State of North Carolina Department of Health and Human Services

Division of Health Benefits (NC Medicaid)

North Carolina Medicaid Health Information Technology Implementation Advance Planning Document-Update – FFYs 2019-2021

Submitted by:

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Table of Contents

List of Tables

List of Figures

1 Executive Summary

North Carolina Department of Health and Human Services (NC DHHS), Division of Health Benefits (NC Medicaid) is submitting this Implementation Advance Planning Document Update (I-APDU) to request Federal Financial Participation (FFP) from the Centers for Medicare and Medicaid Services (CMS) for Federal Fiscal Years (FFY) in 2021 for administrative costs of the NC Medicaid Electronic Health Record (EHR) Incentive Program[1] and related HIT activities. This I-APDU follows the requests for FFP for FFYs 2019-2020 for HIT funding approved October 3, 2018 and FFP approved May 21, 2019[2] to support the continued onboarding of Medicaid providers to the state-designated health information exchange (HIE), NC HealthConnex, as well as to make enhancements to NC HealthConnex to support Medicaid transformation efforts, statewide opioid misuse prevention, and improved public health interoperability in North Carolina.

These activities are aimed at facilitating the exchange of health information among Eligible Professionals (EPs), Eligible Hospitals (EHs), and other NC Medicaid providers aligned with the Promoting Interoperability (PI) Program and the NC Medicaid Electronic Health Record (EHR) Incentive Program authorized by the American Recovery and Reinvestment Act of 2009 (ARRA).[3] These activities are also closely aligned with the mid-range goals from the Office of the National Coordinator for Health IT (ONC)'s Nationwide Interoperability Roadmap of expanding data sources and users in the interoperable health IT ecosystem to improve health and lower costs (2018-2020).[4]

NC DHHS has a vested interest in the progress of HIT both at the state and national levels and understands and accepts the responsibility to efficiently utilize available federal dollars for administration of incentive payments to Medicaid providers. NC DHHS commits to use the funds for the purposes of administering the incentive payments and enabling the meaningful use of CEHRT by Medicaid providers. NC DHHS agrees to continue development of appropriate oversight mechanisms, including detailed tracking of provider registration, attestation, and data collection, which will continue beyond implementation of CEHRT to ensure measurable operational value and improved patient care.

This I-APDU was revised in parallel with the North Carolina State Medicaid HIT Plan (SMHP) and has incorporated information previously submitted separately as the NC HIE I-APD.

This I-APDU requests FFP $4,535,648 at 90 percent in HITECH funds for FFYs 2020 - 2021 in addition to FFY 2019-2020 funding approved October 3, 2018 and FFY 2019 Q4 – FFY 2021 funding approved May 21, 2019. Previously approved funds are shown in *Table 1* below.

[1] Effective April 24, 2018, CMS renamed the Medicaid EHR Incentive Program the Promoting Interoperability Program (PIP). While the EHR Incentive Program is part of the Promoting Interoperability Program, we will still operate under the name NC Medicaid EHR Incentive Program.

[2] previously submitted in HIE I-APDU Version 2.0 for Q4 FFY 2019-Q4 FFY 2021 and approved May 21, 2019

[3] Pub. L. 111-5, enacted on February 17, 2009.

[4] Version 1.0, published 2015.

Table 1 – Total NC Federal Funding Requests for FFYs 2019-2021 approved as of May 21, 2019

	HIT		HIE		HIT + HIE		
	Federal Share (90%)	State Share (10%)	Federal Share (90%)	State Share (10%)	Federal Share (90%)	State Share (10%)	Federal + State Total Computable
FFY 2019	$5,405,416*	$600,602*	$13,510,740†	$1,501,193†	$18,916,156	$2,101,795	$21,017,952
FFY 2020	$5,431,891*	$603,543*	$15,116,284	$1,679,587	$20,548,175	$2,283,130	$22,831,305
FFY 2021	$0	$0	$13,710,844	$1,523,427	$13,710,844	$1,523,427	$15,234,271
Program Total Cost	**$10,837,307**	**$1,204,145**	**$42,337,868**	**$4,704,208**	**$53,175,175**	**$5,908,353**	**$59,083,527**

2 Results of Activities included in the Planning Advance Planning Document (P-APD) and SMHP

HIT P-APD Activity Summary

NC DHHS' Medicaid submitted a HIT Planning APD (P-APD), #20100122P-00, on January 22, 2010. This P-APD was approved by CMS on February 9, 2010, and included the following planning tasks:

1. Provider Outreach to include broad-brushed surveying and input from providers for assessment of provider readiness and "shovel ready" ideas for practical EHR and HIT applications within their professional environments;
2. Consumer Outreach to include focus groups of recipients and/or recipient family members to assess consumer specific educational needs and to develop ideas for consumer educational materials and tools;
3. Development of the North Carolina SMHP, beginning with an "As-Is" landscape assessment and baseline measurement of the current use of HIT in North Carolina to facilitate gap analysis for a "To-Be" vision and roadmap plan, inclusive of the activities necessary to deliver incentive payments to meaningful users of CEHRT who see the requisite Medicaid patient volume;
4. Development of the HIT I-APD to implement activities identified in the SMHP necessary to support the state's HIT "To-Be" vision; and,
5. Creation of a strategy to develop the necessary operational infrastructure support and program audit requirements to monitor results at each step of the operational plan.

The P-APD was officially closed out with CMS on September 26, 2011.

The table below was taken from the P-APD and outlines the HIT high-level task activities and deliverables. This table has been updated with actual activities completed during the planning phase of Medicaid HIT activities in 2010.

Table 2: P-APD High-level Task Activity

Task	Expected Deliverable	Actual Activity/Deliverable
Coordinate and Prepare SMHP	As part of the creation of the SMHP: 1. "As-Is" and "To-Be" HIT landscapes; and,	SMHP submitted to and approved by CMS.

Task	Expected Deliverable	Actual Activity/Deliverable
	2. HIT roadmap outlining tasks and milestones to reach the "To-Be" condition over the next five years.	
Prepare an Environmental survey for status of EHR and Health Information Exchange (HIE) capabilities within North Carolina	An acceptable estimate of the current state of the incidence and use of EHR and HIE within the state. This information will be the basis of the work to be done to achieve the end goal.	To determine the status of North Carolina's "As-Is" HIT landscape, NC Medicaid developed and participated in two surveys of NC Medicaid providers. One pertained specifically to EHR usage and the second pertained to broadband availability and included questions on EHR use. As of Nov 1, 2010, 2,133 EHR surveys had been compiled. These surveys indicated that 49 percent of respondents currently used EHRs and an additional 14 percent planned to begin use within a year following survey completion. The broadband survey was not limited to Medicaid or healthcare providers; however, 1,136 of the respondents indicated that their establishments provided healthcare services. Of these, all but six had access to broadband internet connectivity, and 38-73 percent reported use of EHRs (variance based on practice type). Survey results are described in the SMHP.
Create a methodology to administer the Medicaid EHR Incentive Program	Planning/implementation approach and technical architecture.	High-level definition of NC-MIPS was completed in July 2010, which included an alternatives analysis of software solutions. The selected approach is described in the SMHP and I-APD.
Identify best operational mechanisms for monitoring federal and state-specified meaningful use criteria. Document demonstration of achieving meaningful use at the provider level	A solution that is mainly automated in nature to minimize the human labor that is needed to monitor and report on each provider.	The operational strategy and monitoring of meaningful use is under development for implementation in Year 2. Year 1 of the EHR Incentive Program is limited to Adopt, Implement, and Upgrade of CEHRT.
Provider Education	A plan for high-level provider consumer education, to include: 1. Draft of the proposed training curriculum; 2. Draft of high-level samples of training aids	The plan for provider consumer education is described in the SMHP. A provider website has been established for communications and questions regarding the Medicaid EHR Incentive Program, and a program FAQ document has been created. HIT

Task	Expected Deliverable	Actual Activity/Deliverable
	and documentation for presentations; 3. Draft proposal on content of a web-based training program; and, 4. Media campaign plan for provider education.	announcements have been included in monthly Medicaid Bulletins, and information about the program can be found at three different websites: • NC Medicaid; • NCTracks (enrollment); and, • State HIT site.

2.1.1 P-APD Funding Summary

The table below summarizes approved, expended, and remaining P-APD funding. In summary, NC DHHS was more efficient in planning for HIT than originally estimated. For the planning phase of the project, the total cost was $847,012 (FFP $762,311 at 90%). NC DHHS completed the planning phase with $1,708,108 in unspent P-APD funds (FFP $1,537,297 at 90%).

Table 3: P-APD Funding Summary

	FFY 2011 Approved P-APD		
Activity Type	**State**	**Federal**	**Total**
State Employees	25,190	226,710	251,900
Contracted State Staff	23,760	213,840	237,600
Vendor (CSC)	196,372	1,767,348	1,963,720
Hardware & Software Costs	440	3,960	4,400
Direct Non-Personnel Costs (Rent, Supplies, Telephone, Travel)	19,510	75,590	95,100
Indirect Costs (Allocated Personnel, Furniture)	1,200	1,200	2,400
Total Project Costs	**$266,472**	**$2,288,648**	**$2,555,120**
	P-APD Expenditures to Date		
Activity Type	**State**	**Federal**	**Total**
State Employees	10,213	91,918	102,131
Contracted State Staff	50,804	457,239	508,043
Vendor (CSC)	22,707	204,362	227,069
Hardware & Software Costs	0	0	0
Direct Non-Personnel Costs (Rent, Supplies, Telephone, Travel)	977	8,792	9,769
Indirect Costs (Allocated Personnel, Furniture)	0	0	0
Total Project Costs	**$84,701**	**$762,311**	**$847,012**

Activity Type	Remaining P-APD Funding		
	State	Federal	Total
State Employees	14,977	134,792	149,769
Contracted State Staff	(27,044)	(243,399)	(270,443)
Vendor (CSC)	173,665	1,562,986	1,736,651
Hardware & Software Costs	440	3,960	4,400
Direct Non-Personnel Costs (Rent, Supplies, Telephone, Travel)	8,533	76,798	85,331
Indirect Costs (Allocated Personnel, Furniture)	240	2,160	2,400
Total Project Costs	**$170,811**	**$1,537,297**	**$1,708,108**

HIE Activity Summary

While a P-APD was not submitted for HIE activities, two prior HIE-specific I-APDs have been submitted by North Carolina and approved by CMS: HIE I-APD #20120113 (CMS approval letter dated 03012012); and Version 1.0 of this HIE I-APD (CMS approval letter dated 06012017).

Updates on the results of the activities under those documents are below. Note that HIE I-APD Version 1.0 is ongoing through June 30, 2019, so the progress noted below is preliminary.

2.1.2 Results and funding summary of the 2012 HIE I-APD

In HIE I-APD #20120113 (CMS approval letter dated 03012012), $1,359,237 ($1,223,313 @ 90% FFP) for FFY 2012, and $352,959 ($317,664 @ 90% FFP) for FFY 2013, were requested for Medicaid's proportional "fair share" of the design, development, testing and implementation of HIE core services in order to fully operationalize the statewide HIE to support NC providers in achieving their Stage 1 MU objectives. In this prior I-APD, core HIE services were broadly defined as the basic functions needed for information exchange, including applications for patient, provider and organizational identification; record locator services; messaging capabilities; and security functions. Specifically, the activities in the table below were projected and completed after the funding granted therein.

Table 4: HIE I-APD #20120113 Activities, Proposed Timelines, and Current Statuses

Activity	Timeline for Completion	Status
Design and development of core components:		
• **Service Orchestration Layer**	January 2012	Completed
• **Security Service**	January 2012	Completed
• **Patient Matching**	January 2012	Completed
• **Provider/Facility Directory**	January 2012	Completed
• **NwHIN Gateway (now eHealthExchange)**	January 2012	Completed
• **Secure Messaging (Direct)**	January 2012	Completed
Early Adopters Program:		
• **Two Qualified Organizations connected**	July 2012	Completed*

• **Deployment of targeted value-added services (now called features)**	July 2012	Completed
• **Technical onboarding processes validated**	July 2012	Completed

**Community Care of North Carolina was the first Qualified Organization to connect. The "QO" model was subsequently dissolved; however, since then many entities have connected, including large entities where one connection results in hundreds of connected facilities, as is the case today with the University of North Carolina Health Care System (one data feed, 600+ facilities).*

The above services, in addition to CCD exchange and access to a virtual consolidated patient record via the NC HealthConnex Clinical Portal, are operational and available to all HIE participants.

Of note, HIE I-APD #20120113 set forth projections for provider connectivity (termed the "Early Adopters Program," per the above table), tied to what were then termed "Qualified Organizations" or "QOs." Then NC HIE's initial strategy to connect providers to statewide HIE services was to aggregate providers through QOs. Once designated, QOs would serve as gateways through which individuals, providers and organizations could access the NC HIE's HIE services. The QO concept assumed that, where a regional or health system HIE did not exist, local groups of physicians would form their own organizations to purchase HIE connections and administer the various local integrations and accompanying legal constructs to their constituent facilities. That model did not mature for multiple reasons, chief among them, the organizational/administrative burden and cost placed on independent physician communities, and the immature technical readiness and demand for HIE at that time amongst both local communities and large health systems. In addition, many large North Carolina health systems, also known as integrated delivery networks, were still developing their own HIE and analytics strategies at that time, and thus hesitant to become QOs or be early adopters of state-level HIE.

North Carolina's state-designated HIE has since transitioned through two subsequent governance structures, and today, NC HealthConnex is administered and overseen by the North Carolina Health Information Exchange Authority (NC HIEA), a state agency created pursuant to 2015 additions to the North Carolina Statewide Health Information Exchange Act[5] that serves as North Carolina's State-Designated Entity for HIE. NC HealthConnex no longer uses the QO phrasing or concept, though it does seek to connect to as many cloud EHR, health system, HIE, or ACO-type "hubs" as possible, where a single connection provides HIE services to multiple providers/facilities.

The projections in HIE I-APD #20120113, targeting 23 QOs representing 21,799 physicians connected by Q4 of 2016, proved to be ambitious relative to market readiness. As of March 31, 2017, 133 organizations were connected to NC HealthConnex, representing 855 unique facilities; in addition, patient data available in NC HealthConnex represented care provided from 16,735 connected NC providers.

North Carolina closed out its HIE I-APD #20120113 account with CMS in 2013. *Table 5* below summarizes the State's use of these funds.

Table 5: HIE I-APD #20120113 Funding Status Updates

	HIE I-APD Approved Amount			HIE I-APD Expenditures to Date			Remaining HIE I-APD Funding		
	Federal Share (90%)	**State Share (10%)**	**Total Computable**	**Federal Share (90%)**	**State Share (10%)**	**Total Computable**	**Federal Share (90%)**	**State Share (10%)**	**Total Computable**

[5] NCSL 2015-241 Section 12A.5, as amended by NCSL 2015-264.

Contractor (NC HIE)	$1,540,977	$171,219	$1,712,196	$1,540,977	$171,219	$1,712,196	$0	$0	$0
Program Total	$1,540,977	$171,219	$1,712,196	$1,540,977	$171,219	$1,712,196	$0	$0	$0

2.1.3 Preliminary results and funding summary of the 2017 HIE I-APD

In HIE I-APD Version 1.0 (CMS approval letter dated 06012017), $33,659,298 ($30,293,368 @ 90% FFP) for Q4 FFY 2017-Q3 FFY 2019 was requested for accelerating Medicaid provider onboarding to the HIE. This effort was broadly defined to include outreach activities; technical integrations, including public health interface testing and reporting; and provider training and workflow integration with the HIE.

As of April 2019, the NC HIEA is approximately six months from the end of the HIE IAPD Version 1.0 (July 1, 2017) approved scope and funding. *Table 6* and *Table 7* below detail progress to date of Medicaid provider data connections (or interfaces) to NC HealthConnex (note, this is different from unique facilities, as explained below) and related activities as of December 31, 2018, with discussion thereafter.

Table 6: HIE I-APD Version 1.0 Status of Medicaid Provider Data Connections (Interfaces) to NC HealthConnex

Connection Type	Projected by 12/31/18	Actual Live by 12/31/18
Health Systems & Hospitals	43	25
Ambulatory Facilities, Cloud EHR Roll-On	1,540	349
Ambulatory Facilities, On-Premise EHR	517	102
Total Connections	**2,100**	**476**
NCIR Connections	600	8
ELR Connections	53	11
Total Connections	**653**	**19**

Table 7: HIE I-APD Version 1.0 Activities, Proposed Timelines, and Interim Statuses

Activity	End Date	Status
Recruit and train expanded NC HIEA onboarding staff	8/31/17	In progress
Develop and launch NC HealthConnex outreach campaign	12/31/17	Completed
• Create and send periodic (approximately 1 every 2 months) newsletter to stakeholders and participants	N/A	Ongoing
• Finalize 2017 calendar of events/speaking engagements	4/1/17	Completed
• Send direct mailings to targeted Medicaid providers	12/31/17	Completed
• Train NC Medicaid and NCTracks (MMIS) staff on NC HealthConnex and the connection requirement	7/1/17	Completed
• Engage EHR vendors serving Medicaid providers	12/31/17	Completed
• Train NC Regional Extension Center staff on NC HealthConnex and the connection requirement	N/A	Completed

• Send mass e-mail communication to all NC Medicaid providers about the connection requirement	No later than 7/31/17	Completed
• Distribute periodic updates through partner organization newsletters and other communications	N/A	Ongoing
• With NC Medicaid, create media on meeting MU with NC HealthConnex	8/31/17	Completed
Create quarterly report format for progress reports to NC Medicaid/CMS	7/31/17	Completed
Finalize 2017 provider pipeline for public health onboarding (NCIR and ELR)	4/30/17	N/A*
Develop, test, and implement MU reporting solution for HIE measures	8/31/17	Completed
Develop NC HealthConnex training program	12/31/17	In progress†
• Develop NC HealthConnex user guide	6/30/16	Completed
• Create dynamic calendar for scheduling onsite training events	8/31/17	Not yet started†
• Create video modules for using NC HealthConnex via the Portal and specific visually integrated EHRs	12/31/17	Not yet started†
• Create video modules for using the NCIR functionality via the NC HealthConnex Portal and specific visually integrated EHRs	12/31/17	Not yet started†
• With NC Medicaid, create training modules on meeting MU/PI with NC HealthConnex	12/31/17	Not yet started†
Finalize 2018 provider pipeline for public health onboarding (NCIR and ELR)	12/31/17	Completed
Connect signed participants to NC HealthConnex	N/A	Ongoing
Finalize 2019 provider pipeline for public health onboarding (NCIR and ELR)	12/31/18	In progress

Provider onboarding efforts were pushed to 2018 due to NC DPH capacity issues and hiring delays.
†Note that much of the proposed training program has been delayed due to state staffing issues and under-budgeting in this category. To complete these activities, North Carolina is collaborating with the NC Area Health Education Centers (AHEC), the state's former ONC Regional Extension Center grantee.

Note that while connections figures in the table above lag significantly behind projections, North Carolina has already exceeded its two-year goal of connecting 4,000+ facilities by June 30, 2019 by building fewer connections resulting in greater overall impact. That is, the NC HIEA's initial focus has been to connect hubs and health systems that only incur one "integration" connection federal/state charge but result in tens or hundreds of connected facilities.

As of June 20, 2017—immediately prior to the beginning of approved funding under HIE I-APD Version 1.0 (July 1, 2017)—the NC HIEA had 884 facilities live and sending data to NC HealthConnex. As of December 31, 2018, that figure is 4,502, with over 3,500 more (and growing rapidly) having signed participation agreements and in the onboarding process—hence the need for continued funding approved May 21, 2019 via the HIE I-APDU Version 2.0. The NC HIEA anticipates, going forward, to come closer to our projected "integration" connection estimates, and expend more, as more of the independent or smaller providers subject to the 2019-2021 state mandate deadlines require "one-off" integrations. To meet this need, SAS Institute will be allocating several staff to the HIE integrations effort and have contracted with

multiple third-party integration companies that stand ready to scale to the need we face for mass integration.

The area of connections that has truly lagged is in public health connectivity. The NC HIEA has experienced significant hiring delays and challenges fitting the new onboarding effort into NC DPH's existing program capacity and processes. However, recent guidance and ambitious onboarding deadlines from NC DHHS should prompt significant progress in public health onboarding in 2019-2021.

Most activities were completed or are progressing as anticipated, except for building out a robust NC HealthConnex training program. North Carolina has been unable to secure a state position and hire for the clinician/trainer role to date, and underestimated the resources needed to extend the current training tools as initially described. To this end, an improved plan and additional funding were proposed in *Section III* of the HIE I-APDU Version 2.0 and approved May 21, 2019.

The table below summarizes the State's use of funds approved in HIE I-APD Version 1.0 as of February 28, 2019. North Carolina does have significant monies unspent for the currently approved scope of work, due to the reasons described above (efficiency of hub and health system integrations, resulting in lower draw-down per connection, and delays in public health onboarding due to dependencies at the NC DPH).

Table 8: HIE I-APD Version 1.0 Funding Status Updates

	HIE I-APD Approved Amount			HIE I-APD Expenditures to Date			Remaining HIE I-APD Funding		
	Federal Share (90%)	**State Share (10%)**	**Total Computable**	**Federal Share (90%)**	**State Share (10%)**	**Total Computable**	**Federal Share (90%)**	**State Share (10%)**	**Total Computable**
State Personnel	$2,646,718	$294,080	$2,940,798	$596,120	$142,908	$739,028	$2,050,598	$151,172	$2,201,770
State Expenses (including Travel)	$272,250	$30,250	$302,500	$21,081	$1,702	$22,783	$251,169	$28,548	$279,717
HIE Technology Contractor	$27,374,400	$3,041,600	$30,416,000	$2,611,800	$272,350	$2,884,150	$24,762,600	$2,769,250	$27,531,850
Program Total	**$30,293,368**	**$3,365,930**	**$33,659,298**	**$3,229,001**	**$416,960**	**$3,645,961**	**$27,064,367**	**$2,948,970**	**$30,013,337**

3 Statement of Needs and Objectives

NC Medicaid EHR Incentive Program

3.1.1 NC-MIPS Overview

Providers attest for the NC Medicaid EHR Incentive Program through the North Carolina Medicaid EHR Incentive Payment System (NC-MIPS). NC-MIPS was built in 2010-2011 and managed and housed at the Office of Medicaid Management Information Systems Services. North Carolina implemented a replacement MMIS called the NC Transparent Reporting, Accounting, Collaboration, and Knowledge Management system (NCTracks). NCTracks went live in July 2013.

In 2013, NC-MIPS moved to state servers to achieve cost savings. Program management—including policy, outreach, monitoring, and oversight—is provided by the NC Office of Health Information Technology (NC OHIT) with support from NC Medicaid Budget, Hearings, and DHHS IT staff. For more about the Program's organization, see *Section C.1* in the NC SMHP. (Note: all SMHP references in this document refer to version

4.4 unless otherwise specified.) NC-MIPS is maintained in-house and began accepting Program Year 2019 attestations for Stage 3 MU on May 1, 2019. Program Year 2019 will close April 30, 2020.

3.1.2 New System Needs, Objectives, and Anticipated Benefits

The staff of the NC Medicaid EHR Incentive Program plans and executes NC-MIPS development and enhancement efforts. The objectives of the NC-MIPS development effort—present and future—include the following:

- Enhance NC-MIPS to quickly accommodate state and federal program changes (ongoing);
- Enhance NC-MIPS to accommodate pre- and post-payment attestation validation workflow documentation (ongoing);
- Enhance NC-MIPS2 database to accommodate communication with the CMS Registration & Attestation (R&A) System, and thus synced federal and state program databases (ongoing); and
- Continue to improve and automate the system for optimal efficiency and cost containment (ongoing).

Tables within NC-MIPS2 database were created to store data elements required for the registration, attestation, and incentive payment calculations, providing a complete audit trail of all activities. A Service Oriented Architecture (SOA) was used to build NC-MIPS, ensuring easy integration with NCID in 2013 and other state systems as needed.

Past and future benefits of this approach include:

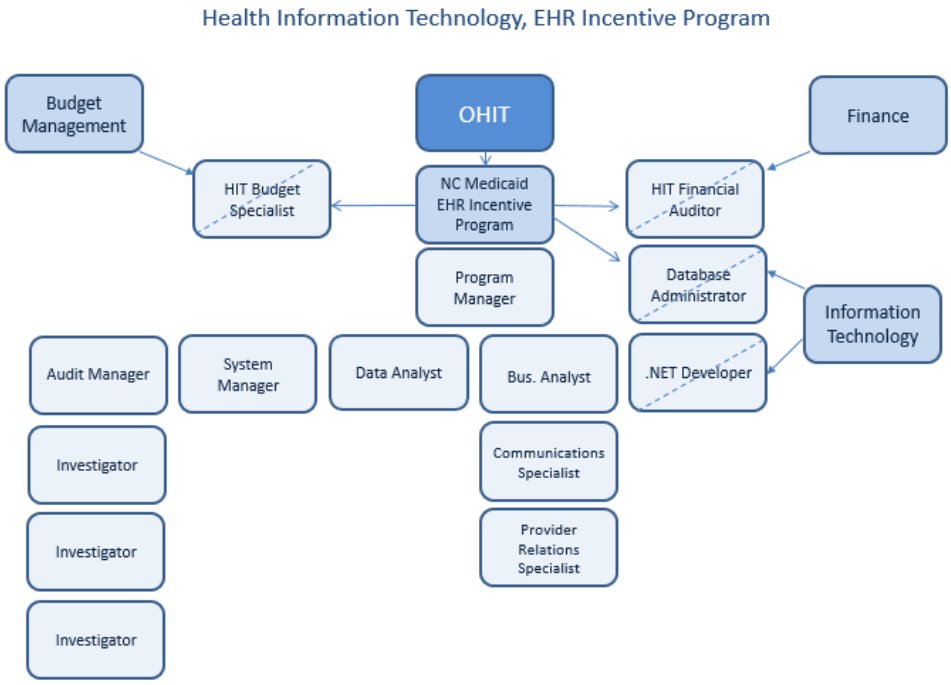
- A quick and flexible implementation of NC-MIPS (completed);
- Ability to meet an aggressive CMS testing schedule for the National Level Repository (NLR) interfaces (completed); and,
- Accelerated design, development, testing, and implementation by building the solution in overlapping iterative phases (ongoing).

For more on NC-MIPS activities, see *Section C.4* of the SMHP.

3.1.3 Program Management and Oversight Activities

As stated in the SMHP, the NC Medicaid EHR Incentive Program management and oversight, including policy and outreach around HIT efforts, is carried out by the NC Medicaid HIT Team in collaboration with various stakeholder organizations. For more information on the HIT Team structure and roles/responsibilities, see below.

Figure 1: Organizational Structure of the Medicaid Health IT Team



NC Office of Health Information Technology (OHIT) Director

Responsible for developing a state plan for implementing and ensuring compliance with national HIT standards and for the most efficient, effective, and widespread adoption of HIT; identifying available resources for the implementation, operation, and maintenance of HIT; and monitoring HIT efforts and initiatives in other states and replicating successful efforts and initiatives in North Carolina. Works closely with NC HIEA in coordinating efforts toward legislatively mandated connections.

Roles and Responsibilities of the Program team

All team staff time is dedicated to the NC Medicaid EHR Incentive Program, HIT projects described in the SMHP, and developing other HIT/HIE projects, e.g., emPOWER. Staff who contribute part-time complete timesheets to document accurate distribution of effort and funds. This timesheet data goes through a cost allocation program to charge the appropriate amount of payroll expenses to the correct cost centers. Where projects are eligible for various Federal Financial Participation (FFP) rates (i.e., 90 percent administrative, 100 percent incentive payments), this is specified in the last node of the cost center number such that the invoice reviewer codes the payment with the proper FFP funding.

Program Manager

Responsible for the overall planning, implementation, and management of the NC Medicaid EHR Incentive Program. Core responsibilities include: directing activities of the Program team toward federal EHR Incentive Program goals, ensuring program compliance, and acting as the Program contact for CMS and other states.

Data Analyst

Designs and leads data analytics for the NC Medicaid EHR Incentive Program, including NC-MIPS metrics reporting, MMIS data warehouse research, and data synthesis for outward/upward distribution. Tracks and analyzes program performance metrics.

Communication Specialist

Crafts and executes the Communication Plan for the NC Medicaid EHR Incentive Program, including messaging, provider outreach, program website, articles, bulletins, and communication with key stakeholders and partners. Assists all other roles with external communication such as correspondence templates and training and internal documentation review. As of May 2019, this position is vacant with duties backfilled by Business Analyst.

Systems Manager

Responsible for tracking maintenance and enhancement projects for NC-MIPS and AVP, QA testing, facilitating communication between Program team and Information Technology Division staff, managing server maintenance and upgrade projects, and maintaining documentation related to program's servers, hardware, and software.

Senior .NET Developer

Serves as the lead technical resource for the NC Medicaid EHR Incentive Program in support of all maintenance and enhancement development for NC-MIPS and the attestation validation portal (AVP) including software building, release management, and developer testing including source code management. As of May 2019, the .NET developer divides time between the Program and the Information Technology Division.

Business Analyst

Responsible for creating all documentation used by developers for maintenance and enhancement of NC-MIPS and AVP including responding to CMS changes, updating system design and user documentation, and creating test cases and performing QA testing.

Budget Specialist

Part-time employee; manages the budget for the NC Medicaid EHR Incentive Program, monitors accuracy of incentive payments, provides regular financial reporting and forecasting to program manager, and conducts all CMS financial reporting related to the Program, including CMS 37 and 64 reports.

Financial Auditor

Part-time employee; serves as the subject matter expert for hospital payment calculations for the NC Medicaid EHR Incentive Program. Calculates payments for hospitals, creates policy around NC-specific hospital eligibility and attestation requirements, and conducts outreach with hospitals as necessary.

Provider Relations Specialist

Heads up the help desk for the NC Medicaid EHR Incentive Program. Responsible for overseeing the pre-payment validation process, including eligibility determination, provider outreach efforts, denials, and eligibility appeals and hearings. Vacant as April 2019 with duties backfilled by Program staff.

Audit Manager

Heads up the team of investigators who conduct pre- and post-payment validations and audits. Responsible for risk analysis, audit scheduling, Audit Strategy, representing NC Medicaid at audit-related meetings and hearings, and conducting validations and audits with the investigators.

Investigators

Conduct pre- and post-payment validations for professionals and pre-payment processes for hospitals; oversee recoupment of payment in the case of adverse post-payment review findings. Two investigator positions vacant as of May 2019, with plans to post one position summer 2019.

Activities covered in this I-APDU for planning, support, and continued definition of the State's ongoing HIT efforts include:

- Updates to the SMHP and I-APD for scope and requirement changes and for subsequent phases, to include meaningful use capture and verification;
- Business process modeling for all phases of the project including provider support for registration and attestation, quality assurance, audit, appeals, payment processing, budget preparation and reporting, clinical oversight, and meaningful use data analysis;
- Support of the Program Help Desk and provider outreach efforts;
- Planning and execution by DHHS of a state-level HIT/HIE conference and/or sponsorship of external HIT conference;
- Hosting various HIT stakeholder meetings and workgroups;
- Continuous improvement of the quality assurance process used to validate incentive payments pre-payment;
- Program Integrity audits covering verification of eligibility, attestation data, and adopt, implement, or upgrade (A/I/U) and meaningful use requirements;
- Design and implementation of the appeals process for denial of incentive payments;
- Coordination with the NC HIEA to develop plans to achieve goals such as:
    - Ramp up connectivity between Medicaid providers and the NC HIE;
    - Capture and report clinical quality measure data to support incentive payment eligibility;
    - Design, develop, and implement essential public health interfaces to the NC HIE; and,
- Use of clinical data obtained through EHRs to impact Medicaid policy and patient care, including participation in the Medicaid Evidence-based Decision Project (MED Project) and the Drug Effectiveness Review Project (DERP); and,
- Conducting follow-up environmental scans to track EHR adoption and provider experiences statewide.

For more on HIT program activities, see *Section C* of the SMHP.

Updates to the SMHP and this I-APD will occur annually or more often if needed.

Enabling Electronic Test Orders and Results (ETOR) with the State Laboratory of Public Health

The mission of the North Carolina State Laboratory of Public Health (NC SLPH) is to "provide certain medical and environmental laboratory services (testing, consultation and training) to public and private health provider organizations responsible for the promotion, protection, and assurance of the health of

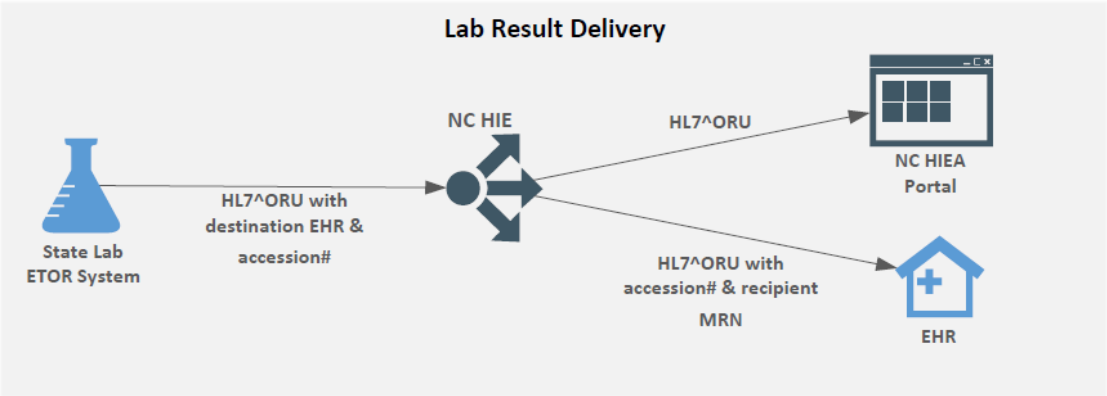
North Carolina citizens."[6] Among its services are myriad environmental testing services (water systems, dairies, etc.); testing for biological and chemical terrorism agents; microbiology and virology/serology services for various specimens; testing for newborn and prenatal screenings, infant blood lead levels, and others. Health systems, pediatric and primary care providers, and many other health care providers rely on the services of the NC SLPH to remain compliant with state reporting laws and inform their daily patient care.

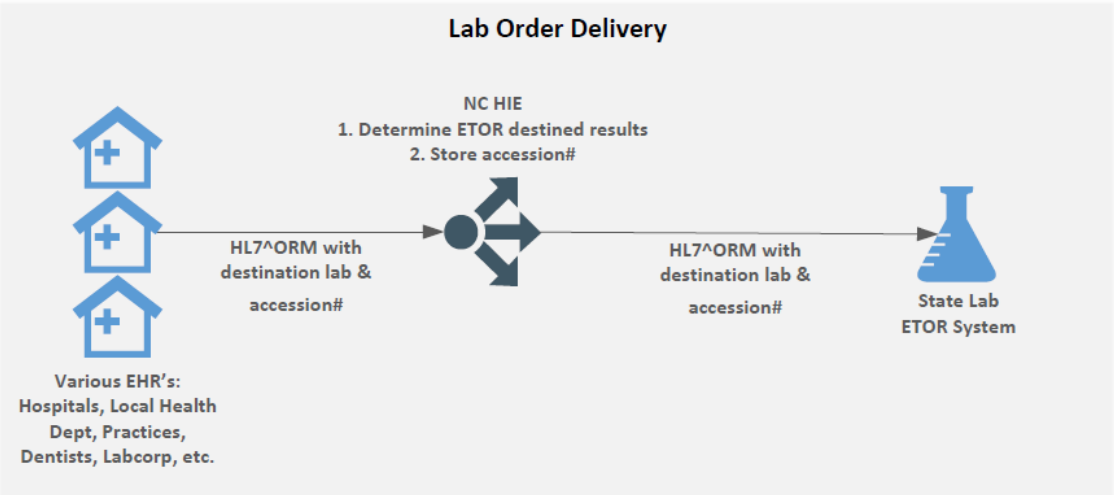
North Carolina has a unique opportunity in its health information exchange, NC HealthConnex, to leverage existing interfaces with provider EHRs, which by state law will eventually include approximately 98% of North Carolina health care providers, to serve as a gateway to the NC SLPH laboratory information management system (Starlims). Through a bidirectional interface between the two systems, efficiencies can be introduced into the test order and results process by allowing health care providers in North Carolina to be able to submit electronic lab orders and receive results from the SLPH without leaving their EMRs—a marked improvement from today's paper- and portal-based process. In addition, North Carolina Session Law 2019-23 HB70 mandates that the NC SLPH shall begin submitting demographic and clinical data to NC HIEA's, NC HealthConnex, by June 1, 2021.

Per guidance in State Medicaid Director Letter #16-003 pertaining to available HITECH funding for interoperability and health information exchange (HIE) architecture, connecting public health systems to HIEs, and assisting EPs and EHs with meeting specific PI objectives, North Carolina requests federal financial participation to assist with the design, development, and implementation of the NC HealthConnex-NC SLPH interface, and subsequent onboarding of Medicaid providers to the new service. Specifically, this new HIE feature will allow EPs to leverage their existing NC HealthConnex interface to help meet PI Objective 4 Measure 2, Computerized Order Entry of ordered labs. The figure below depicts the proposed information flow for lab result delivery into EHRs and the ordering process to NC SLPH.

[6] https://slph.ncpublichealth.com/

Figure 2: Proposed Information Flow between the NC SLPH, NC HealthConnex and Healthcare Organizations





NC SLPH currently receives around 800,000 mailed in paper-based, standardized laboratory test requisitions accompanied by specimens annually. NC SLPH performs 125 clinical laboratory tests for public and private health care providers.

Description of Current Business Process:

- Every test order requisition is paper-based, and the test order form data and specimen data are entered manually into the Starlims system. Once test order results are generated, those are automatically updated in the Starlims system via interfaces with testing equipment.
- The test results are then mailed to all the submitters. All test results are also posted in the DPH-developed web portal, Clinical and Environmental Lab Results (CELR). CELR presents test result data from the Starlims database.

Issues related to manual processes:

- Accuracy of data is compromised due to manual transcription of test order and demographic data when received at the laboratory.
- Wrong test orders are created due to human misinterpretation of the information written in the form. The testing process carries on and the test results are released to the submitter. When the submitter raises a complaint that the wrong test was performed, NC SLPH must perform the testing

again and issue a corrected report.

- Demographic information on test order forms is either not provided or misinterpreted when being entered into Starlims.
- Incorrect demographic information delays the publishing of test results until the correct demographic information is available.
- Inability to provide electronic test reports to the health care submitters negatively impacts patient care due to the delays in receiving paper-based reports via the mail.

Initiative Description

NCSLPH is seeking to acquire a comprehensive ETOR solution that would combine existing processes and help eliminate day to day use of the paper forms and help improve the accuracy of information submitted. Additionally, an ETOR solution would help enforce the collection of information that could be utilized in addressing Insurance/Grant/Individual/Program/Client/etc. billing (revenue recovery) processes. The high-level capabilities that follow are the primary standard of care for Health Providers to enable more timely and accurate communications:

- A web portal for the environmental lab submitters and the clinical lab submitters that do not have electronic medical record (EMR) systems to submit their electronic test orders directly to the NC SLPH and view electronic test reports.
- An integration suite for the NC SLPH to integrate with NC HealthConnex and any external EMR systems (i.e., for those clinical providers that are not participating in NC HealthConnex) to transmit test orders and test results.

NC SLPH expects to achieve the desired solution, that supports the scope, requirements, and users, through a phased implementation approach. The phased implementation approach should allow for higher user adoption rates, implementation flexibility, and cost effectiveness.

Phase I – NC HealthConnex and ETOR Integration

- Implement ETOR and NC HealthConnex integration for delivering patient demographics and testing results electronically.
- Estimated timeline for Phase I is 24 months.

Phase II – ETOR Portal implementation

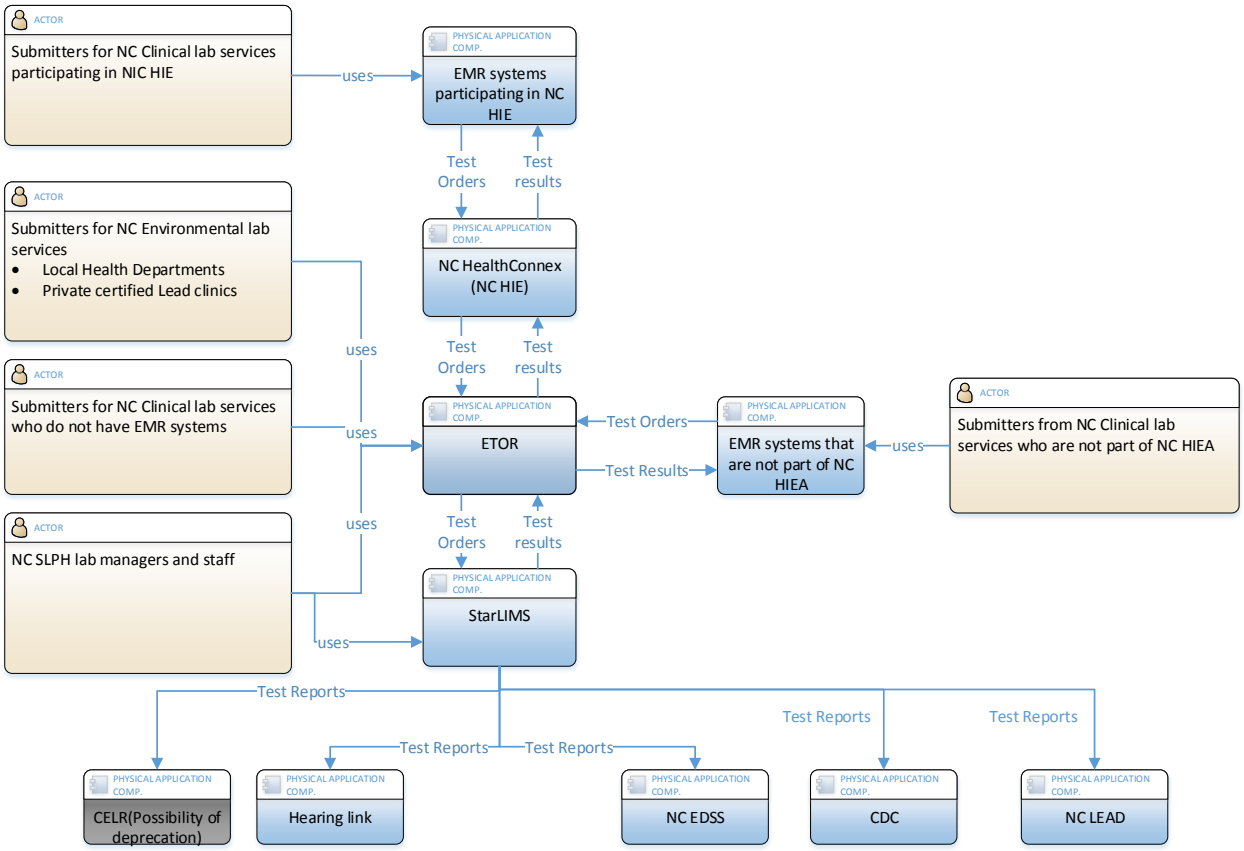
- Implement an ETOR web portal for clinical submitters who do not have an EMR system to submit/receive electronic test orders/test results directly and who may not be a full participant of NC HealthConnex.
- Implement an ETOR web portal for environmental submitters to submit/receive electronic test orders/test results directly.
- In parallel with Phase 1, estimated timeline for Phase II is 18 months.

Phase III – ETOR and non-NC HealthConnex participating EMR Integration

- Implement ETOR and non-NC HealthConnex participating EMR integrations for those who chose not to be full participants of NC HealthConnex but would still prefer a more automated electronic test order and results interface.

The ETOR Future State Context Diagram below gives an overview of the external entities (i.e., people, division, system) that will interact with the future solution.

Figure 3: ETOR Future State Context Diagram



APHL's Software as a Service (SAAS) Solution - iConnect

This strategy will enable NC SLPH to subscribe to the ETOR SaaS solution offered by APHL who hosts the application within their private cloud. The APHL solution is built around a product by iConnect and is based on a multi-state consortium model where the SaaS solution is shared with the other states, thus leveraging economies of scale and shared support among other state public health laboratories.

These costs ($630,000 and $76,500 in 90% FFP for FFY 2020 and 2021 respectively) are included in Table 19 under Hardware and Software Costs and in the total new request for this I-APDU.

Staffing Approach:

The APHL's SaaS vendor will be contracted to configure and implement the solution. However, necessary NC SLPH staff must be significantly involved during all phases of the project to:

- Communicate business goals and requirements to vendor.
- Provide ongoing project oversight and guidance.
- Integrate the solution with Starlims.
- Execute user acceptance testing between Starlims, the Solution, NC HealthConnex, and healthcare providers.
- Collaborate with vendor to develop trainings, project management approaches, documentation, communication, implementation, and roll-out plans for the various Phases.

At a minimum, the effort will require contracted staff to include one application system specialist, one medical lab specialist, and one project manager (PM). Their duties would be as follows:

Application Systems Specialist: To assist the vendor with integrating the ETOR solution with Starlims by making any necessary configuration changes needed within the laboratory information management system.

Medical Lab Specialist: To act as the clinical laboratory testing subject matter expert and liaison who will assist the Vendor and IT staff with any necessary laboratory testing workflow adjustments that may be required due to the shift from paper-based to electronic test orders and results.

Project Manager: To act as the State's project manager who will assist in scheduling State resources, completing reporting requirements, and communicating with the various State and vendor stakeholders.

Funding required for contracted staff ($357,552/year in 90% FFP) has been included in Table 19 under Contracted State Staff and in the total new request for this I-APDU.

Total funding requested in this I-APDU for ETOR work is $987,552 in 90% FFP for FFY 2020 and $434,052 in 90% FFP for FFY 2021.

Approved North Carolina HIT Projects and Anticipated Benefits

3.1.4 A New State HIT Website

NC DHHS has created a statewide HIT website to provide information on meaningful use and HIT in public health. The vision for the site is to show the progress of HIT activities within the state. The site will be designed as a central point of contact for HIT, with project summaries and links to serve as a reference for parties interested in HIT and HITECH progress in NC. There are currently no associated costs for which we are requesting additional HITECH funds.

3.1.5 MU^2 and the North Carolina Regional Extension Center

Completing Modified Stage 2 in 2018 and moving forward with Stage 3 of Meaningful Use, North Carolina recognizes that HITECH is about much more than just using certified EHR technology to collect and submit clinical data; it's about improving health outcomes. It is with this goal in mind that North Carolina proposes to leverage the North Carolina Area Health Education Centers' (NC AHEC) Regional Extension Center (REC) existing infrastructure and strong history of adult learning to continue the work done in Stage 1 and Stage 2 into Stage 3 of Meaningful Use, promoting the electronic exchange of health information to improve the quality and lower the cost of health care in North Carolina. NC believes these projects will approximate the federal objective of making "meaningful use of Meaningful Use," or MU^2.

The objectives tied to these initiatives are as follows:

- Help NC eligible professionals with Stage 3 of Meaningful Use in Program Year 2019 and beyond;
- Expand the reach of AHEC consultants beyond primary care providers to community-based specialists;
- Continue to promote patient engagement through use of electronic patient portals;
- Remove vendor-specific barriers to the achievement of all stages of Meaningful Use;

NC Medicaid believes the benefits of these initiatives are substantial and requested funding for participation in these projects in the amount of $2,071,842 in 90 percent federal funding for FFY 2019 and $2,071,842 in 90 percent federal funding for FFY 2020. The total cost for FFYs 2019 and 2020 approved in a CMS letter dated October 3, 2018, including 10 percent state match, is $4,604,094. This update requests no changes to these amounts for FFY 2020. We anticipate contracting with NC AHEC for FFY 2021 and will submit details in the next I-APDU in 2020.

For more detail on each objective, see *Section B.5.1* of the SMHP.

3.1.6 HITECH Safety Net Providers and the North Carolina Office of Rural Health

The North Carolina Office of Rural Health (ORH) helps rural and underserved communities to develop innovative strategies for improving access, quality, and cost-effectiveness of health care. ORH heard the call to action of the Office of the National Coordinator for Health IT (ONC) regarding the Meaningful Use Challenge in critical access and small rural hospitals. Together with the NC Area Health Education Centers (AHEC), ORH has provided the expertise and leadership essential for realizing ONC's goal of Promoting Interoperability.

Now, NC Medicaid has approved funding six (6) permanent FTE positions within the ORH: one (1) Rural HIT Program Manager, one (1) Rural Telehealth Specialist, three (3) Rural HIT Specialists, and one (1) Database Administrator to address the needs of the rural safety net providers in NC. The Rural Health IT Team will:

- Assess, inventory, anticipate, and prioritize safety net providers' technical, operational, organizational, clinical, hardware, applications, and funding HIT needs; identify services and resources for resolving any gaps and build out needed infrastructure, while keeping patient information protected and secure,
- Link multiple efforts such as broad band, Meaningful Use, HIE connectivity and use, development of quality dashboards, building infrastructure to use telehealth to expand access to key missing services (i.e. eye exams for rural diabetic patients, telepsychiatry, remote patient monitoring, etc.) and collaborate with key business partners to support the Department's programs and new Medicaid Transformation initiatives
- Contribute to the development of expert knowledge, frameworks, and strategies for quality improvement (QI), analytics, and reporting
- Plan, conduct, arrange, and participate in trainings/webinars and/or identify qualified trainers for key topics (e.g., QI, EHR, MU, MACRA, NC HIE, NC Care360 - new Social Determinants of Health resource platform, and maximizing the use of clinical and claims data to improve the quality of patient care)
- Assist safety net providers in attesting to Meaningful Use and/or other value-based care initiatives such as promoting interoperability

- When appropriate, link resources and assist with PCMH certification
- Oversee, and monitor safety net HIEA Participation Agreements
- Serve as the subject matter expert and point of contact for telehealth efforts across North Carolina
- Collaborate with key stakeholders such as the NC Broadband Infrastructure Office and others on telemedicine efforts
- As part of North Carolina's approved 1115 Medicaid Waiver to transform its current Medicaid delivery system ("Medicaid Transformation"), ORH has identified the opportunity to support a statewide Community Health Worker Initiative and partner with a state university to create a data repository for Community Health Workers (CHWs). The goal of the data repository is to establish and assess the effectiveness of CHW training and the CHWs role in improving the health of Medicaid beneficiaries. The team is in the process of working with state IT and procurement staff to develop an agreement with the university. Some HIE data may be used to track performance measures, health outcomes, and other related clinical data.

ORH has committed to providing the 10 percent state match required by the acceptance of 90 percent Federal Financial Participation (FFP). To meet the requirements above, the Rural HIT Team positions are budgeted at a combined annual salary and benefit package of $1,076,049 (benefits calculated at 28%). The total budget includes costs for staff travel, training events and materials, equipment, contractual support, software, and supplies totaling $378,832. The total funding request approved October 3, 2018 for FFYs 2019-2020 was $2,909,762 ($2,618,785 FFP + $290,976 ORH match), including $1,454,881 ($1,309,393 FFP + $145,488) for FFY 2019 and $1,454,881 ($1,309,393 FFP + $145,488) for FFY 2020. This update requests no changes to these amounts for FFY 2020 but does include a request of $1,454,881 ($1,309,393 FFP + $145,488) for FFY 2021.

More detail on the role that these six ORH staff play in engaging rural providers in HIT efforts is provided in the SMHP. Due to HR delays in creating and filling state positions, ORH's actual costs have been lower than the funding requested. In 2017, ORH was able to fill the first position. Three Rural HIT Specialist positions were filled in 2018 and the Telehealth Specialist was filled in April 2019. ORH continues to work with OSHR to create and fill the Database Administrator position. Associated costs can be found under line item "ORH" in the funding summary tables.

3.1.7 MU^2 and the Medicaid Evidence-Based Decision and Drug Effectiveness Review Projects

In FFYs 2019-2020, NC Medicaid continues to participate in two initiatives coordinated by the Oregon Health Sciences University's Center for Evidence-based Policy. These are the Medicaid Evidence-based Decision Project (MED Project) and the Drug Effectiveness Review Project (DERP). The MED Project is a collaboration of 18 state agencies (Alabama, Alaska, Arkansas, Colorado, Louisiana, Michigan, Minnesota, Missouri, New York, North Carolina, Ohio, Oregon, Rhode Island, Tennessee, Texas, Washington, West Virginia, and Wisconsin), primarily Medicaid, with a mission to provide policy-makers the tools and resources to make evidence-based decisions. The DERP Project is a collaborative of state Medicaid and public pharmacy programs that have joined forces to provide concise, comparative, evidence-based products that assist policymakers and other decision-makers facing difficult drug coverage decisions.

DERP is nationally recognized for its clinical objectivity and high-quality research. It focuses on specialty and other high-impact drugs, particularly those that have potential to change clinical practice. DERP reports evaluate efficacy, effectiveness and safety of drugs to ultimately help improve patient safety and quality of care while helping government programs contain exploding costs for new therapies. Many of

these reports and activities dovetail with the clinical quality measures on which EPs and EHs must report for demonstrating Meaningful Use under the Medicaid EHR Incentive Program. Expanding availability of evidence-based resources provides North Carolina more robust sources of data and information on which to base sound decision-making around best practices.

NC Medicaid has participated for six years, 2014 through 2019, and believes the benefits of both MED and DERP are substantial. In a letter dated October 3, 2018, CMS approved $95,500 for DERP and $153,000 for MED VI for a total of $248,500 ($223,650 FFP) for 2019 and $105,050 for DERP and $168,300 for MED VI for a total of$273,350 ($246,015 FFP) in 2020. This update requests no changes to these amounts for FFY 2020. We have no current plans to continue these projects in FFY 2021.

For more detail on MED/DERP, see *Section B.5.3* of the SMHP.

3.1.8 Continued Medicaid Provider Onboarding to NC HealthConnex

Consistent with CMS guidance offered in its August 17, 2010, State Medicaid Director (SMD) letter (SMD# 10-016), its May 18, 2011, SMD letter (SMD# 11-004), its February 29, 2016, SMD letter (SMD# 16-003) and its June 11, 2018, SMD letter (SMD# 18-006), NC Medicaid recognizes HIE as a critical element to the meaningful use of certified EHR technology and implementation of delivery system reforms being pursued by CMS. Studies affirm the benefits of HIE in improvements in the efficiency and effectiveness of care.[7]

However, the benefits of an HIE cannot be realized until providers connect to exchanges, access and share data, and integrate the information into their workflow and care delivery processes. Over the past five years, North Carolina has learned this lesson first-hand; while NC HealthConnex is a powerful tool, its potential for furthering the goals of the Promoting Interoperability Program, and ultimately improving health care delivery and health outcomes, is only beginning to materialize as NC HealthConnex is still in its first years of broad participation and use. Moreover, certain segments of the health care market in North Carolina, particularly independent physician practices, smaller hospitals, behavioral health and long-term care organizations, and others serving rural and underserved areas, have faced significant financial pressures and resource limitations that have resulted in slower adoption of HIE, hindering their ability to achieve PI and adapt to national and state value-based payment reform efforts.

With several parallel value-added development initiatives on the horizon and a newly published *NC HIEA Roadmap 2021*, NC Medicaid requested continued federal funding through the HIE I-APDU Version 2.0 (approved May 21, 2019) for administrative and technical integration costs associated with onboarding Medicaid providers to NC HealthConnex to support NC Medicaid providers in administering smarter health care while achieving HIE-dependent Stage 3 PI objectives in 2019-2021. Whereby effective care coordination and PI achievement require NC Medicaid EPs and EHs be connected to various provider types within their health care communities, NC Medicaid proposed funding onboarding activities for any Medicaid provider in North Carolina aligned with supporting the NC Medicaid EHR Incentive Program—per CMS State Medicaid Director (SMD) Letter # 16-003, this includes "behavioral health providers, substance abuse treatment providers, long-term care providers (including nursing facilities), home health providers, pharmacies, laboratories, correctional health providers, emergency medical service providers, public health providers, and other Medicaid providers, including community-based Medicaid providers."[8]

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[7] Mark E Frisse, Kevin B Johnson, Hui Nian, Coda L Davison, Cynthia S Gadd, Kim M Unertl, Pat A Turri, Qingxia Chen, "The financial impact of health information exchange on emergency department care," J Am Med Inform Assoc 2012;19:3 328-333, November 4, 2012.

[8] Centers for Medicare and Medicaid Services State Medicaid Director Letter # 16-003

Designed as a modular, shared utility, NC HealthConnex provides a standards-based gateway to multiple data sources and HIE services that: (1) enables providers to meet the Health Information Exchange and Public Health Reporting Stage 3 PI objectives; (2) reduces the long-term connectivity costs for system participants; and 3) informs more appropriate care decisions by providing clinicians with access to additional patient data at the point of care. With respect to specific PI measures, depending on EHR capabilities, providers connected to NC HealthConnex today can exchange care summaries across unaffiliated providers, send and receive secure messages, and submit data in accordance with the public health objectives currently supported by the NC Division of Public Health. By making financial assistance for HIE onboarding available to all Medicaid provider types in North Carolina, Medicaid EPs and EHs will have access to community data and provider messaging abilities across their health care community trading partners, a need expressed by family medicine physicians in a 2017 NC survey.[9]

In summary, while NC HealthConnex is currently assisting its participants in meeting PI requirements, continued expansion of the number/scale of participating Medicaid providers/organizations will: 1) enable new participants to connect and leverage NC HealthConnex to meet Medicaid PI objectives, and 2) increase the current and future participants' trading partners and thus more readily enable them to meet their Health Information Exchange PI objective. Once connected, NC HealthConnex will encourage and track utilization by its participants through multiple tactics. These include: 1) rolling out a comprehensive training plan that works with each connected facility as requested to integrate use of the HIE into its workflow; 2) monitoring monthly Clinical Portal and bidirectionally integrated/cloud-based EHR usage statistics; and, 3) adjusting HIE features and processes per iterative feedback on value and use from NC HIEA Advisory Board members, participants and other key stakeholders.

2015 and 2018 Revisions to the North Carolina Statewide Health Information Exchange Act

In September 2015, the North Carolina General Assembly (NCGA) passed broad scale changes to the Statewide Health Information Exchange Act of 2011. The revisions under NC Session Law 2015-241 Section 12A.5, as amended by NC Session Law 2015-264, created the NC Health Information Exchange Authority (the NC HIEA), a new state agency under the Department of Information Technology (DIT)'s Government Data Analytics Center (GDAC), to serve as the new State-Designated Entity for HIE. Per a legislated deadline, the statewide HIE network was transferred to the NC HIEA on February 29, 2016.

Lockstep with value-based NC Medicaid reform efforts, the 2015 revisions also directed providers who receive Medicaid or other state payments (e.g., for services rendered under the State Health Plan) for the provision of health care services to electronically submit clinical and demographic data to the state-operated health information exchange, NC HealthConnex, by June 1, 2018, or no longer receive payment for those services. In 2018, after considering extensive feedback from the health care community, stakeholders, and state agencies on the varying states of technical readiness of provider groups required to connect under the law, the NCGA made additional revisions to NCGS § 90-414.4, as amended by NC Session Law 2018-41, Section9.(a). This latest set of revisions extends the deadline for certain groups to connect and creates an additional extension process whereby groups may apply for a limited extension beyond their legislated deadline if they demonstrate an "ongoing good-faith effort" to work toward the connection process. The current deadlines are as follows:

[9] According to a 2017 survey to measure provider needs and attitudes toward NC HealthConnex distributed by the North Carolina Academy of Family Physicians to their member constituents, over 50% of respondents expressed a desire to exchange health information electronically with a variety of other provider types (including other primary care providers, specialists, hospitals, long-term care providers, home health providers, pharmacies, laboratories, medical imaging facilities, emergency medical service providers, and public health providers)—a capability they do not currently have.

1. Hospitals, physicians, physician assistants and nurse practitioners as defined in statute must be connected and sending clinical and demographic data as of June 1, 2018.
2. Prepaid Health Plans under Medicaid managed care set to launch in 2019 must be connected and sending claims and encounter data as of the start of their contract with NC Medicaid.
3. Local management entities/managed care organizations, which manage behavioral health services statewide, must be connected and sending claims and encounter data as of June 1, 2020.
4. Ambulatory surgical centers and dentists as defined in statute must be connected and sending clinical and demographic data as of June 1, 2021.
5. Pharmacies as defined in statute must be connected and sending claims data as of June 1, 2021.
6. Provider types other than those mentioned in 1-5 above who receive Medicaid or other state payments for the provision of health care services must be connected and sending clinical and demographic data of June 1, 2019.

As of July 1, 2018, 78% of North Carolina providers that fell under the June 1, 2018 deadline (per 1. above) were connected and sending data to NC HealthConnex; as of November 2018, this figure was 84%. Some other providers have signed contracts with the NC HIEA and have been granted extensions due to connection delays outside of their control. The remaining providers are working with NC Medicaid on corrective actions plans to connect and comply. With the move to managed care happening in 2019, NC Medicaid is doing its best to collaborate with and accommodate providers amidst lots of change, so as not to create access issues for beneficiaries.

The law cited the following findings as justification for the connection and data sharing mandate:

(1) That controlling escalating health care costs of the Medicaid program and other State-funded health services is significant to the State, its taxpayers, its Medicaid recipients, and other recipients of State-funded health services.

(2) That the State needs timely access to certain demographic and clinical information pertaining to services rendered to Medicaid and other State-funded health care program beneficiaries and paid for with Medicaid or other State-funded health care funds in order to assess performance, improve health care outcomes, pinpoint medical expense trends, identify beneficiary health risks, and evaluate how the State is spending money on Medicaid and other State-funded health services.

(3) That making demographic and clinical information available to the State by secure electronic means as set forth in subsection (b) of this section will, with respect to Medicaid and other State-funded health care programs, improve care coordination within and across health systems, increase care quality for such beneficiaries, enable more effective population health management, reduce duplication of medical services, augment syndromic surveillance, allow more accurate measurement of care services and outcomes, increase strategic knowledge about the health of the population, and facilitate health care cost containment.[10]

While the mandate requires connection and data contribution to NC HealthConnex, the NC HIEA encourages use of the system through the provision of value-added features such as event notifications, automated public health reporting and provider messaging at no cost to providers.

Recognizing that a requirement for the vast majority (an estimated 98%) of North Carolina health care providers to connect and share data would require significant effort and resources, the NC General Assembly provided state appropriations to assist with initial operations of NC HealthConnex, provided that the NC HIEA "[h]ave the successor HIE Network gradually become and remain one hundred percent

[10] N.C.G.S. 90-414.4(a).

(100%) receipt-supported by establishing reasonable participation fees and by drawing down available matching funds whenever possible."[11]

Vision for Accelerating Medicaid Provider Onboarding to NC HealthConnex

NC Medicaid's goals for NC Medicaid Health IT and the NC Medicaid EHR Incentive Program, as described in Section C of the NC SMHP, are closely aligned with those of the NC HIEA and the work described herein to accelerate Medicaid provider onboarding to NC HealthConnex. The NC HIEA's broad vision is to:

> *Link all health care providers across North Carolina enabling participants to access information to support improved health care quality and outcomes.*

Building on this idea, the vision specific to this Medicaid provider onboarding initiative is two-pronged:

> *Support Medicaid providers across North Carolina in their pursuit of connecting to NC HealthConnex to inform smarter and better health care for their patients, while meeting their regulatory and quality reporting requirements under the NC Medicaid EHR Incentive Program and The North Carolina Health Information Exchange Act. Support the North Carolina Medicaid program in providing visibility into health care service utilization to assist in the transition to value-based payment and improved health outcomes for Medicaid patients.*

Status of Statewide Organizational Connectivity to NC HealthConnex

The status of organizational connectivity to statewide HIE services is outlined in the table below. The numbers below represent total known facilities or organizations/entities statewide for each provider type category, and include those that serve Medicaid, Medicare, private-payer, un- and under-insured populations. This table is provided as background information only to give CMS broader insight into the entire state landscape. Note that several facilities may make up a single organization and/or connection; the total number of integrations/"connections" to connect the entire state to NC HealthConnex is unknown. Assumptions for the numbers provided in the table below include:

1. A provider is "connected" when patient clinical and demographic information from their EHR pertaining to services paid for by Medicaid and other State-funded health care programs are being sent to NC HealthConnex at least twice daily, either through a direct connection to NC HealthConnex or via a larger health system, ACO, HIE or cloud-based EHR. All daily incoming data feeds from currently "connected" participants are via Health Level-7 (HL7) messages and/or Continuity of Care Documents (CCDs); no ongoing daily data submission substantiating a "connection" is currently being transmitted to NC HealthConnex via Direct Secure Messaging.
2. The NC laboratory market is split between hospitals (approximately 40%) and two major retail laboratory companies: Laboratory Corporation of America (LabCorp) and Quest Diagnostics (together, approximately 60%). Both LabCorp and Quest are reviewing agreements to connect and submit lab results to NC HealthConnex as of December 2018 and must connect by June 1, 2019.
3. North Carolina's Medicaid Behavioral Health Program operates through seven regional Local Management Entities/Managed Care Organizations (LME/MCOs). As the LME/MCOs will not have access to all clinical data in the HIE data target for their constituent providers/agencies, individual providers/agencies will need to connect independently to satisfy the law. A NC HIEA Behavioral Health Work Group was formed in 2017 and includes three behavioral health agencies and two behavioral health EHRs, in addition to NC HIEA and technical contractor staff. The group

[11] NCSL 2015-241 Section 12A.5(a)(3), as amended by NCSL 2015-264.

developed a behavioral health/intellectual and developmental disability (BH/IDD)-specific connection model, including a data target and best practices, which has helped to connect nearly 300 BH/IDD facilities in 2017-2018. LME/MCOs are also required to connect under the law by June 1, 2020 to provide claims/encounter data and are eligible for onboarding support under this I-APDU. The numbers in the table below represent the seven LME/MCOs and the approximate number of independently operating individuals and agencies under those seven entities (from LME/MCO data as of March 24, 2017); unique facilities have not been estimated.

4. The number of Physician Practices/Other Facilities represents the number of active entities registered with the NC Secretary of State's office that provide health care services as their professional services indication as of March 17, 2017 (11,644). We anticipate some overlap in the figures between this category and the behavioral health and long-term care categories.

Table 9: Status of Statewide Organizational Connectivity to NC HealthConnex, as of December 11, 2018

	# Statewide	# Contracted	# Connected
Hospitals	135	121	97
	# Statewide	**# Contracted**	**# Connected**
County Health Departments	85 (rep. 100 counties)	83	63
Federally Qualified Health Centers (FQHCs)	39 (incl. 2 look-alikes)	37	28
Rural Health Clinics	70*	35	31
Laboratories (major retail)	2	0	0
Behavioral Health Organizations	7 LME/MCOs 4,000+ individual providers/agencies	0 LME/MCOs 295 organizations representing 905 facilities	0 LME/MCOs 37 organizations representing 295 facilities
Long-Term/Post-Acute Care Organizations	1,200+	46 organizations representing 170 facilities	2 organizations representing 37 facilities
Physician Practices/Other Facilities (in addition to above categories)	11,000+	1,804 organizations representing 7,659 facilities	496 organizations representing 4,280 facilities

**Note: the baseline number of Rural Health Clinics statewide as certified by CMS has been revised from 26 in Version 1.0 of the HIE I-APD to 70, the current number tracked by the NC Office of Rural Health. The initial count was taking into consideration organizational ownership, while the new figure represents unique facilities.*

Within much of the above universe of organizations/facilities, the NC HIEA's provider-entity resolution workstream reports approximately 60,000 unique providers serving Medicaid patients statewide as of November 2018.

3.1.9 Increasing Utilization Through Training and Data Integrity

As NC HealthConnex rapidly adds Medicaid providers to its statewide network, North Carolina aims to better train and prepare those providers to leverage the HIE in their clinical workflows. Currently, the NC HIEA provides five recorded video tutorials and a user guide to its participants, but lacks the capacity to conduct widespread onsite training and assistance integrating use of the HIE's features into a provider's clinical workflow. Concurrent with training on building use of NC HealthConnex into daily workflow, the

NC HIEA also has a need for participant training and support regarding data quality improvement within participant EHRs, which will translate to better data quality in the HIE.

To fill these gaps, North Carolina is partnering with the North Carolina Area Health Education Centers (NC AHEC) housed at the University of North Carolina. The NC AHEC Program at the University of North Carolina at Chapel Hill (UNC-CH) was awarded an ONC HITECH grant on February 8, 2010, to perform the function of the NC Regional Extension Center (REC). Since this time, the NC AHEC Practice Support Program has continued to deliver provider-centric services to enable transformed health care service delivery and patient-centered care through HIT statewide. Although funding for the program's HIT initiatives transitioned from the initial REC grant to HITECH funds under the NC HIT I-APDU in February 6, 2015, provider engagement in the NC Medicaid EHR Incentive Program and HIE is ongoing. NC AHEC has continued to build capacity in coaching practices through transformation to prepare for new value-based payment models and stands ready to quickly disseminate technical assistance to its base of primary care and subspecialty practices, as well as other Medicaid provider types now participating with NC HealthConnex.

On the national front, NC AHEC recently completed an Agency for Healthcare Research and Quality (AHRQ) R18 grant to support the use of data in enabling practices to improve cardiovascular health and continues as a CMS delivery mechanism for the Quality Payment Program Small Underserved and Rural Support (QPP-SURS) technical assistance program. NC AHEC has worked with several partners across the state to strengthen the quality and reach of services while minimizing duplication of efforts; these include the Carolinas Center for Medical Excellence (CCME), Alliant Health, the North Carolina Medical Society Foundation (NCMSF), the North Carolina Academy of Family Physicians (NCAFP), Community Care of North Carolina (CCNC), and the NC Institute for Public Health (IPH).

The NC AHEC Practice Support Program includes 30-40 staff with extensive experience in teaching, training, and quality improvement assistance and has worked with over 4,000 practices statewide. The NC HIEA has historically worked with NC AHEC to ensure this team is up to speed on NC HealthConnex recruiting efforts and technical features to share with the practices they work with on a regular basis.

Through the funding approved May 21, 2019 via the HIE I-APDU Version 2.0, North Carolina is launching a robust NC HealthConnex training and data quality program, directed by the NC HIEA and carried out by NC AHEC, including:

- Onsite and virtual training for NC HealthConnex existing and newly connected participants, including training on new features and specific use cases, as well as the facilitation of larger health system or regional group workshops/trainings;
- The creation of content for brief video tutorials on using specific features of NC HealthConnex for patient care and quality improvement;
- The establishment of a NC HealthConnex training request/support center at NC AHEC (separate from the technical Help Desk hosted by SAS, the NC HealthConnex technical vendor);
- Promotion of data quality and integrity by reviewing the NC HealthConnex participant data quality report together with a practice or organization and working to close gaps in the quantity and quality of data provided to NC HealthConnex; and,
- Joint marketing with the NC HIEA to promote available training options, both to participants already live on NC HealthConnex and to those in the onboarding process.

As of April 2019, NC HealthConnex has health data available for over six million unique patients (NC's population is 10.3 million[12]) with over 50 bidirectional interfaces delivering NC HealthConnex data into the clinical workflow and over 3,000 users with Clinical Portal credentials. Yet, average monthly portal logins are between 400-600 and average monthly queries are around 280,000. North Carolina believes that usage will remain low until providers are shown how to effectively integrate the HIE's features into their daily clinical workflows. North Carolina believes NC AHEC is uniquely positioned to do just this, while tailoring training to fit new HIE features and specific use cases and providing facilitation with EHR data inputs to optimize EHR technology to provide useful data as part of the NC HealthConnex data quality and integrity initiative.

On May 21, 2019, North Carolina received CMS approval for $3,086,268 ($2,777,641 @ 90% FFP) for contracted services for Q4 FFY 2019-Q4 FFY 2021 to launch this enhanced training and data quality program. This amount is inclusive of personnel, supplies, travel, development of training modules, subcontracts, etc., and is broken out as follows: FFY 2019 ($396,252 total, $356,637 @ 90% FFP), FFY 2020 ($1,345,008 total, $1,210,507 @ 90% FFP), and FFY 2021 ($1,345,008 total, $1,210,507 @ 90% FFP). *Table 11* on pages 32-33 of the HIE I-APDU Version 2.0 contains a quarterly cost breakout for this initiative; and *Table 13* on pages 38-39 and *Table 17* and *Table 18* on pages 42-43 cite the total amount for this contractor, and what is included in the rate, for FFYs 2019-2021.

While training will be provided at the practice's, facility's, or health system's request, the NC HIEA and NC AHEC anticipate providing training in some capacity to approximately 1,900 Medicaid-serving NC HealthConnex participating organizations in the first year of the program, and an additional 2,000+ through the end of FFY 2021.

3.1.10 Enhancements to NC HealthConnex to Support NC Medicaid Advanced Medical Homes

As North Carolina approaches a major shift to Medicaid managed care in mid-2019, NC DHHS and the NCGA plan to leverage NC HealthConnex to support Medicaid providers' growing needs for access to timely clinical data across the care continuum. In a policy paper entitled *Data Strategy to Support the Advanced Medical Home Program in North Carolina* dated July 20, 2018[13], NC DHHS encourages providers to leverage NC HealthConnex as a key partner for their data sharing needs around admission/discharge/transfer notifications and access to other relevant clinical information to become (and maintain status as) Advanced Medical Homes, and to inform their care decisions and population health/care management processes. The NC HIEA has a two-pronged approach, as described below, to meet the emerging needs of Medicaid providers under new requirements in 2019, while better supporting their ability to meet the Health Information Exchange PI objective.

Enabling Nimble Data Retrieval and a Current Snapshot

NC HealthConnex currently exchanges health information with EHRs and HIEs primarily via legacy Health Level Seven International (HL7) standards and HL7 Consolidated Clinical Document Architecture (C-CDA). This type of document exchange has provided a workable foundation for the sharing of summary of care (encounter summary) documents among health care providers and public health entities in North Carolina. However, new data standards now offer the opportunity to: 1) move beyond a set of structured documents to leverage and transport discrete, critical data elements on their own (or in logically grouped "bundles") to where they'll be most useful; and 2) better consolidate disparate encounter data to give a

[12] https://files.nc.gov/ncosbm/documents/files/Rec2018-19_PopulationDynamics.pdf
[13] https://files.nc.gov/ncdhhs/AMH-Data-PolicyPaper_FINAL_2018720.pdf

treating provider a robust current "snapshot" of relevant patient information from the HIE at the point of care, directly within their EHR or as a printable record within the NC HealthConnex Clinical Portal.

Per guidance in State Medicaid Director Letter #16-003 pertaining to available HITECH funding for interoperability and HIE architecture, North Carolina is leveraging federal financial participation (approved May 21, 2019) to implement the following HIE infrastructure to better support North Carolina Medicaid providers in their data needs for Advanced Medical Home participation and in meeting their Health Information Exchange PI objective:

- The FHIR Standard: technology and health care industry experts (including Apple, Cerner, and many of the country's largest health systems) agree that health data interoperability must move quickly toward a more flexible, Application Program Interface (API)-based standard that allows for data elements to be more nimbly requested, sent and retrieved—together or individually—by health care providers, managers, payers and patients via multiple types of devices and user interfaces. HL7's open-source solution to this challenge is the FHIR standard. Per the *NC HIEA Roadmap 2021*, enabling FHIR for NC HealthConnex will allow for myriad future use cases to better promote interoperability and support Medicaid providers, management and patients in their quest for instant, relevant patient health information. The NC HIEA's initial application of the FHIR standard will be in collaboration with NC Medicaid to support Advanced Medical Homes in their data sharing needs. North Carolina proposes to leverage the ONC Inferno testing suite to ensure consistent implementation, per an October 2, 2018, ONC blog post.[14]
- Consolidated Continuity of Care Document (CCD): while the NC HealthConnex Clinical Portal offers a consolidated statewide longitudinal view of a patient record, Medicaid providers that access NC HealthConnex from within their EHRs are still shuffling through a list of recent summary of care documents to find information relevant to their point of care treatment decisions. North Carolina will build logic to make available a single, current, consolidated summary of care record that mirrors key elements of the Clinical Portal's consolidated longitudinal record and follows the Promoting Interoperability and NC HIEA CCD data specification. North Carolina believes that, in combination with the proposed training program, this easily accessible consolidated record—customized for each organization—will dramatically increase usage of NC HealthConnex, better inform medication reconciliation, reduce duplicate testing and procedures, and contribute to better care management and appropriate care transitions for Medicaid providers and patients.

The NC HIEA believes that becoming FHIR-enabled and producing a customized, consolidated CCD in response to a NC HealthConnex query from within the provider EHR will increase use of NC HealthConnex and thus promote additional sharing of summary of care documents for follow-up and care transitions, contributing to a Medicaid EP or EH's performance on the Health Information Exchange PI objective and measures. Specifically, these features will directly enhance the ability of EPs and EHs to meet PI Objective 7 Measures 2 and 3 by equipping them with a document that will serve as a single source of truth across care sites statewide, and power clinical information reconciliation by providing consolidated, current medications, medication allergies, and problems.

The NC HIEA will initially work to test initial FHIR connectivity with a cloud-based EHR vendor serving multiple Medicaid Advanced Medical Homes in collaboration with NC Medicaid, then conduct one test with an additional Medicaid-serving EHR vendor each quarter after the initial test throughout the period

[14] https://www.healthit.gov/buzz-blog/interoperability/onc-is-fhird-up-unwrapping-the-new-inferno-testing-suite/

covered under this I-APDU. The NC HIEA will initially train a large Medicaid-serving health system on leveraging the consolidated CCD in the workflow, and then continue to onboard additional bidirectional Medicaid-serving HIE participants to the consolidated CCD service.

In a CMS letter dated May 21, 2019, NC received approval for $364,800 ($328,320 @ 90% FFP) for contracted services for Q4 FFY 2019-Q4 FFY 2021 to FHIR-enable and test NC HealthConnex [FFY 2019 ($0 total), FFY 2020 ($172,800 total, $155,520 @ 90% FFP), and FFY 2021 ($192,000 total, $172,800 @ 90% FFP)] and approval for $320,000 ($288,000 @ 90% FFP) for contracted services for Q4 FFY 2019-Q4 FFY 2021 to design, develop and implement the consolidated CCD for integrated HIE users [FFY 2019 ($0 total), FFY 2020 ($200,000 total, $180,000 @ 90% FFP), and FFY 2021 ($120,000 total, $108,000 @ 90% FFP)].

These contracted services are provided at an inclusive rate for a deliverables-based contract and contain all personnel, supplies, subcontracts, etc. needed to deliver the technology design, development and implementation/onboarding services described herein. The above total costs represent summary figures across *Table 12* and *Table 13* on this I-APDU. *Table 17* of this I-APDU contains a quarterly cost breakout of the implementation component of these initiatives (testing with/onboarding Medicaid providers to these services). All approved contracts costs are included in the total contracted services number for the HIE technology vendor in *Table 15* in this I-APDU.

Improving Event Notifications to Support Care Management and Transitions of Care

In September 2018, the NC HIEA introduced NC*Notify, an improved event notification service available at no cost to full participants of NC HealthConnex. The service was developed as a response to extensive provider and stakeholder feedback to leverage the HIE to routinely place targeted, actionable patient data into the hands of subscribed providers, based on their desired specific patient panels. Unlike the notification services previously available in the NC HealthConnex Clinical Portal, NC*Notify provides a secure, regular "push" of relevant notifications to providers as their patients receive services statewide and across the care continuum, including in acute and ambulatory care settings.

Currently in its initial phase (Release/Version 1.0), the service provides daily, weekly, monthly or quarterly updates to providers, as requested, on hospital and ambulatory setting patient admissions and discharges via secure file transfer protocol (sFTP). Subscribed providers or provider organizations are responsible for providing their requested patient panels and updating those panels no less than quarterly.

Working collaboratively with the NC Medicaid Advanced Medical Home Strategy Team, the NC HIEA has three more planned releases of NC*Notify through 2020, each with additional functionality, data elements, and delivery methods, to make the notifications more useful for NC Medicaid providers' population health/care management processes. NC*Notify Release/Version 2.0 will add chief complaint and diagnosis to the message and enable additional delivery mechanisms, including via Direct Secure Messaging and text message.

Per guidance in State Medicaid Director Letter #16-003 pertaining to available HITECH funding for interoperability and HIE architecture, and specifically encounter alerting, North Carolina received approval May 21, 2019 to leverage federal financial participation for Releases/Versions 3.0 and 4.0 of NC*Notify to expand and enhance its usefulness for NC Medicaid providers striving to provide appropriate care management and care transitions for their patients—functions central to the Promoting Interoperability program and participation with NC Medicaid as an Advanced Medical Home. These releases will:

1. Add additional notification triggers, as identified by a newly built Clinical Intelligence Engine (CIE). Examples of these triggers include a data addition to the NC Diabetes Registry, an administered

immunization as reported to the NC Immunization Registry, a filled prescription as reported to the NC Controlled Substances Reporting System, a critical lab result as flagged by the HIE from multiple lab provider inputs, a patient attribution change as reported from a health plan, and a risk score calculated by the CIE itself based upon various data in the HIE.

2. Add configuration preferences, such as patient-level content and frequency preferences based upon risk level.
3. Add "real-time" as a frequency preference, so subscribers may be alerted as their patients receive care elsewhere.
4. Add delivery methods and formats, including by FHIR Application Programming Interface (API), Portable Document Format (PDF), HL7 and mobile application.
5. Add message content, including provider information, place of care details, relevant data from connected state registries and repositories, and a patient's NC HealthConnex consolidated CCD.
6. Improved reporting capabilities, to include monthly volume reports per participant.

More information on the planned NC*Notify releases can be found in the *NC*Notify Service Roadmap*, which was submitted with the HIE I-APDU Version 2.0. More information on adoption goals for NC*Notify can be found in the *NC HIEA Roadmap 2021*. See Appendix D of this I-APDU for a visual representation of NC*Notify and other services and system interactions with NC HealthConnex.

As all NC Medicaid providers are required by law to participate with NC HealthConnex by specified dates in 2018-2021 (ranging per provider type), they may leverage NC*Notify at no cost to become better informed (and on a timelier basis) of their patients' care outside of their organizations. North Carolina anticipates that this type of pushed, timely information will prompt additional sharing of summary of care records, contributing to their performance on the Health Information Exchange PI objective.

In a CMS letter dated May 21, 2019, NC received approval for $2,393,200 ($2,153,880 @ 90% FFP) for contracted services for Q4 FFY 2019-Q4 FFY 2021 for design, development and implementation of NC*Notify Releases/Versions 3.0 and 4.0. This amount is broken out as follows: FFY 2019 ($0 total), FFY 2020 ($971,600 total, $874,440 @ 90% FFP), and FFY 2021 ($1,421,600 total, $1,279,440 @ 90% FFP).

These contracted services are provided at an inclusive rate for a deliverables-based contract and contain all personnel, supplies, subcontracts, etc. needed to deliver the technology design, development and implementation/onboarding services described herein. The above total costs represent summary figures across *Table 12* and *Table 13* of this I-APDU. *Table 17* contains a quarterly cost breakout of the implementation component of these initiatives (onboarding Medicaid providers to the service). All approved contractor costs are included in the total contracted services number for the HIE technology vendor in *Table 15* of this I-APDU.

3.1.11 Enhancements to the PDMP and NC HealthConnex to Support Opioid Misuse and Prevention

North Carolina's Prescription Drug Monitoring Program (PDMP) was developed in 2007 to "improve the State's ability to identify controlled substance abusers or misusers and refer them for treatment, and to identify and stop diversion of prescription drugs in an efficient and cost-effective manner that will not impede the appropriate medical utilization of illicit controlled substances," per the North Carolina Controlled Substances Reporting System Act (NCGS § 90-113.71(b)). A patient's controlled-substance history, viewable in the state PDMP (called the NC Controlled Substances Reporting System, or CSRS), enables health care providers and pharmacists to better manage patients' prescriptions and to improve safety and quality of care as a result. PDMP data in North Carolina includes millions of patient records,

each with approximately twenty variables. The PDMP is administered by the NC Division of Mental Health, Developmental Disabilities and Substance Abuse Services (NC DMH/DD/SAS, part of NC DHHS).

Since an estimated 86% of health care providers registered to use the CSRS serve Medicaid patients, there is a significant need to provide PDMP information within the clinical workflow as part of the health system electronic health record. Additionally, NC statute requires that pharmacies shall report the information under this section no later than the close of the next business day after the prescription is delivered; however, dispensers are encouraged to report the information no later than 24 hours after the prescription was delivered. To address this legislative mandate, North Carolina seeks to make PDMP data available to authorized users via health information exchanges, pharmacy management systems and electronic health records through the Appriss PDMP Gateway solution.

The goal of the PDMP Gateway is to increase utilization of PDMP data by enabling providers to access PDMP data within their existing clinical workflow. The primary objective of an enterprise license for the NC PDMP Gateway is to increase participation in the PDMP Gateway integration by removing the significant cost barrier that health care providers currently face.

In addition to staffing needs, the PDMP team plans to continue working with a contractor to facilitate each project's steering committee meetings and generate supporting artifacts. The CSRS in North Carolina supports the Public Health and Clinical Data Registry Reporting objective of the Promoting Interoperability Programs under the NC Medicaid EHR Incentive Program.

To further Medicaid providers' options to access PDMP data through their existing EHR interfaces, NC DHHS and the NC General Assembly agreed to leverage NC HealthConnex as a means for providers to access the CSRS and combat the opioid epidemic in North Carolina. Per the Strengthen Opioid Misuse Prevention (STOP) Act of 2017, or the STOP Act (NCSL 2017-74), health care providers in North Carolina who prescribe controlled substances must pull a report from the North Carolina Controlled Substance Reporting System (CSRS) to verify a patient's controlled substances prescription fill history prior to writing any such prescription.

To reduce the burden of this additional requirement on affected providers, the STOP Act assumes integration with NC HealthConnex as a gateway to the CSRS—preventing sign-on to another disparate system—and delays the effectiveness of the statutory requirement until such integration is complete. North Carolina has begun work on this initial integration to facilitate prompt provider compliance with the STOP Act and expects to deliver this functionality to HIE participants in 2019.

Per State Medicaid Director Letter #18-006 dated June 11, 2018, which advises state Medicaid agencies to consider leveraging Medicaid technology to address the opioid epidemic, North Carolina is leveraging (since receiving CMS approval May 21, 2019) HIE HITECH funding to: 1) further enhance seamless provider access to CSRS reports via NC HealthConnex, and 2) leverage CSRS data as a part of NC HealthConnex notification services, making the data actionable from a care standpoint by proactively putting timely controlled substance fill history data back into the hands of a patient's providers.

North Carolina is following a phased approach to CSRS integration with NC HealthConnex, described below.

- Phase I will deliver immediate value to providers and put the STOP Act into effect through single sign-on access to the CSRS via the NC HealthConnex Clinical Portal. This is estimated to be available in the second calendar quarter of 2019 and was not a part of the funding request in the HIE I-APDU Version 2.0.

- Phase II will improve the user experience for NC HealthConnex EHR-integrated participants by providing access to a CSRS report from directly within a provider's EHR via an Observation Result (ORU) message interface. With this functionality, an HIE-connected prescribing provider would simply request the CSRS report through their EHR—the same way they currently order a lab, test, or medication—and receive the report immediately for review. The ease of this approach in existing workflow has great appeal to NC providers. The design, development, and implementation of this phase, including the initial implementations of the functionality with a Medicaid hospital and a Medicaid ambulatory provider, is slated for late 2019 and was part of the funding request in the HIE I-APDU Version 2.0 (approved May 21, 2019).
- Phase III will integrate CSRS data into the HIE event notification service, NC*Notify. HIE participating providers subscribe to NC*Notify by providing a panel of their patients and selecting the types of data they would like to receive, and on what schedule (daily, weekly, monthly, or quarterly—in 2020, also in real-time). By selecting "CSRS data" and "Daily," a provider may be notified daily if a patient of theirs fills a prescription for controlled substances and take any appropriate follow-up action thereafter. The design, development, and implementation of this phase is slated for 2020 and was part of the funding request in the HIE I-APDU Version 2.0 (approved May 21, 2019).

As these activities are the first proposed to leverage funding outside of North Carolina state appropriations for the CSRS in relation to NC HealthConnex, North Carolina assures CMS that these PDMP integration activities do not duplicate activities funded under CDC, SAMHSA and DOJ authorities.

In addition to supporting the North Carolina STOP Act and acting on the findings in the President's Commission on Combating Drug Addiction and the Opioid Crisis Final Report, Phases II and III of NC HealthConnex-CSRS integration as described above will provide additional prescription fill history to providers to enable more comprehensive medication reconciliation, a key tenet of the Promoting Interoperability program, and specifically enabling EP and EH achievement of PI Objective 7 Measure 3. NC DMH/DD/SAS, which owns the CSRS, will declare the CSRS a specialized public health registry for the purposes of reporting to the Promoting Interoperability program in 2019.

In a CMS letter dated May 21, 2019, NC received approval for $2,258,536 ($2,032,683 @ 90% FFP) for PDMP staff, supplies and contracted services to support the PDMP for Q4 FFY 2019-Q4 FFY 2021 [FFY 2019 ($301,020 total, $270,918 @ 90% FFP), FFY 2020 ($978,758 total, $880,882 @ 90% FFP), and FFY 2021 ($978,758 total, $880,882 @ 90% FFP)] and approval for $748,000 ($673,200 @ 90% FFP) for contracted services for Q4 FFY 2019-Q4 FFY 2021 for design, development and implementation of Phase II of the NC HealthConnex-CSRS integration. (Phase III costs are included in the NC*Notify development costs.) This amount is broken out as follows: FFY 2019 ($0 total), FFY 2020 ($388,000 total, $349,200 @ 90% FFP), and FFY 2021 ($360,000 total, $324,000 @ 90% FFP).

These contracted services are provided at an inclusive rate for a deliverables-based contract and contain all personnel, supplies, subcontracts, etc. needed to deliver the technology design, development and implementation/onboarding services described herein. The above total costs represent summary figures across *Table 12* and *Table 13* of this I-APDU. *Table 17* contains a quarterly cost breakout of the implementation component of these initiatives (onboarding Medicaid providers to the service). All approved contractor costs are included in the total contracted services number for the HIE technology vendor in *Table 15* of this I-APDU. See Appendix D of this I-APDU for a visual representation of the planned interactions between the CSRS and NC HealthConnex.

3.1.12 Enabling Electronic Orders and Results with the State Laboratory of Public Health

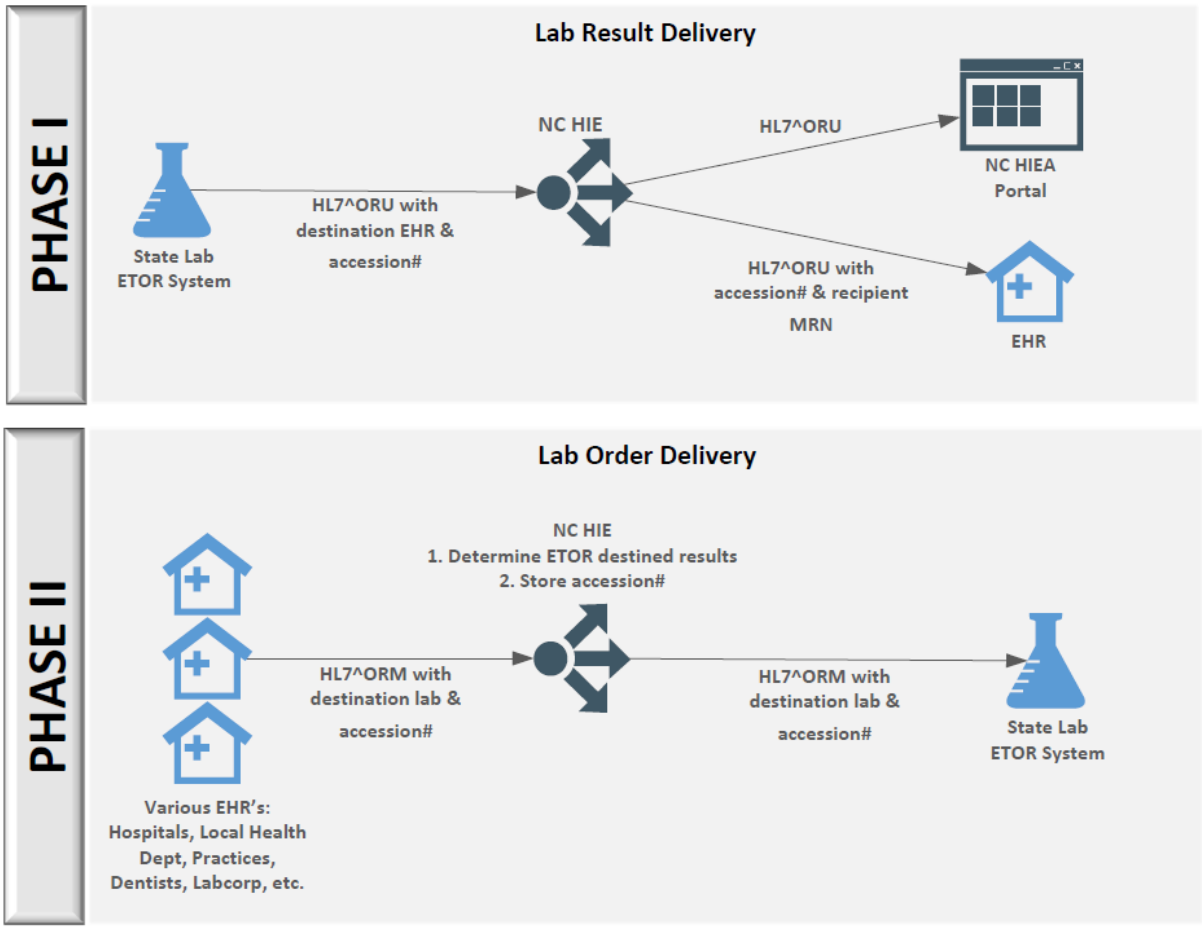
North Carolina has a unique opportunity to leverage NC HealthConnex's existing interfaces with provider EHRs, which by state law will eventually include approximately 98% of North Carolina health care providers, to serve as a gateway to the North Carolina State Laboratory of Public Health (NC SLPH) to introduce efficiencies into their orders and results process. Through a bidirectional interface between the two systems, health care providers in North Carolina will be able to submit electronic lab orders and receive results from the SLPH without leaving their EHRs—a marked improvement from today's paper- and portal-based process.

The mission of the NC SLPH is to "provide certain medical and environmental laboratory services (testing, consultation and training) to public and private health provider organizations responsible for the promotion, protection and assurance of the health of North Carolina citizens."[15] Among its services are myriad environmental testing services (water systems, dairies, etc.); testing for biological and chemical terrorism agents; microbiology and virology/serology services for various specimens; testing for newborn and prenatal screenings and infant blood lead levels, and others. Health systems, pediatric and primary care providers, and many other health care providers rely on the services of the NC SLPH to remain compliant with state reporting laws and inform their daily patient care.

Per guidance in State Medicaid Director Letter #16-003 pertaining to available HITECH funding for interoperability and HIE architecture, connecting public health systems to HIEs, and assisting EPs and EHs with meeting specific PI objectives, on May 21, 2019, North Carolina received approval for federal financial participation to assist with the design, development and implementation of the NC HealthConnex-NC SLPH interface and subsequent onboarding of Medicaid providers to the new service. Specifically, this new HIE feature will allow EPs and EHs to leverage their existing NC HealthConnex interface to help meet PI Objective 4 Measure 2, Computerized Order Entry of ordered labs. Figure 4 below depicts the proposed information flow for lab result delivery into EHRs and the ordering process to NC SLPH.

[15] https://slph.ncpublichealth.com/

Figure 4: Proposed Information Flow between the NC SLPH, NC HealthConnex and Healthcare Organizations



In a CMS letter dated May 21, 2019, NC received approval for $559,200 ($503,280 @ 90% FFP) for contracted services for Q4 FFY 2019-Q4 FFY 2021 for design, development and implementation of the NC HealthConnex-NC SLPH orders and results service. This amount is broken out as follows: FFY 2019 ($0 total), FFY 2020 ($0 total), and FFY 2021 ($559,200 total, $503,280 @ 90% FFP).

These contracted services are provided at an inclusive rate for a deliverables-based contract and contain all personnel, supplies, subcontracts, etc. needed to deliver the technology design, development and implementation/onboarding services described herein. The above total costs represent summary figures across *Table 12* and *Table 13* of this I-APDU. *Table 17* contains a quarterly cost breakout of the implementation component of these initiatives (onboarding Medicaid providers to the service). All approved contractor costs are included in the total contracted services number for the HIE technology vendor in *Table 15* of this I-APDU. See Appendix D of this I-APDU for a visual representation of the planned interactions between the NC SLPH and NC HealthConnex.

NC HealthConnex and Promoting Interoperability

At the core of the HIE-PI relationship is care coordination across unaffiliated health care providers. A subset of NC Medicaid EPs and EHs are using NC HealthConnex today to facilitate electronic transitions of care and referrals, including backend reporting to substantiate these for audit documentation. In addition to care transitions, North Carolina is leveraging NC HealthConnex as a gateway for providers' reporting of

public health data to satisfy PI requirements and improve efficiencies within NC DHHS. The approaches for immunization and reportable lab reporting were approved and funded in the SMHP (Section A.14) and HIT I-APDU (Section 3.4.1) dated August 8, 2013. North Carolina's public health utilities through the Division of Public Health (DPH) include the following services (with related HIE capabilities in parentheses):

- NC Immunization Registry (bidirectional functionality live/available)
- Electronic Lab Reporting (daily batch reporting functionality live/available)
- NC Diabetes Specialized Registry (automated reporting for all HIE participants live/available)
- State Laboratory of Public Health (bidirectional orders/results interface proposed in the HIE I-APDU Version 2.0 and approved May 21, 2019)
- NC Controlled Substances Reporting System (access within the HIE Clinical Portal under development; access from within provider EHRs proposed in the HIE I-APDU Version 2.0 and approved May 21, 2019)
- Central Cancer Registry (potential candidate for future I-APDU)

For the NC Medicaid EHR Incentive Program's Program Years 2019-2021, NC HealthConnex will continue to support EPs and EHs in meeting several of the measures under the Health Information Exchange and Public Health objectives for Stage 3 and will newly support the Stage 3 Computerized Provider Order Entry (CPOE) objective through the coming bidirectional interface with the State Lab of Public Health. *Table 10* below shows a crosswalk of NC HealthConnex functionality and Stage 3 objectives supported. NC Medicaid will update this I-APDU to include any changes or additions to supporting functionality in subsequent years of the NC Medicaid EHR Incentive Program.

Table 10: Stage 3 Promoting Interoperability Objectives and Supporting NC HealthConnex Functionality

Stage 3		
Objective	**Measures**	**Supporting NC HealthConnex Functionality**
4. Computerized Provider Order Entry (CPOE)	**EP Measures:** An Eligible Professional (EP), through a combination of meeting the thresholds and exclusions (or both), must satisfy all three measures for this objective: **Measure 1** – More than 60 percent of medication orders created by the EP during the Promoting Interoperability (PI) reporting period are recorded using computerized provider order entry. **Measure 2** – More than 60 percent of laboratory orders created by the EP during the PI reporting period are recorded using computerized provider order entry. **Measure 3** – More than 60 percent of diagnostic imaging orders created by the EP during the PI reporting period are recorded using computerized provider order entry. **EH Measures:** An Eligible Hospital/Critical Access Hospital (CAH) must meet the thresholds for all three measures. **Measure 1** – More than 60 percent of medication orders created by the authorized providers of the eligible hospital or CAH inpatient or emergency department (POS 21 or 23) during the	• **State Laboratory of Public Health Orders and Results:** This new capability will allow Medicaid providers to use CPOE within their EHR to order laboratory tests from the State Laboratory of Public Health. This new functionality will contribute to Measure 2 for participating Medicaid providers, and will help to convert some of the two million labs now annually requested via paper and portal to an electronic process, seamlessly integrated within the provider's EHR.

	Promoting Interoperability (PI) reporting period are recorded using computerized provider order entry. **Measure 2** – More than 60 percent of laboratory orders created by the authorized providers of the eligible hospital or CAH inpatient or emergency department (POS 21 or 23) during the PI reporting period are recorded using computerized provider order entry. **Measure 3** – More than 60 percent of diagnostic imaging orders created by the authorized providers of the eligible hospital or CAH inpatient or emergency department (POS 21 or 23) during the PI reporting period are recorded using computerized provider order entry.	
7. Health Information Exchange	**Measures (identical for EP/EH):** Providers must attest to all three measures and must meet the threshold for at least two measures to meet the objective. **Measure 1** – For more than 50 percent of transitions of care and referrals, the EP/EH/CAH that transitions or refers their patient to another setting of care or provider of care: (1) Creates a summary of care record using CEHRT; and (2) Electronically exchanges the summary of care record. **Measure 2** – For more than 40 percent of transitions or referrals received and patient encounters in which the provider has never before encountered the patient, the EP/EH/CAH incorporates into the patient's EHR an electronic summary of care document. **Measure 3** – For more than 80 percent of transitions or referrals received and patient encounters in which the provider has never before encountered the patient, the EP/EH/CAH performs a clinical information reconciliation. The provider must implement clinical information reconciliation for the following three clinical information sets: (1) Medication. Review of the patient's medication, including the name, dosage, frequency, and route of each medication. (2) Medication allergy. Review of the patient's known medication allergies. (3) Current Problem list. Review of the patient's current and active diagnoses.	• Direct Secure Messaging available to all NC HealthConnex participants through the NC HealthConnex Clinical Portal or visually integrated within a provider's EHR. The NC HealthConnex HISP is DirectTrust accredited and maintains compliance with all ONC/DirectTrust requirements. • Provider Directory with 20,000+ provider addresses available through NC HealthConnex Clinical Portal and sent to NC HealthConnex participants directly for use within their EHRs (updated quarterly). • Query-based retrieval of patient records within NC HealthConnex by providers at the point of care. New capability in 2019-2020 for EHR-integrated users to access a consolidated CCD which will contain the most current, consolidated information for Measure 3. • Backend reporting on message delivery notifications for MU/PI reporting verification/audit logging. • Note: non-eligible provider types connected to NC HealthConnex will augment the electronically available referral/trading partners for EPs/EHs/CAHs.
8. Public Health Reporting	**Measures (1-5 identical for EP/EH):** **Measure 1** – Immunization Registry Reporting: The EP/EH/CAH is in active engagement with a PHA to submit immunization data and receive	• **Immunization Registry Reporting**: Live bidirectional connection to the NC Immunization Registry (NCIR), allowing for automated reporting from entry into the EHR patient record directly to the NCIR, as well as query capability through the

immunization forecasts and histories from the public health immunization registry/immunization information system (IIS).
Measure 2 – Syndromic Surveillance Reporting: The EP/EH/CAH is in active engagement with a PHA to submit syndromic surveillance data from an urgent care setting.
Measure 3 – Electronic Case Reporting: The EP/EH/CAH is in active engagement with a PHA to submit case reporting of reportable conditions.
Measure 4 – Public Health Registry Reporting: The EP/EH/CAH is in active engagement with a PHA to submit data to public health registries.
Measure 5 – CDR Reporting: The EP/EH/CAH is in active engagement to submit data to a CDR.
***EH Only:* Measure 6** – Electronic Reportable Laboratory Result Reporting: The EH/CAH is in active engagement with a PHA to submit electronic reportable laboratory (ELR) results.

EHR or NC HealthConnex Clinical Portal to the NCIR to pull vaccination history and recommendations.

- **Public Health Registry Reporting:** All connected NC HealthConnex participants, once live, automatically submit data to the NC Diabetes Registry. NC HealthConnex provides documentation to this end for provider records/audit logging. The NC CSRS will be declared a registry for PI reporting in 2019, and connection through NC HealthConnex will provide another option to satisfy this requirement.
- **Electronic Reportable Laboratory Result Reporting:** Reporting through NC HealthConnex live/available. Hospital laboratories may submit their ELR daily batches via NC HealthConnex to NC DPH.

The onboarding efforts described under this I-APDU includes all Medicaid provider types, including those not eligible for incentive payments under the EHR Incentive Program, but nonetheless aligned with supporting Promoting Interoperability—per State Medicaid Director Letter #16-003, this includes "behavioral health providers, substance abuse treatment providers, long-term care providers (including nursing facilities), home health providers, pharmacies, laboratories, correctional health providers, emergency medical service providers, public health providers, and other Medicaid providers, including community-based Medicaid providers."[16] As noted repeatedly in this I-APDU and in State Medicaid Director Letter #16-003, the connection of these other provider types to NC HealthConnex will enable transitions of care between those parties and NC Medicaid EPs and EHs, facilitating their attainment of the Health Information Exchange objective, now and in the future.

Goals and Objectives of Medicaid Provider Onboarding and NC HealthConnex Enhancements

With the HIE I-APDU Version 2.0 (approved May 21, 2019), NC Medicaid proposed accelerating the onboarding of NC Medicaid providers across 1,795 connections representing 3,000+ facilities to NC HealthConnex by assisting them with one-time integration costs and workflow training. "Onboarding" is defined as a one-time activity to bring a health care facility live on NC HealthConnex, or onto a new feature of NC HealthConnex, and includes the design, development and implementation of technical interfaces, as well as training for providers and facility staff to integrate utilization of NC HealthConnex and its features into their practice workflows. The HIE I-APDU Version 2.0 also proposed various enhancements to NC HealthConnex to better support NC Medicaid Advanced Medical Homes, combat opioid misuse statewide, and improve public health interoperability. The table below summarizes the overarching goals and objectives of these efforts, to be carried out by the NC HIEA and its training and technical contractors.

[16] Centers for Medicare and Medicaid Services State Medicaid Director Letter # 16-003

Table 11: Goals and Objectives of Continued Medicaid Provider Onboarding and NC HealthConnex Enhancements

Goal A: Educate NC Medicaid providers about NC HealthConnex and available onboarding assistance	
Objective 1	**Continue a targeted outreach campaign** touching all 60,000+ NC Medicaid providers and their EHR vendors
Objective 2	**Engage stakeholders** directly and through advocacy groups representing targeted providers
Objective 3	**Leverage statewide events** (meetings, conferences, collaboratives) sponsored by partner organizations
Goal B: Increase enrollment in and use of NC HealthConnex	
Objective 1	**Obtain signed PAs representing at least 90% of identified Medicaid providers** by legislated deadline(s)
Objective 2	**Connect* 80% of Medicaid NC HealthConnex applicants within 180 days** of receiving signed agreements
Objective 3	**Provide a multi-pronged training program** (web-based, virtual live, and onsite) to increase use of HIE
Goal C: Support NC Medicaid providers in meeting the requirements of Promoting Interoperability Stage 3	
Objective 1	As a joint effort with NC Medicaid, **provide educational media on meeting PI with NC HealthConnex**
Objective 2	As a joint effort with NC Medicaid, **create and conduct a training program on meeting PI with NC HealthConnex**
Objective 3	**Provide PI reporting and documentation** to NC HealthConnex participants for use in PI attestation/audit
Objective 4	**Facilitate electronic transitions of care** by recruiting providers within the health care ecosystems of Medicaid-serving NC HealthConnex participants
Goal D: Support NC Medicaid providers in achieving their State-mandated connection* to NC HealthConnex	
Objective 1	Together with NC Medicaid, i**ncrease awareness of the connection requirement** among NC Medicaid providers
Objective 2	Together with NC Medicaid, **connect* all signed participants per Goal B above**
Objective 3	Together with NC Medicaid, continue to **educate the NC General Assembly** about the operational challenges and benefits of connecting the state's Medicaid providers to NC HealthConnex
Goal E: Support NC Medicaid Advanced Medical Homes in their data-sharing needs	
Objective 1	**Produce a consolidated CCD across HIE encounter data** to increase efficient use of NC HealthConnex and better inform clinical decision-making
Objective 2	**Enable and test FHIR capability** with ONC testing tools and EHRs with a large Medicaid provider footprint
Goal E: Support NC Medicaid Advanced Medical Homes in their data-sharing needs	
Objective 3	Together with NC Medicaid, continue to **develop and refine NC*Notify event notifications** to include enhanced delivery mechanisms, additional content, and eventually, smart content targeted at Medicaid provider data needs
Objective 4	**Increase NC*Notify enrollment** such that the service monitors at least 1M patients by December 2019 and at least 2.5M patients by December 2020 statewide
Goal F: Support opioid misuse and prevention across North Carolina	

Objective 1	Build the capability to **access CSRS reports within a NC HealthConnex integrated participant's EHR**
Objective 2	At a provider's request, **include CSRS data in NC*Notify event notifications** to help providers act quickly on identified opioid and substance use disorder issues with their patients
Objective 3	Without a provider's specific request, **build clinical intelligence to include CSRS data in NC*Notify smart event notifications** whenever relevant to help providers act quickly on identified opioid and substance use disorder issues with their patients
Objective 4	Support the PDMP program with administrative and implementation costs to **expand access via EHR connectivity to Medicaid providers**
Goal G: Leverage NC HealthConnex to support the State Laboratory of Public Health's transition from paper to electronic orders and results	
Objective 1	Together with NC DPH, **build a bidirectional interface between NC HealthConnex and the State Lab of Public Health**
Objective 2	Together with NC DPH, **onboard Medicaid providers to submit lab orders and receive results electronically with the State Lab of Public Health**

**A provider is "connected" when patient clinical and demographic information from their EHR pertaining to services paid for by Medicaid and other State-funded health care programs are being sent to NC HealthConnex at least twice daily, either through a direct connection to NC HealthConnex or via a larger health system, HIE, or cloud-based EHR with which s/he participates.*

When onboarding new facilities to NC HealthConnex, the NC HIEA leverages technical and operational efficiencies wherever possible. Examples of these efficiencies include using open source tools; working with EHR vendors directly to model new connections after previously built interfaces; leveraging the replicability of cloud-based EHR integrations by conducting outreach jointly with vendors to other NC users of those technologies to expand impact; and connecting large health systems and HIEs where a single connection links tens or even hundreds of facilities/providers. The NC HIEA together with its technical vendor, SAS Institute, will ensure that any existing technologies or systems that can be reused are leveraged. Under no circumstances will HITECH funds be used to purchase EHR licenses, either on behalf of providers or for the HIE's testing or training purposes.

To more accurately quantify the effort and associated costs of connecting the state's Medicaid providers to the HIE and its services, NC Medicaid together with the NC HIEA has estimated the unique facilities or actual connections those providers represent. The table below details these proposed connections and associated technical integration costs for funding under this I-APDU. The NC HIEA notes for CMS that it anticipates coming closer to our projected "integration" connection estimates, and expending more, than under Version 1.0 of this HIE I-APDU in 2017-2018. To meet this need, SAS Institute will be allocating several staff to the HIE integrations effort and have contracted with multiple third-party integration companies that stand ready to scale to the need we face for mass integration. Assumptions for the figures provided in the table below include:

1. NC HIEA's provider-entity resolution workstream reports approximately 60,000 unique providers serving Medicaid patients across North Carolina as of November 2018. Of those, approximately 52,000 have an affiliation with an organization. While NCTracks, NC Medicaid's MMIS, notes approximately 20,000 Medicaid-serving organizations, that number drops to approximately 10,000 when de-duplicating for entities tied to the state's six largest health systems (University of North Carolina, Atrium Health (previously Carolinas HealthCare System), Mission Health System, Vidant, Duke and Novant; each of which is already connected via a single integration to NC HealthConnex). Taking into account those already connected; market consolidation trends;

providers without EHRs; provider types that have been given extended connection deadlines per NCGS § 90-414.4, as amended by NC Session Law 2018-41, Section9.(a); and technical vendor capacity; NC Medicaid and the NC HIEA estimate connecting over 3,000 new facilities across 1,795 connections during the two-year period covered in this I-APDU.

2. Of 135 NC hospitals, 119 serve Medicaid patients, 97 of which are connected to NC HealthConnex as of April 2019. The below projection includes the remaining North Carolina Medicaid serving hospitals, in addition to an estimated 2-4 per quarter out-of-state hospitals bordering NC that serve a high volume of NC Medicaid patients. Note that due to consolidation under large integrated health care systems (six large and many mid-sized and smaller), the NC HIEA has been able to connect 90+% of Medicaid-serving hospitals in approximately half the number of connections and has brought live thousands of physician practices and other facility types that share health system EHRs.
3. Local health departments, federally qualified health centers, and other ambulatory sites providing a variety of health care services have been included in the "Independent Physician Practices & Other Ambulatory Facilities" category/count.
4. For cloud-based EHRs, the "One-Time Integration Cost" column is an average estimated cost per facility which includes both the initial integration work between NC HealthConnex and the cloud-based EHR hub, as well as the costs to onboard each facility to the hub. The quantity estimate comes from totaling NC customer counts from cloud-based EHR vendors with a large NC footprint with which the NC HIEA is working (including Allscripts, athenahealth, Quest, Greenway, CureMD, Office Practicum, and others).
5. For all facility types, integration fees are based on total average costs to build standard HL7 ADT and CCD interfaces for each instance (XDR/visual integration within the EHR, where vendor technology allows), including parsing discrete data and populating the NC HealthConnex longitudinal record, and where applicable, the required interfaces and EHR visual integration for PI-compliant public health connectivity.
6. All NCIR interfaces will be fully bidirectional and allow automated reporting of immunizations entered in the EHR to the NCIR, as well as query capability of the NCIR from within the EHR to retrieve vaccination history and recommendations and allow such data to be added to a patient record within the EHR, unless limited by EHR functionality.
7. ELR interfaces are priced and projected per hospital, even for those hospitals that are part of larger health system connections, as each hospital must submit to and test with the Division of Public Health independently to meet its PI reporting obligation. The cost represents work atop the one-time integration cost listed for hospitals and health systems (which sets up the actual connection) and represents the full testing and onboarding process between the hospital, the NC HIEA, and the Division of Public Health. The number of ELR connections listed represents those projected to not yet be electronically reporting lab results to the Division of Public Health either directly or via NC HealthConnex as of Q1 FFY 2019.
8. To enable more robust patient record access for NC Medicaid patients living near state borders and/or accessing care outside of their communities due to travel, natural disasters, or other emergency situations, NC HealthConnex will connect to neighboring state and other in-state HIEs.
9. Although not technically a Medicaid provider, the U.S. Department of Defense (DOD) is counted as a Health System under this effort, with plans to build a bidirectional interface with NC HealthConnex in 2019. Fort Bragg in Fayetteville, North Carolina, is home to approximately 57,000 military personnel and 23,000 military family members, making it one of the largest military

complexes in the world.[17] Many of these military members and their families, and those before them, are covered by Medicaid at some point after their service commitments have ended. Research by the Henry J Kaiser Family Foundation in 2015 indicated that one in 10 veterans ages 19-64 was covered by Medicaid, many of whom have complex health needs; and in North Carolina, 27,055 veterans were on Medicaid and 26,680 more were uninsured, and thus potential candidates for Medicaid.[18] These veteran patients, and their families, have records in the DOD EHR that will be critically important for Medicaid providers to access at the point of care, and assist Medicaid EPs and EHs with their performance on PI Objective 8 related to HIE.

10. Although not technically a Medicaid provider, North Carolina prison health services (as well as two rehabilitative centers and three probation violation centers) are counted as a single Ambulatory Facility (On-Premise) connection under this effort, with plans to build a bidirectional interface with NC HealthConnex in 2020. North Carolina currently houses more than 37,000 inmates across 55 state prisons,[19] with many more incarcerated in jails and juvenile detention facilities statewide. It is state policy for inmates housed in prisons to be screened for Medicaid eligibility upon initial processing, and if eligible, Medicaid is billed for emergent or other care received outside the facility during their prison stay.[20] Many will also be enrolled in Medicaid upon their release back into the community. For this reason, the patient data housed in the EHR used in these 60 correctional health services centers will be critically important for Medicaid providers to access at the point of care when treating current or former inmates and will assist Medicaid EPs and EHs with their performance on PI Objective 8 related to HIE.
11. Each count of "FHIR Resource Testing" entails successful testing of at least one FHIR resource on an EHR public server. Note, EHRs with a large Medicaid-serving footprint in North Carolina that demonstrate readiness for this type of testing will be prioritized.
12. Instances of onboarding Medicaid-serving NC HealthConnex participants to the other new services proposed in this I-APDU (Consolidated CCD, NC*Notify, integrated CSRS access within a provider EHR, and orders and results with the State Laboratory of Public Health within a provider EHR) as noted are anticipated to be initially implemented with large Medicaid-serving health systems, hospitals and cloud-based EHRs. Consequently, each "instance" will likely enable these features for multiple (sometimes hundreds or even thousands of) Medicaid providers.

[17] https://www.bragg.army.mil/index.php/about/fort-bragg-history

[18] Medicaid's Role in Covering Veterans. Kaiser Family Foundation, June 29, 2017. https://www.kff.org/infographic/medicaids-role-in-covering-veterans/

[19] https://www.ncdps.gov/adult-corrections/prisons

[20] https://files.nc.gov/ncdps/div/Prisons/HealthServices/CC_ContinuityPatientCare/cc14.pdf

Table 12: Technical Integration Costs for Onboarding Facilities Serving Medicaid Patients to NC HealthConnex and Enhanced Services, Q4 FFY 2019-Q4 FFY 2021

	Estimated Quantity	One-Time Integration Cost	Total Integration Costs
Hospitals/Health Systems/HIEs-ADT and CCD	45	$24,000	$1,080,000
Independent Physician Practices & Other Ambulatory Facilities-ADT and CCD (Cloud)	1,200	$5,000	$6,000,000
Independent Physician Practices & Other Ambulatory Facilities-ADT and CCD (On-Premise)	550	$20,000	$11,000,000
Bidirectional NC Immunization Registry (Per Facility, Any Type)	450	$8,000	$3,600,000
Electronic Lab Reporting (Per Individual Hospital Facility)	84	$6,000	$504,000
FHIR Resource Testing (Per Instance)	6	$48,000	$288,000
Consolidated CCD (Per Instance)	32	$5,000	$160,000
NC*Notify (Per Instance)	110	$5,000	$550,000
CSRS Orders/Results (Per Instance)	28	$15,000	$420,000
SLPH Orders/Results (Per Instance)	10	$18,000	$180,000
Total	**2,515**		**$23,782,000**

Table 13: Anticipated Contracted Services and Costs for Onboarding Facilities Serving Medicaid Patients to NC HealthConnex and HIE Enhancements, by Quarter FFYs 2019-2021

Service	Q4 FFY19	Q1 FFY20	Q2 FFY20	Q3 FFY20	Q4 FFY20	Q1 FFY21	Q2 FFY21	Q3 FFY21	Q4 FFY21	Total
NC HealthConnex Training Program with NC AHEC	$396,252	$336,252	$336,252	$336,252	$336,252	$336,252	$336,252	$336,252	$336,252	**$3,086,268**
HIE Enhancements to Support Medicaid AMHs:										
1. **FHIR enablement**	$0	$0	$76,800	$0	$0	$0	$0	$0	$0	**$2,080,000**
2. **Consolidated CCD**	$0	$0	$160,000	$0	$0	$0	$0	$0	$0	
3. **NC*Notify Releases 3 & 4**	$0	$0	$0	$921,600	$0	$921,600	$0	$0	$0	
Service	**Q4 FFY19**	**Q1 FFY20**	**Q2 FFY20**	**Q3 FFY20**	**Q4 FFY20**	**Q1 FFY21**	**Q2 FFY21**	**Q3 FFY21**	**Q4 FFY21**	**Total**

NC Controlled Substances Reporting System Integration: **Initial build and connections of Medicaid hospital and ambulatory**	$0	$0	$0	$256,000	$72,000	$0	$0	$0	$0	**$328,000**
State Lab of Public Health Integration: **Initial build and connections of Medicaid health system/hospital and ambulatory facility**	$0	$0	$0	$0	$0	$0	$379,200	$0	$0	**$379,200**
Total Cost by Quarter	**$396,252**	**$336,252**	**$573,052**	**$1,513,852**	**$408,252**	**$1,257,852**	**$715,452**	**$336,252**	**$336,252**	**$5,873,468**

The NC HIEA will track progress toward the seven goals described in *Table 11* through quarterly progress reports to NC Medicaid on efforts toward the 23 underlying objectives, and data on total facilities connected and total integration and enhancement costs. The progress reports will also include total Medicaid facilities connected to NC HealthConnex and onboarded to each of the public health reporting and other new services/features as described herein.

To take advantage of onboarding assistance, NC Medicaid providers and HIEs supporting NC Medicaid patients and providers will have to:

1. Sign a Participation Agreement (PA) with the NC HIEA;
2. Provide documentation of their technical readiness to connect with NC HealthConnex;
3. Attest to being eligible for the EHR Incentive Program OR committing to support EPs and EHs by using NC HealthConnex for care transitions;
4. Complete system test and acceptance within six months of submitting a signed PA; and
5. Acknowledge receipt of NC HealthConnex training packet within 12 months of submitting a signed PA, and before go-live.

Failure to meet any of the above conditions would prevent the Medicaid-serving provider/entity from completing the connection process. Exceptions may be made on a case-by-case basis if circumstances are outside of the provider/entity's control (e.g., vendor delays).

4 Statement of Alternative Considerations

NC-MIPS Considerations

In June and July of 2010, North Carolina OMMISS undertook an effort to develop a High-level Definition and Alternative Analysis of NC-MIPS. That document was the basis for much of the information noted above in terms of requirements, functionality, components, and high-level architecture. The conclusion of the analysis was that none of the other state or vendor efforts to create a state-level incentive payment solution were far enough along to either evaluate or estimate effort of trying to share components to

meet a deadline of August 26, 2010 for CMS interface testing. Therefore, OMMISS decided to move forward with a fast-track design and development effort for NC-MIPS.

In the fall of 2011, NC Medicaid developed another alternatives analysis to examine systems and development options moving forward with Phase 3 and beyond of NC-MIPS. After careful consideration of the opportunities afforded by each approach, NC Medicaid and OMMISS decided to bring all NC-MIPS future development in-house at OMMISS/NC Medicaid and explore leveraging parts of Kentucky's incentive payment solution to enhance and improve the current NC-MIPS. After further research in early 2012, NC Medicaid found Kentucky's solution to be a whole-system replacement and opted to move forward instead with planned NC-MIPS enhancements.

In April 2012, NC Medicaid assumed management of technical development for NC-MIPS from OMMISS. By this time, the NC Medicaid HIT team was fully staffed and both organizations determined it would be more efficient and cost-effective to maintain and enhance NC-MIPS alongside other program staff. This cost savings is reflected in the sharp decrease in MMIS funds requested (largely in the vendor costs category) in Appendix A of this I-APD. At that point, the HITECH funding request was adjusted upward in the contract staff and hardware/software line items to accommodate these activities, but at a much lower overall cost.

HIE Considerations

North Carolina's HIE I-APD (Version #20120113) provides an extensive Statement of Alternative Considerations regarding the initial development of the statewide HIE model as a statewide network of networks (then called "Qualified Organizations," or "QOs"), built on a hosted shared statewide services architecture. The statewide HIE network has since undergone two governance transitions—first under a local, non-profit entity called Community Care of North Carolina that acts as NC Medicaid's care management arm (February 1, 2013), and later under a new state agency, the NC HIEA (February 29, 2016). It has also moved away from the QO model due to lack of market interest, and toward directly connecting any entity that applies, from individual physician practices to large health systems.

Despite these changes, many things remain the same today as they were at the launch of the statewide HIE network in 2012. These include the architectural design and the nature of the HIE, though now officially under state governance, as a public-private partnership with SAS Institute investing in the project and providing the technology service. Section B.2 on page 71 of Version 4.3 of the NC SMHP (approved October 3, 2018) includes a description of the governance, technical, and strategic approaches of the HIE under state governance at the NC HIEA.

PDMP Considerations

No additional alternatives were considered for the initiatives described herein, as all leverage and request funds only for NC HIEA and CSRS state staff and our technical partners, SAS and Appriss, to continue Medicaid provider onboarding efforts, connect additional public health and patient data systems as additional data sources, and enhance the HIE and the CSRS to better support Medicaid transformation efforts, opioid misuse prevention, and required electronic public health reporting in North Carolina.

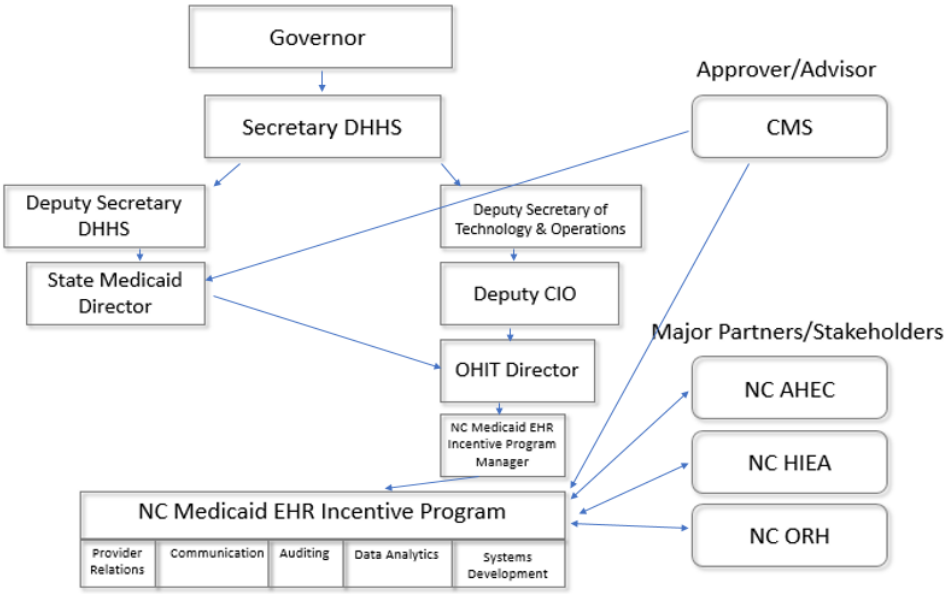
5 Personnel and Contract Resource Statement

NC DHHS staffs HIT initiatives with state resources tasked in a combination of full and part time to projects. DHHS staff makes up all of personnel contributing to administration and oversight of the NC Medicaid EHR Incentive Program. NC Medicaid's Director, along with the Director of Health IT and the HIT Program Manager, provides executive project management support and represents the project to executive staff.

Additional DHHS staff in Program Integrity, Finance, Budget Management, and Information Technology, provides program support in the areas of outreach, policy, reporting, operations, management, and oversight.

The figure below depicts the organizational structure for the Medicaid HIT Program in the context of the NC Department of Health and Human Services.

Figure 5: North Carolina HIT Organizational Structure within DHHS



Staffing Requirements

Resource requirements to administer the NC Medicaid EHR Incentive Program include a combination of NC DHHS full-time and part-time staff. The table below presents a list of state staffing requirements through FFY 2021. When short-term technical resources are needed for the NC-MIPS development effort at NC Medicaid, requisitions occur via the NC Statewide IT Procurement Short Term IT Staffing Contract.

In addition to state personnel, DHHS has in the past employed contractors for incentive payment system support. In 2017, DHHS streamlined technical staff and converted two key positions to state staff to manage updating and ongoing maintenance of NC-MIPS. Since December 2017, there have been no contractors employed with the Program, though it is possible that contractors may be needed at some point within FFYs 2019-2021 if State staff attrition becomes an issue. If so, funds budgeted for State staff will be used to backfill with contractors.

Staffing costs related to accelerating Medicaid provider onboarding to NC HealthConnex and enhancements to NC HealthConnex to support Medicaid transformation efforts, statewide opioid misuse prevention, and improved public health interoperability in North Carolina, are also included below.

Note that all state staff are dedicated to the work described in this I-APDU, and the percentage time noted is representative of the effort attributed to the activities described herein only.

Table 14: State Staffing Requirements

State Staff Title	Description of Responsibilities	% Time	Annual Program Hours	Annual Cost with Benefits	Q4 FFY 2019-Q4 FFY 2021 Cost with Benefits
Administration Support	Oversees NC Medicaid and Clinical Policy activities	0.01	66	$4,780	$10,754
Hearings and Appeals	Conducts impartial informal hearings and appeals for NC Medicaid EHR Incentive Program participants	0.07	1673	$58,748	$132,184
Financial/Accounting/Audit Support	Provides budget and accounting support for Program participants and OHIT financials	0.07	1669	$90,058	$202,630
Contracts/Purchasing Support	Provides support for Program and OHIT contracts and purchase orders	0.03	766	$31,240	$70,290
IT Security/MMIS/Facilities Support	Provides IT-related support including security and facility maintenance	0.01	103	$3,977	$8,949
HIT Program Manager	Oversees NC Medicaid EHR Incentive Program administration and coordinates related OHIT projects	1	2080	$132,654	$298,472
HIT .NET Developer/Bus & Tech Appl Spec	Lead technical resource for NC-MIPS and AVP, responsible for software building, release management, and developer testing	1	2080	$132,041	$297,092
HIT Data Specialist/Bus Systems Analyst	Designs and leads HIT data analytics; completes CMS transactions and annual report	1	2080	$112,363	$252,817
HIT System Manager/Bus Systems Analyst	Manages server maintenance and upgrade; coordinates NC-MIPS/AVP enhancement; performs QA testing	1	2080	$120,595	$271,338
HIT Business Analyst/Bus System Analyst	Creates NC-MIP and AVP docs for developers and users, responsible for system updates and performing QA testing	1	2080	$120,595	$271,338
HIT Communications Specialist	Crafts and executes HIT Communication Plan; including website & outreach	1	2080	$71,729	$161,390
HIT Provider Relations	Heads up help desk; conducts HIT outreach; performs pre-payment validations for Incentive Program	1	2080	$89,065	$200,396
HIT Audit Manager	Creates and implements pre- and post-payment audit processes for Incentive Program; risk analysis	1	2080	$89,065	$200,396
HIT Program Integrity Investigator	Implements pre- and post-payment audit processes for HIT	1	2080	$80,158	$180,356
HIT Program Integrity Investigator	Implements pre- and post-payment audit processes for HIT	1	2080	$80,158	$180,356
HIT Program Integrity Investigator	Implements pre- and post-payment audit processes for HIT	1	2080	$75,705	$170,336
OHIT Director	Coordinates HIT efforts in NC; works closely with NC HIEA and HIT stakeholders	1	2080	$210,872	$474,462
OHIT Technology Lead	Advises on technology infrastructure decisions related to integrating state systems with the NC HIE	0.75	1560	$119,760	$269,460
OHIT Project Manager	Manages a diverse portfolio of state HIT initiatives	0.5	1040	$53,449	$120,260
OHIT Communications Specialist/Webmaster	Designs, implements, and manages the enhanced state HIT website	0.75	1560	$106,227	$239,011
HIT Subtotals		**14**	**33396**	**$1,783,239**	**$4,012,288**
Executive Director, NC HIEA	Directs and oversees the statewide HIE, NC HealthConnex. Responsible for overall business operations and the direction and leadership toward the achievement of the NC HIEA's mission, vision, values, strategy, goals and direction.	0.2	416	$32,742	$73,670
Assistant Director & Analytics Manager, NC HIEA	Directs and oversees NC HIEA technology functions carried out by the technical contractor, and oversees the technical vision and strategy for NC HealthConnex. Supervises public health initiatives and connections to other state systems and external data sources. Acts as the principal subject matter expert on HIE technical capabilities and processes.	0.5	1040	$79,121	$178,022
Assistant Attorney General, NC Department of Justice/NC HIEA	Advises on NC HIEA policies and legal agreements with technical vendors, NC HealthConnex participants, EHR vendors, and other parties. Renders opinions on the legality and propriety of agency rules and regulations and advises NC HIEA decision-makers on interpretation of laws and proper courses of legal action and on the revision of existing statutes. Represents the NC HIEA in hearings and investigations in administrative proceedings and in litigation before courts.	0.25	520	$31,250	$70,313
Finance/Budget Analyst, NC HIEA	Responsible for performance of all aspects of fiscal management of the NC HIEA, to include budgeting, appropriations, and revenue receipt and expense distribution and accounting. Oversees and performs duties related to contracts, agreements, grants and procurements as assigned.	0.5	1040	$54,160	$121,860
Communications Manager, NC HIEA	Manages all internal and external communications regarding the NC HIEA and NC HealthConnex. Represents the NC HIEA at stakeholder events, to trade associations and advocacy groups, to the media, across state agencies and to state/federal partners. Coordinates closely with the NC HIEA provider relations, outreach and training teams.	0.5	1040	$35,737	$80,408

State Staff Title	Description of Responsibilities	% Time	Annual Program Hours	Annual Cost with Benefits	Q4 FFY 2019-Q4 FFY 2021 Cost with Benefits
Grant Manager, NC HIEA	Responsible for managing the HITECH grant, including writing annual I-APDs/updates, tracking progress against objectives and completing federal and state reporting, exploring additional initiatives for funding, and related tasks as assigned.	0.5	1040	$76,800	$172,800
Provider Relations Lead, NC HIEA	Oversees day-to-day business operations and systems, office and material management, resolution of escalated participant issues, and external data and information requests. Ensures intra-office coordination on issues and initiatives. Leads team of Provider Relations Specialists in communications with HIE participants.	0.75	1560	$58,151	$130,840
Provider Relations Specialist, NC HIEA	Serves as the NC HIEA front line customer service point for NC HealthConnex participants and interested providers and provider groups. Processes new participation agreements, and assists with administrative tasks and data requests related to NC HIEA and NC HealthConnex business operations. **1 full-time employee (FTE) allocated at 100%, 2 FTEs allocated at 75% and 1 half-time employee allocated at 100% to the scope herein.*	3	6,240	$163,996	$368,991
Outreach Specialist, NC HIEA	Responsible for outreach initiatives to specified provider groups: 1 FTE on NC hospitals, representative large health systems and associated ACOs; 1 FTE on primary care, long-term care, and specialist providers; 1 FTE on behavioral health and rural health providers; and 1 FTE dedicated 100% to Medicaid provider outreach and onboarding (all/any provider types). Coordinates with the NC HIEA trainer to develop appropriate training and workflow adjustment materials for these audiences. Coordinates with the NC HealthConnex technical vendor and Help Desk to ensure participant organizations remain engaged through the onboarding process and training program, including onsite training, prior to go-live. *1 FTE allocated at 100% and 3 FTEs allocated at 75% to the scope herein.	3.25	6760	$334,985	$753,716
Clinician/Training Specialist, NC HIEA	Responsible for NC HIEA provider training program, including overseeing the training contractor to produce training collateral, videos, web presentations, onsite and other trainings for all NC HealthConnex participants. Advises NC HIEA management and the technology vendor on clinical quality/data analytic and value-added initiatives.	0.75	1560	$84,805	$190,811
Health Analytics Lead, NC HIEA	Manages and oversees the technical vendor's work on the NC HIEA population health and analytics portfolio, including the data quality workstream, NC Diabetes Registry and additional registries, Heart Health Now project and related initiatives. Manages business relationships with EHR vendors.	0.75	1560	$94,085	$211,691
MPI Quality Assurance Specialist, NC HIEA	Responsible for managing the master patient index (MPI) environment utilized as the foundation for NC HealthConnex analytics and reporting activities. Monitors MPI data quality and works duplicate records, false positives and negatives, manually to ensure MPI data is clean and patient records are consolidated and accurate. **2 FTEs.*	2	4160	$131,060	$294,885
Implementation Project Manager- Special Initiatives, NC HIEA	This position conducts administrative work in planning, organizing and monitoring value-added initiatives from their inception through implementation. Provides project management and monitoring for various initiatives with the technical vendor.	0.5	1040	$50,000	$112,500
Business Analyst- New Initiatives, NC HIEA	This position assists with design and business requirements for new development initiatives, including the new interfaces and workflows associated with connection to the State Lab of Public Health, enhancements to NC*Notify, integration with the CSRS, and other initiatives on the *NC HIEA Roadmap 2021*.	0.5	1040	$50,594	$113,837
Public Health Specialist- Immunization Registry, NC HIEA and NC DPH	Responsible for supporting the full life-cycle of Medicaid provider onboarding to the NC HealthConnex Immunization Registry interface functionality. Coordinates onboarding pipeline (NC HIEA/NC DPH), acts as the main point of contact for providers through the multi-step onboarding process with the NC Immunization Branch and NC HealthConnex. Creates training modules for the functionality per interface scenarios and conducts provider training for using the functionality. *2 FTEs.	2	4160	$238,218	$535,991

State Staff Title	Description of Responsibilities	% Time	Annual Program Hours	Annual Cost with Benefits	Q4 FFY 2019-Q4 FFY 2021 Cost with Benefits
Public Health Specialist/Project Manager- State Lab and Electronic Lab Reporting, NC HIEA and NC DPH	This position supports two lab initiatives for the NC HIEA: supporting the full life-cycle of Medicaid hospital onboarding to the NC HealthConnex Electronic Laboratory Reporting (ELR) interface functionality, and managing the State Lab of Public Health (SLPH) integration and onboarding. Coordinates onboarding participant pipeline (NC HIEA/NC DPH), assists with LOINC coding and quality review, and acts as the main point of contact for providers as they navigate the multi-step onboarding process with the NC DPH and NC HealthConnex. Conducts hospital staff training for maintaining the functionality. **3 FTEs.*	3	6240	$363,000	$816,750
Application System Specialist **Contracted State Staff not State Personnel**	Assists vendor with integrating the ETOR solution with Starlims by making any necessary configuration changes needed within the laboratory information management system	1	2080	$145,600	$291,200
Project Manager **Contracted State Staff not State Personnel**	Assists in scheduling State resources, completing reporting requirements, and communicating with the various State and vendor stakeholders	1	2080	$176,800	$353,600
Medical Laboratory Specialist **Contracted State Staff not State Personnel**	Acts as the clinical laboratory testing subject matter expert and liaison who will assist the vendor and IT staff with any necessary laboratory testing workflow adjustments that may be required due to the shift from paper-based to electronic test orders and results	1	2080	$74,880	$149,760
Controlled Substances Reporting System (CSRS) Consultant, NC DMH/DD/SAS **Contracted State Staff not State Personnel**	Oversees Prescription Drug Monitoring Program (PDMP) provider onboarding, including project design, development and implementation; identification of terminology gaps; and collaboration with vendors to onboard eligible entities and providers. **1 FTE cost-allocated to Medicaid at 86%.*	0.86	1789	$62,449	$140,510
Controlled Substances Reporting System (CSRS) Data Analyst, NC DMH/DD/SAS **Contracted State Staff not State Personnel**	Creates awareness around STOP Act requirements and provider onboarding to the PDMP; develops specialty reports, products, materials, and approaches to successful onboarding practice. **1 FTE cost-allocated to Medicaid at 86%.*	0.86	1789	$79,722	$179,375
HIE Subtotal				$2,020,875	$5,341,529
Grand Total				$3,804,114	$9,353,817

HIT/HIE Contracts

In addition to the above state staff, NC Medicaid has engaged with the University of North Carolina at Chapel Hill Area Health Education Centers (AHEC) to perform a variety of support functions for the HIT Program. NC Medicaid executed a contract extension for $2,302,047 for NC State Fiscal Year 2019 (7/1/18-6/30/19). An additional extension is being drafted for CMS review for SFY 2020 to extend ongoing services through June 30, 2020. AHEC's work focuses on helping NC providers achieve MU and attest for the NC Medicaid EHR Incentive Program as well as other HIT activities. For details, see SMHP A.5.2. We are not requesting any changes to the $4,604,094 for 2019-2020 HIT contracts with AHEC that was approved October 3, 2018. For personnel resources, the contract includes part-time support from principal investigator, clinical director, HIT manager, project manager, business services coordinator, and programmer in AHEC main office for the state and up to 1.75 FTE technical assistance coach at each of NC's nine regional AHECs.

Contracts for administrative costs related to accelerating Medicaid provider onboarding to NC HealthConnex and enhancements to NC HealthConnex to support Medicaid transformation efforts, statewide opioid misuse prevention, and improved public health interoperability in North Carolina, are detailed below.

Note also that the "Main Contract Cost" (dollar figure on the second row) listed in *Table 15* is an annual addition to an existing contract with SAS Institute that is the financial responsibility of the state, paid by annually recurring appropriated funds in the state budget dedicated to NC HealthConnex operations. Per the *Table 15* footnote; however, this main contract extension allows for another contract addendum to be carried forward which extends the ability to pay SAS Institute HITECH and state matching funds for Medicaid provider onboarding to NC HealthConnex as approved in Version 1.0 of the HIE I-APD (through Q3 FFY 2019). The "New Addendum Cost" (bottom dollar figure) represents the HITECH and state matching funds for Q4 FFY 2019-Q4 FFY 2021 as proposed in HIE I-APDU Version 2.0 approved May 21, 2019. North Carolina will provide all contacts, addendums and amendments for the NC HIEA and NC DMH/DD/SAS' contracted work to CMS for review and approval prior to their execution by the State.

Table 15: Contracts (HITECH funding approved as of May 21, 2019 – no new contract funding requests in this I-APDU)

Contractor Cost Category	Vendor	Total Contract Cost*	Description of Services	CMS Approval Status	Term of Contract
Technical Assistance	North Carolina Area Health Education Centers (NC AHEC)	$2,302,047 July 1, 2018 - July 1, 2019 $2,302,047 July 1, 2019 - July 1, 2020 (contract development in progress as of June 1, 2019) FFY 2021 TBD	Provide direct, local assistance to practices on health IT work including assisting with selection of an appropriate EHR system; guidance on system implementation, security and risk assessments, and system optimization through meeting Promoting Interoperability (PI) and CMS's Quality Payment Program MIPS program requirements	Not yet approved	July 1, 2019 - June 30, 2020
Technical Assistance	SAS Institute	$8,000,000 + not-to-exceed amounts for services delivered under HIE I-APD Version 1.0 (Main Contract Cost; Addendum 5 to Amendment 4, also carrying forward Addendum 3 to Amendment 4)*	Provide all operations, maintenance, and enhancements for NC HealthConnex and associated data quality and analytics initiatives. Design, develop and implement interfaces between NC HealthConnex and health care facilities, and provide technical support to those facilities, at the direction of the NC HIEA.	Not yet approved	Main Contract: Dec. 23, 2018 - Dec. 22, 2019
Technical Assistance	SAS Institute	Not-to-exceed $26,569,200 (New Addendum Cost, including proposed HIE-IAPDU Version 2.0 HITECH and matching state funds for activities described herein)	Provide design, development and implementation of enhancements for NC HealthConnex as described in HIE I-APDU Version 2.0. Design, develop and implement interfaces between NC HealthConnex and health care facilities, and provide technical support to those facilities, at the direction of the NC HIEA. Contract is deliverables-based, and total represents rates inclusive of personnel, technology costs, supplies, training, travel, subcontracts, etc.	Not yet approved	New Addendum: July 1, 2019-Dec. 22, 2019 and Dec. 23, 2019-Dec. 22, 2020, and Dec. 23, 2020-Sept. 30, 2021 (Must follow parent contract renewal terms)
Training Program	North Carolina Area Health Education Centers (NC AHEC)	$3,086,268	Enhance and expand the NC HealthConnex training program, including but not limited to creation of additional training materials; providing onsite and virtual training; and training-the-trainers in regional, community, and health system settings. Includes funding for personnel, supplies, travel, training development, etc.	Not yet approved	July 1, 2019-Sept. 30, 2021
DHHS/DMH - PDMP Technology Services	Appriss	$2,251,546 (Cost allocated 86% to Medicaid/HITECH: $1,936,330)	Provision of Gateway, NarxCare and RxCheck services. Gateway provides CSRS integration with entities software system, including licenses for integrations through NC HealthConnex. NarxCare	Not yet approved	July 1, 2019-Sept. 30, 2021
DHHS/DMH - PDMP Technology Services	SAS Institute	$2,700 (Cost allocated 86% to Medicaid/HITECH: $2,322)	Software component to support Appriss Gateway product.	Not yet approved	July 1, 2019-Sept. 30, 2021
Total		$36,513,808			

6 Proposed Activity Schedule

In the first quarter of FFY 2020, the NC Medicaid Incentive Program will focus on implementing any Final Rule changes and updating NC-MIPS for Program Year 2020 Stage 3 MU. The second quarter of FFY 2020

will be dominated by processing Program Year 2019 attestations, including validations, outreach, and payment. In the third quarter of FFY 2020, we will close out Program Year 2019 and open Program Year 2020. Though outreach is always ongoing, we conduct special outreach projects in the fourth quarter to encourage participation and provide program updates.

The high-level project plan for HIT-related program and system activities for FFYs 2019-2021 is shown below. More detail on these initiatives can be found in Section 3 of this I-APDU and in North Carolina's SMHP.

Table 16: High Level Activity Schedule FFYs 2019-2021

Task	Start	Finish	FFY 2019	FFY 2020	FFY 2021
Incentive Program's NC-MIPS and Attestation Validation Portal (AVP)					
System updates as required by CMS	2011	09/2022			
Enhancement of NC-MIPS documentation	2013	09/2022			
NC-MIPS open for Prog Year 2018	05/2018	04/2019			
Prog Year 2018 validations (AVP)	05/2018	08/2019			
System updates for Program Year 2019	11/2018	04/2019			
NC-MIPS open for Prog Year 2019	05/2019	08/2020			
Prog Year 2019 validations (AVP)	05/2019	08/2020			
System updates for Program Year 2020	11/2019	04/2020			
NC-MIPS open for Prog Year 2020	05/2020	04/2021			
Prog Year 2020 validations (AVP)	05/2020	08/2021			
System updates for Program Year 2020	11/2020	04/2021			
NC-MIPS open for Prog Year 2020	05/2021	10/2021			
Prog Year 2020 validations (AVP)	05/2021	11/2021			
Incentive Program Oversight & Outreach					
Provider outreach via help desk	11/2010	09/2022			
Pre-payment validation outreach	02/2011	10/2021			
Enhancement of program website	2013	09/2022			
Enhancement and maintenance of MIPS2 db (SLR)	2013	12/2021			
Post-payment audting	02/2013	09/2023			
Prog Year 2018 audit awareness outreach	05/2018	08/2019			
Audit strategy update	05/2019	06/2019			
SMHP and IAPD update	05/2019	07/2019			
Prog Year 2019 audit awareness outreach	05/2019	08/2020			
Previous calendar year PV outreach for 2019	07/2019	07/2019			
Returning meaningful user outreach for 2019	08/2019	09/2019			
Annual HITECH conference	winter 2019				
SMHP and IAPD update	05/2020	07/2020			
Prog Year 2020 audit awareness outreach	05/2020	08/2021			
Audit strategy update	07/2020	08/2020			
Previous calendar year PV outreach for 2020	07/2020	07/2020			
Returning meaningful user outreach for 2020	07/2020	08/2020			
Environmental scan	08/2020	09/2020			
Annual HITECH conference	winter 2020				
Other HIT Projects					
NC AHEC	2014	10/2021			
MED/DERP	2014	06/2020			
NC ORH	2017	12/2021			
HIE Projects					
Recruit and train expanded NC HIEA staff	03/2016	12/2019			
Continue NC HealthConnex outreach campaign	07/2016	ongoing			
*Create and send periodic newsletters	07/2016	ongoing			
*Distribute periodic updates through partners	01/2017	ongoing			
*Engage EHR vendors serving Medicaid providers	02/2017	ongoing			
*Finalize 2019 calendar of events	01/2019	04/2019			
*Finalize 2020 calendar of events	01/2020	04/2020			
*Finalize 2021 calendar of events	01/2021	04/2021			
Enhance NC HealthConnex training program	01/2019	06/2021			
*Enhance/create video modules	07/2019	06/2020			
*Create media on meeting PI reqs with HealthConnex	07/2019	12/2019			
*Launch NC AHEC-NC HealthConnex training help desk	07/2019	12/2019			
*Launch data quality participant review with NC AHEC	07/2019	12/2019			
Connect practices to NC HealthConnex	03/2012	ongoing			
Finalize 2020 provider pipelines for PH onboarding	10/2019	12/2019			
Enhancements to Support Medicaid AMHs	04/2019	10/2020			
*FHIR Enablement	04/2019	01/2020			
*Consolidated CCD	04/2019	01/2020			
*NC*Notify Release 3.0	04/2019	04/2020			
*NC*Notify Release 4.0	11/2019	10/2020			
NC CSRS Integration Phase II	04/2019	04/2020			
Onboard Medicaid providers to the NC CSRS	07/2019	09/2021			
State Lab Integration	03/2020	03/2021			

NC Medicaid anticipates that the NC HIEA will draw down funds through Q4 of FFY 2021 based on actual costs incurred as it continues to onboard providers to NC HealthConnex and achieve the planned system enhancements and onboarding to new services described herein. The projected number of connections per quarter are shown in the table below.NC Medicaid and the NC HIEA will continue reporting progress quarterly to CMS through the end of FFY 2021.

Table 17: Anticipated NC Medicaid Provider Connections, by Quarter Q4 FFY 2019-Q4 FFY 2021

	Q4 FFY19	Q1 FFY20	Q2 FFY20	Q3 FFY20	Q4 FFY20	Q1 FFY21	Q2 FFY21	Q3 FFY21	Q4 FFY21	Total
Health Systems/ Hospitals/HIEs	13	4	4	4	4	4	4	4	4	**45**
Ambulatory Facilities, Cloud EHR Roll-On	200	200	150	150	100	100	100	100	100	**1,200**
Ambulatory Facilities, On-Premise EHR	75	75	75	75	50	50	50	50	50	**550**
Total Connections*	**288**	**279**	**279**	**279**	**154**	**154**	**154**	**154**	**154**	**1,795**
NCIR Connections	50	50	50	50	50	50	50	50	50	**450**
ELR Connections	7	8	9	10	10	10	10	10	10	**84**
FHIR Resource Testing Instances	0	0	0	1	1	1	1	1	1	**6**
Consolidated CCD Instances	0	0	0	2	6	6	6	6	6	**32**
NC*Notify Instances	0	0	0	0	10	25	25	25	25	**110**
CSRS Orders/Results Instances	0	0	0	0	4	6	6	6	6	**28**
SLPH Orders/Results Instances	0	0	0	0	0	0	0	2	8	**10**
Total Public Health/Enhancement Connections	**57**	**58**	**59**	**63**	**81**	**98**	**98**	**100**	**106**	**720**

**Note that these total connections represent a higher number of total facilities (estimated at over 3,000), per assumption 1 on page 30 of this I-APDU.*

7 Proposed Budget

Proposed HITECH Project Budget

NC's total budget for FFY 2021 is estimated at $19,176,589 which includes $17,258,930 (90% Federal share) and $1,917,659 (10% State share). The State is requesting $4,881,652 in new IAPD funding and $0 in new MMIS IAPD funds for activities for October 2019 - October 2021. The State is carrying over $0 (90% federal funds) in unspent funds for planning activities approved under the State's HIT Planning Advance Planning Document (PAPD).

Table 18: Summary of Administrative HIT Funding Requested for FFYs 2020 - 2021

Covers Federal Fiscal Years 2020 - 2021							
	HIT CMS Share (90% FFP) Admin Funding	State Share (10%)	HIT CMS Share (90 % FFP) HIE Funding	State Share (10%)	HIT Enhanced Funding FFP Total	State Share Total	HIT Enhanced Funding Total
	24C & 24D		24C & 24D				
FFY 2020	$5,431,891	$603,543	$16,103,836	$1,789,315	$21,535,727	$2,392,858	$23,928,585
FFY 2021	$3,114,034	$346,004	$14,144,896	$1,571,655	$17,258,930	$1,917,659	$19,176,589
Total FFY 2020 Funding Requested in this IAPD-U	*	*	**$987,552**	$109,728	**$987,552**	$109,728	$1,097,280
Total FFY 2021 Funding Requested in this IAPD-U	**$3,114,034**	$346,004	**$434,052**	$48,228	**$3,548,086**	$394,232	$3,942,318

* HIT funding for FFY 2020 was approved October 3, 2018. This I-APDU does not request additional HIT funding for FFY 2020.

The table below includes the amounts from NC-2018-08-14-HITECH-IAPD and NC-2019-05-06-HITECH-IAPD that were already approved plus the new requests covered in this I-APDU.

Table 19: HITECH Detailed Budget Table Covering Federal Fiscal Years 2020 & 2021

	HIT		HIE		HIT + HIE		
	Federal Share (90% FFP)	State Share -10%	Federal Share (90% FFP)	State Share -10%	**Federal Share (90% FFP)**	**State Share -10%**	**Federal + State Grand Total Computable**
	--	--		--	24C & 24D†	--	--
FFY 2020	$5,431,891	$603,543	$16,103,836	$1,789,315	$21,535,727	$2,392,858	**$23,928,585**
FFY 2021	$3,114,034	$346,004	$14,144,896	$1,571,655	$17,258,930	$1,917,659	**$19,176,589**
Total	$8,545,925	$949,547	$30,248,732	$3,360,970	$38,794,657	$4,310,517	**$43,105,174**

The table below lists HIT funding requested for FFY 2021 for administration of the NC Medicaid EHR Incentive Program, NC Office of Rural Health HIT activities, and a DHHS HIT conference and/or sponsorship of external state-level HIT conference(s).

Table 20: State Proposed Budget for New HIE and Administrative HIT Funding Request for FFYs 2020-2021

Activity Type	FFY20				
	90% Federal Share	75% Federal Share	50% Federal Share	10% State Share	Total
State Personnel	0	0	0	0	0
Contracted State Staff	357,552	0	0	39,728	397,280
Hardware & Software Costs	630,000	0	0	70,000	700,000
Direct Non-Personnel Costs	0	0	0	0	0
Total Project Costs	**$987,552**	**$0**	**$0**	**$109,728**	**$1,097,280**
Activity Type	**FFY21**				
	90% Federal Share	**75% Federal Share**	**50% Federal Share**	**10% State Share**	**Total**
State Personnel	1,604,915	0	0	178,324	1,783,239
Contracted State Staff	357,552	0	0	39,728	397,280
Hardware & Software Costs	162,826	0	0	18,092	180,918
Direct Non-Personnel Costs	68,400	0	0	7,600	76,000
Vendors/State Partners:					
NC AHEC/REC					TBD 2020
ORH	1,309,393	0	0	145,488	1,454,881
HIT Conference	45,000	0	0	5,000	50,000
Total Project Costs	**$3,548,086**	**$0**	**$0**	**$394,232**	**$3,942,318**

AHEC contract budget proposal for FFY 2021 will be submitted with next IAPD-U in 2020. No new contract budget is being proposed at this time for FFY 2021.

Approved, expended, and remaining I-APD HITECH funds for FFY 2019 (as of June 10, 2019) are summarized in the table below.

Table 21: HIT Funding for FFY 2019 (approved October 3, 2018)

Activity Type	Approved I-APD		
	State	Federal	Total
State Personnel	178,324	1,604,916	1,783,240
Contracted State Staff	0	0	0
Hardware & Software Costs	9,135	82,215	91,350
Direct Non-Personnel Costs	7,600	68,400	76,000
Vendors/State Partners:			
NC AHEC/REC	230,205	2,071,842	2,302,047
ORH	145,488	1,309,393	1,454,881
MED & DERP Projects	24,850	223,650	248,500
HIT Conference	5,000	45,000	50,000
Total Projected Costs	**$600,602**	**$5,405,416**	**$6,006,018**
Activity Type	**I-APD Expenditures**		
	State	**Federal**	**Total**
State Personnel	66,265	596,381	662,646
Contracted State Staff	0	0	0
Hardware & Software Costs	840	7,560	8,400
Direct Non-Personnel Costs	2,534	22,804	25,338
Vendors/State Partners:			
NC AHEC/REC	121,707	1,095,365	1,217,072
ORH	21,892	197,030	218,922
MED & DERP Projects	15,500	139,500	155,000
HIT Conference	0	0	0
Total Expenditures	**$228,738**	**$2,058,640**	**$2,287,378**
Activity Type	**Remaining I-APD Funding**		
	State	**Federal**	**Total**
State Personnel	112,059	1,008,534	1,120,594
Contracted State Staff	0	0	0
Hardware & Software Costs	8,295	74,655	82,950
Direct Non-Personnel Costs	5,066	45,596	50,662
Vendors/State Partners:			
NC AHEC/REC	108,497	976,477	1,084,975
ORH	123,596	1,112,363	1,235,959
MED & DERP Projects	9,350	84,150	93,500
HIT Conference	5,000	45,000	50,000
Total Funding Remaining	**$371,864**	**$3,346,776**	**$3,718,640**

Table 22: I-APD HITECH Funding Summary for FFY 2020 (approved October 3, 2018)

Activity Type	Approved I-APD		
	State	Federal	Total
State Personnel	178,324	1,604,915	1,783,239
Contracted State Staff	0	0	0
Hardware & Software Costs	9,592	86,326	95,918
Direct Non-Personnel Costs	7,600	68,400	76,000
Vendors/State Partners:			
NC AHEC/REC	230,205	2,071,842	2,302,047
ORHHC	145,488	1,309,393	1,454,881
MED & DERP Projects	27,335	246,015	273,350
HIT Conference	5,000	45,000	50,000
Total Projected Costs	**$603,543**	**$5,431,891**	**$6,035,435**

7.1.1 Total Funding Request

A HITECH project cost of $3,460,038 (FFP $3,114,034 at 90%) is estimated to support the Medicaid EHR Incentive Program and HIT activities for FFY 2021. Incentive payment projections for FFYs 2019-2020 can be found in Appendix B of this I-APDU. This I-APDU also requests $987,552 in 90% FFP for FFY 2020 and $434,052 in 90% FFP for FFY 2021 for enabling electronic test orders and results (ETOR) with the State Laboratory of Public Health.The state share of this project will be satisfied with state appropriations and in-kind funding sources. NC DHHS certifies that it has available its share of the funds required to complete the activities described in this I-APD. The state requests approval to proceed with federal funding at the below levels.

Table 23: Total New Federal Funding Request for FFYs 2020 - 2021

	MMIS @ 90% FFP	HITECH @ 90% FFP	HITECH @ 100% FFP (Incentive Payments)	Total
FFY 2020	$0	$987,552	$0	$987,552
FFY 2021	$0	$3,548,086	$8,930,673	$12,478,759
Federal Share	$0	$4,535,638	$8,930,673	$13,466,311

Budget Assumptions

The following budget assumptions were made in compiling the projected cost of the NC Medicaid HIT Program:

- Only costs associated with activities and functionalities addressed in North Carolina's SMHP are included in this I-APD. To the extent possible, existing state staff is utilized. Travel costs have been included for various stakeholder and professional development meetings.
- Vendor/contractor costs represent a total solution cost (i.e., including travel, hardware, software, networking, etc.). Vendor costs were given by vendors as high-level, unbinding estimates.

- Provider incentive payments have been requested on the CMS-37 report and were approximately $343 million for FFYs 2011-2018 (the program's first eight years). The amount of funding requested and approved October 3, 2018 for incentive payments for FFY 2020 was $8,930,673 (100% FFP). This I-IAPDU requests $8,930,673 (100 percent FFP) for FFY 2021 for incentive payments.

This I-IAPDU requests $987,552 in 90% FFP for FFY 2020 and $12,478,769 ($3,548,096 in 90% FFP and $8,930,673 in 100% FFP) for FFY 2021.

8 Cost Allocation Plan for Implementation Activities

NC Medicaid EHR Incentive Program

NC is not receiving funding from other sources at this time; thus, the 90/10 FFP cost allocation method is the only one that applies to the HIT Program. The below table shows the 90% FFP cost allocation on a quarterly basis.

As specified in the Office of Management and Budget Circular A-87, a cost allocation plan must be included that identifies all participants and their associated cost allocation to depict non-Medicaid activities and non-Medicaid FTEs participating in this project, if any.

There are no non-Medicaid activities to report in this IAPDU, or any other cost that must be cost allocated.

Table 24: Quarterly Incentive Program Administrative Costs (90% FFP) for FFYs 2019-2020, approved October 3, 2018

FFY 2019					
State Cost Category - HITECH	Oct - Dec	Jan - Mar	Apr - Jun	Jul - Sep	**Total**
State Personnel	$ 401,229	$ 401,229	$ 401,229	$ 401,229	**$1,604,916**
Contracted State Staff	-	-	-	-	-
Vendors	$ 912,471	$ 912,471	$ 912,471	$ 912,471	**$3,649,885**
Hardware & Sofware Costs	$ 20,554	$ 20,554	$ 20,554	$ 20,554	**$ 82,215**
Direct Non-personnel Costs	$ 17,100	$ 17,100	$ 17,100	$ 17,100	**$ 68,400**
Total Costs	**$1,351,354**	**$1,351,354**	**$1,351,354**	**$1,351,354**	**$5,405,416**
FFY 2020					
State Cost Category - HITECH	Oct - Dec	Jan - Mar	Apr - Jun	Jul - Sep	**Total**
State Personnel	$ 401,229	$ 401,229	$ 401,229	$ 401,229	**$1,604,915**
Contracted State Staff	-	-	-	-	-
Vendors	$ 918,063	$ 918,063	$ 918,063	$ 918,063	**$3,672,250**
Hardware & Sofware Costs	$ 21,581	$ 21,581	$ 21,581	$ 21,581	**$ 86,326**
Direct Non-personnel Costs	$ 17,100	$ 17,100	$ 17,100	$ 17,100	**$ 68,400**
Total Costs	**$1,357,973**	**$1,357,973**	**$1,357,973**	**$1,357,973**	**$5,431,891**

Table 25: Quarterly Incentive Program Administrative Costs (90% FFP) for FFY 2021

FFY 2021					
State Cost Category - HITECH	Oct - Dec	Jan - Mar	Apr - Jun	Jul - Sep	**Total**
State Personnel	$ 401,229	$ 401,229	$ 401,229	$ 401,229	**$1,604,915**
Contracted State Staff	-	-	-	-	-
Vendors	$ 338,598	$ 338,598	$ 338,598	$ 338,598	**$1,354,393**
Hardware & Sofware Costs	$ 21,581	$ 21,581	$ 21,581	$ 21,581	**$ 86,326**
Direct Non-personnel Costs	$ 17,100	$ 17,100	$ 17,100	$ 17,100	**$ 68,400**
Total Costs	**$ 778,508**	**$ 778,508**	**$ 778,508**	**$ 778,508**	**$3,114,034**

HIE

All HIE activities in this I-APDU are Medicaid-related and directly tied to assisting Medicaid providers in meeting the requirements of Medicaid transformation and Promoting Interoperability. While NC HealthConnex is a statewide HIE for all health care providers, the NC HIEA's focus is to continue to provide a public utility infrastructure that best supports Medicaid providers in adapting to state transformation efforts toward value-based, whole-person care, and in their desire to improve health care quality while meeting state and federal reporting requirements.

To this end, 92% of participants in NC HealthConnex as of October 2018 are enrolled Medicaid providers, and the NC HIEA's outreach and onboarding focus remains nearly exclusively on helping Medicaid providers onboard efficiently to meet their state-mandated reporting requirements, while equipping them with cost-free tools to meet Promoting Interoperability reporting requirements and qualify for the highest possible reimbursements under the new managed care structure.

North Carolina notes for CMS that some non-Medicaid providers will continue to be onboarded to the HIE simultaneously with the Medicaid provider onboarding effort described in this document by leveraging the annually recurring NC state appropriations for NC HealthConnex operations in FFYs 2019-2021. However, all HIE enhancement activities described herein are planned in coordination with NC Medicaid to be initially focused on and tailored to Medicaid provider needs. Specifically, FHIR-enablement, the consolidated CCD, and NC*Notify are aimed at supporting Medicaid transformation efforts, while integrated access to the NC Controlled Substances Reporting System and electronic orders and results with the State Laboratory of Public Health are directly tied to PI public health measures and improving care for Medicaid beneficiaries. HIE onboarding efforts described herein apply only to Medicaid providers. For these reasons, North Carolina believes that no cost allocation across other funding sources for these activities is warranted at this time.

PDMP

For the state and contracted costs proposed herein to support the NC CSRS (PDMP), North Carolina has cost-allocated these amounts at 86% to HITECH, as this represents the percentage of providers participating in the NC CSRS who are actively enrolled with NC Medicaid to serve Medicaid beneficiaries.

9 Assurances, Security, Interface Requirements, and Disaster Recovery Procedures

Assurances, Security, and Disaster Recovery Procedures

NC DHHS confirms that it will adhere to the CMS required assurances identified from Federal regulations as marked below:

Procurement Standards (Competition/Sole Source)

- 42 CFR Part 495.348 ☑ Yes ☐ No
- SMM Section 11267 ☑ Yes ☐ No
- 45 CFR Part 95.615 ☑ Yes ☐ No
- 45 CFR Part 92.36 ☑ Yes ☐ No

Access to Records, Reporting and Agency Attestations

- 42 CFR Part 495.350 ☑ Yes ☐ No
- 42 CFR Part 495.352 ☑ Yes ☐ No
- 42 CFR Part 495.346 ☑ Yes ☐ No
- 42 CFR Part 433.112(b)(5) – (9) ☑ Yes ☐ No
- 45 CFR Part 95.615 ☑ Yes ☐ No
- SMM Section 11267 ☑ Yes ☐ No

Software & Ownership Rights, Federal Licenses, Information Safeguarding, HIPAA Compliance, and Progress Reports

- 42 CFR Part 495.360 ☑ Yes ☐ No
- 45 CFR Part 95.617 ☑ Yes ☐ No
- 42 CFR Part 431.300 ☑ Yes ☐ No
- 42 CFR Part 433.112 ☑ Yes ☐ No

Security and interface requirements to be employed for all State HIT systems

- 45 CFR 164 Securities and Privacy ☑ Yes ☐ No

9.1.1 HIPAA Compliance

NC DHHS requires its systems be fully HIPAA-compliant as mandated, including the Transaction and Code Sets Rule, Privacy Rule, Security Rule, as well as the National Provider ID and other rules that may be established. Contractors will be required to demonstrate HIPAA compliance.

9.1.2 Statewide Technical Architecture Compliance

Compliance with the North Carolina Statewide Technical Architecture (NCSTA) policies, standards and best practices as well as the all other Federal requirements and specifications as mentioned above, are mandatory for all solutions and implementations completed by this Department.

The NCSTA includes eight distinct technology domains including Application, Data, System Integration, Collaboration, Network, Security, Enterprise Management and Platform Domains. With NCTracks aligned with the CMS-defined MITA currently underway, the NC-MIPS application design addressed each of these domains separately during the design, development and implementation cycle.

9.1.3 Application & System Integration Domains

The NC-MIPS application components are implemented with an SOA and N-tier architecture design. The services infrastructure uses standards-based .NET elements that allow seamless service process integration and data sharing with other organizations and agencies. SOA is a well-suited framework for building an architecture that is flexible, agile, and able to take advantage of new technologies. The design lends itself especially well to application integration efforts due to its flexibility to accommodate both batch and real-time integration from external and internal systems.

Section 3 of the I-APD provides further details on the application and system requirements, but it can be noted here that the NC-MIPS application design considers the following as primary integration or interface points with other state and CMS applications:

- CMS R&A: The NC-MIPS application uses CMS defined messaging formats and the prescribed secure file transfer protocol to integrate with the CMS Registration & Attestation System.
- Provider Enrollment, Credentialing and Verifications Application: The Enrollment, Credentialing and Verifications Application (EVC) system serves as the authoritative source for the state's provider base information. This solution is currently running on a .NET/MS SQL Server architecture. The NC-MIPS application leverages the same technologies to establish real-time interfaces with the EVC database.
- MMIS: Once NCTracks is made operational, the NC-MIPS application will have a close coupling with its databases and will use secure ODBC/JDBC access methods.

9.1.4 Data and Security Domains

NC-MIPS utilizes a Microsoft SQL Server platform to take advantage improved integration, data processing and analysis. The design includes all data, at rest, in use, and in motion, to be protected from unauthorized access and unauthorized disclosure by multiple layers of the security structure. Stored data (at rest) will be kept in controlled-access buildings or rooms, where access is restricted to authorized users and all access events are logged. Where appropriate and authorized by design, stored data can also be encrypted to render unusable any data obtained illegitimately from the servers.

Direct server access will not be allowed to networked users; only authorized technical staff will be able to access the servers for support and maintenance purposes. Networked access to servers (data in use) will be indirect; users will first be authenticated by a tier of access control servers (authorization and authentication services) and requests for information (data, reports, etc.) will be fulfilled by middle-tier servers which will accept the queries and retrieve appropriately authorized data from the file and data servers.

Transmitted data (in motion) will be encrypted, either by message layer security or transport layer security (TLS). Messages can be directly encrypted by clients/users before transmission, or the transport itself can be encrypted using Virtual Private Network (VPN) or Transport Layer Security (TLS/SSL) methodologies. The intent will be to enable end-to-end consistency in the encryption technologies eliminating conflicting protocols, encryption keys and mechanisms. All encryption mechanisms will be FIPS 140-2 approved, such as the Federal Advanced Encryption Standard (AES). Data transmitted in response to authorized requests will be copies of the data/file/report; no single-copy, original source data will be transmitted.

User provisioning, authorization and access control for the NC-MIPS application is based on Roles Based Access Control design, Single Sign-on and User provisioning workflows.

9.1.5 Collaboration & Platform Domains

The NC-MIPS application is a web-based solution that complies with the Section 508 Web accessibility standards as well as W3C standards. The Section 508 compliance is measured through the use of HiSoftware's AccVerify compliance testing and reporting tool. W3C compliance is measured through the use of Adobe and Total Validator tools. For provider and public facing user interfaces, the NC-MIPS application is design to be compatible with modern browsers whose usage exceeds 500,000 users nationally and at least two percent of the traffic to the NC DHHS home Web site. As of the writing of this document the top four browsers by market share include Internet Explorer, Firefox, Safari, and Google Chrome.

9.1.6 Network and Enterprise Management Domains

The NC-MIPS networked components are protected by intrusion detection and intrusion prevention technologies (e.g., network access control devices, firewalls, host intrusion prevention systems (HIPS)). Requirements include logs of network and server activities to be collected, stored and reviewed for anomalous or unauthorized activities.

Server administration includes change management (patches and system upgrades) and active monitoring of all processes and protection technologies 24 hours a day, 7 days a week.

For system failure and disaster recovery purposes, the design includes redundancy and fail-over capabilities where possible. All data storage devices are configured at a minimum RAID Level 5 configuration to facilitate the replacement of damaged storage units without loss of data. The design includes all databases and data stores to be fully backed up at least once a week with daily incremental back-ups during the week (depending on size/amount of the data). The backed-up data will be encrypted, and the back-up media will be stored off-site and rotated on a designed and tested pattern to ensure recoverability of the data. Servers, workstations, and storage media which reach out-of-service limitations will be deactivated and any internal storage media will be "wiped" clean and/or destroyed before external disposal.

The NC-MIPS solution was hosted by the CSC Albany Data Center, but for easier access and cost savings purposes, moved to North Carolina Information Technology Services (ITS) servers in 2013. Staff within the NC-MIPS Help Desk will utilize an incident response plan that details recognition of problems and authorized response activities to reduce the effects, control the spread, determine the root cause, and document the details of all detected incidents. The incident response plan will feed into the business continuity/disaster recovery plan if an incident, or several incidents, reaches the pre-determined threshold for initiating a plan to relocate to an alternate data center requiring the restoration of the most recent data backups.

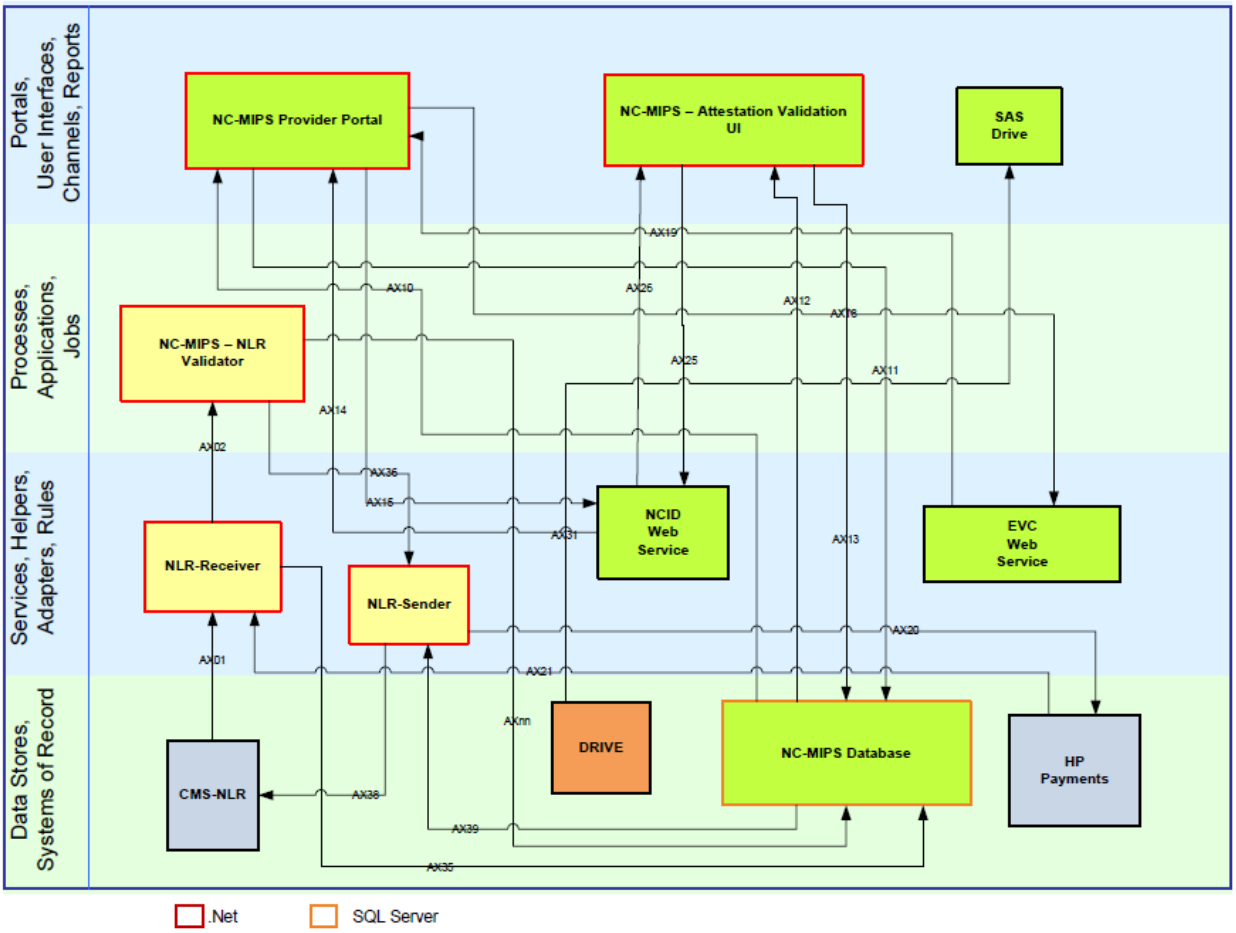
Interface Requirements

As depicted documented in the CMS "HITECH Interface Control Document," there are six interfaces between CMS and the state:

1. Interface B-6: CMS to state to send registration data;
2. Interface B-7: State to CMS for state to update CMS on registration status;
3. Interface C-5: CMS to state to send attestation information for dually eligible EHs;
4. Interface D-16: State to CMS to check for duplicate payments and exclusions;
5. Interface D-17: NLR to state to send dually eligible hospital cost report data;
6. Interface D-18: State to CMS to update CMS with state incentive payment data;

Extensible Markup Language (XML) is used as the communication protocol for interfacing with CMS through a Gentran mailbox. NC-MIPS also interfaces with the current EVC and will interface with NCTracks through web services. NC-MIPS accesses historical claims data from the legacy MMIS data warehouse (DRIVE) through asynchronous batch calls (or other comparable protocols). Relevant claims data fields are stored in the NC-MIPS database. NC-MIPS accesses data for sanctions or recoupments owed to the state via API calls or other comparable protocols.

Figure 6: NC-MIPS' system architecture components



Appendix A: MMIS Expenditures

This section details former budgets for the implementation phase of the NC Medicaid EHR Incentive Program.

Note that there is no MMIS funding request for FFY 2019-2021, as system and operations activities related to the NC Medicaid EHR Incentive Program were brought in-house to NC Medicaid during FFYs 2012-2013 and have been supported from FFY 2014 and beyond with HITECH funds.

The below is a summary of state and federal funding distribution.

The tables below summarize approved, expended, and remaining MMIS-only I-APD funds for FFYs 2011-2012.

Table 26: I-APD MMIS Funding Summary, FFY 2011

	Approved I-APD		
Activity Type	**State**	**Federal**	**Total**
State Personnel	64,645	581,809	646,454
System Hardware & Software	0	0	0
Supplies / Miscellaneous	650	5,850	6,500
Contract Personnel	31,680	285,120	316,800
Contract Services	400,915	3,608,231	4,009,146
Total Project Spend	**$497,890**	**$4,481,010**	**$4,978,900**
	I-APD Expenditures to Date		
Activity Type	**State**	**Federal**	**Total**
State Personnel	15,517	139,650	155,167
System Hardware & Software	0	0	0
Supplies / Miscellaneous	1,084	9,758	10,842
Contract Personnel	57,930	521,373	579,303
Contract Services	502,244	4,520,193	5,022,437
Total Project Spend	**$576,775**	**$5,190,974**	**$5,767,749**
	Remaining I-APD Funding		
Activity Type	**State**	**Federal**	**Total**
State Personnel	49,129	442,158	491,287
System Hardware & Software	0	0	0
Supplies / Miscellaneous	-434	-3,908	-4,342
Contract Personnel	-26,250	-236,253	-262,503
Contract Services	-101,329	-911,962	-1,013,291
Total Project Spend	**($78,885)**	**($709,964)**	**($788,849)**

Total project spend in FFY 2011, including HITECH and MMIS expenditures, was $6,240,511 (FFP $5,616,460 at 90%). OMMIS was not able to hire state staff as planned and instead saw overages in the areas of contract personnel and services.

Table 27: I-APD MMIS Funding Summary, FFY 2012

Activity Type	Approved I-APD		
	State	Federal	Total
State Personnel	261,006	2,349,056	2,610,062
System Hardware & Software	155,145	1,396,308	1,551,453
Supplies / Miscellaneous	5,000	45,000	50,000
Contract Personnel	52,930	476,373	529,303
Contract Services	55,333	498,000	553,333
Total Project Spend	**$529,414**	**$4,764,737**	**$5,294,151**
Activity Type	**I-APD Expenditures to Date**		
	State	**Federal**	**Total**
State Personnel	84	757	841
System Hardware & Software	2,880	25,916	28,796
Supplies / Miscellaneous	643	5,790	6,433
Contract Personnel	104,336	939,019	1,043,355
Contract Services	176,238	1,586,142	1,762,380
Total Project Spend	**$284,181**	**$2,557,624**	**$2,841,805**
Activity Type	**Remaining I-APD Funding**		
	State	**Federal**	**Total**
State Personnel	260,922	2,348,299	2,609,221
System Hardware & Software	152,265	1,370,392	1,522,657
Supplies / Miscellaneous	4,357	39,210	43,567
Contract Personnel	-51,406	-462,646	-514,052
Contract Services	-120,905	-1,088,142	-1,209,047
Total Project Spend	**$245,233**	**$2,207,113**	**$2,452,346**

Total project spend in FFY 2012, including HITECH and MMIS expenditures, was $3,315,286 (FFP $2,983,757 at 90%). OMMIS was not able to hire state staff as planned and instead saw overages in the areas of contract personnel and services.

The tables below summarize MMIS-only I-APD funds for FFYs 2013-2014.

Table 28: MMIS Budget – Contractor Personnel

	FFY 2013			FFY 2014		
Contractor Staff Title	**% of Time**	**Project Hours**	**Cost with Benefits**	**% of Time**	**Project Hours**	**Cost with Benefits**
NC-MIPS/NCTracks Project Manager	0.75	1,560	148,606	0.00	0	0
Operations Manager	0.40	832	80,622	0.00	0	0
Total	**1.15**	**2,392**	**$229,228**	**0.00**	**0**	**$0**

Table 29: MMIS Contractor Personnel Job Descriptions

Contractor Staff Title	Description of Responsibilities
NC-MIPS/NCTracks Project Manager	FFY 2013: Oversee NC-MIPS Operations Team and Help Desk FFY 2013-2014: Manage OMMISS and CSC relationship in relation to NC-MIPS/ NCTracks integration
Operations Manager	Provide overall management support and escalate appropriate issues to OMMISS and CSC executive management

Table 30: MMIS State Budget for FFYs 2013-2014

FFY 2013					
State Cost Category	**90% Federal Share**	**75% Federal Share**	**50% Federal Share**	**10% State Share**	**Total**
State Personnel	0	0	0	0	0
System Hardware	4,500	0	0	500	5000
System Software	4,500	0	0	500	5000
Training	0	0	0	0	0
Supplies	4,500	0	0	500	5000
Total Costs	**$13,500**	**0**	**0**	**$1,500**	**$15,000**
FFY 2014					
State Cost Category	**90% Federal Share**	**75% Federal Share**	**50% Federal Share**	**10% State Share**	**Total**
State Personnel	0	0	0	0	0
System Hardware	0	0	0	0	0
System Software	0	0	0	0	0
Training	0	0	0	0	0
Supplies	0	0	0	0	0
Total Costs	**$0**	**0**	**0**	**$0**	**$0**

Table 31: MMIS Contract Budget for FFYs 2013-2014

FFY 2013					
Cost Category	**90% Federal Share**	**75% Federal Share**	**50% Federal Share**	**10% State Share**	**Total**
Contract Personnel	206,305	0	0	22,923	229,228
Contract Services	613,805	0	0	68,201	682,006
Total Costs	**$820,110**	**0**	**0**	**$91,124**	**$911,234**
FFY 2014					
Cost Category	**90% Federal Share**	**75% Federal Share**	**50% Federal Share**	**10% State Share**	**Total**

FFY 2013					
Cost Category	**90% Federal Share**	**75% Federal Share**	**50% Federal Share**	**10% State Share**	**Total**
Contract Personnel	0	0	0	0	0
Contract Services	0	0	0	0	0
Total Costs	**$0**	**0**	**0**	**$0**	**$0**

For the reasons described in *Section 7* of this document, the total MMIS project cost for the items described in this document for FFYs 2013-2014 is $926,234 (FFP $833,610 at 90%). The $92,624 state share of this project will be satisfied with MMIS state appropriations and in-kind funding sources.

MMIS actuals for FFY 2013 were $435,997. MMIS actuals for FFY 14 through April 30, 2014 were $4,261.

No additional MMIS funding has been requested since 2014. After 2014, the needs of the program were best met with HITECH funds. The state continues to review State Medicaid Director Letters and will request MMIS funding if that source is determined to be the most appropriate for future work.

Appendix B: Estimates of Provider Incentive Payments by Quarter

Projected Medicaid Incentive Payments – 100% FFP HITECH Funding

The total payout of Medicaid incentives through May 7, 2019 was over $142 million to EHs and $211 million to EPs, and we estimate $8.9 million in incentive payouts per year in FFYs 2020-2021. These estimates are to be included in the CMS-37 report but may change depending on such variables as EP participation, readiness for Stage 3, and the impact of healthcare reform on the Incentive Programs. Estimates for FFYs 2020 and 2021 are based on trends from previous FFYs. Note that while the number of incentive payments shown in the tables below are estimates, the numbers for FFY 2011-19 and through May 7, 2019 reflect actuals.

Table 32: Incentive Payments by Number per Quarter

FFY 2011					
	Q1	Q2	Q3	Q4	Total
EH	0	0	0	1	1
EP	0	0	2	53	55
EP - Pediatric	0	0	0	0	0
FFY 2012					
	Q1	Q2	Q3	Q4	Total
EH	20	0	9	6	35
EP	194	555	281	537	1567
EP - Pediatric	16	24	17	12	69
FFY 2013					
	Q1	Q2	Q3	Q4	Total
EH	19	22	14	5	60
EP	494	607	718	370	2189
EP - Pediatric	24	11	23	17	75
FFY 2014					
	Q1	Q2	Q3	Q4	Total
EH	12	21	16	16	65
EP	534	606	788	360	2288
EP - Pediatric	18	6	28	33	85
FFY 2015					
	Q1	Q2	Q3	Q4	Total
EH	-2	35	27	7	67
EP	221	526	1334	197	2278
EP - Pediatric	3	2	47	18	70
FFY 2016					
	Q1	Q2	Q3	Q4	Total
EH	6	3	15	13	37
EP	94	206	1156	500	1956
EP - Pediatric	2	4	23	27	56
FFY 2017					
	Q1	Q2	Q3	Q4	Total
EH	0	1	10	3	14
EP	272	1118	1086	79	2555
EP - Pediatric	2	26	53	4	85
FFY 2018					
	Q1	Q2	Q3	Q4	Total
EH	0	0	0	1	1
EP	382	709	561	6	1658
EP - Pediatric	5	5	44	*2*	*56*
FFY 2019					
	Q1	Q2	Q3	Q4	Total
EH	0	0	0	0	0
EP	2	862	253	*6*	*1123*
EP - Pediatric	0	44	12	*2*	*58*
FFY 2020					
	Q1	Q2	Q3	Q4	Total
EH	0	0	0	0	0
EP	235	433	344	*26*	*1038*
EP - Pediatric	2	2	14	*1*	*19*
FFY 2021					
	Q1	Q2	Q3	Q4	Total
EH	0	0	0	0	0
EP	*3*	*825*	*205*	*5*	*1038*
EP - Pediatric	*1*	*10*	*7*	*1*	*19*
Totals for FFYs 2011-2020					
EH					280
EP					17745
EP - Pediatric					592
Grand Total					18617

Table 33: Incentive Payment by Dollar Amount per Quarter

FFY 2011					
	Q1	Q2	Q3	Q4	Total
EH	0	0	0	275,226	275,226
EP	0	0	42,500	1,126,250	1,168,750
EP - Pediatric	0	0	0	0	0
FFY 2012					
	Q1	Q2	Q3	Q4	Total
EH	17,582,908	0	8,391,282	2,533,126	28,507,316
EP	4,122,500	11,793,750	5,971,250	11,411,250	33,298,750
EP - Pediatric	226,672	340,008	240,839	170,004	977,523
FFY 2013					
	Q1	Q2	Q3	Q4	Total
EH	12,870,317	15,596,546	8,539,106	3,724,893	40,730,862
EP	9,796,250	11,164,750	12,154,809	5,746,000	38,861,809
EP - Pediatric	289,008	138,837	266,341	198,339	892,525
FFY 2014					
	Q1	Q2	Q3	Q4	Total
EH	5,932,315	12,571,703	9,860,636	8,182,029	36,546,683
EP	7,140,806	7,730,136	10,790,750	5,418,750	31,080,441
EP - Pediatric	153,006	59,502	260,676	340,011	813,195
FFY 2015					
	Q1	Q2	Q3	Q4	Total
EH	-1,111,740	11,474,846	7,312,161	2,812,228	20,487,495
EP	2,962,250	6,587,500	15,023,750	2,962,250	27,535,750
EP - Pediatric	42,501	11,334	334,349	119,006	507,190
FFY 2016					
	Q1	Q2	Q3	Q4	Total
EH	4,429,160	1,492,144	2,849,969	3,515,677	12,286,950
EP	1,564,000	2,847,500	12,261,250	5,282,750	21,955,500
EP - Pediatric	28,334	39,668	138,841	170,009	376,852
FFY 2017					
	Q1	Q2	Q3	Q4	Total
EH	0	64,287	1,563,098	371,920	1,999,305
EP	4,224,500	11,849,000	12,533,250	709,750	29,316,500
EP - Pediatric	19,834	164,342	393,851	22,668	600,695
FFY 2018					
	Q1	Q2	Q3	Q4	Total
EH	0	0	46,355	0	46,355
EP	3,234,250	6,074,514	4,751,500	51,000	14,111,264
EP - Pediatric	28,335	28,335	249,348	11,334	317,352
FFY 2019					
	Q1	Q2	Q3	Q4	Total
EH	0	0	0	0	0
EP	17,000	7,327,000	2,150,500	*51,000*	*9,545,500*
EP - Pediatric	0	249,348	68,004	*11,334*	*328,686*
FFY 2020					
	Q1	Q2	Q3	Q4	Total
EH	0	0	0	0	0
EP	*1,997,500*	*3,680,500*	*2,924,000*	*221,000*	8,823,000
EP - Pediatric	*11,334*	*11,334*	*79,338*	*5,667*	107,673
FFY 2021					
	Q1	Q2	Q3	Q4	Total
EH	0	0	0	0	0
EP	*25,500*	*7,012,500*	*1,742,500*	*42,500*	8,823,000
EP - Pediatric	*5,667*	*56,670*	*39,669*	*5,667*	107,673
Totals for FFYs 2011-2021					
EH					140,880,191
EP					215,697,264
EP - Pediatric					4,921,691
Grand Total					361,499,146

Appendix C: Grants or Other Funding

There are currently no other funding sources for the program outlined in the request.

Appendix D: FFP for HIE

This appendix contains additional background information about the statewide HIE approach and the development and rollout of HIE in North Carolina, and references existing narrative in the NC SMHP, which may be helpful context for the request in this HIE I-APDU.

HIE Approach

Coordinated planning for statewide HIE in North Carolina began in early 2009, when the North Carolina HIT Strategic Planning Task Force (HIT Task Force) was established to forge a new vision of how health and healthcare can be improved by enhancing the use of health IT. Details on the statewide HIE approach can be found in Section B.2 on page 60 of the SMHP (Version 4.3; CMS approval letter dated 10032018). Note that the technology approach has not changed since the inception of the NC HIE.

Infrastructure Development and Transition to Ongoing Operations

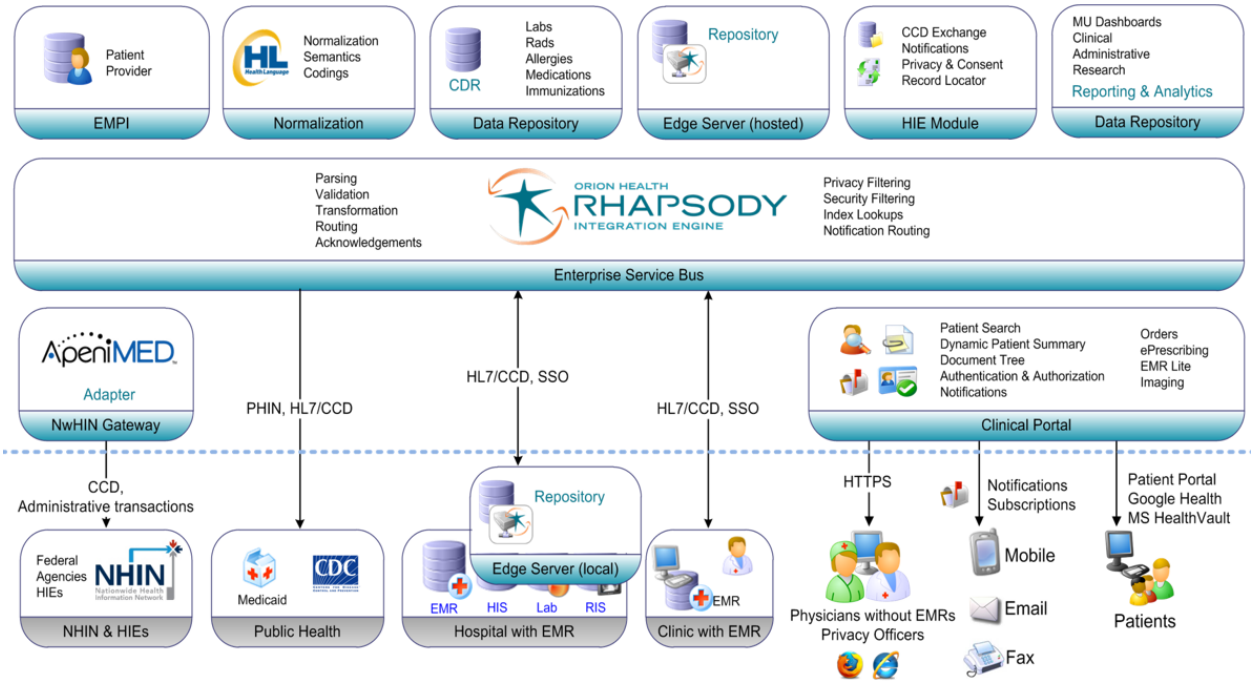
Based on intensive assessment, prioritization and planning facilitated by national subject matter experts and vetted through a public process, NC HIE developed and released an RFP for statewide HIE services on April 25, 2011.

In July 2011, NC HIE's Board approved the selection of CapGemini/Orion as NC HIE's technical services vendor. In August 2011, CapGemini/Orion and NC HIE began the formal design process. The initial implementation of core HIE services included:

- Connectivity with participating systems: CCD, HL7, SSO, Web Services (Rhapsody™);
- Privacy and consent services;
- Enterprise MPI;
- Data normalization;
- Public health reporting;
- User subscribed notifications;
- Clinical Data Repository;
- Web-based access to the longitudinal patient record (Clinical Portal);
- Direct secure messaging; and
- eHealth Exchange.

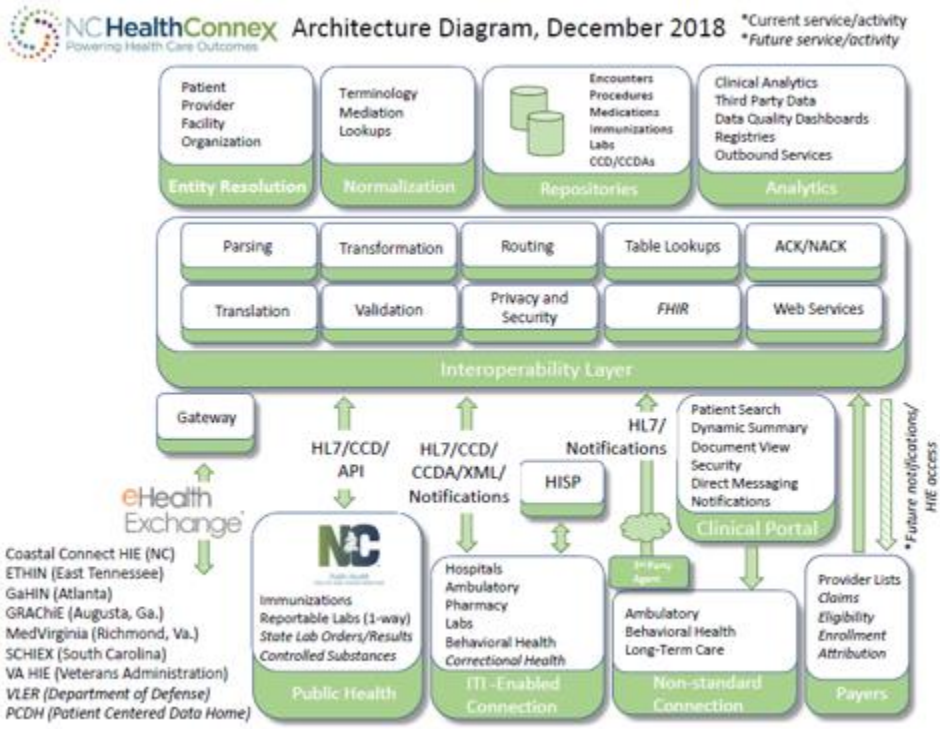
In December 2011, CapGemini/Orion defined and built interfaces and integration services to promote exchange of clinical messages between organizations. A visual representation of the initial design of core services and interactions is provided in the figure below.

Figure 7: NC HIE Core/Services/Interactions Design, 2011



In April 2012, NC HIE completed the development and initial deployment of HIE core services and launched its first phase of statewide HIE connectivity with the availability of secure messaging leveraging the Direct protocol. From April 2012 through 2016, the main technical focus of the HIE through two subsequent governance transitions has been building out additional facility connections. The figure below depicts NC HealthConnex's core services and interactions as of 2018, and those planned for delivery in 2019-2021.

Figure 8: NC HealthConnex Current and Planned Core Services/Interactions, 2018



For more on plans for continued enhancements to NC HealthConnex infrastructure and services, see the *NC HIEA Roadmap 2021*.

Risks and Mitigation Strategies

Details on the HIE's risks and mitigation strategies can be found in Section B.2.4 on page 72 of the SMHP (Version 4.3; CMS approval letter dated 10032018).

An additional risk not mentioned in the SMHP for continued Medicaid public health onboarding and the HIE enhancement initiatives described herein is that external systems or organizations lack readiness, technical capacity/resources, or in some cases policy or authority to deliver on planned activities. An example of this is that the NCIR or CSRS has competing programmatic priorities.

The probability and impact of this risk is moderate to high, and the NC HIEA's mitigation strategy involves dedicating NC HIEA staff to careful planning and vetting of activities and project plans with all relevant stakeholders, and co-management of initiatives with regular project touchpoints.

Annual Benchmarks and Performance Goals

Details on annual benchmarks and performance goals for the statewide HIE approach through 2019 can be found in Section B.2.5 on page 74 of the SMHP (Version 4.3; CMS approval letter dated 10032018). The NC HIEA is pleased to report the following update on those stated goals from early 2017, in the table below. Additional goals for 2020-2021 have been added and will be included in the next SMHP update.

Table 34: NC HealthConnex Performance Goals and Progress to Date (2018)

Performance Goal	Metric	2016 Baseline	2018 Goal	2018 Actual	2019 Goal	2020 Goal	2021 Goal
Expand connectivity to NC HealthConnex core services	Total # of facilities	835	5,000	4,502	7,500	8,500	10,000
	Total # of hospitals	22	110	97	120	125	130
	Total # of health departments	23	85 (all)	63	85 (all)	85 (all)	85 (all)
Expand patient and provider base within NC HealthConnex	Total # of unique providers with contributed patient records in NC HealthConnex	19,744 (April 2017 actual)	TBD	41,568	65,000	70,000	75,000
	Total # of unique patients with records in NC HealthConnex	3.5 million	8 million	6 million	10 million	10 million*	10 million*

**The state's population hovers around 10 million, so while the total # of unique patients will grow slowly thereafter due to movement in the population, the goal has not been set higher than 10 million.*

For additional performance goals, see the *NC HIEA Roadmap 2021*.

Link to Promoting Interoperability Strategy

For a crosswalk of 2019 (Stage 3) Promoting Interoperability objectives and NC HealthConnex supporting technology, see *Table 10* of this I-APDU.

Clinical Quality Measures and Public Health Interfaces

NC Medicaid's strategy for electronic clinical quality measure (CQM) collection and public health interfaces are described in Section B.2.7 on page 81 of the SMHP (Version 4.3; CMS approval letter dated 10032018). Note that the CQM strategy does not currently involve NC HealthConnex. The status of public health system interfaces and relevant provider reporting capabilities with NC HealthConnex are also addressed in *NC HealthConnex and Promoting Interoperability* in this I-APDU.

Short- and Long-Term Value Propositions

Details on the value propositions for NC's statewide HIE approach can be found in Section B.2.8 on page 81 of the SMHP (Version 4.3; CMS approval letter dated 10032018).

Role of State Government

NC DHHS has been intimately involved with the statewide HIE network from early planning under the state's Health and Wellness Trust Fund Commission in 2009-2010; to the creation of statewide HIE policy guidance—including the North Carolina Health Information Exchange Act and the development of the original statewide HIE participation agreement—in 2011; through continued collaboration with the NC Office of Health Information Technology (NC OHIT) and close coordination with NC Medicaid and the NC

Division of Public Health; and finally through legislated full oversight and operational management since its transition under the state agency NC HIEA on February 29, 2016.

Stakeholder Investments

North Carolina's statewide HIE network has seen federal, state, private corporation, and participant contributions to its financial picture since its inception. Funding from early investors with limited investment periods (i.e., ONC through the State HIE Cooperative Agreement, CMS through HITECH funds) were leveraged for initial design and development costs. Funding from other initial investors with longer term benefit horizons (e.g., commercial insurers) will see their payment mechanisms adapt over time.

The initial financing strategy for NC's HIE after early funding had been exhausted was to shift to a services model, whereby participant fees would cover ongoing costs of the core services and any deployed value-added services/features, to be billed to participants based upon utilization or subscription. As described in *Appendix C*, with the transition of the statewide HIE network under the NC HIEA, the current funding makeup includes state appropriations, an infrastructure contribution from SAS Institute, and time-limited HITECH funding as approved through the HIE I-APD Version 1.0.

NC Medicaid is cognizant of the need to ensure other stakeholders join the State of North Carolina, SAS Institute, CMS and NC Medicaid in supporting the costs associated with sustaining statewide HIE services. As such, NC Medicaid worked closely with NC HIE and now, the NC HIEA, on both its initial funding approach and longer-term plans for financial support from stakeholders. The *NC HIEA Roadmap 2021* discusses plans for payer and patient access, both of which hold promise for significant future investment and cost-sharing in HIE ongoing operational costs. The NC HIEA anticipates adding private payer relationships to the NC HealthConnex investment makeup in 2019.

Cost Allocation Methodology Used for Funding HIE Core Services and Features Development

The initial cost allocation methodology for funding HIE core services development from North Carolina's HIE I-APD Version #20120113 (CMS approval letter dated 03012012), is as follows (Note: "DMA" stands for the NC Division of Medical Assistance, the former name for the NC Medicaid agency):

In determining the proportion of initial HIE core services development that would be eligible for 90% FFP, DMA prioritized meeting the CMS cost allocation principles given that a range of other entities, including health plans, would benefit from statewide HIE.

DMA's goal was to identify the number of Medicaid providers within the state among those who are categorically eligible for the Medicaid EHR Incentive Program (e.g., doctors of medicine, doctors of osteopathy, nurse practitioners, certified nurse midwives and dentists). These data would serve as the denominator in the fair share ratio. In identifying the numerator, DMA sought to balance the number of providers that could eventually meet the Medicaid EHR Incentive Program's volume thresholds (20 percent volume requirements for pediatricians, 30 percent volume for all other eligible professionals) with the lack of historical data that all states face in predicting enrollment in the program. Ultimately, DMA determined that the numerator needed to inclusive not just of those providers that already met Medicaid volume requirements but of those providers who could potentially meet these requirements over the next five years.

According to data from the American Academy of Family Physicians, the average family physician has 85 patient visits per week.[21] This is equivalent to 340 visits per month. Twenty percent of this volume (i.e., the volume threshold for pediatricians) would equal 68 visits or encounters. DMA felt that 68 visits was not sufficiently broad that it would reflect providers that would be eligible over five years, particularly with Medicaid expansion efforts and increased Medicaid payment rates as a result of the Affordable Care Act. Therefore, DMA determined that providers with 60 or more encounters per month should be included in the numerator.

In performing these calculations, DMA found that 20.8 percent of the state's providers met this volume threshold. Denominator data were obtained from DMA's MMIS as were numerator data. Data from the numerator took the average number of encounters over a three-month period to account for variability in patient volume in any one month.

While physician assistants (PAs) who practice in an FQHC or RHC that is so led by a PA are also eligible for the Medicaid EHR Incentive Program, DMA did not include these data in the denominator because encounter data for PAs are not available in the MMIS.

As stated in *Section 8* of this document, all activities described in the HIE I-APDU approved May 21, 2019 are directly tied to supporting NC HealthConnex participants (92% of whom are currently enrolled Medicaid providers) and CSRS participants (86% of whom are currently enrolled Medicaid providers) in the transition to value-based care, while meeting Promoting Interoperability requirements. Thus, North Carolina asserts that no cost allocation across other funding sources is warranted at this time for the HIE initiatives.

Long-Term Sustainability

In its first five years, NC's statewide HIE network saw slow adoption by providers and underwent major governance transitions. In September 2015, concerns about its sustainability combined with a need for greater visibility into Medicaid services for efficient program administration led the NC General Assembly to pass NC Session Law 2015-241 Section 12A.5, as amended by NC Session Law 2015-264, which assigned the oversight and administration of the statewide HIE network to a new state agency called The North Carolina Health Information Exchange Authority (NC HIEA), and which mandated that providers of health care services paid for with state funds connect to and share clinical data with the statewide HIE network.

Rebranded NC HealthConnex in 2016, the statewide HIE network under the NC HIEA now has broad support from the NC legislature and key state health care leaders, who are depending on it to help reshape health care delivery and administration in North Carolina. NC HealthConnex operations are fully funded on an annually recurring basis in the NC state budget; the current state budget runs through the end of state fiscal year 2019 (June 30, 2019), but the funding level is expected to remain constant through state fiscal year 2022 (June 30, 2022). The *NC HIEA Roadmap 2021* discusses plans for payer and patient access and plans to gradually become 100% receipt-supported per state statute, in addition to the NC HIEA's strong commitment to serving state-funded providers and beneficiaries and supporting NC DHHS, NC Medicaid, and other state agencies.

[21] American Academy of Family Physicians. (2008). Average number of family physician visits per week and average number of patients in various settings, June 2008 [Table 5]. Accessed October 20, 2011 from: http://www.aafp.org/online/en/home/aboutus/specialty/facts/5.html

Appendix E: Center for Medicare and Medicaid Services Seven Conditions & Standards

Yes ☑ **No** ☐ **Modularity Condition.** Use of a modular, flexible approach to systems development, including the use of open interfaces and exposed API; the separation of business rules from core programming; and the availability of business rules in both human and machine-readable formats.

Modularity in the Medicaid Electronic Health Record Incentive program is achieved in several ways:

- To adjust to the MMIS system replacement, a modular, decoupled approach was seen as necessary from the outset. The provider-facing NC Medicaid EHR Incentive Payment System (NC-MIPS) and back-end Attestation Validation Portal (AVP) are modular and separate from NC's MMIS to allow for fast updates as CMS changes are released for the program. NC-MIPS and AVP are maintained inhouse with program staff, so changes do not require the costly and time-consuming change request procedures for MMIS through CSRA, the fiscal agent for NC DHHS.
- The software is built using best practice design patterns such as separating the data, business, and presentation layers within the application.
- The solution leverages data from documented, well-defined interfaces to communicate with other systems (CMS R&A, enrollment/credentialing, payment, claims data, authentication, I certification number verification, etc.). Where possible, new technologies supporting more flexible interfaces (XML, web services, etc.) are used.
- Attestations, attestation validation, and meaningful use all benefit from leveraging metadata driven rules for processing.

For a software development life cycle, the key components of the NC-MIPS approach are to:

- Generate finalized business requirements through frequent short meetings between the business and development teams.
- Implement some SCRUM tactics to ensure a strong development process, avoid pitfalls commonly associated with the waterfall approach, and realize other benefits of agile development.

The NC HealthConnex solution uses documented interfaces and federal and industry standards for interoperability and modularity. The NC HealthConnex platform, though provided as a service from a single vendor, is composed of components capable of standing alone and/or replacement as necessary. The components are coupled via industry-standard interfaces that include but are not limited to healthcare messaging transactions, web services, and even batch processing where required. Our approach to the development of new services is open, collaborative, and based on an agile industry-standard Systems Development Life Cycle (SDLC). Business use cases are developed in direct collaboration of active HIE participants and future participants, as well as healthcare business, technical, compliance and policy stakeholders. These use cases are distilled into requirements, which are distilled again into technical use cases that drive the development of modules. NC HealthConnex's quality assurance process is comprehensive and reengages the appropriate stakeholders as modules are assembled into services; these services are tested in a protected environment, and then methodically rolled out to HIE participants.

Yes ☑ **No** ☐ **MITA Condition.** Align to and advance increasingly in MITA maturity for business, architecture, and data.

As a decoupled solution relying on data mastered in multiple other systems, the Medicaid Electronic Health Record Incentive Solution is architected to participate as a data consumer and producer within a larger service-oriented architecture. The solution aligns with the state's MITA goals.

The NC HealthConnex solution uses documented interfaces and federal and industry standards for interoperability and modularity. The NC HealthConnex platform, though provided as a service from a single vendor, is composed of components capable of standing alone and/or replacement as necessary. The components are coupled via industry-standard interfaces that include but are not limited to healthcare messaging transactions, web services, and even batch processing where required. Our approach to the development of new services is open, collaborative, and based on an agile industry-standard Systems Development Life Cycle (SDLC). Business use cases are developed in direct collaboration of active HIE participants and future participants, as well as healthcare business, technical, compliance and policy stakeholders. These use cases are distilled into requirements, which are distilled again into technical use cases that drive the development of modules. NC HealthConnex's quality assurance process is comprehensive and reengages the appropriate stakeholders as modules are assembled into services; these services are tested in a protected environment, and then methodically rolled out to HIE participants

Yes ☑ **No** ☐ **Industry Standards Condition.** Ensure alignment with, and incorporation of, industry standards: the Health Insurance Portability and Accountability Act of 1996 security, privacy and transaction standards; accessibility standards established under section 508 of the Rehabilitation Act, or standards that provide greater accessibility for individuals with disabilities, and compliance with Federal civil rights laws; standards adopted by the Secretary under section 1104 of the Affordable Care Act; and standards and protocols adopted by the Secretary under section 1561 of the Affordable Care Act.

Taking advantage of industry standards is a key goal of the Medicaid Electronic Health Record Incentive Solution. Attention to industry standards is specifically included in all phases of the software development process including requirements gathering/design, development, system integration testing, and user acceptance testing. Particular attention is being paid to section 508 of the Rehabilitation Act. No software will be released without achieving compliance for the user interface. Each failure to comply with an applicable standard will result in a critical bug being logged for immediate remediation.

NC HealthConnex incorporates industry standards set by the Secretary of HHS to meet interstate agency interoperability, accessibility, and security requirements in all project phases. This implementation is hosted in a state-of-the-art data center in the continental U.S. We ensure HIPAA compliance through standard quality assurance and compliance processes enforced at all levels of the project and monitored by the project sponsors. The State Medicaid Agency complies with the Affordable Care Act Section 1104, Administration Simplification and Section 1561, Health IT Enrollment Standard and Protocols. All vendors engaged with the HIE have long and successful histories working with CMS concerning 508 standards, take care to design their products to meet 508 requirements, and provide necessary product assessment statements.

Yes ☑ **No** ☐ **Leverage Condition.** Promote sharing, leverage, and reuse of Medicaid technologies and systems within and among states.

North Carolina's Medicaid Electronic Health Record Incentive Solution is being built to both leverage capabilities from other states and to be leveraged by other states. We also have been using CMS's program portals to review material from other states. North Carolina's approach to attestation validation and reporting may be of interest to some states.

NC HealthConnex utilizes and extends federally-sponsored interoperability standards. It is built to both leverage capabilities from other states and to be leveraged by other states to engage in the meaningful exchange of critical healthcare information. The foundational technology and standards by which NC HealthConnex has not fundamentally changed since its inception; it is the convergence of interoperability standards, alignment of legal agreements (e.g., the DURSA), and shared experiences and services that provide the true value. To that end, the project team openly collaborates with state agencies (i.e. Division of Public Health) and several state-level and regional HIEs to both learn from and contribute to the resolution of common challenges. We engage in discussions at local, regional, and national conferences with respect to the same. We actively engage our present and future participant population in the responsibilities of and value to be gained from the exchange of health information, and how such collaboration helps prepare them for the transition to managed care and value-based purchasing arrangements.

Yes ☑ **No** ☐ **Business Results Condition.** Support accurate and timely processing of claims (including claims of eligibility), adjudications, and effective communications with providers, beneficiaries, and the public.

A guiding principle in developing the Medicaid Electronic Health Record Incentive Solution is to have clear communication with the provider community on requirements and status. A second principle is to reduce the administrative time for processing attestations through bringing together the disparate data sets required for attestation validation, providing the ability to monitor the overall attestation validation process, and allowing flexibility in data capture during validation to support process management and improvement.

NC HealthConnex does not directly support the adjudication and processing of claims, nor does it affect the confirmation of eligibility at this time. It does, however, enable near real-time exchange of healthcare information between providers and allows providers to consume that information in a variety of ways. In so doing, it influences outcomes to the betterment of Medicaid beneficiaries and the public at large, reduces costs, and reduces duplicative testing and medical errors. It also enables direct, secure communication between providers to assist in referrals, transitions in care, and other health-related inquiries, and reduces the complications of largely manual workflows and the risks associated with paper-based

Yes ☑ **No** ☐ **Reporting Condition.** Produce transaction data, reports, and performance information that would contribute to program evaluation, continuous improvement in business operations, and transparency and accountability.

The approach to North Carolina's Medicaid Electronic Health Record Incentive Solution is consistent with the more recent best practices of building the monitoring and support of the solution into the solution itself. By maintaining a centralized activity log, the solution can provide stakeholders (providers, management, and program operations) insight into current or historical activity. A separate audit log maintains detailed information that can be used for troubleshooting or performance analysis. Together, both logs may be used for reporting metrics or derived key performance indicators allowing SLAs to be monitored and corrective actions to be developed as necessary.

NC HealthConnex currently produces reports that speak to the performance of the various layers of the HIE infrastructure. It can provide stakeholders (providers, health care and health plan management, and program operations staff) insight into current or historical activity at a global, participant, and even a transactional level. Each module maintains a separate audit log of detailed information that can be used for troubleshooting or performance analysis. In addition, NC HealthConnex plans to offer data

quality reporting that will offer participants in the HIE valuable insight into the richness and relevance of their healthcare data. Over time, this programmatic approach will lead to better data, more actionable data and workflow and programmatic improvements within clinical settings.

Yes ☑ **No** ☐ **Interoperability Condition.** Ensure seamless coordination and integration with the Exchange (whether run by the state or federal government), and allow interoperability with health information exchanges, public health agencies, human services programs, and community organizations providing outreach and enrollment assistance services.

North Carolina's Medicaid Electronic Health Record Solution is designed and executed with reuse in mind. It is intended to be a system with suitable exposure to multiple enterprise service buses, including but not limited to the NC Division of Department of Health and Human Services buses.

As a Health Information Exchange (HIE), NC HealthConnex's primary function is to enable the timely exchange of healthcare information between providers. To meet a connectivity mandate set forth in NC state law, NC HealthConnex must accept data from and send data to several dissimilar technologies using a variety of standard and non-standard methodologies. We integrate federal and state-level entities and ensure interoperability between them and local and regional HIEs, public health entities, hospitals, integrated delivery networks, behavioral health organizations, and other types of participants who wish to connect. We provide outreach, technology, and technical assistance services to ease the burden and cost of entry for less-enabled provider organizations and continue to contemplate intuitive ways for our participants to access value-added features that seamlessly integrate into their clinical workflows.

Appendix F: Acronyms and Abbreviations

Acronyms and Abbreviations	
A/I/U	Adopt, Implement, or Upgrade
API	Application Programming Interface
ARRA	American Recovery and Reinvestment Act
AVP	Attestation and Validation Portal
BAA	Business Associate Agreement
CMS	Centers for Medicare and Medicaid Services
CSC	Computer Sciences Corporation
NC DHHS	North Carolina Department of Health and Human Services
DHB	Division of Health Benefits (NC Medicaid), formerly Division of Medical Assistance
DRIVE	Former MMIS Data Warehouse
EH	Eligible Hospital
EHR	Electronic Health Record
EP	Eligible Professional
EVC	Enrollment, Verification, and Credentialing
FFP	Federal Financial Participation
FFY	Federal Fiscal Year
HIE	North Carolina Health Information Exchange
HIPAA	Health Insurance Portability and Accountability Act
HIT	Health Information Technology
HITECH	Health Information Technology for Economic and Clinical Health
I-APD	Implementation Advance Planning Document
IC	Informatics Center

Acronyms and Abbreviations	
ITS	North Carolina Information Technology Services
MITA	Medicaid Information Technology Architecture
MMIS	Medicaid Management Information System
MS SQL	Microsoft Structured Query Language
MU	Meaningful Use
MU^2	Meaningful use of Meaningful Use
NC AHEC	North Carolina Area Health Education Center
N3CN	North Carolina Community Care Networks
NC-MIPS	North Carolina Medicaid Incentive Payment System
NCTRACKS	NC Transparent Reporting, Accounting, Collaboration, and Knowledge Management System
NLR	National Level Repository
OMMISS	Office of Medicaid Management Information System Services
ONC	Office of the National Coordinator
ORH	Office of Rural Health
P-APD	Planning Advanced Planning Document
PCG	Public Consulting Group
REC	Regional Extension Center
SMD	State Medicaid Director
SME	Subject Matter Expert
SMHP	State Medicaid HIT Plan
SOA	Service Oriented Architecture
XML	Extensible Markup Language