use of system approaches proven to be successful in industries as diverse as transportation and banking. Working with State Medicaid agencies, the IT industry, and other Federal partners, CMS has developed MITA over the past 3 years with the intention of transforming today's MMIS into a service-oriented architecture capable of sharing health-related information across organizational silos, reducing costs, and improving program performance based on measurable outcomes.

While MITA remains a work in progress for the foreseeable future, various aspects of it have been sufficiently well-developed that it can be of significant value to States today that are interested in modifying, enhancing, or reprocuring their current systems (Centers for Medicare & Medicaid Services, 2006a). The purpose and scope of this article is to describe the current status of MITA and to provide a better understanding of the role it is expected to play in the broader national dialogue regarding HIT and HIE.

BACKGROUND

In October 1972, Public Law 92-603 was enacted providing Federal financial participation (FFP) to States that developed "… automated claims processing and information retrieval systems."

The requirements, described in the *State Medicaid Manual* focused on the development of a system that had accurate and timely claims processing as its core functionality (Centers for Medicare & Medicaid Services, 1998). Data collected from the claim form, processed through the MMIS, had considerable utility for managers interested in identifying patterns of potential fraud and abuse by providers and beneficiaries, additional sources of revenues for medical payments (third party liabilities), and a host of management capabilities tied to the daily operation of the program. These systems, collectively referred to as the MMIS, have served as the IT workhorses for all State Medicaid agencies and the District of Columbia for the past 35 years.

State MMISs have not stood still during the past three decades, adding decision support capabilities in the 1980s, data warehouses and data mining techniques shortly thereafter, childhood immunization registries, Web portals, and many more features beginning in the mid-1990s (Dilma, 1998). Because each State developed its own MMIS to meet the unique circumstances by which public medical assistance was provided in that State under a general umbrella of Federal requirements, no one MMIS looked and operated alike. For many years, this differential was believed to be of considerable advantage to the States, particularly in light of the exponential growth of State plan amendments and waivers through which States increasingly differentiated their approaches to providing medical assistance. This differentiation in programmatic solutions required each

State's MMIS to be highly customized to fit its unique policy requirements. In spite of these challenges, in many ways, the MMIS has established a remarkable record of success relative to handling very large claim volumes from a wide variety of payer types with efficiency and reliability.

CHALLENGES FACED BY TODAY'S MMIS

As pressures have continued to mount on State governments to accomplish more with less, it has become increasingly clear that the MMIS will have to change if it is to remain the effective IT engine it has been in the past for Medicaid managers (Bailit, Burgress, and Roddy, 2004). Its nearly exclusive focus on the Medicaid claim as the source for all data has rendered it less useful as a means for understanding the full spectrum of care received by Medicaid beneficiaries. Section 1915(b) waivers, for example, allow States to make capitated payments to providers via managed care arrangements in which the providers are put at risk. Reconciling the services provided with the capitated payments to providers has been a challenge for the fee-for-service claims-based MMIS. Perhaps even more challenging for the MMIS have been section 1915(c) waivers that allow States to target certain services to one of the eligible target groups; e.g., children with traumatic brain injuries. Certain waivers, for example, enable mentally retarded and/or developmentally disabled beneficiaries to receive care outside of the traditional, institutional facilities such as hospitals, intermediate care facilities for people with mental retardation, or nursing homes. Unfortunately from the perspective of the MMIS, because the care is provided outside of such facilities, payments made on the beneficiaries' behalf are harder to reconcile since the MMIS' focus was

originally developed with institutional billing systems in mind. In response to the growing use of waivers, States sought to ensure that their systems, including the MMIS, kept pace with these changes in programmatic approaches. While some States were able to very effectively integrate home and community-based waiver requirements directly into their MMIS, others were compelled to develop customized IT workarounds to their respective MMIS to accommodate these changes; i.e., set up other systems that fed into their MMIS.

Today's emphasis on health care outcomes is also a forceful agent of change in terms of the MMIS because little, if any, meaningful real-time, clinical data comes through the MMIS (Mathematica Policy Research, Inc., 2006). Medicaid managers know what they are paying for, but have a much harder time knowing whether the service was ultimately worth the investment in the absence of health care outcome information tied to the clinical record.

Finally, the rate of policy change within Medicaid also continues to increase from Federal as well as State perspectives as legislators seek to make adjustments to the program. Because of the way legacy systems were built in the past, Medicaid IT managers frequently have considerable difficulty keeping up with the turbulent environment of rapidly evolving Medicaid policy. Coding conventions and software rules tend to be so intricately woven throughout a system that to make even a minor change inevitably results in large, costly, and time-consuming rewrites.

WHAT IS MITA?

Recognizing the need for change, CMS and the States began several years ago to rethink the MMIS. The initiative, known as the MITA framework, will establish new national guidelines for technologies

and business processes that will enable improved administration of the Medicaid Program nationally while allowing States to continue to customize their business solutions locally. As an initiative, it is a plan to promote improvements in the Medicaid enterprise and the systems that support it through collaboration between CMS and the States. As a framework, MITA is a blueprint consisting of models, guidelines, and principles to be used by States as they implement business and technical enterprise solutions. MITA will become an integral part of the prior approval process for CMS' FFP in Medicaid IT initiatives via the advanced planning document process.

How Can MITA Help States?

As Medicaid functions such as managed care, data analysis, fraud detection, and prior authorization have become automated over time, they were usually added as separate systems loosely cobbled together with the MMIS, or, in some cases, hard-coded into the MMIS. As a result, they did not easily communicate directly and often exchanged information with significant difficulties. Medicaid administrators could not, for example, get an hourly overview of all provider and beneficiary activity because of such fragmentation. Prior authorization staffs, typically, are not able to see other outstanding authorization requests such as dental, pharmacy, hospital, durable medical equipment, and/or physician, and therefore, could not understand an individual's total treatment profile.

MITA Goals, Principles, and Key Concepts

MITA is a plan to promote improvements in the Medicaid enterprise and the systems that support it through collaboration between CMS and the States. Also, it is a

blueprint consisting of models, guidelines, and principles to be used by States as they implement enterprise solutions.

MITA is an IT initiative intended to stimulate an integrated business and IT transformation affecting the Medicaid enterprise in all States. MITA will improve Medicaid Program administration by establishing national guidelines for technologies and processes. The MITA initiative includes an architecture framework, processes, and planning guidelines that allow State Medicaid agencies to meet their Medicaid objectives within the MITA framework, yet support unique local needs.

To begin with, MITA adheres to certain fundamental goals (Centers for Medicare & Medicaid Services, 2006b):

- Enable those with a legitimate need-to-know and access rights to have views of patient-centric health care information that is not constrained by the source of the data's organizational silo from which it is derived.
- Support transparency of information so that consumers, providers of care, managers and others are able to have access to information for which they have an appropriate and legitimate need.
- Develop seamless and integrated systems that communicate effectively.
- Achieve common Medicaid goals through interoperability and shared standards.
- Promote an environment that supports flexibility, adaptability, and rapid response to changes in programs and technologies.
- Promote an enterprise view that supports enabling technologies aligned with Medicaid business processes and technologies.
- Provide data that is timely, accurate, usable, and easily accessible to support analysis and decisionmaking for health care management and program administration.

- Provide performance measurement for accountability and planning.
- Coordinate with public health and other partners to integrate health outcomes within the Medicaid community.

To achieve these goals, CMS believes that MITA needs to be a business driven, rather than IT driven, undertaking by the States. Moreover, the differences among State-administered programs must be recognized and allowed to flourish while not undermining the basic idea of MITA serving as a framework for all Medicaid Programs across the country. The way CMS plans to achieve these somewhat contradictory objectives is to insist that all States use commonly accepted standards in defining and building their systems. Such adherence to standards enables a high degree of variability while assuring transparency across a wide spectrum of end users.

In addition, MITA is based on specific key concepts that CMS believes to be critical building blocks for all States to follow when incorporating MITA. These include (1) a maturity model that describes in detail how Medicaid operations are expected to mature over time by defining the characteristics of five levels of improvement, (2) a business process model that defines a set of common business processes used across the Medicaid enterprise, and (3) a business capability matrix that defines the maturation characteristics for individual business processes and is in alignment with the maturity model.

Patient/Consumer-Centric Perspective

Unlike the MMIS, an important concept of MITA is to have a patient/consumer-centric perspective that is not constrained by organizational silos. MITA seeks to collect, use, and provide for analytical purposes, information on Medicaid beneficiaries obtained from a variety of sources inside and outside of the Medicaid agency. Because beneficiaries may move on and off Medicaid eligibility roles, it is critically important that managers have as comprehensive an understanding of the beneficiary's care regardless of whether a claim for reimbursement was submitted to the Medicaid Program or not. By having this broader, more comprehensive base of information, the analysis of health care outcomes becomes a more achievable goal under MITA than is possible with today's MMIS. Thus, integration of public health and clinical data becomes a critical part of MITA's scope in the future.

Interoperability Based on Standards

A second goal of MITA is to ensure that all future Medicaid systems are ultimately built according to national data and technical standards that facilitate system interoperability.[1] While all of the standards have not yet been developed, MITA will adopt standards via a governance process that reviews and approves their incorporation into MITA based on specific criteria consistent with achieving MITA's long-term goals. In the absence of any standards today in the MMIS, achieving the more comprehensive data profile previously mentioned becomes virtually impossible. By building the systems with such standards, a number of opportunities begin to open up for States, ranging from communicating more effectively to driving down program and administrative costs. Today, a number of States have attempted to save money by transferring what they perceive to be a successful MMIS from one State to another. However, because of the inherent difficulties associated with large system transfers that invariably require major alterations to

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[1] Interoperability means that components of the MMIS, once developed and tested, may be inserted into other MMIS with little need for subsequent changes and at no or little cost.

meet the unique program requirements of the receiving State, other States have been naturally risk-averse to system transfers. Most States prefer that their MMIS be designed for their unique policy environment. As a result, States and CMS wind up paying over and over again for many of the same basic modules.

CMS believes that with MITA, real savings can finally be achieved as system components developed on behalf of one State can be used by another State, as long as the technology is standard based. Thus, the costs experienced today by every state having to pay for major hardware and software changes can be significantly mitigated through such a standards based approach required by MITA. Additionally, commercial-off-the-shelf software becomes a real option in Medicaid, in which IT solutions based on industry standards enabled pieces of the architecture to be interchanged at little additional cost.

While this discussion of system transfer and reuse may sound overly IT-oriented, it is important to keep in mind that IT is simply a means to achieving larger programmatic goals. In this case, the flexibility afforded by interoperability will enable State Medicaid Programs to reflect real-time changes in the delivery of services faster and more efficiently than under existing circumstances in which it takes weeks, if not months, to make changes to program software.

Transparency in Terms of Access, Quality, and Cost

MITA also seeks to leverage the concept of transparency across the Medicaid platform. Transparency in this context means affording all stakeholders—beneficiaries, providers of care, and Medicaid Program administrators—with a window into the cost and quality of care aspects of the Medicaid Program (Leavitt, 2006). By providing these stakeholders with ready access to program information that is comparable, comprehensive, and accessible via Web portals on a secure need-to-know basis, MITA can provide the day-to-day reality that taxpayers have been seeking in terms of provider choices, quality and competitive pricing for their health care. In terms of the four cornerstones of health care transparency, i.e., (1) interoperable health systems, (2) quality standards, (3) price standards, and (4) properly placed incentives. MITA will provide a major impetus for establishing a health IT infrastructure within the States through the Medicaid Program so that different health information systems can quickly and securely communicate and exchange data.

MITA'S COMPONENTS

MITA is comprised of three interdependent parts: (1) a business architecture, (2) an information architecture, and (3) a technical architecture. These pieces are designed to differentiate among the processes, data, and technical solutions that should be the same for all Medicaid Programs (common) and those that should be specific to individual States. The States will participate in defining these and decide what common features are relevant for their particular situations. The MITA models and templates are designed in such a way as to accommodate cost-effective implementation of State-specific needs using common solutions where appropriate, and permit differentiation where needed.

Such an approach balances our need on a national level to share Medicaid data across State boundaries, when necessary and appropriate, with the equally compelling need of program managers at the State level to have systems that are designed to track their unique solutions to the Medicaid

challenges that differ from one State to another. MITA's goal is to maximize the benefit across the State Medicaid agencies, while promoting innovation and creativity in local implementations. In effect, MITA enables States to look at their entire health care purchasing enterprise and fit Medicaid within that larger context.

MITA's business architecture is based on a concept of operations that is a reflection of where States believe they need to be 5-10 years from now if they are to meet their goals. CMS interviewed the business and technical leaders of more than 30 States to arrive at this baseline understanding of their sense of future challenges and opportunities. By utilizing MITA's business architecture, States should be able to define both where they are today, and where they want to be in the future, using a common vocabulary that has as much utility for California and New York as it does for Wyoming and Rhode Island. MITA is business-driven; that is, the IT system developed under MITA needs to serve as a means to achieving each State's business goals, rather than becoming an end in itself.

The MITA information architecture is a companion to the MITA business architecture with business processes mapped to conceptual and logical data models. In addition to the specific data elements, it also includes a data management strategy and data standards. MITA will not focus on creating new standards so much as utilizing data standards developed by other national organizations such as those that are responsible for implementation of the Health Insurance Portability and Accountability Act (electronic transmission standards) and Health Level 7 (clinical data standards) (Centers for Medicare & Medicaid Services, 2006c).

MITA's technical architecture builds off of the business architecture. It includes business, technical and data access services,

as well as an application architecture and technology standards. Together these components define a specific set of services and standards that States will use to plan and develop their unique IT solutions, all with the same common set of building blocks. The technical architecture is based on a service-oriented model that places high priority on achieving business, not IT goals. Other features of the technical architecture are that it is highly adaptable and extensible, places a premium on common interoperability and access services, involves a hub architecture, and contains performance metrics so that States can track their overall progress in becoming MITA compliant (Centers for Medicare & Medicaid Services, 2006b).

MITA COMPLIANT

In order for States today to receive a financial match from CMS (ranging from 50 to 90 percent of the share of the costs to design, implement, and operate) the MMIS, their MMIS system must be certified. Certification entails a number of steps that includes the filing of a planning document, a description of the costs and benefits of the proposed IT project, and a clear delineation of the activities and costs covered by the request. The prior approval process occurs before the initiation of any work and is tied to a set of requirements found in the *State Medicaid Manual*. Once the system or enhancement is completed, CMS conducts an onsite review to validate that all system requirements are met.

While the prior approval and certification steps necessary to gain Federal financial support will not change as a result of MITA, the criteria on which the systems must adhere will. At the present time, CMS is still developing these requirements in conjunction with national IT initiatives such as the Office of the National Coordinator for

Health Information Technology's National Health Information Networks (NHIN) and others.[2] As the requirements evolve, CMS will be publishing them as voluntary guidelines for any State that wishes to get an early start on MITA. Within the next 2 to 3 years, CMS will submit the MITA requirements through the public comment process before mandating that all States must follow them. It is quite possible that between now and their final publication, some of them will change as CMS receives feedback from early adopter States that have found better ways to accomplish CMS' intended purposes. Ultimately, however, in order to receive FFP in the future, State systems will need to adhere to these requirements. Failure to do so will result in no Federal financial support.

CMS believes MITA is the synthesis of some of the best ideas for approaching IT infrastructure today. Many of the ideas and technologies advocated by MITA already exist in the approaches that a number of State Medicaid agencies are already taking. The use of hub architectures, business-driven re-engineering of IT systems, and providing Web access to providers and beneficiaries are all examples of this approach.

CMS recognizes that States will need time to transition from their existing MMIS to MITA. The period between now and the publication of the new Federal MITA requirements following the usual public comment process—approximately 24 to 36 months—will provide the Medicaid agencies time to begin to familiarize themselves with MITA as well as understand how MITA can be adopted to address the corollary issues of enterprise architecture at the State level. State Chief Information Officers (CIOs), and the State Human Services Agencies' CIOs are currently thinking

through many of the same issues that CMS has been looking at relative to breaking down barriers to data sharing. CMS has been working with a number of organizations such as the National Association of State Medicaid Directors, the American Public Human Services Association's Information Systems Management Board, and the Federal Office of the National Coordinator for Health Information Technology to coordinate MITA with their respective initiatives.

MITA AND HIT

A considerable amount has been written about the promise of HIT in general, and the challenges Medicaid must overcome in adopting HIT and HIE. To the extent HIT is narrowly defined only in terms of EHRs, PHRs, and/or ePrescribing (Certification Commission for Healthcare Information Technology, 2006), today's MMIS will be severely restricted to contributing to its adoption because of its historical absence of clinical information, program orientation focused more on paying claims than health outcomes, and system incompatibilities. CMS was granted through the 2005 Deficit Reduction Act $150 million to foster Medicaid transformation initiatives over fiscal years 2007 and 2008. A number of States have applied for these grants in order to fund ePrescribing projects and other HIT initiatives at the provider level. The grants may provide a means of transitional funding for States as they move from the MMIS to MITA to cover those costs, such as provider equipment, that are not currently eligible for Federal match under the MMIS rules.

Regardless of the specific allocation of the grant funds, MITA will provide the building blocks on which all Medicaid agencies can participate in, and in some cases, lead the electronic health care revolution.

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[2] The NHIN is a set of guidelines used in the development of a national IT infrastructure based on standards to facilitate data exchanges across diverse organizations and platforms.

HIT ultimately is about developing quality standards for comparative purposes, lowering the barriers to provide information to those with a need-to-know quickly and seamlessly, and having the tools at our disposal to look at a return-on-investment from the perspective of Medicaid managers, providers, and beneficiaries. MITA will serve as both a catalyst and a springboard within the Medicaid community to achieve these purposes. MITA, like HIT/HIE, is not so much about technology as it is about transforming the way we look at health care. For decades, we have focused more on inputs than outputs, efficiencies than effectiveness. While MITA and HIT/HIE will enable us to still pay attention to these factors, they provide us for the first time with the additional opportunity to answer the questions of not only were these the right services to have been provided, but did they make a difference in the beneficiaries' health care outcome.

ACKNOWLEDGMENT

REFERENCES

Bailit, M., Burgess, L., and Roddy, T.: *State Budget Cuts and Medicaid Managed Care: Case Studies of Four States*. National Academy for State Health Policy Publication. June 2004.

Centers for Medicare & Medicaid Services: *State Medicaid Manual, Part 11, 1998*. Internet address: http://www.cms.hhs.gov/manuals/pub45/pub. (Accessed 2006a.)

Centers for Medicare & Medicaid Services: *Medicaid Information Technology Architectures*. Internet address: http://www.cms.gov/Medicaid InfoTechArch. (Accessed 2006b.)

Centers for Medicare & Medicaid Services: Internet address: http://www.cms.hhs.gov/HIPAA GenInfo/02_TheHIPAALawandRelated%20Information.asp (Accessed 2006c.)

Certification Commission for Healthcare Information Technology: *CCHIT Glossary of Acronyms and Terms*. Internet address: http://www.cchit.org/about/resources/glossary.htm. (Accessed 2006.)

Dilma, S.: *A Practical Introduction to Health Information Management*. Jones and Bartlett Publishers. Boston, MA. December 1998.

Leavitt, M.: *Remarks at the Signing of the Executive Order on Health Care Transparency*. Internet address: http://www.whitehouse.gov/news/releases/2006/08/20060822.html. (Accessed 2006.)

Mathematica Policy Research, Inc.: *Turning Data into Information for Program Monitoring, Decision Support, and Policy Analysis*. Internet address: http://www.mathematica-mpr.com/health/manageinfo.asp. (Accessed 2006.)