



U.S. Department of Health and Human Services
Assistant Secretary for Planning and Evaluation
Office of Disability, Aging and Long-Term Care Policy

**LONG-TERM AND
POST-ACUTE CARE PROVIDERS
ENGAGED IN HEALTH
INFORMATION EXCHANGE:
FINAL REPORT**

October 2013

Office of the Assistant Secretary for Planning and Evaluation

The Office of the Assistant Secretary for Planning and Evaluation (ASPE) is the principal advisor to the Secretary of the Department of Health and Human Services (HHS) on policy development issues, and is responsible for major activities in the areas of legislative and budget development, strategic planning, policy research and evaluation, and economic analysis.

ASPE develops or reviews issues from the viewpoint of the Secretary, providing a perspective that is broader in scope than the specific focus of the various operating agencies. ASPE also works closely with the HHS operating agencies. It assists these agencies in developing policies, and planning policy research, evaluation and data collection within broad HHS and administration initiatives. ASPE often serves a coordinating role for crosscutting policy and administrative activities.

ASPE plans and conducts evaluations and research--both in-house and through support of projects by external researchers--of current and proposed programs and topics of particular interest to the Secretary, the Administration and the Congress.

Office of Disability, Aging and Long-Term Care Policy

The Office of Disability, Aging and Long-Term Care Policy (DALTCP), within ASPE, is responsible for the development, coordination, analysis, research and evaluation of HHS policies and programs which support the independence, health and long-term care of persons with disabilities--children, working aging adults, and older persons. DALTCP is also responsible for policy coordination and research to promote the economic and social well-being of the elderly.

In particular, DALTCP addresses policies concerning: nursing home and community-based services, informal caregiving, the integration of acute and long-term care, Medicare post-acute services and home care, managed care for people with disabilities, long-term rehabilitation services, children's disability, and linkages between employment and health policies. These activities are carried out through policy planning, policy and program analysis, regulatory reviews, formulation of legislative proposals, policy research, evaluation and data planning.

This report was prepared under contract #HHSP23337004T between HHS's ASPE/DALTCP and Westat. For additional information about this subject, you can visit the DALTCP home page at http://aspe.hhs.gov/office_specific/daltcp.cfm or contact the ASPE Project Officer, Jennie Harvell, at HHS/ASPE/DALTCP, Room 424E, H.H. Humphrey Building, 200 Independence Avenue, S.W., Washington, D.C. 20201. Her e-mail address is: Jennie.Harvell@hhs.gov.

LONG-TERM AND POST-ACUTE CARE PROVIDERS ENGAGED IN HEALTH INFORMATION EXCHANGE: Final Report

Colene Byrne, Ph.D.
Westat

Michelle Dougherty, MA, RHIA
AHIMA Foundation

October 29, 2013

Prepared for
Office of Disability, Aging and Long-Term Care Policy
Office of the Assistant Secretary for Planning and Evaluation
U.S. Department of Health and Human Services
Contract #HHSP23337004T

The opinions and views expressed in this report are those of the authors. They do not necessarily reflect the views of the Department of Health and Human Services, the contractor or any other funding organization.

TABLE OF CONTENTS

ACKNOWLEDGMENTS	vii
ABSTRACT	viii
ACRONYMS	ix
EXECUTIVE SUMMARY	xiv
1. INTRODUCTION	1
1.1. Long-Term Services and Supports, and Long-Term and Post-Acute Care	2
1.2. Health Information Exchange	2
1.3. Care Coordination During Care Transitions and Shared Care	3
2. METHODOLOGICAL APPROACH	5
2.1. Research Questions.....	5
2.2. Framework to Characterize Health Information Exchange for Persons Receiving Long-Term and Post-Acute Care/Long-Term Services and Supports	6
2.3. Literature Review	9
2.4. Environmental Scan	10
2.5. Key Informant Interviews.....	10
2.6. Site Visits	11
3. FINDINGS	12
3.1. Evidence Base for Health Information Exchange to Support Care Coordination During Transitions and Instances of Shared Care	12
3.2. Initiatives to Support Care Coordination and Transitions in Care on Behalf of Persons Receiving Long-Term and Post-Acute Care/Long-Term Services and Supports.....	15
3.3. Initiatives to Support Adoption of Health Information Technology and Electronic Health Information Exchange	19
3.4. State of Health Information Exchange to Support Care Coordination.....	26
3.5. Process, Outcome, and Cost Measures and Metrics to Assess Health Information Exchange Interventions on Care Coordination.....	34
3.6. Health Information Exchange Interventions and Activities to Support Care Coordination for Persons Receiving Long-Term and Post-Acute Care/Long-Term Services and Supports	38

4. SYNTHESIS OF FINDINGS FROM CASE STUDIES OF HEALTH INFORMATION EXCHANGE TO SUPPORT CARE COORDINATION FOR PERSONS RECEIVING LTPAC/LTSS	44
4.1. Summary of Site Visits	45
4.2. Synthesis of Health Information Exchange Findings from Site Visits	56
4.3. Summary of Electronic Health Information Exchange	62
4.4. Summary of Long-Term and Post-Acute Care Data That Could be Prioritized for Electronic Health Information Exchange	64
4.5. Use of Health Information Technology Standards to Support Interoperability and Exchange.....	65
4.6. Findings, Challenges, and Opportunities Identified from Site Visits	65
4.7. Barriers for Challenges to Advancing Health Information Exchange	69
4.8. Opportunities to Advance Health Information Exchange for Persons Receiving Long-Term and Post-Acute Care/Long-Term Services and Supports	70
5. CONCLUSION	73
BIBLIOGRAPHY	77

APPENDICES

- APPENDIX A. Selected Programs and Initiatives that Support Care Coordination and Information Exchange for Persons Receiving LTPAC/LTSS
- APPENDIX B. Framework to Characterize Health Information Exchange to Support Care Coordination for Persons Receiving LTPAC/LTSS
- APPENDIX C. Environmental Scan and Literature Review Sources
- APPENDIX D. Promising Components and Interventions to Reduce Readmissions
- APPENDIX E. Summary of Literature on Health Information Exchange Outcomes and Related Measures
- APPENDIX F. Examples of Community-Based Care Transition Program with LTPAC/LTSS Participation
- APPENDIX G. Health Information Exchange Interventions and Activities Identified that Support Care Coordination for Persons Receiving LTPAC/LTSS

- APPENDIX H. Site Visit Report: Rush University Medical Center, Care Transitions Program, Bridge Program
- APPENDIX I. Site Visit Report: Beechwood Homes
- APPENDIX J. Site Visit Report: Eastern Maine Health System, Eastern Maine Home Care
- APPENDIX K. Summary of Information Routinely Exchanged by the Three Sites Visited, by Care Coordination Function
- APPENDIX L. Standards Available to Support Health Information Exchange of Long-Term and Post-Acute Care Data
- APPENDIX M. Glossary

LIST OF FIGURES AND TABLES

FIGURE 4-1. Bridge Program Systems Targeted for Coordination.....	47
FIGURE H-1. Bridge Program Systems Targeted for Coordination.....	H-9
FIGURE H-2. Replication Sites for Bridge Model and Community-Based Care Transition Program Sites.....	H-13
FIGURE J-1. EMHC Service Areas	J-7
FIGURE J-2. Patient Risk Summary.....	J-10
FIGURE J-3. Illustration of Bangor Beacon Community	J-13
FIGURE J-4. HealthinfoNet HIE Technical Architecture	J-16
FIGURE J-5. Progression to an ACO	J-19
FIGURE J-6. Home Health Gold Dashboard	J-27
<hr/>	
TABLE 2-1. Care Coordination Constructs and Functions Based on Study Framework, With Selected Examples Describing HIE	7
TABLE 2-2. Key informants and Their Organizations.....	10
TABLE 3-1. ACOs Identified with LTPAC/LTSS Providers.....	16
TABLE 3-2. EHR Adoption Rate by Selected LTPAC Provider Types	28
TABLE 3-3. LTPAC Highest-Leverage Areas for Performance Improvement and Core Measure Concepts from MAP	36
TABLE A-1. Selected Programs and Initiatives that Support Care Coordination and Information Exchange for Persons Receiving LTPAC/LTSS Services	A-2

TABLE B-1. Coordination of Care Model Activities by Functions and Integration Constructs.....	B-1
TABLE B-2. Examples of Categories Associated with the Technology Facet.....	B-4
TABLE B-3. Examples of Categories Associated with the Data Category within the Technology Facet	B-5
TABLE B-4. Examples of Categories Associated with the Use and Workflow Facet.....	B-6
TABLE B-5. Examples of Categories Associated with the Environment Facet.....	B-7
TABLE B-6. Examples of Categories Associated with the Outcomes Facet.....	B-8
TABLE D-1. Promising Components and Interventions to Reduce Readmissions	D-1
TABLE F-1. Examples of Community-Based Care Transition Programs with LTPAC or LTSS Participation	F-1
TABLE G-1. HIE Interventions and Activities Identified that Support Care Coordination for Persons Receiving LTPAC/LTSS	G-2
TABLE H-1. HIE by Care Coordination Function and Partners, Rush University Medical Center Bridge Program	H-19
TABLE H-2. Shared Care Information Exchange Activities.....	H-23
TABLE H-3. Other Information Exchange Activities	H-24
TABLE I-1. Provider Types and Health Information Available on HEALTHeLINK HIE.....	I-7
TABLE I-2. AOD Modules Used	I-11
TABLE I-3. Skilled Nursing Facility Workflow Processes	I-14

TABLE I-4.	Perspectives from Non-Affiliated Community Partners	I-18
TABLE I-5.	HIE by Care Coordination Function and Partners, Beechwood Homes.....	I-20
TABLE I-6.	Shared Care Information Exchange Activities.....	I-24
TABLE I-7.	Other Information Exchange Activities	I-27
TABLE J-1.	EMHC Summary -- Age, Diagnosis and Payers	J-7
TABLE J-2.	Telehealth Patient Outcomes Results by Diagnosis in 2012.....	J-11
TABLE J-3.	Estimated Health Care Cost Savings Results by Diagnosis	J-12
TABLE J-4.	HIT Standards Used by HIN and EMHS Capabilities.....	J-16
TABLE J-5.	EMHC Software Applications.....	J-24
TABLE J-6.	Home Health Care Workflow Processes.....	J-28
TABLE J-7.	HIE by Care Coordination Function and Partners, Eastern Maine Homecare	J-31
TABLE J-8.	Shared Care Information Exchange Activities.....	J-32
TABLE J-9.	Other Information Exchange Activities	J-34
TABLE J-10.	Measures for Use in Establishing Quality Performance Standards that ACOs Must Meet for Shared Savings	J-41
TABLE K-1.	HIE Activities for Transitions of Care	K-2
TABLE K-2.	HIE Activities for Shared Care	K-6
TABLE K-3.	Other Health Information Exchange Activities.....	K-10
TABLE L-1.	Standards Available to Support HIE of LTPAC Data	L-1

ACKNOWLEDGMENTS

Westat would like to acknowledge the contributions of Jennie Harvell, the Contract Officer's Representative from the Office of the Assistant Secretary for Planning and Evaluation who provided detailed edits and contributed to various sections of this report and informed the case studies.

Westat would also like to acknowledge the key informants who provided valuable information and insights on health information exchange to support long-term and post-acute care and long-term support services. We list those informants in this report.

Finally, Westat is indebted to the many staff who helped organize and participated in the highly informative site visits, shared relevant materials, and who were also willing to respond to additional requests for information.

ABSTRACT

In 2012 the U.S. Department of Health and Human Services (HHS) funded this project designed to expand the knowledge base related to the state of health information exchange (HIE) to support care for persons receiving long-term and post-acute care (LTPAC). The main tasks of the project included a targeted literature review, environmental scan, and key informant interviews to examine what is known about HIE to support transitions in care and shared care for persons receiving LTPAC. In-depth, on-site case studies were also conducted with three LTPAC providers engaged in different types of HIE to help understand the experiences of the providers and other participants involved in the HIE activity/intervention, the types of information exchanged, and the impact of these HIE activities. These tasks were guided by a framework developed for this study. This work was conducted by Westat, and sponsored by the Office of the Assistant Secretary for Planning and Evaluation (ASPE) under Task Order No. HHSP2337004T, Contract Number HHSP23320100026WI, for which Jennie Harvell served as the Project Officer.

Authors: Colene Byrne, Ph.D., Westat
Michelle Dougherty, MA, RHIA, AHIMA Foundation

Other Contributors: Heather McKenzie, MBA, RN
Benedicta-Osfo-Darko, MA, both Westat

ACRONYMS

The following acronyms are mentioned in this report and/or appendices.

AAA	Area Agency on Aging
ACA	Patient Protection and Affordable Care Act <i>or</i> Affordable Care Act
ACE	Angiotensin-Converting Enzyme
ACO	Accountable Care Organization
ACT	Advanced Care Transitions
ACTION	Appalachian Community Transitions
ADC	Adult Day Care
ADE	Adverse Drug Event
ADL	Activity of Daily Living
ADRC	Aging and Disability Resource Center
ADT	Admission, Discharge, and Transfer
AHA	American Hospital Association
AHIMA	American Health Information Management Association
AHRQ	HHS Agency for Healthcare Research and Quality
AIDS	Acquired Immune Deficiency Syndrome
ALF	Assisted Living Facility
AoA	HHS Administration on Aging
AOD	Answers on Demand
APN	Advanced Practice Nurse
ARB	Angiotensin Receptor Blocker
ARC	Aging Resource Center
ASPE	HHS Office of the Assistant Secretary for Planning and Evaluation
BCC	Bridge Care Coordinator
BHIX	Brooklyn Health Information Exchange
BMI	Body Mass Index
BOOST	Better Outcomes for Older Adults through Safe Transitions Project
BPACK	Brand Pack
BSL	Brookdale Senior Living
CAD	Coronary Artery Disease
CAH	Critical Access Hospital
CAHPS	Consumer Assessment of Healthcare Providers and Systems
CAST	Center for Aging Services Technology
CBO	Community-Based Organization
CCD	Continuity of Care Document
CCDA	Consolidated Clinical Data Architecture
CCHIT	Certification Commission for Health Information Technology

CCITI	Continuum of Care Improvement Through Information
CCRC	Continuing Care Retirement Community
CCT	Community Care Team
CCTP	Community-Based Care Transitions Program
CDA	Clinical Document Architecture
CDT	Current Dental Terminology
CEHRT	Certified Electronic Health Record Technology
CFO	Chief Financial Officer
CFR	Code of Federal Regulations
CHF	Congestive Heart Failure
CHIC	Community Health Information Collaborative
CHIDS	Center for Health Information and Decision Systems
chIE	Clinical Health Information Exchange
CHIP	Children's Health Insurance Program
CIHIE	Central Illinois Health Information Exchange
CIO	Chief Information Officer
CMIO	Chief Medical Informatics Officer
CMIS	Client Management Information System
CMMI	CMS Center for Medicare and Medicaid Innovation
CMS	HHS Centers for Medicare and Medicaid Services
CMSA	Case Management Society of America
CNL	Clinical Nurse Leader
CoP	Community of Practice
COPD	Chronic Obstructive Pulmonary Disease
COR	Contract Office Representative
CORHIO	Colorado Regional Health Information Organization
CRISP	Maryland Chesapeake Regional Information System for Our Patients
CT	Computed Tomography
DAM	Domain Analysis Model
DETOG	Deep East Texas Council of Governments
DHIN	Delaware Health Information Network
DME	Durable Medical Equipment
DNR	Do Not Resuscitate
ECIN	Extended Care Information Network
ED	Emergency Department
EDPP	Enhanced Discharge Planning Program
EH	Eligible Hospital
EHR	Electronic Health Record
EMCC	Eastern Maine Community College
EMHC	Eastern Maine HomeCare
EMHS	Eastern Maine Health System
EMMC	Eastern Maine Medical Center
EMR	Electronic Medical Record
ENS	Encounter Notification Service

EP	Eligible Professional
esMD	Electronic Signature for Medical Document
FFS	Fee-For-Service
FIPS	Federally Information Processing Standards
FQHC	Federally Qualified Health Center
GPCK	Generic Pack
H&P	History and Physical
HCBS	Home and Community-Based Services
HCRR	Home Care Referral Registry
HCS	Health Commerce System
HEAL	Health Care Efficiency and Affordability Law
HF	Heart Failure
HHA	Home Health Agency
HHQI	Home Health Quality Improvement Initiative
HHS	U.S. Department of Health and Human Services
HIE	Health Information Exchange
HIEO	Health Information Exchange Organization
HIM	Health Information Management
HIMSS	Healthcare Information and Management Systems Society
HIN	HealthInfoNet
HIO	Health Information Organization
HIPAA	Health Insurance Portability and Accountability Act
HISP	Health Information Service Provider
HIT	Health Information Technology
HITECH	Health Information Technology for Economic and Clinical Health Act
HIV	Human Immunodeficiency Virus
HL7	Health Level 7
HMO	Health Maintenance Organization
HRS	Health Resource Solutions
HRSA	HHS Health Resources and Services Administration
HTN	Hypertension
IADL	Instrumental Activity of Daily Living
ICF	International Classification of Functioning
ICFMR	Intermediate Care Facility for Persons with Developmental Disabilities
ICPC	Integrating Care for Populations and Communities
ICU	Intensive Care Unit
IDN	Integrated Delivery Network
IDS	Integrated Delivery System
IHE	Integrating the Healthcare Environment
IHI	Institute for Healthcare Improvement
INTERACT	Interventions to Reduce Acute Care Transfers
IPA	Independent Physician Association

IRF	Inpatient Rehabilitation Facility
IRF-PAI	Inpatient Rehabilitation Facility-Patient Assessment Instrument
IS	Information Services
IT	Information Technology
ITCC	Illinois Transitional Care Consortium
IVD	Ischemic Vascular Disease
KHIN	Kansas Health Information Network
LAND	Massachusetts Local Adaptor for Network Distribution
LCC	Longitudinal Coordination of Care
LCSW	Licensed Clinical Social Worker
LIPIX	Long Island Patient Information Exchange
LTACH	Long-Term Acute Care Hospital
LTCH	Long-Term Care Hospital
LTPAC	Long-Term and Post-Acute Care
LTSS	Long-Term Services and Supports
LVEF	Left Ventricular Ejection Fraction
LVSD	Left Ventricular Systolic Dysfunction
MAP	Measure Application Partnership
MAPCP	Multi-Payer Advanced Primary Care Practice
MAR	Medication Administration Record
MATCH	Medications at Transitions and Clinical Handoffs Toolkit
MD	Medical Doctor
MDS	Minimum Data Set
MeHI	Massachusetts e-Health Institute
MFP	Money Follows the Person
MLR	Minimum Loss Rate
MMIS	Medicaid Management Information System
MPFS	Medicare Physician Fee Schedule
MPI	Master Patient Index
MRI	Magnetic Resonance Imaging
MSA	Metropolitan Statistical Area
MSR	Minimum Savings Rate
MSW	Master of Social Work
MU	Meaningful Use
NAMCS	National Ambulatory Medical Care
NCPDP	National Council for the Prescription Drug Programs
NH	Nursing Home
NIST	National Institute of Standards and Technology
NP	Nurse Practitioner
NQF	National Quality Forum
NSRCF	National Survey of Residential Care Facility
NwHIN	Nationwide Health Information Network

NYCHHIP	New York Community Home Health Interoperability Project
OASIS	Outcome and Information Assessment Set
ONC	HHS Office of the National Coordinator for Health Information Technology
OT	Occupational Therapy
P4P	Pay For Performance
PAI	Patient Assessment Instrument
PCC	Point Click Care
PCMH	Patient-Centered Medical Home
PCP	Primary Care Physician <i>or</i> Primary Care Provider
PHIN	Public Health Information Network
PHQ	Patient Health Questionnaire
PHR	Personal Health Record
POC	Plan of Care
PPS	Prospective Payment System
PQRS	Physician Quality Reporting System
PSO	Patient Safety Organization
PT	Physical Therapy
QA	Quality Assurance
QI	Quality Improvement
QIO	Quality Improvement Organization
RACF	Residential Aged Care Facility
RARE	Reducing Avoidable Readmissions Effectively Campaign
REC	Regional Extension Center
RED	Re-Engineered Discharge Project
RHA	Illinois Rush Health and Aging
RHIO	Regional Health Information Organization
RIM	Reference Information Model
RN	Registered Nurse
RUMC	Rush University Medical Center
S&I	Standards and Interoperability
SARCOA	Southern Alabama Regional Council on Aging
SASH	Support and Services at Home
SBAR	Situation, Background, Assessment, and Recommendation
SBD	Semantic Brand Drug
SBDF	Semantic Brand Drug Form
SBDG	Semantic Brand Drug Group
SCD	Semantic Clinical Drug
SCDF	Semantic Clinical Drug Form
SCDG	Semantic Clinical Drug Group

SDM	Shared Decision-Making
SED	Severe Emotional Disturbance
SEE	Massachusetts Surrogate EHR Environment
SHA	Secure Hash Algorithm
SMI	Serious Mental Illness
SMRTNET	Secure Medical Records Transfer Network
SNF	Skilled Nursing Facility
STAAR	State Action on Avoidable Re-hospitalization Initiative
SWG	Sub-Workgroup
TARCOG	Top of Alabama Regional Council of Governments
TB	Tuberculosis
TCM	Transitional Care Management
UD	Unstructured Document
UHIN	Utah Health Information Network
UIC	University of Illinois at Chicago
URAC	Utilization Review Accreditation Committee
USDA	U.S. Department of Agriculture
UTF	Universal Transfer Form
VHIE	Vermont Health Information Exchange
VHR	Virtual Health Record
VLER	Virtual Lifetime Electronic Record
VNSNY	Visiting Nurse Service of New York
VPN	Virtual Provider Network

EXECUTIVE SUMMARY

In 2012 the U.S. Department of Health and Human Services (HHS) funded this study to expand the knowledge base related to the state of health information exchange (HIE) to support care for persons receiving long-term and post-acute care (LTPAC) and long-term services and supports (LTSS). LTPAC providers play an important role in the United States health care system, providing care for elderly, frail, and disabled individuals, including persons who require ongoing treatment after an acute health episode. Over a third of all Medicare patients discharged from acute hospitals receive subsequent LTPAC services such as a skilled nursing facility (SNF) or home health services.¹ As the United States population ages, the demand for health care services by Americans age 65 and older is expected to dramatically increase.

The focus of this study was as follows:

- Synthesize evidence-based practices regarding HIE interventions and activities to support transitions in care and shared care by multiple members of the care team.
- Describe these HIE interventions and activities including electronic HIE.
- Characterize the HIE interventions, activities, LTPAC and LTSS providers, and external entities who are engaged in HIE to support care coordination and transitions of care, guided by a framework developed for this study.
- Identify factors that enable or create barriers to implementing these HIE interventions/activities.
- Describe the availability of process, outcome, and cost measures and metrics to assess the impact of identified HIE interventions.

Methodological Approach

The study was guided by several research questions described in the report. The study methods included a targeted literature review, environmental scan, and key informant interviews to examine what is known about HIE to support transitions in care and shared care for persons receiving LTPAC. In-depth, on-site case studies were also conducted with providers in three communities engaged in different types of HIE involving LTPAC/LTSS providers to help understand the experiences of the providers and other participants involved in the HIE activity/intervention, types of information exchanged, and impact of these HIE activities.

Study Framework

Two frameworks were adapted for this study to describe and characterize HIE interventions. The information exchange could be electronic or through other means (e.g., telephone, fax, paper). Key dimensions of the care coordination framework are care functions and mechanisms that support care transitions, shared care, and administrative functions; the staff; the organizational affiliations of organizations exchanging information (e.g., staff within or between organizations); and HIE between these organizations and their patients, family members or caregivers. A health information technology (HIT) organizational framework was adapted to this study to capture and describe the important dimensions of the HIE, including applicable HIT systems that may support HIE; data exchanged; and data interoperability and use of standards for technology-enabled HIE. The frameworks also captured other important characteristics such as environmental facets including policy drivers and financial incentives for HIE, users and uses of the information, workflow around HIE, and any outcomes associated with HIE.

Key Findings

Benefits of HIE for Care Coordination to Support Persons Receiving LTPAC/LTSS

LTPAC providers often admit and care for patients with incomplete information about their medical status. The literature review and environmental scan produced evidence that sharing and communicating information supports care coordination, particularly during transitions of care, and can reduce medication errors and other adverse events associated with preventable hospitalizations. Many interventions and tools to reduce preventable hospitalizations, including readmissions, incorporate best and promising practices that include the exchange of key information at the time of transitions and shared care.

Much of the evidence on the benefits of HIE on care coordination is anecdotal and based on qualitative information. However, a few HIE interventions that involved exchange with LTPAC providers reported positive, quantitative (although not peer-reviewed and published) impacts of HIE including reduced rates of hospital admissions/readmissions, avoided transfers to emergency departments, and improved physician followup after hospital discharge. Other benefits reported as a result of implementing the interventions included more comprehensive and useful information for care planning and timely services delivery post-discharge, ensuring that important care and services that can prevent rehospitalization are provided soon after discharge. Study informants also reported that having access to information through HIE allowed them to better assess whether patients are suitable for their LTPAC services, plan for patient care before admission, better assess functional and cognitive status and risks (e.g., fall risk), and avoid unnecessary and duplicative tests and procedures.

Barriers to HIE Participation by LTPAC/LTSS

Barriers to adoption and use of HIT by LTPAC have been widely reported. This report discusses some of the more pervasive barriers including costs and limited resources for LTPAC providers to adopt and use HIT, certified electronic health record technology (CEHRT), and interoperable HIE. There is a general lack of awareness of HIE standards and interoperable HIE solutions and their value by LTPAC providers. Current standards in LTPAC electronic health record (EHR) solutions are generally outdated and do not support efficient interoperable HIE and information reuse. Even with available standards, LTPAC providers must often develop costly customized interfaces to participate in HIE. Other barriers and challenges are the differences in clinical processes and information needs between LTPAC/LTSS and other health care providers, which impacts agreement on and availability of key HIE information; a lack of LTPAC provider organizational commitment and capacity to acquire, implement, and use HIT including HIE; and high LTPAC staff turnover rates. In addition, privacy and security policies and requirements, while important to ensure secure HIE, pose barriers to LTPAC use of HIE. Some states' HIE policies restrict disclosure of protected health information for primary uses such as treatment only, which prevents LTPAC providers from accessing needed information before a treatment relationship has been established (e.g., for preadmission planning).

Drivers Accelerating HIE by LTPAC/LTSS

This study identifies and describes several payment policies and programs that support HIE with and by LTPAC/LTSS providers. These initiatives are discussed in this report and summarized below and include: HIT/EHR grant programs, health care service and payment reform models, the EHR Incentive Programs, EHR certification programs, and HIT standards that support HIE.

HIT and HIE Adoption Support

Despite the demonstrated benefits of HIE, the use of EHR technology by LTPAC providers, including interoperable technology, appears to be lagging behind other sectors. LTPAC providers are not eligible for the Medicare and Medicaid EHR Incentive Programs and have lower rates of technology use in comparison to inpatient and ambulatory care settings. However, there has been some funding available to help LTPAC providers implement HIT such as EHRs and participate in electronic HIE. These include Office of the National Coordinator for Health Information Technology (ONC) grant funds to LTPAC providers and their affiliated health care delivery systems through the Challenge grants and Beacon Community grants, and the ONC State HIE Initiative, through which some states are providing assistance to to engage LTPAC providers in HIE. In addition, in three states the Medicare Quality Improvement Organizations are supporting LTPAC use of HIT to support medication management and care coordination in transitions of care, and advancing HIE. Most of the LTPAC providers identified as actively exchanging health information were recipients of these additional funds and

other supports such as training, software, Internet access, and interfaces to an HIE organization (HIEO).

Health Care Payment Reforms and Service Delivery Models

Funding and programmatic initiatives and incentives such as those funded and authorized under the Patient Protection and Affordable Care Act (Affordable Care Act) promote and highlight the importance of care coordination around transitions and shared care. These incentives and initiatives include new federal, state, and private health care payment and delivery models such as Accountable Care Organizations and Patient-Centered Medical Homes, and other initiatives such as the Balancing Incentive Programs targeting LTSS providers and various programs implemented through the Administration for Community Living. Some of these initiatives are designed to reduce LTPAC transfers to hospitals, including readmissions. Many of the LTPAC HIE interventions identified in this study were participating in these initiatives. For example, the HHS Centers for Medicare and Medicaid Services (CMS) Innovations Models include the Community-based Care Transitions Program, which tests models for improving care transitions from the hospital to other settings and reducing readmissions for high-risk Medicare beneficiaries. The CCTP requires participation by community-based organizations such as LTSS. Some of the State Innovations Models also focus on care coordination and target LTPAC, and permit funding for the acquisition and use of HIT by these providers.

HITECH EHR Incentive Programs

The Health Information Technology for Economic and Clinical Health (HITECH) Act, enacted as part of the American Recovery and Reinvestment Act of 2009, advances the adoption and “meaningful use” (MU) of CEHRT including the interoperable exchange of health information.^a This legislation was the foundation of the EHR Incentive Programs for eligible professionals, eligible hospitals, and critical access hospitals; the development of criteria for what constitutes the MU of EHRs; and the specification of EHR certification criteria and standards that must be integrated into CEHRT used by eligible providers in the EHR Incentive Programs.

To receive EHR incentive payments, hospitals and physicians must use CEHRT. As EHR adoption and interoperability requirements continue to advance in the acute care and ambulatory care sectors, it will be increasingly important for LTPAC providers to adopt technology solutions that have the capability of exchanging standardized clinical data with care partners such as hospitals, primary care practitioners, reference laboratories (labs), and pharmacies. Adopting CEHRT, particularly systems that meet ONC defined certification requirements for exchanging clinical care summaries at

^a The Medicare and Medicaid EHR Incentive Programs are staged in three steps with increasing requirements for participation. All providers begin participating by meeting the Stage 1 requirements for a 90-day period in their first year of MU and a full year in their second year of MU. After meeting the Stage 1 requirements, providers will then have to meet Stage 2 requirements for two full years.

transitions of care, is one important step towards supporting care coordination through more efficient HIE.

Beyond implementing certified EHRs, the EHR Incentive Programs encourage providers to use their EHRs in ways that positively impact the care of their patients. Thus, HIE is a key focus in MU Stage 2 and beyond, and the Stage 2 criteria place an emphasis on HIE between providers to improve care coordination for patients. One of the core objectives in Stage 2 of the EHR Incentive Programs requires eligible providers who transition or refer a patient to another setting or provider provide a summary of care record for more than half of these transitions of care and referrals. Additionally, MU Stage 2 includes other new requirements for the electronic exchange of summary of care documents. Stage 3 MU requirements are expected to include new requirements to support the interoperable exchange of additional content at times of transitions and referrals.

HIT and HIE Standards and Certification

This report describes several initiatives around the development of standards to support the exchange of information to support care coordination on behalf of persons receiving LTPAC/LTSS. It also describes activities to advance EHR certification for technology needed by LTPAC providers. These efforts support the HIT infrastructure for HIE by advancing standards for documents, content, data elements, and privacy and security requirements. One of the central findings from this study is that the adoption of electronic HIE by LTPAC providers is just beginning, and interoperable exchange appears to be non-existent.

Available standards for key HIE requirements that are applicable to LTPAC providers and patients are identified in this report (Appendix L). Standards will be required beginning in 2014 as part of Stage 2 of the EHR Incentive Programs. Standards are currently available to support the secure exchange of summaries of care, care plans, functional/cognitive status, medication reconciliation, laboratory test orders and results. However, these standards are not yet widely adopted.

Characterization of LTPAC/LTSS HIE Interventions to Support Care Coordination

Over 25 HIE interventions that engage LTPAC and/or LTSS in HIE to support care coordination were identified in 22 states. Almost all of these interventions include electronic HIE. Most of these initiatives are through state HIE initiatives, and LTPAC/LTSS participation is through a state or community HIEO. The care coordination and HIT frameworks were applied to characterize, describe, and better understand how HIE is used by LTPAC/LTSS providers for transitions, referrals in care, shared care, and other purposes.

HIE to Support Care Transitions

All of the identified interventions use some form of HIE to support care transitions. Key functions or use cases for HIE include preadmission assessments and referrals to LTPAC, discharges and transfers from hospitals to LTPAC, and transfers from LTPAC to acute care or home and community-based services or LTSS. The types of information required to support transitions are complex and varied, and electronic HIE is typically supplemented with other means of exchange such as fax, paper, and telephone. In addition, some hospitals provide LTPAC provider access to the hospital EHR system which allows HIE.

The most common type of electronic HIE to support care coordination was found to be point-to-point HIE during transitions from an LTPAC/LTSS provider (e.g., SNF) to a hospital or from a hospital to an LTPAC/LTSS provider, where information is electronically exchanged through secure messaging directly between providers. A less frequent type of electronic HIE is LTPAC staff querying and retrieving patient information from a HIEO repository that contains information from an exchange partner (e.g., hospital). HIE is often triggered by specific use cases and alerts, such as a change in patient or resident status that may result in a transfer to a hospital. This study also identified interventions and tools that included an HIE component to support transitions between LTPAC and hospitals. These interventions included electronic/non-electronic (e.g., telephone, fax, paper) methods of exchange.

An important gap in data at times of care transitions is the lack of current medication information to support medication reconciliation. For example, reconciling pre-hospitalization medications with post-hospital medications to determine the ongoing medication regime is difficult because complete medication history data are usually not available at transitions. Furthermore, HIEOs may be the primary source of a majority, but not all, prescription history data. Other identified gaps in information that, if addressed, could improve care transitions is the lack of information from LTSS and community-based providers such as the patient's home care environment, current and previous use of support services, and receipt of durable medical equipment, homemaker, and other services.

HIE to Support Shared Care

Although use of HIE to support shared care is less frequent than in the case of transitions in care, there is an increasing focus on shared care and coordination of care across multidisciplinary health care teams and across provider settings for ongoing care. Shared care creates significant HIE opportunities for a variety of health care providers to support the assessment of ongoing needs and goals; develop and update the patient's care plan; monitor and respond to changes in the patient's status; and medication reconciliation and management.

Opportunities to Expand Health Information Exchange to Support Long-Term and Post-Acute Care and Long-Term Services and Supports

A number of opportunities emerged from this study to advance the efficient use of HIE to support care coordination for persons receiving LTPAC. These opportunities are discussed in the report, and include the following areas:

- Exploring opportunities in the policy and service delivery environments to advance HIE, particularly in new health care delivery models.
- Supporting multiple methods of electronic information exchange by LTPAC/LTSS, particularly as HIT standards mature.
- Identifying the information that LTPAC/LTSS can provide to HIEOs to support care coordination such as assessment data (e.g., cognitive, functional), medication administration records, care plans, and flow sheets.
- Specifying EHR certification criteria for LTPAC providers that align with the EHR and HIE requirements for other providers (e.g., physicians/hospitals).
- Establishing policies that encourage greater use of CEHRT by LTPAC to support HIE with other providers.
- Leveraging of existing standards to support HIE; developing and testing HIT standards that can be easily used and deployed to support interoperability and HIE by LTPAC providers.
- Defining key HIE use case and modifying the workflow to support electronic HIE.
- Increasing resources for the acquisition and use of HIE technology for LTPAC/LTSS providers.
- Improving communication across all providers, HIEOs, and state and federal programs, of the value proposition of including LTPAC/LTSS providers in HIE activities including supporting administrative processes.
- Addressing privacy and consent issues that hinder LTPAC/LTSS engagement in HIE activities.
- Exploring the feasibility, benefits and limits of making available electronic pharmacy data (including from long-term care pharmacies) to support medication reconciliation.

1. INTRODUCTION

Long-Term and Post-Acute Care (LTPAC) providers play an important role in the United States health care system providing care for elderly, frail, and disabled individuals, including persons who require ongoing treatment after an acute health episode. Over a third of all Medicare patients discharged from acute hospitals receive subsequent LTPAC services such as skilled nursing or home health services.¹ Health information exchange (HIE) involving LTPAC providers is expected to play a significant role in improving and achieving health policy goals, such as those in the Patient Protection and Affordable Care Act (Affordable Care Act), related to care coordination and reducing avoidable hospital readmissions.² Currently, there is limited information on the use of HIE interventions/activities to support care coordination by LTPAC providers.

To fill this information gap, the Office of the Assistant Secretary for Planning and Evaluation (ASPE) contracted with Westat to conduct a literature review, environmental scan, interviews with key informants, and in-depth, on-site case studies with three providers engaged in HIE to support care coordination for persons receiving LTPAC/Long-Term Services and Supports (LTSS). This report summarizes the findings with a focus on:

- Synthesizing evidence-based practices regarding HIE interventions and activities to support transitions in care and shared care by multiple members of the care team.
- Describing these HIE interventions and activities including electronic HIE.
- Characterizing the HIE interventions, activities, LTPAC/LTSS providers and external entities that are engaged in HIE to support care coordination and transitions of care, guided by a framework developed for this study.
- Identifying factors that enable HIE or create barriers to implementing these HIE interventions/activities.
- Describing the availability of process, outcome, and cost measures and metrics to assess the impact of the HIE interventions identified.

This report provides information to help advance the use of HIE for policymakers charged with improving quality and efficiencies across the health care continuum and LTPAC providers who seek to improve the quality and continuity of care, and participate in the changing delivery system.

1.1. Long-Term Services and Supports, and Long-Term and Post-Acute Care

In the United States health care system, there are a wide array of institutional and home and community-based providers that deliver specialized care to elderly, frail, or disabled persons and to individuals who require ongoing treatment or care, often following an acute health episode. There is no single agreed upon definition that encompasses this wide array of services. Recently, the concept of “Long-Term Services and Supports” has emerged as a way to describe certain institutional and community-based services such as nursing homes/skilled nursing facilities (SNFs), care management, adult day care, home-delivered meals, transportation providers, and other services.^{3,4} LTPAC is another concept that has been used to describe services such as nursing homes/SNFs, long-term care hospitals (LTCHs), inpatient rehabilitation facilities, and home health agency (HHA) providers.¹ For the purposes of this report, both concepts are used.

LTPAC and LTSS providers deliver services to people with functional and/or cognitive limitations and/or chronic illnesses who may need assistance to perform routine daily activities such as bathing, dressing, preparing meals, and administering medications; and may require medical and skilled nursing care.³

Given the diverse range of institutional and community-based LTPAC/LTSS, for the purposes of this report persons who receive LTPAC/LTSS will be described as “patients,” “residents,” or “clients,” depending on the setting, and these terms may be used interchangeably. A glossary with definitions of these and other key terms used in this report is included in Appendix M.

1.2. Health Information Exchange

Electronic HIE is defined as the electronic movement of health-related information among organizations using national standards.⁵ The use of standards to support electronic HIE is often referred to “interoperable” HIE. HIE moves clinical information among disparate health care information systems while maintaining the integrity of the information during the exchange. Formal organizations providing HIE services are known as HIE organizations (HIEOs), Health information organizations (HIOs), or health information service providers (HISPs). HIE initiatives and activities in the United States may include participation of state, regional, and community (including private or enterprise) HIEOs or HIOs, statewide state-designated entities, health care delivery organizations, non-governmental organizations or policy/advocacy groups, academic institutions, technology vendors, public health departments, and state governments.⁶ HIE also occurs without the services provided by formal HIEOs, HIOs, or HISPs, such as HIE between the same electronic health record (EHR) users across non-affiliated providers, HIE between a hospital and affiliated independent physician practices, and through point-to-point exchange between non-affiliated partners (e.g., hospital to community-based SNF). The expanding reach of HIE initiatives has begun to attract and

integrate new stakeholder entities such as behavioral health, home and community-based services (HCBS), aging services, other LTSS, and LTPAC providers.

For the purposes of this study and report, ASPE and the investigators considered various forms of exchange of health information, including electronically-enabled interoperable HIE, as well as more traditional forms such as paper-based approaches, fax, and telephone. Thus, the literature review and environmental scan, which examined the evidence around the exchange of information at times of transition and shared care, was not limited to electronically-enabled interoperable exchange.

1.3. Care Coordination During Care Transitions and Shared Care

Care coordination is the deliberate organization of patient care activities to facilitate the appropriate delivery of health care services. It involves activities to promote, improve, and assess integration and consistency of care across primary care physicians, specialists, acute and LTSS/LTPAC services, patients and care providers, including methods to manage care throughout an episode and during transitions.⁷ Examples of care coordination activities include supporting individuals during transitions (e.g., the movement of a patient from one setting of care to another), and arranging for the timely delivery of needed services. Transitions coordination may involve discharge planning, setting up post-discharge followup appointments with primary care and specialty providers, coordinating medication and other therapy services post-discharge, in addition to arranging for other supports such as medical equipment that may be needed in the home. Care coordination is also important for assessing patient needs and goals, creating a plan of care (POC), monitoring, following up, responding to changes in the patient, and linking patients to community resources. These coordination activities require sharing of patient health and other information to ensure continuity of care and services needed for the recovery, rehabilitation, and health maintenance of the patient.

The Agency for Healthcare Research and Quality (AHRQ), in its Care Coordination Measures Atlas, proposed a definition and framework for integrated care. Integrated care is viewed as multidimensional construct rather than one-dimensional organizational activities, and is defined as “patient care that is coordinated across professionals, facilities, and support systems; continuous over time and between visits; tailored to the patient’s needs and preferences, and based on shared responsibility between the patient and caregivers for optimizing health.”⁸ Relevant constructs from the AHRQ framework that informed this study are the need to coordinate care across teams, between teams, and with community resources; shared responsibility with patients and caregivers; and continuous familiarity with the patient over time.⁹

Shared care and decision-making¹⁰ can be facilitated by care coordination, communication, and HIE among all care organizations providing care and support to the patient. Shared care, also referred to as “shared management of care” refers to patient and health care providers (e.g., physicians and LTPAC/LTSS providers) working

together as a team, which may also include family members, friends, or lay caregivers designated by the patient, guided by the preferences and expectations of the patient. Shared decision-making is a collaborative process that allows patients and their providers to make health care decisions together, taking into account the best scientific evidence available, as well as the patient's values and preferences.¹¹

Poorly coordinated care transitions, especially those from hospitals, and other care hand-offs, are associated with hospital readmissions, emergency department (ED) visits, medication errors, adverse drug events (ADEs), and other negative outcomes, which greatly affect the cost of care.¹²⁻¹⁸ The high rates of hospital readmissions of Medicare beneficiaries within 30 days of discharge in general (20%)¹⁹ and for those beneficiaries discharged to SNFs (almost 25%) have been widely reported.^{13,19-21} Approximately half of all hospital-related medication errors, and 20% of all ADEs, have been attributed to poor communication during transitions of care, and these can result in hospital readmissions.²² Communication breakdowns are the root cause of approximately 80% of sentinel events^b reported to the Joint Commission.²³ When care transitions are enhanced through care coordination activities such as expedited patient information flow, these activities can reduce duplication of care services and costs of care, resolve conflicting care plans,^{13,18} and prevent medical errors.²⁴ Many care transition models, programs, initiatives (see Appendix A), and best practices emphasize the importance of timely communication and information exchange between transferring and receiving providers.^{14,25-26}

^b A sentinel event is an unexpected occurrence involving death or serious physical or psychological injury, or the risk thereof.

2. METHODOLOGICAL APPROACH

2.1. Research Questions

The following research questions guided the work during the literature review, environmental scan, and interviews with key informants:

1. What HIE interventions and activities are being implemented/advanced to support transitions in care and shared care involving persons who receive LTPAC/LTSS services?
2. What is the evidence base for these HIE interventions?
3. How does the use of health information technology (HIT) support these HIE interventions?
4. What factors are enablers or create barriers for needed HIE on behalf of persons who receive LTPAC/LTSS services?
5. What is a framework that can be used to synthesize and describe the HIE care models, interventions/activities, and barriers/enablers to support transitions in care and instances of shared care on behalf of person who receive LTPAC/LTSS services?
6. Who are the LTPAC/LTSS providers engaged in HIE for transitions in care and shared care? What interventions are they implementing, and what are the key characteristics of these providers and the communities within which they are located?
7. What information do LTPAC/LTSS providers have that other providers want for care planning, coordination, and transitioning? Functional status? Cognitive status? Medications? More medically-oriented information such as medications, diagnoses, allergies? Other information? (This question is agnostic as to whether HIT is used for HIE.)
8. What is the state of electronic exchange for LTPAC/LTSS providers as it relates to assessments, care plans, and other documents to support transitions in care?
9. How do the following impact the feasibility of adoption and type of HIE by LTPAC/LTSS providers?
 - Workforce preparation and support;
 - Payer mix;

- Payer and other financial incentives;
 - Availability of HIT such as EHRs, interoperable standards-based information exchange, and/or summary of care records;
 - Type of information available to be exchanged; and
 - Exchange between non-affiliated exchange partners.
10. What, if any, federal and state requirements create competing policies and/or priorities that may inhibit HIE?
 11. What public (e.g., Centers for Medicare and Medicaid Services [CMS]) payer incentives exist for HIE, and what, if any, other payer incentives support HIE in LTPAC/LTSS settings for projects identified in the conduct of this work?
 12. What is the payer mix related to each case study site and its impact on their HIE?
 13. How are LTPAC/LTSS being paid for and how does payment impact HIE including facilitators and barriers?
 14. What programs are developing and/or expanding that include an HIE component involving LTPAC/LTSS providers including Affordable Care Act and U.S. Department of Health and Human Services (HHS) initiatives (e.g., through CMS and the Office of the National Coordinator for Health Information Technology [ONC])?

2.2. Framework to Characterize Health Information Exchange for Persons Receiving Long-Term and Post-Acute Care/Long-Term Services and Supports

This study developed a framework to describe key care coordination constructs and functions, and selected HIE activities. Two frameworks were used and adapted to describe and characterize HIE models, interventions, and activities, as well as facilitators and barriers. These frameworks were used to guide and structure the literature review, environmental scan, site visits, and the resulting study findings. One framework was largely based on the HIT organizational framework developed by Westat researchers²⁷ that identifies five major, interrelated facets (aspect of a particular feature, similar to a dimension) that provide a structure to organize and capture information on the implementation and use of HIT such as HIE. The framework in Rippen et al. (2013) was supplemented with the framework used by AHRQ for care coordination functions or mechanisms as discussed earlier⁸ (e.g., support care transitions and care planning), and was used to help characterize the care coordination processes and purpose of information exchange (e.g., to reduce rehospitalizations, coordinate post-discharge support services, improve medication safety). This study framework also uses the concept of care coordination constructs (coordinate between and across teams, providers, and family and caregivers).⁹ The care coordination functions and constructs

were modified for this study to capture and characterize how HIE supports care transitions and shared care for persons receiving LTPAC care services.

The care coordination functions/mechanisms used for this study are: (1) to support care transitions or hand-offs (e.g., medication reconciliation, referrals); (2) to support shared care (e.g., assessment, monitor, develop POC); and (3) to support other functions such as public health reporting, quality reporting, and legibility determination. The care integration mechanisms used to describe HIE for this study are: (1) across members of the care team within affiliated organization; (2) between staff in an organization and other non-affiliated care providers including community services; and (3) between staff in an organization and patient/family members. Table 2-1 presents these care coordination constructs and functions, and examples of key HIE activities.

TABLE 2-1. Care Coordination Constructs and Functions Based on Study Framework, With Selected Examples Describing HIE			
	Care Coordination Constructs -- HIE Across/Between		
	Across members of the care team within affiliated organization	Between staff in an organization and other non-affiliated care providers including community services	Between staff in an organization and patient/family members
Care Coordination Functions Supported by HIE:			
Support Transitions in Care			
Referral/Assessment		Preadmission assessment process: gathers information to evaluate the patient for appropriateness of admission and to obtain clinical, demographic and financial information for communication with care team	
Transfer/Discharge	LTPAC/LTSS to Acute Care		
		SNF charge nurse sends admission/discharge/transfer (ADT) form via secure e-mail to hospital ED intake manager	
	Acute Care to LTPAC/LTSS		
	Hospital case manager notifies affiliated primary care physician via e-referral software of patient transfer to LTPAC/LTSS	Hospital sends home health nurse wound care notes, ostomy notes, social worker notes, physical therapy (PT), occupational therapy (OT), via e-referral software used by both settings. This information is automatically integrated into the HHA EHR, and populates some fields, including demographics. Notes have to be printed and scanned into HER. LTPAC/LTSS (e.g., skilled nursing) intake manager queries and access HIE virtual data repository of hospital data prior to admission	

TABLE 2-1 (continued)			
Care Coordination Constructs HIE Across/Between			
	Across members of the care team within affiliated organization	Between staff in an organization and other non-affiliated care providers including community services	Between staff in an organization and patient/family members
LTPAC/LTSS to Subsequent Placement			
Followup Post Transfer/Discharge	Hospital case manager follows up by secure e-mail with affiliated primary care physician to ensure patient has scheduled followup appointment		Patient/family/ caregiver portal access to HIE data in virtual data repository
Support Shared Care			
Assess Needs and Goals		Aging Services receives information about patient living alone at home from hospital case manager in electronic formats, fax, and hard-copy	
Create and Maintain Plan of Care		HHA receives notification of patient admission to hospital from HIE, initiate services planning for return to home	
Monitor, Followup, and Respond to Change		Primary care physician receives notification of patient admission to hospital from HIE, monitors and plans for discharge	
Support Other Administrative Functions			
Quality and Public Health Reporting		LTPAC provider sends e-mail via Direct to local public health agency of reportable infectious disease	
Payment authorization and eligibility determination		LTPAC providers submit required documentation for Medicaid authorization via HIE to state Medicaid agency	

HIE approaches, interventions, and tools can be implemented through many processes and mechanisms, which are related to and vary with respect to the other facets including the participants, organizations, setting, technology, and contextual factors. Five facets based on the HIT framework were used to describe and characterize the HIE interventions and frame the study findings:

- **HIE Technology** captures elements relevant to HIT applications that enable electronic HIE. Key information captured includes the technology functionality, purpose of design, performance, and how technology facilitates the exchange of information.
- **HIE Data** captures the characteristics of the data being exchanged.^c

^c According to the Rippen framework, data and interoperability are a sub-category under the Technology facet. For purposes of this study the data sub-category was treated as another facet and describes the characteristics of all data exchanged, electronic and other forms.

- **HIE Use and Workflow** characterizes the use and users of the electronic or HIT-enabled HIE information, within and across exchange partners. For this study, this facet was expanded to also include manual, non-electronic, traditional means of exchanging information. It focuses on the workflow involved in exchanging information, the workflow insertion points for the HIE, and who has access to the information within and across the organization.
- **HIE Environment** addresses the environmental and contextual factors including the settings exchanging information, their affiliations, and facilitators and barriers such as organizational support for care coordination, resources, and local factors.
- **HIE Outcomes** describes outcomes from HIE to support care coordination, including care coordination measures, health care utilization such as hospitalizations, and patient safety and care quality measures such as medication-related errors, and adverse events.

These facets were originally conceptualized to characterize and understand HIT implementations, but, with the exception of the technology facet, for purposes of this study were applied to all forms of HIE, electronic and other forms. Appendix B provides the HIT frameworks, care coordination constructs and the HIT facets, with examples that are relevant to LTPAC/LTSS.

2.3. Literature Review

A targeted literature review was conducted using peer-reviewed scientific and academic articles and the gray literature. Sources included trade journals, reports from the public and private sectors, and other identified material relevant to HIT and HIE in LTPAC/LTSS settings, and interventions to reduce hospital readmissions and medication errors in this population. Care coordination and care transitions literature were also reviewed to identify effective models of care and the role of information sharing and exchange. Sources for published articles were PubMed, Google Scholar, and the International Medical Informatics Association Inventory of HIT Evaluation Studies and Systematic Reviews (<http://evaldb.umit.at>). The inclusion criteria included studies based in the United States from 2007 and later. References from the most relevant articles were also reviewed to identify any important published articles that were not identified from the targeted search.^d

^d Search terms included “Health Information Exchange” and other terms including, but not limited to: “Care Coordination,” “Care Transitions,” “Long-Term Care,” “Long-Term and Post-Acute Care,” “Nursing Home,” “Post-Acute Care,” “Home Health,” “Long-Term Support Services,” “Hospice,” “Care Transitions,” “Hospital Readmissions,” “Medication Management,” “Medication Reconciliation,” “Outcomes,” and “Measures.”

2.4. Environmental Scan

The environmental scan sources used for this study were widespread (see Appendix C for a complete description of sources used). In brief, the environmental scan included web sites of HIEOs and participating health care systems with participating LTPAC/LTSS providers (e.g., ONC sponsored Challenge and Beacon community grantees); materials provided by key informants and expert project advisors; information including reports on initiatives to promote the adoption of HIT to facilitate electronic HIE;²⁸ state, federal, and other web sites of initiatives and programs that support care coordination and transitions such as the Standards and Interoperability (S&I) framework; and information on CMS programs, rules, and funding initiatives that support new models of care and that include LTPAC/LTSS care. All literature review and environmental scan sources are cited and listed in the bibliography, and were used to summarize key findings.

2.5. Key Informant Interviews

Westat conducted seven key informant interviews with persons who provided perspectives on the state of HIE in LTPAC/LTSS settings. The key informants interviewed are shown in Table 2-2. Information from the interviews, primarily descriptions of HIE interventions and activities, was summarized and incorporated throughout this report.

Key Informant and Title	Organization	HIE Organization (HIEO)	Initiatives/ Programs
Dr. Larry Garber, Medical Director for Informatics	Reliant Health & Challenge Grant PI	Massachusetts SAFE Health	Challenge Grant
Lisa Harvey, Director of Care Continuum	Eastern Maine Health System, Eastern Maine HomeCare	Maine HealthInfoNet	Beacon Community, ACO
Barbara Gorenflo, Assistant Administrator	Beechwood Continuing Care	Western New York, HealtheNet	Beacon Community
Matt Cairns, Vice President*	Yeaman & Associates, & Challenge Grant Lead	Oklahoma SMRTNET	Challenge Grant
Rodolfo Alvarez del Castillo. MD*	Director LTC, Physician Advisor, Yeaman & Associates	Oklahoma SMRTNET	Challenge Grant
Larry Wolf, HIT Strategist	Kindred Healthcare	A few HIEOs in selected Kindred care markets (e.g., Indiana HIE)	N/A
Scott Ranson, Chief Information Officer	Brookdale Senior Living	No HIEO	CMS Innovations Grant, INTERACT program**
Seth Vilensky, Administrative Director	The Cleveland Clinic	Currently exchange through EPIC HIE with other EPIC users, plan to join Clinisys, Ohio's statewide HIEO	N/A
<p>* Two representatives from Secure Medical Records Transfer Network (SMRTNET) were interviewed to better assess the HIE technology, data and standards (M. Cairns), as well as the provider perspective, enablers, barriers, and workflow to support care transitions (Dr. Alvarez del Castillo).</p> <p>** More information on Interventions to Reduce Acute Care Transfers (INTERACT) program provided in Section 3.1 and Appendix A.</p>			

2.6. Site Visits

Site visits were conducted with three strategically identified providers engaged in cutting edge information exchange to support care coordination for persons receiving LTPAC/LTSS:

1. Chicago's Rush University Medical Center's Bridge Model Care Transition Program, improves care transitions through a patient-centered approach that engages a multidisciplinary health care team to help older adults safely transition back to the community through intensive care coordination that includes HCBS providers and others in the health delivery system.
2. Beechwood Homes, a 272-bed skilled SNF in Western New York, provides a continuum of LTPAC services. Beechwood Homes is one of the first LTPAC providers to participate in HIE through a regional HIEO.
3. Eastern Maine HomeCare (EMHC), part of Eastern Maine Health System (EMHS), an integrated delivery system (IDS), is using HIE to support continuity and cost-effective care across the delivery system, implementing care management practices to support complex/fragile patients, and using telehealth to support service delivery in remote areas.

Interview guides and observation protocols guided the site visits. In-person visits were conducted with the sites and their exchange partners and stakeholders, including clinicians, case and care managers, administration, discharge planners, quality assurance (QA)/Performance Improvement staff, IT staff, and HIEO staff. The site visits provided rich case studies of the state of HIE to support LTPAC/LTSS and opportunities to advance HIE, including interoperable HIE.

3. FINDINGS

The findings from the literature review, environmental scan, and key informant discussions are organized around six areas that address the research questions. The discussion is guided by the study framework, and highlights the themes, trends, barriers, facilitators, lessons learned, leading practices, gaps, and policy implications relevant to the use of HIE to support care coordination for persons receiving LTPAC/LTSS services. The six areas are discussed in the following sections:

- 3.1 Evidence Base for HIE to Support Care Coordination During Transitions and Instances of Shared Care.
- 3.2 Incentives to Support Care Coordination and Transitions in Care on Behalf of Persons Receiving LTPAC/LTSS.
- 3.3 Initiatives to Support the Adoption of Health Information Technology and Electronic HIE.
- 3.4 State of HIE to Support Care Coordination.
- 3.5 Process, Outcome, and Cost Measures and Metrics to Assess HIE Interventions on Care Coordination.
- 3.6 Interventions and Activities to Support Care Coordination for Persons Receiving LTPAC/LTSS.

3.1. Evidence Base for Health Information Exchange to Support Care Coordination During Transitions and Instances of Shared Care

This section examines the evidence base around care coordination to support transitions in care and instances of shared care including the impact of failures of care coordination, and the potential role of HIE interventions and programs to support care coordination and care transitions.

Failures of Care Coordination During Transitions and Shared Care

Failures of care coordination and failure to transfer key information often occur during care transition and handovers.^{16-17,29-31} Examples include failure to transfer the results of medical tests and important information from the medical record, little or no information from referring primary care providers, and inadequate or missing discharge summaries.³² Failure to make available complete, accurate, and timely information

(such as medication-related information) at times of transitions contributes to adverse events, threatens safety and quality of care, and increases costs.^{14,17-18,25-26,33-38} Some of these errors could likely be avoided with timely and accurate information exchange.

Failures of care coordination also often result in avoidable hospitalizations and readmissions and undermine patient care.^{35,39-40} Hospitals' readmission rates are high and costly, and many of these readmissions are preventable.^{19,21,41-43} There is a national public policy focus on reducing avoidable hospitalizations and readmissions, and this goal is used for both quality measurement and performance-based incentives for Medicare and other insurance programs.⁴¹ Hospital readmission rates vary across types of LTPAC/LTSS providers, with SNFs and home health care agencies typically having the highest rates of inpatient readmissions.¹³

Adverse events such as medication errors occur frequently during care transfers and during instances of shared care. Many medication errors can be prevented or ameliorated with simple strategies that include exchanging relevant patient information. The lack of communication between doctors, hospitals, and community pharmacies has been found to be the major cause of medication errors.³⁵ To address this increased risk of medication errors during care transfers, the Joint Commission and the Institute for Healthcare Improvement have provided national leadership to support medication reconciliation at each point of transfer. Medication reconciliation refers to the process of reviewing the patient's complete medication schedule at the time of admission, transfer, and discharge and comparing it with the schedule being considered for the new setting of care.^{30,44} It also refers to the process of identifying the most accurate list of all medications that the patient is taking, including name, dosage, frequency, and route, by comparing the medical record to an external list of medications obtained from a patient, hospital, or other provider. Medication errors may occur when care is shared by multiple physicians and other providers because these clinicians may be unaware of the patient's complete medication list or health status.⁴⁵

Evidence Base for HIE to Support Care Coordination

Care coordination is enhanced through expedited patient information flow, which reduces duplication of care services such as tests or procedures and the likelihood of conflicting care plans¹²⁻¹⁸ and medical errors,²⁴ and can result in cost savings.^{39,46-47} The exchange of clinical information is especially important during care transition, when patients are transferred from one health setting to another. In addition, HIE improves population health through electronic surveillance, more accurate and timely clinical research, and more effective consumer and patient engagement.⁴⁸ While no single intervention implemented alone, or bundle of interventions, appears to be associated with reduced risks of rehospitalizations,⁴⁹ many successful interventions involve a strong information exchange component.^{41,50}

For example, Ouslander et al. evaluated the INTERACT tool--a quality improvement (QI) intervention that includes a set of tools and strategies designed to assist SNF staff in early identification, assessment, communication, and documentation

about changes in resident status (See Appendix A for more information on this program). INTERACT has a number of information exchange components such as transfer documents with a checklist of recommended items. Nursing facilities using INTERACT had lower self-reported hospitalization rates after implementing the tool; however, the investigators were not able to determine which components were most strongly associated with changes in hospitalization rates.⁵¹

Many other care transition models, programs, initiatives, and best practices (e.g., ONC Challenge Grants, Partnership for Patients, Medicaid Transformation Grants) have an information exchange component, exchanging key patient information, including information to support care transitions and medication reconciliation and management.^{7,36,52-56} Some of these programs and initiatives are briefly described below (see Appendix A for more details). Further, some of these models, programs, and initiatives encourage the use of HIT to support HIE across care settings.^{52,57-58}

CMS produced a "Roadmap to Better Care Transitions and Fewer Readmissions"³⁶ focusing primarily on discharges from acute care hospitals. The Roadmap identifies elements of good transitions, including some that involve HIE-standardized, accurate, and timely communication and information exchange between the transferring and receiving provider. The Roadmap also identifies the type of information that should be exchanged at times of transitions in care. The conclusions in Section 5 compares these elements to the actual types of HIE information that were found to be exchanged. Other elements of good transitions include collaboration across health and LTPAC providers and other services and supports; patient and/or caregiver training; patient-centered care plans; procurement and timely delivery of durable medical equipment (DME); and ensuring the sending provider maintains responsibility for patient care until the receiving clinician or organization confirms the transfer and assumes responsibility.

Promising components and interventions to reduce hospital readmissions are identified in white papers on care coordination.^{41,59} A list of these components and interventions is provided in Appendix D. There are many models for organizing care coordination and the care coordination model used is less significant to success than a close working relationship between providers, care coordinators, and patients, facilitated by communication and sharing of information.⁵⁹

The promising components are consistent with evidence-based approaches promoted by Medicare's QI organizations, the Institute for Healthcare Improvement, and AHRQ as being areas that can reduce avoidable readmissions. The components include:⁶⁰

- Intensive post-discharge followup -- Placing frequent telephone calls, as well as sending encouragement and reminders to keep appointments.

- Enhancing care coordination at the interfaces between care settings by ameliorating process breakdowns of information -- Seamlessly transferring patient information from inpatient care team to post-discharge care team.
- Addressing medication discrepancies -- Helping patients understand how to use medications and warning signs that would warrant an emergency call to the physician.
- Providing coaching and patient education -- Providing patients comprehensive information instructions on self-care and medication management and equipping patients with digital tools to document care and communicate with the care team.
- Identifying issues, receiving actionable data from the home, and intervening early in the home to decrease acute care visits and exposure to preventable readmissions.

3.2. Initiatives to Support Care Coordination and Transitions in Care on Behalf of Persons Receiving Long-Term and Post-Acute Care/Long-Term Services and Supports

This section describes some of the funding and programmatic initiatives and incentives that promote care coordination around transitions and shared care including programs that include or expand HIE involving LTPAC/LTSS providers. These include new health care payment and delivery models, and initiatives to reduce LTPAC/LTSS transfers and readmissions to hospitals.

The Federal Government has established a number of incentives and programs designed to reduce the escalating costs of health care in the United States and close well-documented gaps in care and care coordination that occur in the fee-for-service (FFS) reimbursement environments. Many of these programs support implementation of service delivery models intended to improve care and reduce costs. Several of these programs are described below and in more detail in Appendix A.

Accountable Care Organizations

One model of care is the Accountable Care Organization (ACO). ACOs are groups of providers ranging from IDSs and primary care medical groups to hospital-based systems and virtual networks of physicians, who are jointly accountable for achieving measured QIs and reducing the rate of health care spending growth.⁶¹

On November 2, 2011, CMS finalized new rules under the Affordable Care Act to help physicians, hospitals, and other health care providers (in some cases including LTPAC/LTSS providers) improve and coordinate care for Medicare patients through the Medicare Shared Savings Program to facilitate coordination and cooperation among

providers to improve the quality of care for Medicare FFS beneficiaries and reduce unnecessary costs.

HIE is considered essential for ACO success. In 2012, a majority of HIE initiative stakeholders responding to the annual eHealth Initiative survey indicated that they are either participating in an ACO and/or patient-centered medical home (PCMH) efforts or intend to do so in the near future.⁶

One of the ACO initiatives relevant to LTPAC/LTSS is the Pioneer ACO Model, a population-based payment initiative for health care organizations and providers experienced in coordinating patient-centered care across care settings.⁶² At least ten of these Pioneer ACOs include LTPAC/LTSS providers (Table 3-1).

TABLE 3-1. ACOs Identified with LTPAC/LTSS Providers		
ACO Organization	Service Area	Participating LTPAC/LTSS Provider Type
Beacon, LLC (formerly Eastern Maine Healthcare System, ME) -- IDS	Central, Eastern, & Northern Maine	SNF, HHA, HCBS
Fairview Health Services (MN) -- IDS	Minneapolis, Minnesota Metropolitan Area	HHA, Senior services
Franciscan Alliance (IN) -- IDS	Indianapolis & Central Indiana	HHA
HealthCare Partners of Nevada (NV) -- IPA	Clark & Nye Counties, Nevada	SNF
Montefiore ACO (NYC) -- Partnership in an IDS & IPA	New York City (the Bronx) & lower Westchester County, New York	HHA
OSF Healthcare System -- IDS	Central Illinois	HHA
Partners HealthCare (MA) -- IDS	Eastern Massachusetts	HHA, other LTPAC
Plus! (formerly North Texas ACO, TX) -- IPA (recently announced no longer participating in Pioneer program)	Tarrant, Johnson & Parker counties in North Texas	HHA, also participates in an regional HIEO
Steward Health Care System (MA) -- IDS	Eastern Massachusetts	Hospice, HHA
Trinity Pioneer ACO, LC (formerly TriHealth, Inc) IA -- IDS	Northwest Central Iowa	HHA, Mental Health
SOURCE: Descriptions of Pioneer ACO projects from CMS Innovations web site: http://innovation.cms.gov/Files/x/Pioneer-ACO-Model-Selectee-Descriptions-document.pdf .		
NOTE: Independent physician association (IPA).		

Patient-Centered Medical Homes

A PCMH is a team-based model of care led by a physician who provides continuous, coordinated care throughout a patient's lifetime to maximize health

outcomes.⁶³ This care model promotes improved access and communication; care coordination and integration; and care quality and safety.

Models for Dual Eligibles

Based on new authority in the Affordable Care Act, CMS is testing capitated and managed FFS financial alignment models to improve care and control costs for the dual eligible population (i.e., persons who are dually eligible for Medicare and Medicaid).⁶⁴ These demonstrations change the payment approach and financing arrangements among CMS, the state, and providers. The capitated demonstrations will use managed care plans to coordinate services for beneficiaries through a person-centered planning process. Some states require its plans to contract with community-based organizations (CBOs) to provide LTSS coordinators, and may require its plans to contract with Area Agencies on Aging (AAAs) to coordinate with HCBS. These models of care can benefit from effective exchange of information across providers engaged in care coordination.

Community-Based Care Transitions Program

Another initiative is the Community-Based Care Transitions Program (CCTP), designed to improve transitions of high-risk Medicare beneficiaries from inpatient hospitals to home or other care settings, improve quality of care, reduce readmissions, and document measurable savings to the Medicare program. Participating CBOs are paid an all-inclusive rate per eligible discharge based on the cost of care transition services provided at the patient level and implementing systemic changes at the hospital level. According to information from the CMS Innovations web site, at least half of the CCTP recipients were determined to have LTPAC or LTSS participation in their program. Examples of these CBOs identified with participating LTPAC/LTSS providers are provided in Appendix F, based on detailed summaries available for organizations funded in the first two of four funding rounds.

State Innovation Model

The CMS State Innovation Model awards incorporate incentives and funding for HIE and EHR adoption among LTPAC providers, federally qualified health centers (FQHCs) and other safety net providers to enable multi-payer service delivery and payment models.

Medicare-Medicaid Initiatives to Reduce Avoidable Hospitalizations

Other CMS Innovations use bundled care payment models to reduce hospitalizations, one model is targets acute care and post-acute care episodes, and another model targets post-acute care only. These models are designed to lead to higher quality, more coordinated care at a lower cost to Medicare, and may benefit from HIE to support care coordination.

CMS Innovations -- Hospital Readmissions Reduction Program

A CMS Innovations initiative called the Hospital Readmissions Reduction Program focuses on long-stay nursing facility residents who are enrolled in the Medicare and Medicaid programs. The goal of the program is to reduce avoidable inpatient hospitalizations.⁶⁵⁻⁶⁶ Payments will be reduced for hospitals with high 30-day admission rates for acute myocardial infarction, heart failure, and pneumonia. CMS has proposed expanding the list of conditions in fiscal year 2015.

Changes to Medicare Physician Payment Policy

Medicare Physician Fees for Care Transition

Under the Medicare 2013 Physician Fee Schedule, CMS created a “G” billing code that enables physicians to bill for delivery of care transition services to Medicare beneficiaries in the 30 days following a discharge from a hospital, an SNF, or a community mental health center.

Medicare Physician Fees for Chronic Care Management Services

Under the Medicare 2014 Physician Fee Schedule, CMS proposes to cover physician services to pay for non-face-to-face complex chronic care management services for Medicare beneficiaries who have two or more significant chronic conditions. Complex chronic care management services include regular physician development and revision of a POC, communication with other treating health professionals, and medication management.⁶⁷

Medicaid Payment Models

Balancing Incentive Program

The Balancing Incentive Program makes grants available to states to increase access to non-institutional LTSS and lower costs through improved systems performance and efficiency, creating tools to help consumers with care planning and assessment, and improving quality measurement and oversight.

Other Care Coordination Interventions and Activities

A number of public and private entities, including AHRQ, the Partnership for Patients, the Society of Hospital Medicine, Medicare QIOs, and Patient Safety Organizations have developed initiatives to reduce hospital readmissions. These initiatives include tools, resources, and technical assistance to help hospitals and communities understand and address the factors that lead to frequent readmissions²¹ and make it easier to improve care coordination and care transitions.

The Medicare QIO program includes a focus on post-acute care providers, transitions in care, and care coordination/management. One QIO initiative provides technical assistance to LTPAC and other providers in Colorado, Minnesota, and Pennsylvania through the HIT for Post-Acute Care Special Innovation Project. The QIOs help providers optimize their use of HIT to support medication management and care coordination in transitions of care, and advancing HIE. Selected QIO resources related to care transition improvement efforts are available from state QIO sites.⁶⁸

3.3. Initiatives to Support Adoption of Health Information Technology and Electronic Health Information Exchange

Health Information Technology for Economic and Clinical Health (HITECH) Act

There are other facilitators for LTPAC/LTSS providers to engage in HIE, some of which are a result of program initiatives targeting other health care providers that are involved in care coordination for the LTPAC population, such as hospitals and physicians. The HITECH Act,^e enacted as part of the American Recovery and Reinvestment Act of 2009, promotes the adoption and meaningful use (MU) of certified EHRs. This legislation was the foundation of the EHR Incentive Programs for eligible professionals (EPs), eligible hospitals (EHs), and critical access hospitals (CAHs); the development of criteria for what constitutes MU of EHRs; and the EHR certification criteria and standards that must be integrated into certified EHR technology (CEHRT) used by eligible providers in the EHR Incentive Programs.

The goal of MU is to support the use of certified EHRs to improve health care in the United States.⁶⁹ The focus of Stage 1 of the EHR Incentive Programs has been on EP, EHs', and CAHs' adoption of certified EHRs, and the MU of data captured by EHRs. The Stage 2 MU requirements, effective fiscal year 2014, add to this foundation and require electronic exchange of health information and will support electronic coordination of care efforts by EPs, EHs and CAHs. Stage 3 MU requirements are expected to include requirements to support the interoperable exchange of additional content at times of transitions and referrals in care.

LTPAC/LTSS providers such as HHAs, inpatient rehabilitation hospitals, long-term acute care hospitals, and SNFs are not eligible for the Medicare and Medicaid EHR Incentive Programs.⁷⁰ Nonetheless, the ability of LTPAC providers to exchange health information electronically with EPs, EHs, and CAHs could affect the ability of EPs, EHs and CAHs to qualify for incentive payments, and could impact the success of the EHR Incentive Programs to improve care coordination.¹ LTPAC/LTSS providers that want to use EHRs and participate in HIE must either pay for the costs of EHRs or find other sources to offset these costs such as the shared savings ACO programs or the State Innovation Model.

^e See <http://www.hhs.gov/ocr/privacy/hipaa/administrative/enforcementrule/hitechenforcementifr.html>.

Selected MU Stage 2 criteria related to care coordination and HIE include the following:⁵⁸

- **Care Transitions.** When transitioning a patient to another care setting, the EP, EH, or CAH should provide a summary of care record for each transition of care or referral. The Summary of Care Records is to include, if known, a care plan.
- **Patient Visits.** Provide a clinical summary for patients for each office visit.
- **Reminders.** Use clinically relevant information to identify patients who should receive reminders for preventive and/or followup care with patients on relevant health information.
- **Communication.** Use secure electronic messaging to communicate with patients on relevant health information.
- **Data Use.** When a patient transitions from one provider to another, medication reconciliation should be performed. The EP, EH or CAH who receives a patient from another setting of care or provider of care, or who believes an encounter is relevant should perform medication reconciliation.⁷¹
- **Data Portability.** Patients must be able to view and download their own health information and also be able to transmit that information to a third party.

Stage 2 MU measures that will be required in Stage 2 and are particularly relevant to LTPAC are:

- EPs, EHs, and CAHs requirement to provide a summary of care document for more than 50% of transitions of care and referrals, with 10% sent electronically across vendor and provider boundaries (i.e., between recipients using different EHR technology vendors for transitions of care and referrals).⁷²⁻⁷³
- Other MU criteria and measures include the capability to generate and transmit permissible prescriptions electronically, submit electronic data to immunization registries or Immunization Information Systems electronic syndromic surveillance data to public health agencies, and identify and report cancer cases to a state cancer registry. For more information see: <http://www.healthit.gov/policy-researchers-implementers/meaningful-use-stage-2>.
- As the Healthcare Information Technology Policy Committee⁷⁴ continues to consider requirements for Stage 3 MU, there will be a greater focus on transitions/referrals of care.

Federal HIT Principles and Strategies

HHS is committed to realizing a patient-centered, value-driven health care system supported by the secure exchange of information across all providers of care. HIT serves as a foundational building block for achieving better health outcomes at lower costs. HHS recently released its HIE Principles and Strategy report, which notes that a “critical part of enabling the secure flow of information across the system is advancing the adoption of HIT standards through voluntary certification of HIT and HIE products and services.”⁷⁵ As part of this strategy, ONC said in a webinar that it will move forward with determining the potential scope and criteria for a HIT certification program and criteria for providers not eligible for the EHR Incentive Programs, starting with LTPAC (and behavioral health). In addition, CMS is considering ways in which Medicare and Medicaid payment policies can advance interoperable HIE by providers not eligible for the EHR Incentive Programs. Policymakers hope that by specifying EHR certification criteria for products needed by LTPAC providers that adoption of certified technology will increase and support interoperable HIE.⁷⁵⁻⁷⁶

LTPAC providers were included in the 2011-2015 federal HIT Strategic Plan released by the ONC in March 2011. The Strategic Plan describes the need to support HIT adoption and information exchange in LTPAC, behavioral health, and emergency care settings and describes why continued investment is needed to fully support HIE.⁷⁶

ONC Roadmap

ONC has developed a Standards, Interoperability, and Certification Roadmap that recommends establishing LTPAC (and Behavioral Health) HIT certification; and disseminating open source toolkits for Admission/Discharge/Transfer (ADT) alerts.⁷⁵

3.3.1. Facilitators of HIE -- HIT Standards, Specifications, and Certification

EHR Certification for LTPAC

Some of the EHR technology certification criteria used for the EHR Incentive Programs are applicable to care transitions and coordination in LTPAC settings.⁷⁰ The ONC Final Rule for Standards, Implementation Specifications, and Certification Criteria for EHR Technology encourages EHR technology developers of products for providers who are not eligible for the EHR Incentive Programs to certify their projects to: (1) transitions of care module and other appropriate modules; and (2) other certification criteria that make it more efficient for EPs, EHs, and CAHs to electronically exchange health information.⁷⁷ MU Stage 2 transitions of care certification criteria require that EHR technology: (1) receive, display in human readable format, and incorporate transition of care/referral summaries according to specified standards; and (2) create and transmit transition of care/referral summaries according to the standard adopted. At the time of this report, approximately six LTPAC EHR vendors had products certified by ONC Authorized Testing and Certification Bodies.⁷⁸

In addition, a private sector organization, Certification Commission for Health Information Technology (CCHIT), has also established LTPAC EHR certification criteria. At the time of this report, six LTPAC EHR vendors have CCHIT certified products.⁷⁹

To date, LTPAC provider use of these certified EHRs is believed to be low. Nonetheless, some LTPAC providers are reportedly using HIT applications that incorporate ONC-adopted standards that support the Patient Summary Record (i.e., Health Level 7 (HL7) Clinical Document Architecture (CDA)/Continuity of Care Document (CCD)/C32 (MU Stage 1 requirement).

E-Prescribing

Persons receiving LTAC services are often prescribed multiple medications. E-prescribing is complicated for a number of reasons. E-prescribing typically involves multiple parties -- both the prescriber and the pharmacy. However, in certain institutional settings such as SNFs, e-prescribing will involve at least three parties -- the prescriber, facility, and pharmacy -- and may include other entities such as payers. The 2014 MU requirements issued by ONC include a standard for e-prescribing that once adopted will support this three-way information exchange. Use of interoperable e-prescribing technology solutions in SNFs will likely require changes in the current prescribing workflow and technical assistance to support implementation of e-prescribing in SNFs.

Standardizing Interoperability Specifications

There are specific workgroups sponsoring work on HIT and HIE standards that support care for persons receiving LTPAC, including these workgroups managed under the S&I Framework and HL7.⁸⁰ These HIT and HIE standards include the Consolidated Clinical Data Architecture (CCDA) (exchange standard referenced in MU Stage 2), a more robust, implementable standard.^f Relevant workgroups include:

- S&I Longitudinal Coordination of Care (LCC) Workgroup (<http://wiki.siframework.org/Longitudinal+Coordination+of+Care>).
 - The S&I LCC Workgroup is advancing the electronic exchange of information at times of referrals and transition of care and exchange of care plans. The LCC Workgroup consists of two active sub-workgroups (SWGs): the Longitudinal Care Plan and LTPAC Transitions in Care SWGs. The Longitudinal Care Plan SWG has developed the Use Case for the interoperable exchange of the care plan, and identified the functional requirements to support its exchange. The LTPAC Care Transition SWG is developing a requirements-driven view of data elements required for

^f CCDA was developed through the joint efforts of HL7, Integrating the Healthcare Environment, the Health Story Project, and the ONC. CCDA is a more robust, implementable standard, and provides a single source for CDA templates for different document types including the discharge summary and CCD documents and is now the exchange standard referenced in MU Stage 2.

information exchange based on a set of user stories related to transitions and referrals in care.

- The S&I LCC Workgroup is working with HL7 to refine the CCDA Implementation Guide (a requirement in MU Stage 2) to support the exchange of more robust documents for transitions and referrals of care, and care plans. The updated CCDA Implementation Guide (being balloting in Fall 2013) includes new and enhanced document templates for the Transfer Summary, Consultation Note, Referral Note, and Care Plan.
- The S&I LCC Workgroup is also reviewing the Domain Analysis Model developed by the HL7 Patient Care Workgroup (see HL7 below), providing input around care plan exchange (http://wiki.hl7.org/index.php?title=Domain_Analysis_Model).
- The ONC S&I Electronic Signature for Medical Document Initiative (<http://wiki.siframework.org/esMD+Initiative>).
 - This CMS initiative will identify a standard for digital signatures for medical documents (such as care plans).

Facilitator -- Other ONC HIT Initiatives

As described below, ONC has directed some resources to engage LTPAC providers in state HIE activities and now has some programs and resources for LTPAC providers.

Challenge Grants

The ONC Challenge Grants are engaging LTPAC providers in HIT, EHR, and HIE activities at the federal, state and regional level to improve transitions of care. Federal Challenge grants to support LTPAC are operating in four states -- Oklahoma, Massachusetts, Colorado, and Maryland.⁸¹⁻⁸²

- **Oklahoma's** Challenge Grant program is focused on HIE for care transitions, and is based on real-time Activities of Daily Living (ADL) documentation. The HIE partner is SMRTNET -- Secure Medical Records Transfer Network -- a robust HIE network serving Oklahoma's health care systems. SNFs were provided with access to the Internet and computers and then a clinical documentation tool, a "lite" EHR called CareTracker that allows caregivers to record required resident documentation and scans for changes in resident conditions and provide alerts when the conditions change. CareTracker helps to create a Situation, Background, Assessment, and Recommendation (SBAR, see Appendix A for more information), one tools in the INTERACT program, for communication and the Universal Transfer Form (UTF) if the patient is transferred to the ED or hospital. SMRTNET worked with providers to determine what information should

be transferred via the UTF. SMRTNET supports an enhanced version of Direct, a low-cost HIE solution. LTPAC providers can query for patient information and securely send information to providers such as hospitals and physicians. Some of the partner sites with EHRs (e.g., hospitals) can click a link that connects directly to a web-based SMRTNET view, and structured data from the LTPAC providers can be imported to populate a patient's chart.

- **Massachusetts'** IMPACT project is "meeting LTPAC providers where they are" by providing the Local Adaptor for Network Distribution (LAND) and Surrogate EHR Environment (SEE). LAND allows organizations with fully implemented EHRs capable of generating the newly specified transition of care and care plan data elements to create, transmit, and receive these new document types. SEE, intended for organizations without an EHR and lacking the ability to create these documents, allows providers to view, edit, and send documents to the receiving facility via Direct message transmission from a web browser. The IMPACT project is working to create tools to generate, translate, and view UTFs via the HIE. At the time of this study, there were 11 LTPAC facilities participating in IMPACT, all in Worcester County, Massachusetts, with plans to continue to expand as the state's HIE structure improves.
- **Colorado's** HIE and program participant, the Colorado Regional Health Information Organization (CORHIO), is working in four targeted early adopter communities toward integrating HIE to improve care transitions. CORHIO is working with LTPAC organizations, including home health, hospice, SNFs, assisted living, long-term acute care hospitals and residential care facilities for the developmentally disabled to improve care transitions to and from acute care settings through HIE. The goals of the program are to facilitate adoption of HIE by the LTPAC community, develop a community protocol for information sharing across care transitions, and measure the impact of HIE on quality of patient care and rates of hospital readmissions. HHAs receive resources and training as part of their participation in this program.
- **Maryland** and its partner, an operational regional HIEO called the Chesapeake Regional Information System for Our Patients (CRISP) are leveraging Maryland's statewide HIE to electronically share critical pieces of clinical information, including information on advance directives, in near real-time as residents of LTPAC facilities transition from one care setting to another. The project seeks to deploy new scalable technology among LTPAC providers and geographically proximate hospitals that will enable the exchange of care transition data. Three LTPAC facilities have been awarded funds for the adoption and use of HIT to support improved transitions of care for their patients as they transition between hospitals and their facility. These LTPAC providers are or will be able to use CRISP's encounter notification service to alert physicians and care coordinators in real-time when one of their patients has an encounter with a Maryland hospital, such as an ADT. These alerts are sent via a direct secure message or HL7 message to an EHR system.

Beacon Communities

ONC provided funding to 17 selected communities that are considered beacons for their communities in the development of secure, private, and accurate systems of EHR adoption and HIE.⁸³ Some of the Beacon Communities included participation with LTPAC providers such as HHAs and SNFs. Beacon Communities in Rhode Island, Western New York, and Bangor, Maine are connecting HIEOs with LTPAC providers. The Rhode Island Beacon Community has targeted up to 84 nursing facilities across the state and engaged them in CurrentCare, a secure electronic network that gives health care providers access to the patient information. The Keystone Beacon Community in Pennsylvania developed an HIE tool that allows SNFs and HHAs to share a patient's information inexpensively and securely, with or without an EHR. The KeyHIE Transform tool is an all-inclusive, web-based service that transforms the electronic nursing home Minimum Data Sets (MDS) and home health Outcome and Information Assessment Set (OASIS) into an HL7 CCD so that SNFs and HHAs can share this information with other care providers (see Appendix A for more information about KeyHIE).

Community of Practice

ONC initiated a new long-term care community of practice (CoP), supported by the state HIE initiative, which provides opportunities to discuss areas of interest, collaborate, and share knowledge, information, experience, and best practices. This CoP is engaging with policymakers and implementers to identify opportunities to expand HIE in LTPAC and prioritize future advancements such as medication management, lab results integration, and advance directives.

Direct Project

The Direct Project (<http://directproject.org/>)²⁸ was launched by ONC in 2010 “to support the use of standards-based protocols for an easy-to-use, secure, and scalable method of sending encrypted and authenticated health information over the Internet such as clinical summaries, CCDs, and laboratory results, to other providers who also own a DIRECT address.”^{6,84} The most basic implementation of the Direct Project is secure e-mail via an e-mail client or web portal, which works just like regular e-mail, but with an added level of security required to transport sensitive health information. The Direct Project can serve as a solution for simple, point-to-point HIE around specific use cases. This tool can help LTPAC/LTSS providers to send and receive secure messages and electronic attachments with others in their network quickly, easily, and at a low cost, and facilitates referrals and transitions of care.³³ Limitations of Direct include limited or low uptake, in part due to a lack of a provider registry.

3.4. State of Health Information Exchange to Support Care Coordination

The previous section discussed many drivers of HIE to support care coordination for persons receiving LTPAC services. This section describes factors, facilitators, and barriers that impact the ability of LTPAC/LTSS providers to engage in HIE, and discusses the state of electronic HIE for LTPAC/LTSS providers as it relates to assessments, care plans, and other documents to support transitions in care. While there are many drivers to HIE to support care coordination, there are also important barriers to HIE that will be discussed in this section. These barriers impede care coordination and effective transitions of care; retard improvements in the delivery of quality health care; contribute to higher costs for payers and patients, and poor outcomes; and may eventually stymie EPs', EHs', and CAHs' ability to qualify for incentives for the MU of EHRs.¹ Key barriers include continued high costs for technology acquisition, lack of awareness and use of emerging technology solutions, inadequate workforce preparation for IT use, ongoing privacy and security concerns related to HIE, and lack of stakeholder awareness of and use of HIE data standards.

Currently, CMS only requires certain LTPAC providers to complete and electronically transmit assessment information for their residents/patients to state databases for billing under the prospective payment system and QI initiatives.⁷¹ Historically, LTPAC providers have focused on technologies that support compliance with federal assessment requirements and billing. These federal requirements do not support interoperable use and exchange of this assessment information.

However, some LTPAC providers are realizing the benefits of moving beyond collecting data solely for billing purposes, and adopting technologies such as EHRs/electronic medical records (EMRs) that support patient care. LTPAC providers are slowly transitioning to software programs that not only support caregiving and their administrative data collection needs for Medicare and Medicaid programs, but also can accept information from and share information with other providers.^{7,78}

3.4.1. EHR Adoption Rates by Setting

Adoption rates often are reported by levels of EHR functionality. It is important to note that definitions of an EHR differ by type of health care setting and are not comparable across many providers/settings.

EHR Adoption Among Office-Based Physicians

EHR adoption rates are reported to be increasing for two important HIE participants for care coordination -- physicians and short-term acute care hospitals. In 2012, 72% of office-based physicians had adopted an EHR system. Forty percent of physicians have adopted a "basic" EHR with certain advanced capabilities, more than double the adoption rate in 2009.⁸⁵ For 12 of the 15 EHR Incentive Programs' Stage 1 MU core objectives, physicians achieved at least 50% adoption rates.⁸⁶

EHR Adoption Among Acute Care Hospitals

The trend in adoption of EHR systems by non-federal acute care hospitals has been steadily increasing since 2008. From 2010 to 2012, EHR adoption of a “basic” EHR sharply increased from 19% to 44%.⁸⁷ Since 2009, hospital adoption of at least basic and comprehensive EHR systems has more than doubled. The percent of hospitals with CEHRT⁹ increased 18% between 2011 and 2012, rising from 72% to 85%. Hospital adoption rates for each of the 14 EHR Incentive Programs MU Stage 1 Core objectives ranged from 72% to 94%.⁸⁸

EHR Adoption Among LTPAC Providers

The lack of availability, adoption, and use of interoperable EHRs by LTPAC providers is a major barrier to HIE.⁸⁹ Based on currently available data, which in some cases is dated, adoption of computerized technology varies among LTPAC providers.^{70,88}

- In 2010, the National Survey of Residential Care Facilities (NSRCF), which included residential care facilities, assisted living residences, board and care homes, congregate care; enriched housing programs, homes for the aged, personal care homes, and shared housing establishments, found that 17% were using an EHR system, with 3% using a basic EHR system, and that more than half (55%) of these facilities had one or more of six electronic capabilities associated with a basic EHR.⁹⁰⁻⁹¹ A more recent NSRCF was conducted in 2012. However, at the time of this report, results were not available.⁹² The survey does not include SNFs, HHAs, or hospice providers.
- Approximately four in ten SNFs (43%) had adopted an electronic information system in 2004.⁹³ There are no national or large-scale surveys of nursing home adoption of EHRs, and estimates from other sources including an expert panel varied widely.⁹⁴
- Among home health and hospice care providers, 41% had adopted any EHR, and 10% had a basic EHR system in 2007.⁹⁵
- Another study found that certain specialty hospitals that are not eligible for MU incentive payments are less likely to adopt EHR systems. The study was based on the 2009 HIT supplement to the American Hospital Association Survey, which included long-term acute care hospitals, rehabilitation hospitals, and psychiatric hospitals. While 12% of short-term acute care hospitals in 2009 had adopted at least a basic EHR system, only 6% of long-term acute care hospitals, 4% of rehabilitation hospitals, and 2% of psychiatric hospitals had adopted an EHR.⁹⁶

⁸ Certified EHR is EHR technology that has been certified as meeting federal requirements for some or all of the hospital objectives of MU.

Because definitions of EHRs vary by survey, the LTPAC adoption rates are not comparable with EHR adoption rates reported for EPs/EHs.

TABLE 3-2. Adoption Rate by Selected LTPAC Provider Types	
LTPAC Provider Setting	EHR Adoption Rate*
Skilled Nursing Facilities	43%**
Home and Hospice Care Facilities	41%
Residential Care Facilities	17%
Long-Term Acute Care Hospital	6%
* EHR adoption rates are measured differently across provider types and comparisons across provider type is not advised.	
** Survey question was adoption of “electronic information systems”.	

3.4.2. Electronic HIE Capability

While there has been a dramatic increase in the number of United States providers using HIT, expanding interoperability remains challenging, and requires further reducing the cost and complexity of electronic HIE, ensuring trust among the key participants of exchange, and encouraging exchange of information, particularly during transitions of care. ONC is playing a central role in enabling each of these key goals.²⁸

The adoption of EHR/EMRs by LTPAC/LTSS providers could increase the likelihood that these providers will participate in electronic HIE and exchange standardized data to support care coordination. As HIE interoperability standards mature and LTPAC/LTSS and other providers adopt more sophisticated and interoperable HIT including EHRs, the potential for exchanging standardized information and ensure safe, high-quality care, will grow.

- In 2012, of those hospitals that implemented an EHR, approximately 43% can generate a summary care record for transitions.⁹⁷
- Many hospitals are participating in HIE. Exchange between non-affiliated organizations and hospitals with different EHR solutions has recently increased. For example, one study found that in 2009 about 11% of hospitals exchanged data with non-affiliated providers through an HIEO in 2009.⁹⁸ A more recent study based on a national hospital survey, found that in 2012, 58% of hospitals actively exchanged electronic health information with providers and hospitals outside their organization.⁹³ Another study reported that EHR adoption and HIEO participation were associated with significantly greater hospital exchange activity.⁹⁹
- Market research suggests there will be significant investment in HIE in the next few years. A 2012 CapSite report found that 71% United States hospitals plan to purchase HIE tools.¹⁰⁰

- The 2011 National Ambulatory Medical Care Survey found that 29.4% of physicians electronically exchanged a patient clinical summary. Of these physicians, 64.2% used an EMR/EHR vendor, 27.5% used hospital-based systems, 19.5% used secure e-mail attachments, 15.1% used other mechanisms or unknown mechanisms, and 4.6% used HIOs or a state exchange. More than one method of exchange could be reported.⁹³
- In a recent study by the Bipartisan Policy Center, more than 70% of clinicians surveyed identified lack of interoperability, lack of an information exchange infrastructure, and the cost of setting up and maintaining interfaces and exchanges as a major barrier that prevents information exchange.¹⁰¹
- The 2010 NSRCF found that of those residential care facilities that had implemented an EHR, nearly 25% of residential care facilities could exchange with pharmacies, and 17% could exchange with physicians.⁹¹
- The 2010 NSRCF is the only national survey on EHR adoption and use by LTPAC providers that asks questions regarding HIE, and reports on the percentage of residential care facilities engaged in electronic HIE with the following health care providers or resources: pharmacies (8.2%), physicians (7.4%), corporate offices (5.6%), hospitals (5.4%), SNFs (4.7%), laboratories (4.4%), other health or long-term care providers (3.7%), resident's personal health records (3.4%), public health reporting (2.9%), and one or more specified providers (15.5%).⁹³

HIEOs and LTPAC Provider Participation

The 2012 eHealth Initiative Annual Survey of HIE surveyed national, state, regional, enterprise, and community-based "initiatives" working on HIE. These initiatives are not specified, but included more than just HIEOs or HIOs. The respondents represented 50% of total known HIE initiative programs. Of the 161 HIEs initiatives that responded to the surveys, 26, or 16%, reported receiving LTPAC providers' data.⁶ It was not possible to identify the specific number or types of LTPAC providers engaged in HIE initiatives from the survey results. The 2013 and future survey results can track the growth in LTPAC participation in HIE initiatives.

A recent study based on a survey of HIEOs found that there were 119 operational HIEOs in 2012, an increase from 75 in 2010. Operational exchange was defined as the exchange of clinical data between independent entities (e.g., hospitals, laboratories, and payers). The study also found that 1,398 hospitals and 23,341 physician practices were using HIEOs for a variety of functions. Of the 119 operational HIEOs, around 25% reported that LTPAC providers participated by sending data, and 41% by receiving data. Test results (82%) and summary of care records (79%) were the most common exchanged information across all participants. Less than 25% of operational HIEs were found to be financially sustainable, and grants accounted for 52% of HIE efforts. The

authors concluded that while more HIEOs are operational, business models do not yet support a viable future.¹⁰²

3.4.3. Facilitators and Barriers to Adoption and Use of HIE to Support Care Coordination

Costs and Workforce Preparation

Key barriers to LTPAC provider participation in HIE activities include lack of funding and/or payment incentives (e.g., no HITECH EHR incentive funding for LTPAC providers), and the workforce that is not well-prepared to implement and use HIT systems (e.g., issues include staff shortages, turnover, and lack of IT skills, and training needs).^{1,4,103-106}

LTPAC providers continue to have lower rates of EHR adoption than other settings such as physician practices and hospitals. LTPAC providers vary widely from small, non-affiliated providers to large networks of facilities. Acquiring and implementing EHRs by smaller providers can be disproportionately expensive. In addition, smaller facilities often lack staff resources to develop, implement, and maintain these systems. Even in larger LTPAC facilities, it can be difficult to attract and retain skilled IT workers to support the necessary systems. High staff turnover rates in LTPAC settings contribute to high staff training costs. Given privacy and security issues when exchanging health information across entities, clinical care providers and IT staff must be well trained to protect personal health information. LTPAC/LTSS providers must train their staff to use EHRs, which can be costly and time intensive.

Data Availability and Standardization

The data exchanged by the HIE initiatives surveyed by the 2012 eHealth Initiative study included inpatient data (discharge list, problem list, inpatient medication list and physician notes); outpatient/ambulatory data (clinical summaries, problem list, ambulatory medication list, physician notes and referrals summary of care record); and public health reports. Clinical summaries, discharge list, outpatient problem list, and ambulatory medication list were the top five types of inpatient and outpatient data reported to be exchanged according to the eHealth Initiative study.⁶

The Massachusetts IMPACT project identified 483 unique data elements as important for transitions in care. The S&I LCC LTPAC Transition Workgroup worked in collaboration with HL7, to include this data in refinements to the CCDA Implementation Guide. These data elements are available from the S&I LCC Framework.¹⁰⁷

A technical expert panel convened by the National Quality Forum (NQF) developed a starter set of data elements based on the concept of a person-centered POC, to support coordinated care and performance measurement of the care process. NQF found that although some clinical data could be derived from EHRs, other starter data elements such as care plan steward, medical equipment, social supports, and task

completions would have to come from other information systems such as case management, pharmacy, home care and financial systems.¹⁰⁸

The need for health information to support care coordination was an important finding from the study site visits, and is discussed more completely in Section 4. One of the sites that was visited in this study had a care transition program that involved LTSS. This site collected and exchanged a wealth of EHR and other information, mostly as unstructured notes, about the patient and family situation and needs (e.g., medical, psychosocial, and financial data). The site visit discussion provides more detailed information on the types of information exchange to support persons receiving LTSS. In addition, much of the data identified as critical for care transitions and care coordination is presently not electronically exchanged. For example, it was observed during the site visits that most HIT/EHR systems lack the capacity to create, transmit, and incorporate interoperable clinical data such as functional and cognitive status and formal and informal caregiver status. In addition, current, complete medication information was often not available to reconcile medications.

Software and Vendor Issues

Some of the HIE interventions noted that using new software and interfaces with EHRs could be problematic, particularly if these products are first to market, as they may not have been completely tested. Software developers reported needing more time to create “out-of-the-box” capabilities such as discharge summaries or workaround solutions. There was also uncertainty surrounding core EMR vendor HIE interfaces and solutions. For example, vendors may not be willing to develop a customized interface, or they are willing but the cost of such interfaces may be high. There may be no vendor who will develop an interface, for example, in the case of a “home grown” technology solution, or in situations where there is no ongoing maintenance contract.

Even with available standards, interfaces are not easy to implement and smooth implementation of HIE is not guaranteed. There may be significant variability in the interpretation of the standards, for example. Standards such as a CCD do not always have the structure and content to reflect the data needed to support transitions and referrals in care to and from LTPAC/LTSS providers.

Stakeholder and Policymaker Engagement

Stakeholder engagement remains a significant barrier to successful data exchange. The eHealth Initiative survey of organizations that are planning, building, or maintaining technology to help health care entities electronically exchange health data (e.g., HIEOs, state entities, medical groups, hospitals, other types of organizations exchanging data) found that a high percent of those surveyed reported a general lack of stakeholder interest in HIE, and difficulty in engaging stakeholders such as health providers, plans, purchasers, laboratories, and hospitals.⁶

Another significant challenge reported by HIE initiatives is the multiple and competing programs for advancing HIE. States are coordinating numerous initiatives related to health care system transformation and controlling rising health care costs. As a result, states have largely focused their HIE efforts on providers eligible for the EHR Incentive Programs, leaving fewer resources for ineligible providers, including LTPAC/LTSS providers and facilities.

Accountability and Incentives for HIE Related to Payment Models

Disincentives to care coordination include payment methods and sources across the care continuum which may not encourage information exchange.¹⁰⁹ FFS payment methods, still widely used, create little incentive to coordinate and deliver high-quality care. The new payment and service delivery models (e.g., those listed in Section 3.2 such as ACOs, Medicare and Medicaid Shared Savings Programs, and capitated care models) provide incentives to improve care coordination using HIE.

Privacy, Policy, and Security Issues and Compliance

Many information privacy laws were written before the current digital world was conceptualized. The Health Insurance Portability and Accountability Act provides guidance for the exchange of health information. Many states enacted laws more stringent than HIE guidelines. Some states are adapting current laws to update them for the modern context. State laws vary widely, presenting challenges for developing unified policy solutions or solutions that work across states. This variation creates barriers to technology vendors.

Public trust in HIE is critical to ensuring participation, funding, and policymaker support. Policies that permit (or require) consumers to opt-in vs. opt-out of HIE activities is one of the first of many policy decisions the HIEOs need to make. One of the barriers identified in this study was stringent privacy laws and opt-in requirements that impact patient participation. Consumer and provider participation in HIE is higher in states and other areas that have opt-out policies (e.g., Maine) as compared to opt-in policies. Opt-in policies lower the likelihood that patients will be located when their records are queried through an HIEO. Some states such as Maryland, New York, Rhode Island, and Massachusetts have more stringent privacy laws and opt-in policies.

Maryland's HIE policy, for example, currently restricts the disclosure of protected health information through an HIEO for primary use (treatment). This means that LTPAC providers are not able to gather information from the HIEO about potential patients/residents who may be referred to a LTPAC provider upon hospital discharge, without an existing treatment relationship. The state HIE policy does not allow for HIE in this situation.

Maimonides Hospital and the Brooklyn Health Information Exchange (BHIX) experienced patient consent challenges during implementation. Because of state health privacy policies, if a patient has been admitted to Maimonides Hospital and the hospital

has not secured consent from that patient, a policy filter built into the BHIX infrastructure will block an alert from going to the patient's physician(s) and the assigned care coordinator. BHIX estimated that alerts could be sent for an estimated 10,000 additional patients if consent is obtained by the various participating sites.²⁴

Almost half of the surveyed HIE initiatives in 2012 reported that stakeholder concerns about privacy and confidentiality were identified as a moderate or substantial challenge to HIE.⁶

LTPAC/LTSS Engagement and Interest in HIE

Even though the CMS EHR Incentive Program does not include incentive payments to LTPAC/LTSS providers, these providers report looking forward to participating in HIE with their trading partners -- specifically pharmacies, labs, hospitals and physicians. LTPAC/LTSS providers are looking for assistance in navigating the technology and privacy and security requirements that would allow interoperable HIE with these other health care providers.¹¹⁰

3.4.4. Facilitators -- HIE Tools and Resources

A number of public and private sector activities/tools have been developed that support electronic HIE by LTPAC/LTSS providers.

- The QIO Program provides technical assistance in three states to Medicare SNFs and HHAs to support their participation in electronic HIE activities.¹¹¹
- MDS and OASIS assessments can be transformed into an interoperable LTPAC Summary (into CCD format). The tool developed by KeyHIE and described above enables low-cost, interoperable HIE by nursing facilities and HHAs (<http://transform.keyhie.org/>).¹¹²
- The Direct Project (discussed in Section 3.3.1) supports low-cost, standards-based exchange for sending encrypted and authenticated health information over the Internet.
- The Massachusetts statewide HIE incorporated the LAND and SEE developed under Massachusetts' Challenge grant to accelerate LTPAC connectivity. SEE will be available to other states either under open source or through a commercial license from Lantana Consulting Group. LAND is adapter software that organizations can use to convert files or interfaces into "Direct" communications which are compatible with the state's HIE, and vice versa.¹¹³ (See Appendix A and Section 3.3.1 for more information.)
- As described in Section 3.3.1 the SBAR identifies a change in resident condition and communicates patient information in a concise and structured format. Kaiser

Permanente and SNFs participating in the Oklahoma State HIE program have implemented an electronic version of SBAR.¹¹⁴

- The Continuum of Care Improvement through Information New York (CCITI NY) (<http://www.ccitiny.org>) was established to improve the quality, patient safety, and costs of transferring patients between acute, post-acute, and ambulatory care organizations in the greater New York metropolitan region. The CCITI NY project combines an electronic transfer form process with an automated clinical decision support tool. CCITI NY developed a UTF that provides important patient information to clinicians during transfers, including medications, problems and allergies. Key information is provided to care providers in advance of patient arrival. The UTF also contains clinical decision support functionality by providing alerts for harmful drug-drug and drug-allergy interactions. CCITI NY collects patient information by using the infrastructure and clinical messaging capabilities of participating HIEOs and hospitals.

3.5. Process, Outcome, and Cost Measures and Metrics to Assess Health Information Exchange Interventions on Care Coordination

This section describes measures of care coordination which may reflect HIE, the conceptual frameworks on which they are based, if applicable, as well as other measures of process, outcomes and costs that may capture the impact of HIE on care coordination. Some of the most common measures to monitor the impact of the HIE interventions on care coordination to support LTPAC are discussed. One of the conclusions from this study is that care transitions and coordination are broadly defined, and measuring the impact of HIE on these care coordination functions is complicated and nascent. More work is needed to define and validate measures that reflect HIE on care transitions and coordination, for both electronic and other means of information exchange.

3.5.1. Care Coordination Measures

This section describes several frameworks that are useful in identifying potential measures of HIE on care transitions and care coordination.

AHRQ Care Coordination Measures

The AHRQ Care Coordination Measures Atlas provides a framework for care coordination measures, and consists of domains that are important to care coordination, informed by a number of care coordination sources.^h AHRQ's framework starts with the

^h These include: (1) Antonelli RC, McAllister JW, Popp J. Making care coordination a critical component of the pediatric health system: A multidisciplinary framework. New York, NY: The Commonwealth Fund. May 2009. Publication No. 1277. (2) The CMS Definition of Case Management; (3) Coeira E. Guide to health informatics. 2nd ed. London, England: Hodder Arnold, a member of the Hodder Headline Group; 2003; (4) Mathematica Policy

goal of achieving coordinated care, defined as the means to help achieve care goals by meeting patient needs and preferences, and facilitating delivery of high-quality, high-value care.⁸ The framework identifies various actions that have been hypothesized or demonstrated to facilitate care coordination and improve the delivery of health care. These actions can guide the selection of relevant measures for HIE interventions that support care transitions and coordination, and can be employed in an improvised or systematic way.

The measures do not gauge the endpoints of care coordination; rather they capture the care coordination processes and activities that may impact those endpoints. Many, but not all of the measures are applicable to HIE in LTPAC/LTSS settings. An example of a care coordination measure relevant to HIE is the percent of patients discharged from an inpatient facility who receive a transition record at discharge, and documentation that all of the specified elements were reviewed with the patient. (See <http://www.qualitymeasures.ahrq.gov/content.aspx?id=28140> for information on the care coordination measures rationale and definitions.)

National Quality Forum’s Measure Application Partnership

The NQF convened the Measure Application Partnership (MAP), which developed “Measures under Consideration by HHS for 2012 Rulemaking”. These measures include “Post-Acute Care/Long-Term Care Performance Measurement Programs”.¹¹⁵ The MAP analyzed the quality measurements and the gaps in measurements for LTPAC including shared accountability for care coordination through transitions, functional status, advanced care planning, and mental/behavioral health as they apply to providers and health plans integrating with community organizations. The MAP identified performance measurement for areas with the most opportunity to improve the quality of health care, and examples of core measure concepts are provided in Table 3-3.

Research Report -- Coordinating care for Medicare beneficiaries: Early experiences of 15 demonstration programs, their patients, and providers: Report to Congress. Princeton, NJ: Mathematica Policy Research, Inc.; May 2004; and (5) NQF -- Endorsed definition and framework for measuring care coordination. Washington, DC: National Quality Forum; 2006.

TABLE 3-3. LTPAC Highest-Leverage Areas for Performance Improvement and Core Measure Concepts from MAP	
Highest-Leverage Areas for Performance Measurement	Core Measure Concepts
Function	<ul style="list-style-type: none"> - Functional and cognitive status assessment - Mental health
Goal Attainment	<ul style="list-style-type: none"> - Establishment of patient/family/caregiver goals - Advanced care planning and treatment
Patient Engagement	<ul style="list-style-type: none"> - Experience of care - SDM
Care Coordination	<ul style="list-style-type: none"> - Transition planning (discharge planning and timely and bi-directional communication during transitions, requiring educating and preparing patients and families/caregivers, and timely communication between sending and receiving clinicians/institutions)
Safety	<ul style="list-style-type: none"> - Falls - Pressure ulcers - ADEs
Cost/Access	<ul style="list-style-type: none"> - Inappropriate medicine use - Infection rates - Avoidable admissions

CMS ACO Measures

The ACO measures may serve as another potential source of potential measures related to care coordination, particularly if the HIE intervention is part of the health care delivery under an ACO. The ACO care coordination and patient safety areas being measured are as follows:

- Risk standardized all condition readmissions;
- Ambulatory-sensitive conditions admissions: chronic obstructive pulmonary disease (COPD) or asthma in older adults, heart failure;
- EHR Incentive Programs reporting;
- Medication reconciliation; and
- Falls: screening for future fall risk.

In addition, see the Pioneer ACO measures in Appendix K.

Endpoints of Care Coordination

“Endpoints of care” is another approach to measuring care and reflect the Institute of Medicine goals for quality of care -- safety, timeliness, effectiveness, efficiency, equity, and patient-centeredness.⁸ Endpoints of care coordination relevant to HIE include rates of ED visits and transfers; hospital admissions/readmissions; disease-specific hospital admissions; mortality and disease; short-term clinical outcomes (e.g., glycated hemoglobin levels for patients with diabetes); functional status (e.g., for telehealth patients); quality of life; and treatment/service adherence.⁸ The case study sites use endpoints as measures of care coordination supported by HIE.

3.5.2. HIE Impact Measures

The literature review for this study specifically examined the evidence around the impact of electronic HIE. A summary of the literature review is provided in Appendix F. No studies of the impact of HIE in LTPAC/LTSS settings were identified. Further, the evidence of HIE impact remains sparse. Among the measures used to evaluate HIE, health care utilization is the most widely used (e.g., hospital admissions, rates of laboratory tests).¹¹⁶ Only one of the three randomized controlled studies included in this review identified positive HIE outcomes, which was significant cost savings in ED charges per visit at one of the two hospitals involved.¹¹⁷ Moreover, in three studies, HIE use was associated with greater health care services utilization.^{46,118-119}

The lack of results supporting HIE to improve cost and clinical outcomes such as quality of care and safety is not surprising due to the nascency of HIE, methodological challenges in assessing outcomes (e.g., sufficient volume of use, complex study designs, short study intervention periods, need for control groups). The studies aggregated costs and other utilization measures, and results may be confounded by factors such as differences in illness severity in the study groups.

Kern et al. developed a framework and with advice of a national expert panel, searched the literature to identify functionalities enabled by EHRs and HIE across three health care settings (ambulatory, inpatient, and ED). Each of 233 functionality-setting combinations were rated on their likelihood of having a positive financial effect; top-scoring functionalities were validated with the expert panel. The most highly rated HIE functionalities driving financial value included sending and receiving imaging and laboratory reports and allergy history, authorizations for procedures; receiving discharge medication lists from ED and inpatient settings; and enabling structured medication reconciliation.¹²⁰

3.5.3. Care Transition and Coordination Measures Used by Identified HIE Interventions

Most the identified HIE interventions identified, including the sites visited measure the impact of the care transitions and coordination interventions. Not all of the measures may be directly attributable to the exchange of information nor were they reported to be so. It was also not possible from the environmental scan to separate measures used for electronic HIE interventions from non-electronic HIE, with the exception of a measure of whether transitions of care were accompanied by electronic care of summary. For both electronic and non-electronic HIE, the most common measures reported were the rates of ED visits and walk-in care, and hospital admissions and/or hospital readmissions. Three interventions reported that they monitored discharge disposition and two interventions measured length of hospital stay as a measure of their success. Other areas measured for the HIE interventions were impact on duplication of services; unnecessary tests and treatments; medication reconciliation completion rates; transmission of transition record after discharge; transmission of information within 2

hours of discharge; pending test results followed up after discharge; fall rates; changes in rates of urgent care, if patient self-management of medications goals were met; rates of ADEs; functional outcome measures; customer satisfaction; and efficiency, speed and satisfaction with the transition of care process.

3.6. Health Information Exchange Interventions Identified for Study

This section describes and characterizes the use of HIE to support care coordination for persons receiving LTPAC/LTSS services based on the literature review, environmental scan, key informants, and site visits. Selected HIE interventions and activities to support care coordination are described, guided by the frameworks, including the entities involved (affiliated, non-affiliated, and patients/family members/caregivers) and type of data exchanged, the use of an EHR and any electronic tools to support HIE, interoperability standards, user interfaces, and workflow. Information that LTPAC/LTSS providers have that other providers may find useful is highlighted.

3.6.1. HIE Interventions Identified for Study

HIE “interventions” or activities were identified that support transitions and information for persons receiving LTPAC/LTSS care and described in Appendix G. The interventions described in this section were not confirmed or updated by informants, other than for the three case study sites. The interventions were categorized by: (1) individual LTPAC/LTSS providers; (2) groups of LTPAC/LTSS providers that were part of a national corporation or chain; (3) HIEOs such as regional health information organizations and community HIEOs that support HIE for multiple participating LTPAC/LTSS providers and their exchange partners; and (4) health care provider networks with HIE. There is overlap among these four categories. For example, a HIEO may be helping LTPAC providers participate in HIE, and within that state, a participating LTPAC provider that was actively engaged in HIE may also be identified as another intervention.

HIE interventions that included electronic HIE with LTPAC/LTSS providers were identified in 22 states. This likely does not include all of the states with electronic HIE to support care coordination for persons receiving LTPAC/LTSS services. The type of LTPAC/LTSS provider participating in the intervention is also noted. The most frequent LTPAC/ LTSS provider type reported to be engaged in exchange is HHA, followed by SNFs. Four of the interventions involve senior housing, two with continuing care retirement communities, one with a LTCH, and three with HCBS or other LTSS, including one AAA.

The next section describes some of the more common HIE interventions to support care coordination for persons receiving LTPAC/LTSS services, including the context for HIE, users and workflow, key exchange partners, technology, standards and data. Selected examples are provided. More in-depth information, observations, and insights

from the three site visits are discussed in Section 4, and in the individual site visit summaries in Appendix H, Appendix I and Appendix J.

3.6.2. HIE to Support Care Transitions

This section describes some of the uses of HIE supporting care transitions with LTPAC/LTSS providers, specifically: (1) transfers from an LTPAC/LTSS to a hospital; and (2) transfers from a hospital to an LTPAC/LTSS provider. Interventions varied in how HIE was used to support care transitions. This section provides examples of the technology, workflow, data exchanges, and users.

Transition from LTPAC/LTSS to Hospitals (ED, Acute Care, Psychiatric)

Electronic HIE

Electronic exchange from LTPAC/LTSS to ED and hospitals was commonly implemented using directed, peer-to-peer, and query-based technology, with variations across providers.

Peer-to-Peer Exchange

For the small number of LTPAC/LTSS providers that have an EHR, a custom interface sent ADT data using secure HL7 version 2 messaging standards, usually using Direct. ADT messages are sent for specific types of events or use cases, such as inpatient admission. ADT messages typically include key information such as medications, lab test results, demographics, allergies, problems, diagnoses, discharge summaries, vital signs, and clinical notes. The ADT event updates are sent from the HIEO to specific providers through secure messaging, perhaps using a Virtual Provider network connection (e.g., Beechwood Homes, Western New York through HIN, and Cedar Living Nursing Home, Oklahoma through SMRTNET).

Direct exchange is being used to support a variety LTPAC HIE activities such as exchanging CCDs (e.g., CORHIO), sending ADT messages to hospitals supplemented with data from INTERACT and care paths with decision support (i.e., Oklahoma SMRTNET).

- When a patient is admitted to the ED, the SBAR content is electronically sent to ED staff, and alerts ED doctors if more information is available in the HIEO about the patient (e.g., Golden Living Nursing Home through Indiana HIE).
- The HIEO may send alerts to specific care providers such as the patient's primary care provider for events such as hospital admission or discharge.
- More advanced functionality reported by a small number of interventions were real-time alerts upon hospital admission, sent to primary care physicians, mental health providers, and HHA staff.

Query-Based Exchange

Hospital ED admission staff can query for LTPAC patient information via a HIEO upon admission, and retrieve patient information, typically in a CCD format, and distribute to clinical staff.

- At least one hospital automatically prints the CCD and other information and adds it to the patient chart (Indiana HIE).
- The HIEO may send alerts to specific care providers such as the patient's primary care provider.
- Hospital staff at some hospitals can access patient exchange information at the HIEO and import into their hospital EHR (e.g., Norman Regional Hospital, Oklahoma SMRTNET), which was reported to greatly increase physician use of the information.

Non-Electronic HIE

Before electronic HIE was available, information exchange predominately occurred by paper and/or via fax, photocopying, mailing, and telephone calls. Most LTPAC/LTSS sites reported faxing additional information that could not be sent electronically to hospitals, HHAs, and other providers.

At one site, when the SNF sends patients to the hospital, typically through the ED, the SNF also send a packet of information in hard-copy (e.g., demographics, diagnosis, medication list, labs, history and physical [H&P]). However, the SNF found that this information is not accompanying the patient to the medical unit where they are admitted. Another challenge is locating the patient in the hospital and ensuring that the hospital staff know that the patient was admitted from a SNF.

Data Sent from LTPAC Providers at Transitions

The following types of data were found to be transmitted by LTPAC providers at times of transitions in care: INTERACT information (including SBAR), transfer form, face sheet, most recent H&P, recent hospital discharge summary, nurse's progress notes; orders related to acute condition, current medication list or administration record, advance directive, care limiting orders, relevant lab results, relevant x-ray reports, immunization records, and physical therapy notes.

Less frequently sent data from LTPAC providers at transitions included patient assessments including functional and cognitive status (e.g., from MDS, OASIS), wound care and other images, fall and other risks were also sent but less frequently.

HIE Recipients/Users at Hospitals

The types of hospital staff that most often reported to be users of the information sent by LTPAC providers included: hospital admission clerks, ED and hospital clinicians, emergency medical technicians, hospital social workers, and case and care managers. Patient's primary care providers and specialists were also identified as recipients of the information provided by LTPAC providers.

Transition from Hospital to LTPAC/LTSS

This section describes HIE from hospitals to the receiving LTPAC/LTSS provider. The flow of HIE from hospitals to LTPAC/LTSS providers was more common than the reverse direction.

Electronic HIE

Peer-to-Peer Exchange

Point-to-point exchange from the hospital to the LTPAC/LTSS sites using Direct or other means was not commonly reported. One of the case study sites, Rush University Medical Center, does send secure e-mail using their e-referral software to LTPAC/LTSS providers.

Query-Based

To prepare for the return of the patient, the LTPAC/LTSS sites typically are provided with access to web-based portals to query hospital information while the patient is hospitalized. When the patient's name is entered into the portal, data can be accessed from hospitals and other providers. The information is typically available via a community or virtual health repository.

- Depending on the interface available through the EHR or an HIEO, SNF staff can view and use the hospital information in different ways. At least one site reported that they can view all records for the patient, or select only those from a particular facility. A sidebar provides a menu of types of information from which an authorized provider can choose (e.g., lab results, admission and discharge summaries, radiology notes, and a summary information sheet).
- Often other data were available from outpatient providers, laboratories, and other LTPAC/LTSS providers.
- Because this is a portal, information needs to be retrieved and repurposed rather than accessed directly from the LTPAC/LTSS's EHR system.

- Some HIEOs offer sophisticated applications to access and use the HIE information in data repositories.
 - PatientCare360 used by CORHIO has the ability to create, view, and print a CCD into a Summarization of Episode Note.

Non-Electronic HIE

There are many examples of non-electronic exchange of information when patients transition from a hospital to a SNF or home care (e.g., using fax and sending hard-copy documents).

- Some SNFs and post-acute providers report using clinical liaisons (e.g., intake or admission nurses) to gather information and assess patients in the hospital prior to being transferred to the SNF or a rehabilitation center (e.g., Beechwood Homes, Chicago Rush University Medical Center referral SNF).
- Rush University Medical Center, was working with their EHR vendor to develop standard reports that would be sent to their referral sources (e.g., LTPAC/LTSS providers), but not via electronic HIE as the Rush EHR does not have the capability to generate this standardized report.
- Hospital discharge planners more often send hard-copy and fax discharge orders to LTPAC/LTSS providers.

HIE Recipients/Users at LTPAC

The LTPAC users of the information sent by hospitals include charge nurses, directors of nursing, care transfer coordinators, wellness nurses, physicians, and pharmacists.

Data Sent to LTPAC at Transitions

The following types of data may be transmitted by hospitals to LTPAC providers at times of transitions in care: updated hospital information; transfer form; medications; nurses notes; H&P; diagnoses; operative report and other relevant clinical data (e.g., functional status, therapy, skilled nursing services, and the hospital discharge summary).

Information that is less frequently sent from hospitals to LTPAC providers included nutrition, fall risk, physical inactivity rates, ADL, instrumental ADL (IADL), fall history, and self-management information collected in relation to conditions such as COPD, heart disease, diabetes, and asthma. In addition, one HIE intervention involved the hospital sending wound care images to the home care provider.

HIE Impact and Care Coordination Measures Used

Many of the identified HIE interventions reported efforts to measure the impact of their care transitions interventions. The most common measure was related to hospital readmission rates. Other measures reflecting care transitions were the rates of ED visits and hospital admissions. Three interventions reported that they monitored discharge disposition and two interventions measured length of hospital stay.

3.6.3. HIE to Support Eligibility and Authorizations

HIE is also being used to send information to the state Medicaid program for eligibility determinations. Currently, all 98 nursing facilities in Utah use the HIEO, Utah Health Information Network (UHIN), to send an electronic request to obtain preauthorization for Medicaid coverage. This exchange provides a low-cost mechanism to securely send electronic documentation to the state to determine whether individuals meet Medicaid eligibility requirements. This exchange helps ensure timely service delivery and accurate information between the SNF and the Utah Medicaid program. An electronic preauthorization form is sent through secure e-mail, with attachments such as the scanned MDS, physical, and history; and eliminates copying and faxing, which the state no longer allows. The application prepopulates the form with provider information, as well as patient information such as name, birth date, and Medicaid number through state databases. The application requires diagnoses and includes a look up function for the ICD-9 diagnosis codes. UHIN is piloting this program with the HHAs.

4. SYNTHESIS OF FINDINGS FROM CASE STUDIES OF HEALTH INFORMATION EXCHANGE TO SUPPORT CARE COORDINATION FOR PERSONS RECEIVING LTPAC/LTSS

During the literature review and key informant interviews, potential sites were identified for in-depth analysis of HIE activities. Site visits were conducted with three strategically identified providers engaged in HIE to support care coordination for persons receiving LTPAC/LTSS. The purpose of the site visits was to evaluate the information exchange practices for persons receiving LTPAC and/or LTSS related to transitions of care, shared care and other administrative purposes. HIE practices were evaluated regardless of format (telephone, fax, e-mail, exchange network), however, special interest was paid to the current status of electronic exchange including the policy drivers, barriers preventing its use and opportunities for expansion.

The sites provided a snapshot of exchange processes from different types of LTPAC and LTSS providers in different geographic regions: (1) Chicago's Rush University Medical Center's Bridge Model Care Transition Program, which improves care transitions through a patient-centered approach that engages a multidisciplinary health care team through intensive care coordination to help older adults safely transition back to the community that includes LTSS; (2) Beechwood Nursing Home, 272-bed SNF in Western New York, and one of the first LTPAC providers to participate in HIE through a regional HIEO; and (3) EMHC, part of EMHS, an integrated health care delivery system, which is exchanging information with affiliated and non-affiliated partners.

Observation protocols and interview guides guided the site visits. Interviews were conducted with LTPAC provider staff and stakeholders, including clinicians, QA/performance improvement staff, IT staff, administration, referral sources, and HIE network administrators. Key HIE exchange partners were contacted during the site visit including acute care providers who exchange important information during care transitions. The site visits provided rich case studies of best practices and lessons learned around HIE to support care coordination.

Each site visit was two days in length. A summary report was developed for each site that provides the following information: (1) background information on the site; (2) a description of the community HIEO; (3) a summary of grants, other policy initiatives and stakeholders that either supported the advancements in HIE or were key partners; (4) an overview of the site's EHR and HIT systems and development plans related to HIE; (5) findings from discussions on the workflow processes that required HIE; (6) a summary of HIE processes; and (7) identification of barriers and opportunities. Summaries of the site visits are included in Appendix H, Appendix I and Appendix J.

This section synthesizes findings and lessons from the site visits and implications for expanding HIE to support care coordination for persons receiving LTPAC services. The findings are organized as follows:

- Site Visit Summaries and Key Characteristics:
 - Rush University Medical Center Transitional Care;
 - Beechwood Homes; and
 - EMHC.

- Synthesis of HIE findings from the Site Visits:
 - HIE at transitions of care, shared care, and other administrative types of HIE;
 - Summary of electronic HIE;
 - Summary of LTPAC data that could be prioritized for electronic HIE;
 - Use of HIT standards by the sites to support HIE; and
 - Overall findings, challenges and opportunities to advance HIE.

4.1. Summary of Site Visits

HIE has been a long-standing practice between LTPAC and other health care providers both at transitions of care and in support of shared care. The sites evaluated expressed the importance of timely, complete and accurate information for improved care coordination programs including integration of community services. Currently they use many ways to communicate and/or share information such as face-to-face, telephone, fax/e-fax, e-mail, secure messaging, access to hospital EHR systems and use of a community HIEO. Two of the three sites (Beechwood Homes and EMHC) were participating in HIEOs.

The sites visited identified drivers that helped to advance more efficient, electronic HIE to support new processes, models of care and payment. Specifically, new initiatives resulting from the Affordable Care Act and other government programs were identified as providing either the impetus or funding to improve care coordination and/or some HIT infrastructure improvements. Two sites evaluated (Rush and EMHC which are IDSSs) have multiple care manager programs such as hospital discharge planners, primary care managers and community care teams (CCTs). Both sites have care managers supporting coordination of post-hospital care including LTSS community services. They also hold regular care team meetings across multiple provider sites to improve communication, coordination, and care planning.

Summary findings from the three site visits are described below and include an overview of each site, identification of the policy drivers for improved HIE practices, an overview of the HIE and EHR tools used, and a summary of the exchange activities. Detailed site visit summaries are included in Appendix H, Appendix I, and Appendix J.

4.1.1. Rush University Medical Center, Transition of Care Programs

Background

Rush University Medical Center (Rush) is part of the Rush System for Health, an IDS with hospitals and ambulatory care practices. Rush is an urban hospital located in downtown Chicago, Illinois with multiple programs focused on improving care transitions including improving transitions with SNFs and HHAs, and programs focused on reducing hospital readmissions and care coordination with community-based services.

A key components of Rush's Facility Transitions in Care and Bridge Programs is coordination with community-based LTSS. Through a patient-centered approach, Rush works to improve care transitions through intensive care coordination that starts in the hospital and continues into the community. The multidisciplinary health care team is extended beyond the hospital's physicians, nurses, pharmacists, and case managers to include the community resource team (therapists and community providers such as home health, SNFs, and other services). The team identifies and addresses the services and resources needed by the patient and works to eliminate barriers that will prevent them from safely transitioning back to the community and meeting their health care goals.

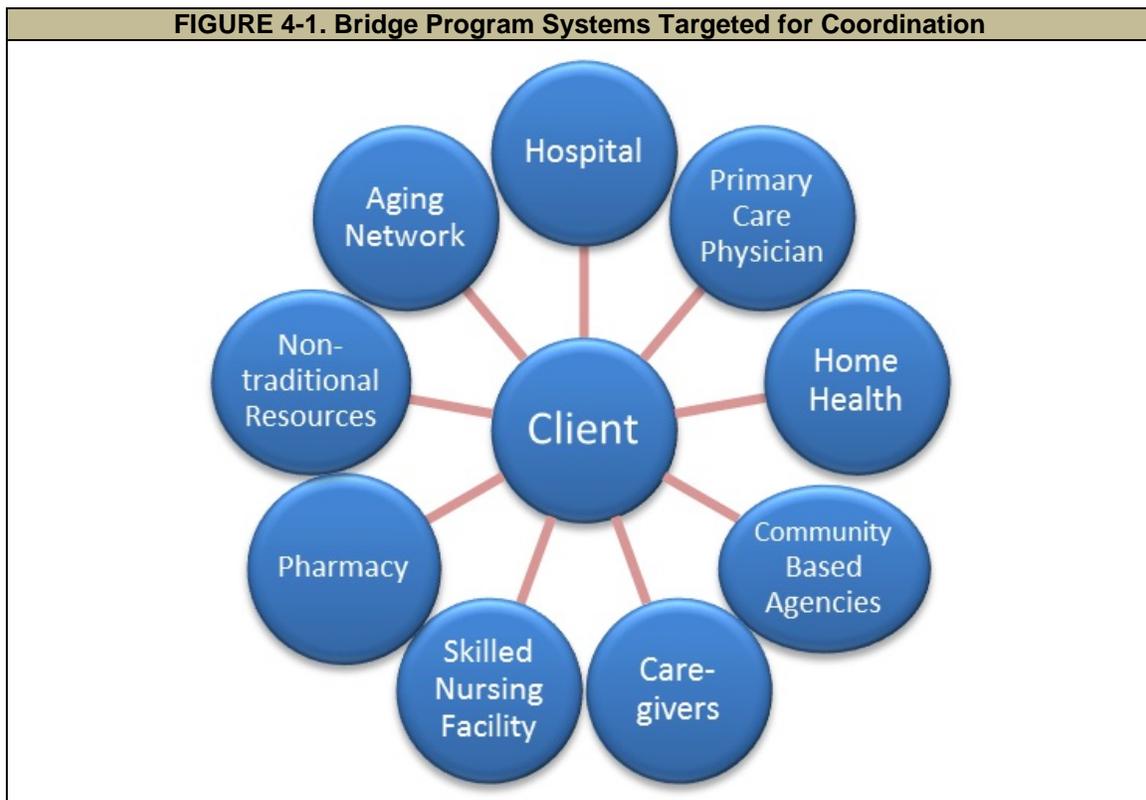
Grants, Policy Drivers and Other Funding Models Advancing HIE

The transition of care programs at Rush have focused on Medicare beneficiaries only. However, Rush has emerging programs that will extend their transition programs to adults of all ages who have chronic conditions. Rush has worked to improve the care transition process for more than 5 years. More recently, two programs -- the CMS Hospital Readmission Reduction Program and CMS CCTP have spurred initiatives to improve processes, communication and information sharing between the hospital and community partners.

- CMS Hospital Readmission Reduction Programs: In response to the CMS program, Rush implemented the Readmission Reduction Project RED Pilot to reduce the number of readmissions and maintain an overall readmission rate of less than 12.3%. At the time of the site visit in April 2013, they had identified interventions and started their pilot project. Interventions related to LTPAC to reduce hospital readmissions include improved coordination and communication prior to hospital discharge (such as participation of LTPAC providers in discharge planning rounds), better access to hospital EHR data to facilitate transitions, and development of post-discharge protocols. Protocols or processes developed include:
 - A home care nurse visit within 24 hours after discharge (same day if possible).

- A physician visit to the SNF within 48 hours after discharge.
 - Social work followup with community services within 24-48 hours to ensure services were started.
- CMS CCTP (3026 Program): Rush is a partner in the Illinois Transitional Care Consortium (ITCC) which is currently participating in the CMS funded CCTP.

The ITCC is deploying the Bridge Program to help manage community-based care transitions. With this program Medicare beneficiaries who have at least one chronic condition requiring followup care and are at risk for rehospitalization are assigned a Bridge care coordinator (BCC). Upon discharge from the hospital, the BCC assists the patient with engaging community services and resources for a 30-day period. Figure 4-1 depicts the providers and services targeted for coordination. The BCCs frequently access, share, and exchange health information to coordinate community services to assess the patient’s needs, communicate with care managers, and coordinate community services.



At the time of the site visit, Rush was not involved in any of the new payment models (such as an ACO or bundled payment), however they are exploring future accountable care arrangements.

Community HIE Organization

The State of Illinois is developing a federated model for their HIEO using a record locator service that will reach out to regions and bundle and route information. The Chicago-area region does not currently have an operational HIEO to facilitate automated, electronic exchange of information. However, Rush staff indicated one is under development with an organizational structure in place and software selected.

Summary of EHR and HIT Systems and Development Plans Related to HIE

Rush University Medical System uses the EPIC EHR system for all patient care documentation in the hospital and ambulatory care sites. EPIC has achieved MU Stage 2 certification for its ambulatory and inpatient applications.ⁱ

HIE from hospital to LTPAC/LTSS providers relies on multiple methods to communicate and exchange information including telephone, fax/e-fax, secure e-mail, and the use of a proprietary electronic referral application (e.g., Allscripts Care Management application). Some Chicago-area hospitals allow LTPAC providers to access their EHR to facilitate communication and information sharing; however, Rush's policy limits EHR access to only staff and physicians and does not allow access to non-affiliated providers such as LTPAC and LTSS providers.

The Allscripts Care Management application facilitates the electronic exchange of some health information (e.g., unstructured narrative messages as well as medical record document attachments) between Rush and their community partners including LTPAC organizations. The community partners who pay a subscription fee and use the Allscripts application can receive messages and attachments from Rush and pull some of the information into their EHR.

Health Information Routinely Exchanged

Clinical, demographic and service information is communicated by hospital case managers and care coordinators to community providers such as HHAs, SNFs, and/or HCBS providers. They use a number of methods to communicate and share information including face-to-face, telephone, fax/e-fax, e-mail, secure messaging, and Allscripts care management application. The lack of HIE tools and an HIEO are a challenge for Rush and their partners. Rush's exchange of health information with LTPAC providers and other community partners typically occurs during the transition of care and followup process. Section 4.2 in this report and Appendix K provide additional information on information routinely exchanged.

ⁱ Epic MU Stage 2 Certification Details: <http://www.epic.com/software-certification.php>.

4.1.2. Beechwood Homes, Getzville, New York

Background

Beechwood Continuing Care is a non-profit, long-term care community in the greater Buffalo, Western New York area. The community comprises independent living, assisted living, and rehabilitative/SNF services. The site visit conducted as part of this study focused on Beechwood Homes (Beechwood), a 272-bed nursing and rehabilitation facility with specialty units in early dementia, hospice, and rehabilitation. Its specialty rehabilitation unit, Wesley Rehabilitation Center, is designed specifically for residents with intensive, short-term rehabilitation or complex medical needs. Beechwood has embraced a patient-centered quality of life focus and is undergoing a transformation to a household environment rather than nursing units.

To deliver short and long-term care to its residents, Beechwood coordinates care and services with a number of health care professionals and community partners including physicians, local hospitals, ancillary services providers including pharmacies, labs and radiology, health plans, and other LTPAC providers. Beechwood has begun participating in the Western New York regional HIEO, HEALTHeLINK, which is advancing electronic information exchange capabilities in the area.

Grants, Policy Drivers and Other Funding Models Advancing HIE

Beechwood's payer mix is primarily Medicaid, Medicare, and Medicare managed care. They also have a limited percentage of private pay and insurance in their payer mix. Beechwood is not participating in any of the emerging payment models that could potentially advance HIE capabilities; however, the Western New York Beacon Community did provide grant funding for the interface costs to connect Beechwood to the regional HIEO. Both the Beacon grant and hospital readmission reduction initiatives helped to spearhead a focus on HIE practices including ways to improve practices and information sharing between the hospital and community partners.

- **Reducing Hospital Admissions/Readmissions.** Although the CMS Hospital Readmission Reduction Program applies to hospitals, Beechwood continuously monitors their readmission rates and clinical processes to reduce unnecessary hospital transfers. Beechwood uses the INTERACTII program to assess and manage residents' change in condition. Standardized INTERACT protocols include checklists and documentation used by Beechwood to support communication between the attending physician and the receiving hospital should transfer to the hospital be warranted.
- **ONC Beacon Grants.** Beechwood was selected as one of five LTPAC partners in the Western New York Beacon Community. The Western New York Beacon Community's efforts are focused on improving clinical outcomes and patient safety through HIT and HIE. The Beacon grant supported the interface costs to connect the LTPAC vendors to the regional HIEO to send ADT alerts for a

resident. In addition to Beechwood's hospital-SNF transfer initiative described above, the Western New York Beacon Community has identified four long-term care use case priorities for 2013:

- Lab and radiology results delivery from lab and radiology providers to Beechwood's EHR through HIE (currently in process).
- Care planning and regulatory requirements after admission acceptance including current data available, data/forms needed, responsible parties, and training needs (currently in process).
- Access to data needed for admission criteria including trigger mechanisms, data available/needed, responsible parties and training (completed).
- Patient preference notification (future consideration).

Community HIE Organization

As noted above, Beechwood participates in HEALTHeLINK the regional Western New York HIEO. There are more than 2,900 providers^j participating in the HIEO with 35 of those providers^k submitting clinical data. The data available includes: ADT alerts, radiology reports, radiology images, labs, transcribed reports (such as an H&P, discharge summary, operative report), ED reports, medication history data, and diabetic measures. HEALTHeLINK obtains its medication history from SureScripts^l and recently began receiving medication data from Buffalo Pharmacies (which is Beechwood's long-term care pharmacy). Buffalo Pharmacies is sending data on Beechwood residents including the resident name, drug name and strength, directions for use, quantity dispensed, date dispensed, and the prescriber.

Health care providers including Beechwood access patient information on HEALTHeLINK using the Virtual Health Record (VHR) portal. Any provider in the region who has signed a participation agreement and has Internet access can use the VHR. Providers may choose to get results delivered from HEALTHeLINK. Currently, Beechwood sends ADT alerts and is working on an interface to have lab and radiology reports delivered through HEALTHeLINK directly to their EHR system.

Summary of EHR and HIT systems and Development Plans Related to HIE

Beechwood has an EHR system, Answers on Demand (AOD), to support the clinical, billing, and administrative operations of their organization. AOD has been certified as an EHR module under the ONC Certification Program for MU Stage 1

^j Health care professionals include physicians, nurse practitioners, physician assistants, chiropractors, nurses, pharmacists, and dentists.

^k Health care providers include hospitals, regional reference labs, regional radiology, telemonitoring sources (home health), long-term care facilities, and medication history sources.

^l SureScripts is a company that operates the nation's largest electronic e-prescribing network, linking pharmacies and health care providers to make the prescribing process safer and more efficient.

program.^m Consistent with Stage 1 certification, the AOD systems have the capability to create, export, and import a patient summary record (using the HL7 C32 CCD standard). However, at this time, Beechwood does not use this functionality due to workflow issues.

Beechwood has electronic, secure access to area hospital EHR systems (or a special shared drive) to support the information gathering and communication process at transition from the hospital. They also access patient health information electronically through HEALTHeLINK's VHR. The information accessed from the HIEO is used to support the admission assessment and care planning processes such as past medical history and recent hospital reports including the discharge summary. As noted above, Beechwood only sends ADT alerts to the HIEO and is working on receiving lab and radiology report results using a standard interface to their EHR. Beechwood does not send information electronically to hospitals and other community providers.

Beechwood developed a physician portal to their EHR to streamline sending their resident's health information to the physician for signature. Physicians log into the AOD system to access records that require their review and signature. Physicians can also review the resident's medical record and write progress notes and orders (e.g., medication, treatment, others). In 2013, Beechwood plans to automate physician order communication with the pharmacy by entering physician orders into the AOD system which are then transmitted to the pharmacy order entry system.

Health Information Routinely Exchanged

Beechwood regularly exchanges information with non-affiliated community health care partners including local hospitals, physician practices, labs, pharmacies, radiology/imaging, SNFs, HHAs, and hospice providers. They use many ways to communicate and share information such as face-to-face, telephone, fax/e-fax, e-mail, mail. In addition they use secure messaging, access to hospital EHR systems, and use of a community HIEO. Health information is communicated and shared at transitions of care and continuously during a resident's stay. Section 4.2 in this report and Appendix K provide additional information on the information routinely exchanged.

4.1.3. *Maine HomeCare, Bangor, Maine*

Background

EMHC is the home care and hospice division of the EMHS. The health system is an IDS with hospitals, ambulatory care practices, LTPAC providers (home health, hospice, SNFs, and assisted living) and ancillary services. The home care division includes three agencies and seven offices serving both urban and rural areas covering two-thirds of Maine. EMHC also provides telehealth services to patients in the health system and has been successful in reducing hospital admissions and ED visits.

^m See <http://www.aodsoftware.com/content/news/aod-software-answers-ehr-receives-onc-atcb-20112012-modular-certification>.

EMHS is both an innovator and a leader in health care having received grants to test new models of care and payment, and industry awards and recognitions. HIT has been a key factor in supporting their innovative practices and a strategy to manage health care for a population that covers a large urban and rural geography. The State of Maine has an operational statewide HIEO, called HealthInfoNet (HIN). Both the EMHS and EMHC participate in HIN.

Grants, Policy Drivers and Other Funding Models Advancing HIE

Medicare is the primary payer for both the Eastern Maine HHAs and hospice providers (approximately 75% of their payer mix collectively). Medicaid, private insurance and self-pay make up the remainder of the EMHC payer mix. The EMHS has received grants and other funding to test new models of care and payment specifically through improved care coordination and case management including community services. The grants have supported a number of programs and HIT enhancements to facilitate communication and coordination.

As described below, EMHS participates in several grants, new payment models and policy initiatives that have driven improvements in the HIT infrastructure supporting communication and care coordination across providers and services:

- **CMS Hospital Readmission Reduction Programs.** The EMHS focuses on reducing hospital readmissions not only to comply with the CMS program requirements, but also as a way to improve quality of care and reduce costs. To reduce hospital readmissions, the hospital and LTPAC providers are improving coordination and communication prior to discharge; access was improved to hospital EHR data to facilitate transitions; case management/care coordination meetings are occurring across health care settings and with community service providers, and the telehealth is used to monitor the clinical status of targeted high-risk populations.
- **ONC Beacon Grants.** EMHS received an ONC Beacon Community grants funded by the ONC to build and strengthen local HIT infrastructure and test innovative approaches to make measurable improvements in health, care and costs.

The Bangor Beacon Community's grant helped to support a HIT infrastructure used for testing new accountable care and payment models and manage patient populations. The goals of the Bangor Beacon Community grant were to use HIT effectively to improve the health of people with select chronic diseases, reduce costs associated with hospital admissions and ED visits, reduce variations in care, and improve population health related to immunizations and sharing immunization data.ⁿ

ⁿ See <http://www.healthit.gov/policy-researchers-implementers/bangor-beacon-community>.

The Beacon grant supported the acquisition of a single EHR application across the multiple home care agencies in the EMHC division, which improved information access and sharing. The grant also supported the acquisition of new telehealth equipment to expand the program and its use for monitoring the target population. It also supported expansion of the Maine HIEO, HIN, to include submission of selected home care data to the exchange (ADT alerts and the home care POC).

- **U.S. Department of Agriculture (USDA) Grant to Expand Telehealth.** One of EMHC's agencies in rural Maine received a \$50,000 federal grant from the USDA's Rural Utilities Service to expand its telehealth program with matching funds. The agency was able to purchase an additional 28 telehealth units.
- **New Care and Payment Model Programs to Advance Care Coordination and Reduce Costs.** EMHS is currently participating in two programs to test the development of new care delivery and payment models to improve care coordination and reduce costs.

- Pioneer ACO:

EMHS was selected as one of 32 ACOs under this Center for Medicare and Medicaid Innovation (CMMI) initiative. Under this 3-year arrangement with CMS, the EMHS ACO shares Medicare savings in year 1 and moves to a capitated rate per beneficiary in years 2 and 3 if they meet the following reporting and/or performance requirement:

1. **1st Performance Year.** Report 33 measures to share in up to 50% or 60% (depending on their model) of Medicare shavings.
2. **2nd Performance Year.** Report eight measures and be paid for performance on 25 measures.
3. **3rd Performance Year.** Paid for performance on 32 measures and paid for reporting on one survey measure related to functional status.

The 33 quality measures used to assess performance have been endorsed by the NQF and are reported across all 32 Pioneer ACOs. Appendix L provides a detailed list of these measures, along with the NQF measure identifier and corresponding data submission requirement. The primary domains for the 33 measures are patient/caregiver experience, care coordination/patient safety, preventive health, and at-risk populations.

EMHS developed its HIT infrastructure over time. The HIT infrastructure provides the ability to manage the health for their population. This includes initiatives to use the same EHR applications across its HHAs, expand Maine's HIEO, and expand home care's use of telehealth. Care coordination initiatives have also been implemented to manage the

population's health and reduce costs. The care coordination initiatives include: use of primary care managers through the PCMH, and CCTs to help engage appropriate HCBS for patients in need; and implementing regular care coordination meetings across the sites of care including LTPAC and LTSS.

– PCMHs:

In addition to being a Pioneer ACO, EMHS also participates in two PCMH projects. The State of Maine established 22 PCMH projects and CMS demonstration project for Multi-Payer Advanced Primary Care Practice.

The PCMHs are reimbursed by three types of payers: Medicare, MaineCare, the state Medicaid Program, and commercial insurers. Medicare and MaineCare pay \$7 per member per month for care management in the medical home and \$3 per member per month for community-based care management. Maine is projecting it will achieve budget-neutrality by decreasing patient inpatient admissions by 6%-7%, decreasing ED visits by 5%, and decreasing specialty consultations and imaging by 5%.

In EMHS's PCMH, a patient care manager is embedded in the primary care clinic to work directly with individuals and their care team to develop a personalized POC. They partner with applicable care providers and care coordination teams across settings such as inpatient care managers, cardiology care managers, mental health care managers, home care and home health service and palliative care to manage risk, costs and transitions. The personalized POC includes individualized services, custom plans based on patient needs, co-management goals, and self-management plans. The patient care managers also perform outreach to other services and providers such as community-based services and LTPAC providers. Accessing updated electronic information and ADT alerts through the HIEO, sharing information with health care providers and coordinating community-based services are all crucial to the coordination of care efforts of the PCMH.

Community HIE Organization

Maine has a statewide HIEO known as HIN, an independent, non-profit organization that was established as the state's HIE in 2006. HIN has been operational exchanging clinical data since June 2009. In 2010, Maine received grants from several sources to expand the technology infrastructure including a state HIE Collaborative grant, an ONC Regional Extension Center (REC) grant (HIN is the REC), and the Beacon Community grant.

All 38 of Maine's acute care hospitals are under contract to connect to the HIEO. HIN has connected 34 of the 38 hospitals, 376 ambulatory provider sites including primary and specialty care practices, all/some FQHCs, 12 mental health agencies, two HHAs (both are part of IDSs) and two long-term care providers. The information available on HIN includes patient demographics, medications, medication history, allergies, lab and test results, vital signs, image reports, transcribed reports, problem lists, and ADT alerts.

EMHC participates in HIN by sending electronic ADT alerts and home care plans of care, and accessing electronic information to support start of care, assessment and care planning activities. A future project is planned to transmit the home health lab results to HIN and medication information from Miller Pharmacy which provides medications to EMHS's SNFs.

Summary of EHR and HIT Systems and Development Plans Related to HIE

EMHS has multiple software applications supporting their operations. The EMHC division does not use the same EHR application as the health system hospitals and physician practices. The hospitals and physicians use the Cerner EHR application. The home care division uses the McKesson Horizon Homecare application. Cerner has an application known as PowerChart that supports organizations with multiple entities. PowerChart provides quick access and viewing of the most frequently used and/or clinically relevant information.

EMHC currently uses Phillips Healthcare Telehealth Solutions as their telehealth vendor. The telehealth tools include in-home devices (a base unit and the measurement device) and a cloud-based software application.^o The telehealth data collected includes clinical data, questionnaire responses, and risk screen results. EMHC is currently working on an interface to bring the telehealth data into the agency's EHR system.

EMHC is in the process of developing a physician portal to the HHA's EHR to streamline the process of sending their patient's health information to the physician for signature. Physicians will log into the McKesson EHR system to access the records that require review and signature. Once implemented, physicians will have the capability to review other patient medical record information and write progress notes and orders (medication, treatment or other types).

Health Information Routinely Exchanged

As an IDS, EMHS maintains an IT network that allows affiliated providers to access information in different EHR systems and through PowerChart. EMHC also exchanges information with non-affiliated partners including hospitals, physician practices, community service providers, and other LTPAC providers primarily through telephone, e-fax, and secure e-mail. HIN provides another source of information on

^o See <http://www.healthcare.philips.com/goto/telemonitoring>.

patients which is particularly useful for background information at the start of care/assessment process. Health information is routinely be communicated and shared at transition of care process and continuously during a patient's stay. Section 4.2.1 in this report and Appendix J provide additional information on the information routinely exchanged.

4.2. Synthesis of Health Information Exchange Findings from Site Visits

The exchange of health information is a critical function in the delivery of care to patients in LTPAC organizations. All three site visits identified multiple clinical and administrative processes requiring the exchange of information. LTPAC providers and their partners use many different methods to exchange information -- face-to-face communication, telephone, fax, e-mail, access to EHR systems, and HIEOs.

A number of findings are consistent across the three site visit locations:

- LTPAC organizations are beginning to use electronic HIE, but in a very limited way.
- Communication and sharing of information occurs in multiple ways to support transitions and shared care. Increasing the use of electronic HIE methods will improve the timeliness and efficiency of communication, although it cannot completely replace face-to-face and telephone communication between health care providers.
- While HIEOs have some content that is useful for background information for admission, assessment, and care planning purposes, LTPAC providers require detailed medical record data prior to admission including narrative progress notes, assessments, and current medications that reflect changes. Access to the hospital EHR system often provides more timely and detailed information than what is currently available from HIEOs (as observed at two sites) to support the transfer of care process.
- The two sites that are IDSs have community care coordination programs to achieve improved health outcomes for specific target populations, and focus on reductions in ED use and hospital readmissions, as well as the costs of care. Community care coordinators and teams work with HCBS providers, with communication primarily by telephone and fax. There may be opportunities for improved efficiency through the use of HIEOs by and other electronic communication with home and community-based providers; however, these types of providers are not currently participants of the HIEOs.
- Some HIT messaging standards are embedded in LTPAC EHR systems and sometimes used to connect these providers with HIEOs. Further, the

interoperability standards in Stage 2 of the EHR Incentive Programs (which will support more robust HIE for transitions in care or shared care with LTPAC/LTSS providers) are not yet used. Many of the standards required through the EHR Incentive Programs could be used to support HIE with and by LTPAC providers, but integration and use of these standards into LTPAC EHR products often requires additional investment of time, financial resources, and organizational awareness. Some standards are still early in their maturity level requiring a significant level of effort to implement.

A synthesis of the HIE findings from the three sites is summarized below using the framework developed for this project. The synthesis describes exchange activities to support transition of care, shared care, and other administrative functions from the perspective of the LTPAC organization. An expanded analysis of 35 identified information exchange workflows is detailed in Appendix K.

4.2.1. Health Information Exchange for Transition of Care

Health information is shared and exchanged to support a number of care processes as a patient transitions between care providers. The type of data shared to support transitions in care and the methods of exchange are summarized below. During transitions, information is typically exchanged face-to-face, by telephone, fax, and on some occasions, electronically.

- **Referral and Preadmission Assessment.** The information typically exchanged during referral and for preadmission assessments includes patient demographics, problems/diagnoses, medications, allergies, treatment orders, activity level, diet, isolation precautions, labs, progress notes (e.g., 3 days of narrative notes), recent H&P, operative reports and pertinent assessments/evaluations including cognitive and functional status. The referral and preadmission assessment information is exchanged using multiple methods -- face-to-face meetings potentially including participation in hospital discharge planning rounds, telephone, fax, access to the hospital EHR (depending on hospital policy) and if available access to community HIEOs.
- **Referral for Community Services.** The community care coordinators obtain information on patient goals and care plan information, patient demographics, problems/diagnoses, medications, allergies, treatment orders, progress notes, recent history, and physical and pertinent assessments/evaluations such as a cognitive status exam and functional status assessments. Setting up community services requires the exchange of information unique to the service provider. Typical information includes demographic and payer information, services requested, and when relevant, clinical information such as diagnosis and medications.

If the community care coordinator is an employee of the IDS, they access that information from the EHR system (hospital or physician practice) and

communicate that information with the HCBS provider, typically by telephone, fax, and sometimes e-mail. If the community care coordinator is not an employee (e.g., they provide community care coordination through an AAA/Aging and Disability Resource Center (ADRC)), they have additional challenges in obtaining the necessary information from the hospital discharge planners by telephone or fax and relaying the information to HCBS providers by telephone, fax, and e-mail at times. In the Rush CCTP funded by CMS (discussed in the Rush Site Visit report in Appendix H), some of the BCCs are employees of organizations like the AAA and ADRC and are able to make special arrangements to access the hospital EHR to obtain necessary information on the patient.

- **Transfer/Admission to LTPAC.** The transferring provider (often an acute care hospital) sends a comprehensive set of updated health information at the point of transfer. The information may include an order for discharge to the LTPAC provider, a transfer summary, medication orders, updated medication administration records, treatment orders, key lab results, discharge summary, recent progress notes, special nursing care instructions (e.g., ostomy, wound, catheter care, dressings, IV), fall risk assessments, rehab/restorative progress and treatment plans, infection control/safety precautions, equipment and supplies needed, advanced directives and/or limited treatment orders and followup care contact information. The transferring provider usually communicates this information via paper documents, telephone, and fax. For hospital transfers, some information may be accessed by the LTPAC provider directly from the hospital EHR prior to admission when security measures and protocols have been established between the organizations.
- **Transfer to Hospital or Another Health Care Provider from LTPAC.** The LTPAC provider sends a comprehensive set of updated information at the point of transfer with the patient when they go to the hospital or to another health care setting. This information typically includes a transfer summary (which includes diagnosis/problems, medication orders, treatment orders, allergies, vital signs, functional and cognitive assessment data), pertinent recent labs, recent narrative progress notes, copies of current medication administration records, and advanced directive/do not resuscitate (DNR) orders. SNFs may send the items identified in the INTERACTII protocols when sending the patient to the hospital (e.g., transfer form, SBAR/nurses notes, recent physician orders and current medications, advanced directives). When sending to another LTPAC organization, they may also send the latest MDS or OASIS data set. This information is typically sent in paper format.
- **Discharge Information from LTPAC Provider to Patient and Community Service Provider.** When patients are discharged from LTPAC they are provided with a detailed discharge POC and instructions including information on discharge medications, self-care instructions, and followup care. As part of the discharge planning process, the LTPAC provider may also assist the patient with identifying and setting up community-based services to support a successful

transition. In these circumstances, the discharging LTPAC provider typically communicates this information via telephone, fax, and sometimes e-mail to the community-based service provider.

- **ADT Event Reporting to HIEOs.** The two sites that participated in an HIEO electronically transmitted and received ADT events via an electronic interface with the HIE. The events reported included the patient identifier, the event (admission or discharge/transfer), date, and time. HIEOs use the ADT event reports to monitor changes and alert other treatment providers to a change in status.

4.2.2. Health Information Exchange for Shared Care

LTPAC providers frequently coordinate and share care with other health care and service providers. When sharing care, there are related HIE processes to support assessment, care planning, and ongoing monitoring. A summary of HIE activities to support shared care is described below along with the type of data shared. During instances of shared care, information is typically exchanged by telephone, fax/e-fax, or electronically such as via secure e-mail, use of HIEOs, or customized portals/data entry processes when available.

- **Assess Needs and Goals.** There are multiple processes related to assessing needs and goals at the start of care that require HIE.
 - Initial assessment and development of admission care plan (such as at times of hospital discharge): To complete the assessment and initial care plan development, nurses, therapists and other interdisciplinary team members require recent hospital information and past medical history information to evaluate the patient. Information needed includes the hospital discharge summary, recent H&P, operative report, recent labs, summary of care records, past assessments, social history, and advanced directives. Typically, LTPAC receives the information needed to help complete the initial assessment and develop the admission POC via paper copies sent with the patient or via fax or telephone. In some cases, LTPAC providers electronically access the hospital EHR (if protocols have been established) and/or the HIEO. Medical record information needed, but not exchanged by the hospital or available from the HIEO must be requested from the hospital (e.g., discharge summary not sent at transfer) and is typically received via mail.
 - Coordination with physician at start of care: The admission transfer summary, physician orders, medications, treatment orders, therapy evaluation, and home care POC content are all reviewed and signed by the physician. For a SNF patient, the physician completes a face-to-face visit, documents a progress note, and reviews and signs the POC and physician orders. Two sites were implementing customized physician portals to the

LTPAC EHR to streamline information exchange. The physician logs into the LTPAC EHR portal to access and review patient information and sign their orders. When an HIEO was available with medication history information, it could be accessed electronically to help with the admission medication reconciliation process, although not a guaranteed source of complete medication history information.

- Communication with pharmacy, lab, and other service providers: The LTPAC provider communicates physician admission orders to the pharmacy, lab and/or other service providers as appropriate. Data exchanged includes demographic and payer information and the detailed orders for medications or services. Typically this is done via telephone, fax or custom web-based portal set up by the pharmacy or lab/radiology service provider. Results received from lab and radiology providers were sent via fax, dedicated printer to LTPAC, or available on the provider's web portal. One HIEO, HIN, was establishing an interface to route results from the lab/radiology provider through the HIE to the SNF's EHR using HL7 results reporting message standards.
- **Create, Maintain, Update, and Implement Care Plan.** After initial assessment, a care plan is established and maintained over time. The care plan is typically developed by the interdisciplinary team and communicated to the attending physician and the patient/family initially and with updates. The physician may review the POC during routine patient visits to a SNF. In home care, the care plan updates are communicated via the home care POC document. Care plan information and updates are communicated to the family in person, via telephone or through a narrative summary mailed to the representative.
- **Monitor, Followup and Respond to Change.** LTPAC providers monitor the ongoing care needs of patients, respond to changes in the patient's condition and followup on care and services required. HIE is required to support multiple care processes.
 - Transmission of telehealth data: Patient's transmit telehealth data from their device and base station in their home to a cloud-based application. The telehealth nurse in home care accesses clinical data including blood pressure, weight, blood sugar, pulse, oxygen saturations, and responses to individualized questions. Home care nurses monitor the telehealth data on the cloud-based telehealth system. The data was not available in the home care EHR (although an interface was being developed at one site). The use of telehealth in an SNF was not observed during the site visits. EMHS had a telepsychiatry pilot program that could not be maintained due to reimbursement issues.
 - Ongoing communication and coordination with physicians: LTPAC providers update the physician with status changes. Information exchanged includes

test results, requests for new or revised orders, telephone orders, physician order renewals, home care POC recertification, and physician visit progress notes. These types of updates occur by telephone, fax, and/or secure e-mail. Two sites established physician portals to their LTPAC EHRs to facilitate the review and signature process.

- Order changes for medications, labs, and radiology tests: When the LTPAC provider communicates change in patient status, the LTPAC provider may obtain from the physician a new order or an order to change a medication (or another intervention). The LTPAC provider typically receives these order changes verbally from the physician via telephone. The physician signs the telephone orders in person, sent via mail, or through the physician portal to the LTPAC EHR.
- For SNFs, there is also a communication process in which medication and other order changes are sent to the long-term care pharmacy. The pharmacy receives the physician order information from the SNF, often via telephone or fax. The pharmacy verifies the medication prescription with the ordering physician. The long-term care pharmacy enters the order in the pharmacy's electronic medication order system and dispenses the medications to the SNF.
- New or changed orders for labs and radiology tests are communicated via telephone, fax, or through a custom web portal as a requisition to the appropriate ancillary service provider by the LTPAC provider. In home care, the nurse may draw the lab. In a SNF, a facility nurse or lab technician draws the lab or gathers the specimen. Results are returned from the lab and radiology provider to the LTPAC provider often by fax or dedicated printers or custom web portal. In Western New York, the HIEO was in the process of developing and implementing an electronic results delivery process to route results from the lab/radiology service providers through the HIEO to the LTPAC EHR.
- **Change of Status and Updates with Patient and Family.** When there is a change in status, the patient and/or their family is notified by the LTPAC provider of the change and related care/treatment plans. This is frequently communicated in person, by telephone or e-mail based on preference.
- **Specialist Visits, Evaluations, and Referrals.** LTPAC providers may identify and schedule visits with specialists (cardiologist, audiologist, psychologist, etc.) or set up a referral for community services to support the patient in their home. Information is exchanged to set up the service including demographic, payer, and service requirements. When applicable, progress notes or visit summary records are shared with the LTPAC provider.

4.2.3. Other Administrative Health Information Exchange

LTPAC providers exchange health information in support of administrative processes such as billing and required reporting.

- **Quality Measure Reporting.** LTAPC sites are collecting and/or submitting quality measure data to support grants and initiatives. EMHS Pioneer ACO is required to report 33 quality or performance measures electronically to CMS (see Appendix L for detailed measures). The data is collected through various mechanisms depending on the data elements -- through the EHR or abstracted from medical records and reported through a defined facility process.

CMS also requires electronic submission of federally mandated data or item sets (MDS, OASIS, inpatient rehabilitation facility-patient assessment instrument [IRF-PAI], Hospice Item Sets,^p LTCH Care Data Set^q). The CMS electronic transmission requirements for assessments do not leverage available HIT standards. CMS uses assessment data for several purposes including calculating quality measures.

- **Mandatory Reporting.** Public health authorities and state agencies may maintain registries or repositories for reportable public health data. The type of data to report varies by community and state. For example, immunization data or influenza and pneumonia data may be reportable information to public health agencies to detect outbreaks. Some states, such as New York, have customized electronic web portals to enter and submit reportable data.
- **Payment.** LTPAC providers may exchange electronic health information with payers to support their case management and claims adjudication processes. Payers may request, in electronic formats, relevant medical record documentation to assess continued coverage, validate services billed, or determine medical necessity. Requested documentation may include physician orders, certification/recertifications, progress notes, flow sheets, medication and treatment administration records, assessments, and other relevant data determined by the payer.

4.3. Summary of Electronic Health Information Exchange

Among the site visits (even in the most advanced) the information that is electronically available for exchange is limited and incomplete. LTPAC providers use multiple methods to share and exchange information frequently relying on mail, fax and

^p See <http://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Hospice-Quality-Reporting/Spotlight.html>.

^q See <http://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/LTCH-Quality-Reporting/Downloads/FAQsLTCHQRProgramv20.pdf>.

secure e-mail when data and documents are required to move from one provider to another. While the current state reflects these traditional forms of communication, trends emerged across all three sites where technology supported electronic information exchange.

- **EHR Access and Other Tools.** Some hospitals recognize the need of LTPAC providers and social worker/community care coordinators to have access to patient information in the hospital EHR both at preadmission and after admission. They have established agreements and secure protocols to either provide direct access to the hospital EHR or provide electronic data/documents on a dedicated network drive. One organization (Rush) uses a proprietary care management referral application that allows the secure, electronic exchange of unstructured notes and attachments to share information between providers who were subscribers of the service. Users of that application report it is helpful in sharing basic information; however, it does not provide two-way communication and is not as complete as access to the hospital EHR to support the preadmission and transfer or care process.
- **Physician Portals to LTPAC EHR.** Two of the sites (Beechwood and EMHC) developed physician portals to their respective EHR applications to streamline the exchange process with the attending physician. In both cases, the physician can log into the SNF or HHA EHR system and access their patient's information to review and sign (e.g., telephone orders, POC, etc.).
- **HIE Organizations.** Two of the sites (Beechwood and EMHC) have active HIEOs in their community. While the LTPAC providers can access their patient's information from the HIEO, there is very limited inclusion of LTPAC data on the exchange. LTPAC providers at both sites send and receive electronic ADT event notifications via an HL7 message standard. EMHC transmits to the HIEOs the home care POC via the HL7 results message standard, but the POC content is not standardized. Beechwood is developing an interface using the HL7 results message standard to receive electronic lab results from the lab through the HIEO to their EHR.

The type of information commonly available from the HIEOs includes: ADT events, problem list, prescription/medication history, allergy information, lab and other test results, vital signs, transcribed reports (e.g., hospital H&P and discharge summary), and visit summary records. While this information is useful in understanding the patient's history to support the assessment and care planning function, it does not include the type of information accessed from the hospital EHR on preadmission, which is needed to support the transfer of care/admission process for the LTPAC provider.

4.4. Summary of Long-Term and Post-Acute Care Data That Could be Prioritized for Electronic Health Information Exchange

LTPAC organizations have a frequent and ongoing need to exchange information -- both as a receiver and a sender. As noted, electronic HIE is beginning to occur, but primarily by allowing access by LTPAC providers to hospital and HIEO information. Minimal information has been requested from LTPAC providers for inclusion by the HIEO, or sent electronically from the LTPAC EHR directly to another provider's EHR.

The following list summarizes the type of information frequently provided by LTPAC organizations and exchanged with other health care providers. This health information can provide the basis for expansion of HIEOs' LTPAC content and/or HIT standards development efforts to facilitate interoperable exchange.

- Current demographic information.
- Transfer summary and/or discharge POC.
- Current problems/diagnoses.
- Medication and treatment orders.
- Recent medications administration records to show the what and when medications were given (at transition of care).
- Current allergies.
- Recent vital signs and trending reports.
- Telehealth data and trending reports.
- Recent immunization, lab, radiology, and other specialized test results.
- Recent narrative progress notes at transfer to assist clinical staff in hand-off of care.
- POC.
- Assessments such as cognitive function, physical function, fall risk, MDS, OASIS, etc. (depending on the receiver).
- Advanced directives and/or DNR order.
- Referral -- such as to community service/aging services to and/type of service requested and past history data.

- Immunization data.
- ADT events for HIEOs.

4.5. Use of Health Information Technology Standards to Support Interoperability and Exchange

Basic HIT and interoperability standards are sometimes used to support electronic HIE at the sites (e.g., use of HL7 version 2 messaging). One of the three sites (Rush) has an EHR vendor that is certified for Stage 2 of the EHR Incentive Programs, but demonstration of HIE with LTPAC providers outside of their network was not observed. None of the sites have implemented standards identified for Stage 2^r to support more robust HIE at times of transitions in care and for instances of shared care on behalf of persons receiving LTPAC/LTSS (because Stage 2 HIE requirements were not in effect at the time of the site visits). In addition, the focus has been on the application of these standards to providers eligible for the EHR Incentive Programs and there is a lack of awareness about the extensibility and applicability of these standards by and to LTPAC/LTSS providers.

Generally, HIE using the LTPAC EHR systems does not leverage HIT standards included in either Stage 1 or Stage 2 EHR Incentive Programs. For example, standards used to exchange information from LTPAC EHR systems used HL7 message standards (e.g., HL7 version 2.x) rather than document standards such as the CCD or CCDA. While many of the standards required by the EHR Incentive Programs could be used to support HIE with and by LTPAC providers, integration and use of these standards into LTPAC EHR products often requires additional investment of time, financial resources, and organizational awareness of the availability and applicability to support HIE. Further, some standards are still early in their maturity level requiring a significant level of effort to implement.

4.6. Findings, Challenges, and Opportunities Identified from Site Visits

A number of overall findings and impressions emerged from the three site visits which provide a snapshot of the current state of HIE by LTPAC to support the transition of care, shared care and care coordination processes. In addition, barriers to and opportunities for advancing HIE in LTPAC settings were also identified across the sites visited.

^r For example, HL7 CDA release 2 required in 2014 edition of the HIT Standards, Implementation Specifications, and Certification Criteria for Electronic Health Record Technology for MU Stage 2 of the EHR Incentive Programs.

Transitions of care are complicated and require a multipronged approach to communication and information exchange. LTPAC providers receiving the hand-off of care from hospitals or other providers must gather information from multiple sources using multiple communication/exchange methods to accurately start care, assess the patient, and develop an appropriate POC. Electronic HIE can create efficiency in the process and improve the timeliness and availability of health information; however, communication in person and by telephone will continue to be necessary to ensure a safe hand-off in care.

New care delivery and payment models are highlighting the importance of care coordination including community services. Programs and initiatives that focus on improved care coordination across settings are highlighting the importance of a HIT infrastructure and financial support for establishing and implementing such infrastructures. The CMS Hospital Readmission Reduction Initiative, CCTP, Beacon Community grants, PCMH programs, and Pioneer ACO all provided an impetus to support coordination and information exchange processes and some funding to advance HIT infrastructures.

Both Rush and EMHS have programs to extend care management and coordination that include community-based services to improve health outcomes and reduce costs. EMHS leaders indicated that care management services along with a HIT infrastructure were critical strategies for helping reach their QI measures and achieve cost savings as a Pioneer ACO. While community care coordinators are instrumental in the care management process, many of the LTSS service providers (e.g., transportation and meal services) are generally not part of HIE activities. Integration of LTSS and HCBS are important to achieving health care goals and outcomes (and are being tested as part of some CMMI initiatives) for high cost/high-risk populations. However, these HCBS/LTSS providers do not use EHR systems and are not on the radar as potential contributors or users of data from HIEOs. The information systems they do use are not interoperable, which contributes to using time-consuming telephone, paper, and fax.

Electronic HIE in LTPAC may be contingent on additional funding sources or policy initiatives. Initiatives to improve care coordination and breakdown the silos between health care providers through electronic HIE were often driven by new policies and funding models. As noted at the site visits, several types of programs and initiatives spurred care coordination and improved HIE practices. Informants at one of the visited sites indicated that additional funding will be needed to support electronic HIE to improve care coordination.

HIE organizations are evolving and the value proposition for LTPAC providers is just beginning to emerge and has not yet been realized. HIEOs are beginning to collect information from different providers including ancillary service providers and maintain this information in one consolidated location. However, at this time, the observed HIEOs do not provide a complete picture of the patient nor include the level of clinical data needed to support LTPAC processes around care transitions. The information needed by LTPAC providers to support the transition of care/admission

process requires detailed medical record data found in hospital EHRs. Timely access to HIEO data may be another limitation. A LTPAC provider's access to needed preadmission data may be delayed until a patient is admitted to LTPAC, a treatment relationship is established, and consent is obtained. Once the treatment relationship is established, information in the HIEO is often useful to LTPAC providers, particularly in terms of past medical history, services and medications. However, the data in the HIEO, while expanding, is currently not comprehensive; thus requiring other information sources to be accessed and information exchange methods to be used.

One of the emerging uses and potential values of the data maintained by HIEOs is the ability to perform population health analytics, which could support a variety of activities such as understanding health outcomes across populations, providers, service delivery models, advancing clinical decision support tools to support practices found to be effective, and supporting public health and safety. However, the realization of this value proposition was not observed during these site visits. The ability to perform these advanced analytics functions is contingent on several factors including the HIEO's structure and purpose, its technical infrastructure, the quality and comprehensiveness of their data, and the ability to reuse this data to support these analyses.

Adoption of electronic HIE applications by LTPAC providers is beginning, but interoperable exchange is non-existent. The primary mode of exchanging health information by LTPAC providers continues to be traditional methods -- telephone, fax, and secure e-mail with PDF attachments. New processes are emerging to improve the timely and efficient exchange of information including use of: secure access to the hospital EHR, shared network drives to house hospital information, proprietary electronic referral applications for subscribers to exchange information, customized portals for physicians to access LTPAC providers' EHRs, and access to community HIEOs.

When HIEOs are available, some LTPAC providers are participating, primarily by accessing medical history information after admission to assist in the assessment and care planning processes. In some limited instances, information is being sent from LTPAC providers to HIEOs (e.g., ADT messages and the home care POC). Some HIEOs such as HEALTHeLINK anticipate delivering results between ancillary service providers and LTPAC providers.

EHR applications used by LTPAC providers may include some basic HIT messaging standards (e.g., HL7 2.3 or 2.5); however, standards-based document exchange meeting MU Stage 2 requirements, such as the exchange of a patient summary record, was not observed to be sent or received by providers or the HIEO. When electronic exchange was implemented, the cost, complexity and lack of technology solutions that support "standardized", interoperable HIE were identified as barriers.

Quality and performance measure data are being collected. All three sites are collecting and reporting some type of quality/performance measurement data. None of

the three sites collected measures specific to HIE activities; however, timely exchange was identified by the sites as a factor that contributes to improved performance. The following list summarizes the focus of pertinent quality measures at the three sites:

- Number and rates of hospital admissions/readmissions over a period of time (e.g., for a SNF, home care, telehealth program).
- Hospital readmission rates for target populations related to the CMS Hospital Readmission Reduction program, Beacon Community grant, and/or identified high-risk/high cost populations.
- Mortality rates.
- Rates of physician followup completed within 30 days post-discharge.
- Increased understanding of medications and discharge POC.
- Decreased patient and caregiver stress.
- Nursing home placement rates.
- Clinical data reporting/measurement for target populations (e.g., completion of labs with certain values for diabetes patients).
- Cost of encounters for a target population.
- Average cost savings over a period of time for target populations in accountable care payment arrangements.
- Required CMS quality measurement/reporting data for SNFs, HHAs, and hospice.

As noted, EMHS collects 33 required quality measures as a Pioneer ACO (see Appendix J, Attachment J-1). EMHC also collects quality performance data on their telehealth program to quantify the reduction in ED, hospital admissions and associated costs. EMHS has been able to quantify a significant impact on key performance indicators and costs for the 167 patients in the telehealth program in 2012, reducing hospitalization and ED visits by an average of 65% for target diagnoses, resulting in an estimated \$2.1 million in health care savings. EMHC also reports that for every dollar invested in home care during the first year of the pilot, they saved \$3 as an ACO.

4.7. Barriers for Challenges to Advancing Health Information Exchange

The findings and observations above begin to highlight a number of barriers or challenges related to HIE and advancing its use by LTPAC providers and the expanded use of electronic HIE. This section describes the barriers or challenges that were identified by the site visit providers.

Medication Reconciliation Challenges at Transitions of Care/Admissions

All three sites identified medication reconciliation as one of their biggest challenges during transition of care. Hospital discharge medications must be reconciled with the patient's pre-hospital regime and post-hospital POC. Exacerbating the problem is often the lack of primary or attending physician's historical knowledge of the patient and their overall POC, and the lack of complete and accurate medication history information, even when a HIEO is available. For example, some HIEOs use SureScripts for filled prescription history data. The prescription information from HIEOs may not reflect all of a patient's prescriptions and whether the patient filled them. In some cases there is a lag time for a pharmacy to report the information to SureScripts. While the information is useful to LTPAC providers, it cannot be considered the complete and accurate trusted source. Because medication reconciliation is critically important for patient safety and continued care, improvements are needed to ensure safe hand-offs at transition from the hospital to the LTPAC provider.

Need for Improved Efficiency in HIE Between LTPAC Provider and Pharmacy

For SNFs, there is also a communication process in which medication and other order changes are sent to the long-term care pharmacy. However, this process is typically not supported through electronic, interoperable transmission. Both Western New York and Maine's HIEOs have begun work to address this gap by connecting a long-term care pharmacy to their exchange.

Lack of Efficient Exchange of Information Between LTPAC and Attending Physicians

During a patient's stay in LTPAC, these provider organizations must frequently exchange information with attending physicians for status changes and updates, order changes, obtaining signatures, POC and certification updates, etc. Typical exchange processes include photocopying, making printouts, or scanning medical record information to mail, fax and send via secure e-mail. However, these methods are labor intensive and highly inefficient for both providers. Two of the LTPAC sites (Beechwood and EMHC) developed physician portals to their EHR applications in lieu of interoperable exchange between the physicians' EHR and the LTPACs' EHR. While this is a first step toward improved efficiency and information access, it does not provide a process for the exchange of information from physician's EHR and the LTPAC provider's EHR. This is an important issue because both the LTPAC provider and

physician share responsibility for care and treatment, but the information continues to be maintained in silos, and is not reusable, resulting in data re-entry.

Even with Standards, Interfaces are not Easy to Implement and Must be Customized

As noted a number of times in this report, standards may be available, but they are challenging to use and require significant resources to implement. Barriers include the use of older standards which contributes to the need for vendors to support customized interfaces, the cost of developing the interfaces and the time to test and implement. While newer standards may facilitate exchange of information, one HIEO informant reported that some of the standards lack specificity, which has resulted in variations in implementation and requires that the HIEO transform reportedly “standardized” information into a consistent format. Further, vendors have been slow to adopt these newer standards, for several reasons including that they have not been tailored and tested for LTPAC implementation.

Lack of Awareness of HIE Standards

In general, there is little awareness among providers (including LTPAC providers) and others regarding the upcoming MU Stage 2 standards, or of the standards emerging through the S&I Framework or being balloted through HL7 to support the exchange of health information including on behalf of persons who receive LTPAC/LTSS services. In some cases there is awareness, but limited resources (time and money) to support implementation of these available/emerging standards. Several respondents, including representatives from HIEOs, health systems administrators, and LTPAC and other providers noted the lack of available resources to support various HIE implementations with LTPAC providers. Appendix L provides a table that identifies the standards that are available to support the types of LTPAC data frequently provided to or requested by other health care providers.

The findings from these site visits also informed opportunities to expand HIE to support care coordination for persons receiving LTPAC/LTSS, discussed in the next section.

4.8. Opportunities to Advance Health Information Exchange for Persons Receiving Long-Term and Post-Acute Care/Long-Term Services and Supports

The following opportunities were identified, based on the site visits, to advance the use of current state of information sharing and exchange involving LTPAC/LSSS.

Care Coordination for QIs and Reduced Costs must Engage LTPAC and LTSS

Health system transformation initiatives are placing focus on the need for improved information sharing and exchange capabilities. Findings from the site visits indicate that LTPAC and LTSS are instrumental in care coordination efforts to improve quality and reduce costs particularly for high-risk/high cost patient populations. For example, care coordination services across care settings and community services are important for improving quality of care and a key strategy for EMHS in achieving their needed health savings as an ACO. There are several opportunities that could support care coordination through information exchange related to these care delivery models including:

- The exchange of a patient-centered care plan can support care coordination across providers and care managers. Using the standard for care plans (being balloted by HL7 in the Fall 2013) could enable the interoperable exchange of care plans across team members and over time. The exchange of care plans can support continuity and quality of care, and align multiple care plans across health care providers. HIEOs can play a critical role in supporting the exchange and alignment of care plans. Further, access to care plans could enable population health analytics by HIEOs.
- Greater involvement of community-based services in HIE activities will support the care coordination models being developed. Integration of community-based services is identified as a key service to improve quality of care and reduce costs for target populations. Electronic exchange of basic health information (such as demographic, scheduling and messaging) with community-based service providers will improve continuity and coordination of care.
- The availability of electronic LTPAC assessment data creates an immediate opportunity for HIEOs to access data that is ubiquitous across LTPAC providers. MDS data is available for all patients in Medicare or Medicaid certified SNFs, OASIS data is available for all Medicare patients receiving home health services, and IRF-PAI data is available for Medicare covered patients in inpatient rehab facilities. HIEOs may want to explore how to include federally required patient assessment data in their network particularly if they are performing advanced population analytics to help support new delivery and payment models. The low-cost technology solutions could transform the assessment data into interoperable and reusable summary content.

Explore Expanded Information Sharing and HIE Options for LTPAC

The nature of care delivery by LTPAC providers requires the exchange of health information with clinical partners, the patient, family and other stakeholders. Many of the current HIE processes are labor intensive and inefficient. Over 35 HIE workflows were identified using the frameworks applied in this study to support transitions of care, shared care, and other administrative functions. There are multiple strategies that could

be explored to improve the HIE capabilities between LTPAC and other provider organizations such as the following:

- Exploring partnerships between non-affiliated organizations to allow authorized providers to view data in EHRs, support point-to-point information exchange between EHRs and/or expanded use of Direct secure e-mail messaging of non-interoperable health information.
- Identifying additional information, methods for obtaining this information, and opportunities to reuse the information to support care giving. For example, HIEOs at two of the sites identified pharmacies as a source of important electronic medication information. HIEOs could make available electronic medication information to LTPAC providers or pharmacies could deliver electronic medication directly to the LTPAC providers. Further, work is needed to explore the feasibility, benefits, and barriers of exchanging electronic medication information from pharmacies, including long-term care pharmacies.
- Increased emphasis on development and testing of HIT standards would ease the implementation of interoperable HIE across the continuum including by LTPAC/LTSS providers.

5. CONCLUSION

This report presents study findings from an environmental scan, literature review, key informants, and site visits, and was guided by frameworks to describe the state of HIE to support care coordination for persons receiving LTPAC/LTSS services and fill key information gaps. HIE includes both electronic and non-electronic exchange of health information. The study frameworks captured important use cases for and dimensions of HIE when used to support care coordination for LTPAC/LTSS. These frameworks can be applied to future studies and policy and standards activities to advance the use of HIE for LTPAC/LTSS.

Drivers and facilitators of and barriers to the use of HIE to support care coordination for persons receiving LTPAC/LTSS are identified, along with opportunities to address these barriers and challenges, and accelerate the adoption of HIE, including interoperable HIE.

This study highlights the importance of information exchange in care coordination. While there are many models for care coordination, the care coordination model used was found to be less significant than a close working relationship between providers, care coordinators and patients and the exchange of timely, key information. A key component of programs and interventions identified in this study to support care coordination is the communication of critical information, using electronic and other means.

However, health information is siloed and often not shared, or shared in a timely manner across providers/caregivers or between health information systems. This lack of timely HIE results in poor continuity and coordination of care, safety and quality problems, redundancies in tests and other services, avoidable ED and hospital admissions, and associated avoidable costs.

LTSS Providers as Key Partners in Care Coordination

LTSS providers along with LTPAC providers are important partners in care coordination and transitions from hospitals. LTSS providers have important information that is generally not exchanged, such as functional and cognitive status, potential risks (e.g., fall history), elder abuse reports, use of services such as DME and homemakers, and information about the patient and family/caregivers that may be relevant to care. New delivery and payment models serve as drivers for LTSS to participate in HIE, particularly for HHAs, but barriers exist. There are few incentives for LTSS participation in HIE, low rates of EHR adoption, and disparate non-interoperable systems (e.g., client tracking, elder abuse reporting, and eligibility).

Drivers for and Barriers to HIE

Drivers of HIE are identified including new care delivery and payment models that recognize the importance of effective care coordination between providers, including LTPAC and LTSS providers. State and federal initiatives to support the adoption of HIT, EHRs, and electronic HIE are also described (e.g., standards, certification, programs to encourage adoption).

Many of the drivers as well as barriers addressed in this study relate to the adoption of HIT such as EHRs, including CEHRT, to support electronic HIE. Adoption of electronic HIE by LTPAC/LTSS providers is growing but has been modest and much slower than other health care sectors. This is due in part to limited financial incentives for LTPAC/LTSS EHR adoption. Participation in HIEOs by LTPAC/LTSS providers is also modest, and driven largely by incentives from the HIEOs and other sources (e.g., providing connectivity, hardware, software, training, and tools). There is a lack of information about the value proposition of their participation in HIEOs. LTPAC/LTSS providers currently do not contribute much data to HIEOs.

Interoperability standards are available or being developed that can accelerate HIE around care coordination, including transitions. However, there is little use of current standards by LTPAC providers or embedded in their HIT products. Further, there appears to be low awareness among LTPAC and other providers regarding the upcoming MU Stage 2 requirements and standards, or of the standards emerging through the S&I Framework and being balloted through HL7 to support the exchange of health information including on behalf of persons who receive LTPAC/LTSS services. In some cases there is awareness, but limited resources to support implementation of these available/emerging standards.

Further, when electronic HIE is available to LTPAC providers, use is reported to be modest due to the impact of HIE on workflow, including time involved to use electronic exchange applications; a lack of well-defined use cases for electronic HIE; usability issues related to the technology and display of data; perceived value of the information (e.g., timeliness, completeness, accuracy); the need to train and retrain LTPAC staff due to high turnover; limited resources to implement and support HIE, and privacy and security barriers.

Characteristics of HIE to Support Care Coordination for Persons Receiving LTPAC

An in-depth analysis of the methods for HIE and types of data exchanged was undertaken to understand the state of HIE to support care coordination. HIE around care coordination, particularly transitions, was found to be complex and relies on multiple methods of HIE. The methods of exchanging health information by LTPAC providers continue to be predominantly non-electronic (including telephone and fax) and at times electronic, but generally non-interoperable HIE (using secure e-mail with PDF

attachments). Because of the complexity of care transitions, there will always be a need for face-to-face and telephone communication.

Common data exchanged around care transitions and shared care functions are identified, as well as key data gaps, which can inform and help prioritize opportunities for expanding data available through electronic HIE, and associated standards. Data commonly exchanged during transitions and shared care were compared with data identified in the literature as important for transitions and coordination (e.g., CMS Roadmap to Better Care Transitions and Fewer Readmissions) and reported by study informants. Important data but not commonly exchanged include comprehensive care plans with patient goals and preferences, advance directives and power of attorney, a reconciled medication list, the patient's cognitive and functional status, planned interventions, followup appointment schedule with contact information, formal and informal caregiver status and contact information, designated community-based care provider, and social supports.

Medication reconciliation during transitions of care is critical to care coordination and patient safety, and is one of the most highly rated functions of HIE, but significant challenges exist related to the exchange of this information. Determining the pre-hospital medications and reconciling with post-hospital medications to determine ongoing medication orders is challenging. HIE between LTPAC providers and pharmacies is usually inefficient. Exacerbating the problem is physicians' lack of historic knowledge of the patient and the overall POC, and lack of complete and accurate medication history information. Access to medication information remains a challenge even when a HIEO is available.

New processes are emerging to improve timely exchange of information, including secure access to hospital and LTPAC providers' EHRs, shared network drives to house hospital information, proprietary electronic referral applications for subscribers to exchange information, and access to HIEOs. These new processes are generally not advancing interoperable HIE.

Accelerating Interoperable HIE by LTPAC/LTSS Providers

This study identified policy and other opportunities for accelerating electronic HIE by LTPAC/LTSS, including the following:

- Providing additional incentives to support LTPAC/LTSS use of electronic HIE; without incentives participation by LTPAC/LTSS will likely remain low.
- Increasing LTPAC/LTSS provider awareness and use of interoperability standards.
- Better communicating the emerging value proposition and benefits of electronic HIE to LTPAC/LTSS providers.

- Identifying additional, well-defined use cases relevant to LTPAC/LTSS.
- Better defining and validating measures that reflect HIE, electronic and other means, on care coordination.
- Conducting further study to better understand:
 - LTSS providers' data, data needs, systems, and potential for HIE, and educate HIEOs and other stakeholders about the value of LTSS participation in HIE.
 - How HIE is and can be used to engage patients/consumers and their families and caregivers in the coordination of their care (e.g., patient portals and other means).

In summary, advancing HIE to support care coordination for persons receiving LTPAC/LTSS will require a multifaceted approach, including leveraging opportunities in the policy and health service delivery environments; providing financial incentives to accelerate HIE; improving enabling technology such as EHRs and interoperability standards; identifying key HIE use cases and modifying workflows to support electronic HIE; improving measures to monitor the impact of HIE on care coordination processes and outcomes; and widely communicating the value proposition of HIE with and for LTPAC/LTSS providers and patients. This study identifies several opportunities and areas of further study to guide future efforts to address challenges and barriers, and provide more incentives for the use of HIE to support care coordination for persons receiving LTPAC/LTSS.

BIBLIOGRAPHY

1. Dougherty M, Harvell J. Opportunities for engaging long-term and post-acute care providers in health information exchange activities: Exchanging interoperable patient assessment information. Washington, DC: U.S. Department of Health and Human Services, Office of the Assistant Secretary for Planning and Evaluation, Office of Disability, Aging and Long-Term Care Policy; 2011. Available at <http://aspe.hhs.gov/daltcp/reports/2011/StratEng.htm>.
2. Affordable Care Act. National pilot program on payment bundling. Public Law 111-148 and Public Law 111-152. 2010: Section 3023.
3. Engquist G, Johnson C, Johnson W. Medicaid funded long-term supports and services: Snapshots of innovation. Center for Health Care Strategies, Inc.; 2010.
4. Woodcock C. Long-term services and supports: Challenges and opportunities for states in difficult budget times. National Governors Association; 2011.
5. National Alliance for Health Information Technology. Report to the Office of National Coordinator for Health Information Technology on defining key health information technology terms. Washington, DC: U.S. Department of Health and Human Services, Office of the National Coordinator of Health IT; 2008.
6. eHealth Initiative. 2012 report on health information exchange: Supporting healthcare reform. Washington, DC: eHealth Initiative; 2012.
7. LTPAC Health IT Collaborative. A roadmap for health IT in long term and post-acute care, 2010-2012. Available at http://library.ahima.org/xpedio/groups/public/documents/ahima/bok1_047579.pdf. Accessed July 25, 2013.
8. McDonald K, Schultz E, Albin L, et al. Care coordination measures atlas version 3. Rockville, MD: Prepared by Stanford University under Subcontract to Battelle on Contract No. 290-04-0020 for the AHRQ; 2010. AHRQ Publication No. 11-0023-EF.
9. Singer SJ, Burgers J, Friedberg M, et al. Defining and measuring integrated patient care: Promoting the next frontier in health care delivery. Medical Care Research and Review; 2011; 68(1):112-127.
10. Office of the National Coordinator for Health Information Technology policy framework RFTOP. Solicitation No 12-233-SOL-00615; 2012.
11. Informed Medical Decisions Foundation. What is shared decision making? Available at <http://informedmedicaldecisions.org/what-is-shared-decision-making/>. Accessed January 12, 2013.

12. Gruneir A, Bronskill S, Bell C, et al. Recent health care transitions and emergency department use by chronic long-term care residents: A population-based cohort study. *J Am Med Dir Assoc*; 2012; 13(3): 202-206.
13. Mor V, Intrator O, Feng Z, et al. The revolving door of rehospitalization from skilled nursing facilities. *Health Aff*; 2010; 29(1): 57-64.
14. Naylor MD, Kurtzman ET, Pauly MV. Transitions of elders between long-term care and hospitals. *Pol. Polit. Nurs. Pract.*; 2009; 10(3): 187-194.
15. Boling PA. Care transitions and home health care. *Clin in Geriatr Med*; 2009; 25(1): 135-148.
16. Bayley KB, Savitz LA, Rodriguez G, et al. Barriers associated with medication information handoffs. In: Henriksen K, Battles JB, Marks ES, et al., editors. *Advances in Patient Safety: From Research to Implementation*. Rockville, MD; 2005.
17. Chhabra PT, Rattinger GB, Dutcher SK, et al. Medication reconciliation during the transition to and from long-term care settings: A systemic review. *Res Soc Admin Pharm*; 2012; 8(1): 60.
18. Forster AJ, Murff HJ, Peterson JF, et al. The incidence and severity of adverse events affecting patients after discharge from the hospital. *Ann Intern Med*; 2003; 138(3): 161-167.
19. Jencks SF, Williams MV, Coleman EA. Rehospitalizations among patients in the Medicare fee-for-service program. *N Engl J Med*; 2009; 360(14): 1418-1428.
20. Thorpe KE. *The Medicare advantage experience: Lessons for reform to original Medicare*. Atlanta, GA: Emory University Rollins School of Public Health; 2012.
21. Clancy CM. Commentary: Reducing hospital readmissions: Aligning financial and quality incentives. *Am J Med Qual*; 2012; 27(5): 441-443.
22. Barnsteiner JH. Medication reconciliation: Transfer of medication information across settings-keeping it free from error. *J Infus Nurs*; 2005; 28(2 Suppl): 31-36.
23. Sentinel events statistics for 2011. *Jt Comm Perspect*; 2012; 32(5): 5.
24. Office of the National Coordinator for Health Information Technology. Getting to impact: Harnessing health information technology to support improved care coordination. In *State HIE Bright Spots Synthesis: Care Coordination Part 1*. Washington, DC: ONC; 2012. Available at http://statehieresources.org/wp-content/uploads/2013/01/Bright-Spots-Synthesis_Care-Coordination-Part-1_Final_010913.pdf.
25. Murray LM, Laditka SB. Care Transitions by older adults from nursing homes to hospitals: Implications for long-term care practice, geriatrics education, and research. *J Am Med Dir Assoc*; 2010; 11(4): 231-238.

26. LaMantia MA, Scheunemann LP, Viera AJ, et al. Interventions to improve transitional care between nursing homes and hospitals: A systemic review. *J Am Geriatr Soc*; 2010; 58(4): 777-782.
27. Rippen HE, Pan EC, Russell C, et al. Organizational framework for health information technology. *Int J Med Inf*; 2013; 82(4): e1-e13.
28. Office of the National Coordinator for Health Information Technology. Update on the adoption of health information technology and related efforts to facilitate the electronic use and exchange of health information. Washington, DC: Office of the National Coordinator for Health Information Technology; 2013.
29. Patterson ES, Roth EM, Woods DD, et al. Handoff strategies in settings with high consequences for failure: Lessons for health care operations. *Int J for Qual Health Care*; 2004; 16(2): 125-132.
30. Gleason K, Brake H. Medications at transitions and clinical handoffs (MATCH) toolkit for medication reconciliation. Rockville, MD: AHRQ; 2012; 11(12)-0059.
31. Siefferman JW, Lin E, Fine JS. Patient safety at handoff in rehabilitation medicine. *Phys Med Rehabil Clin N Am*; 2012; 23(2): 241-257.
32. Lucian Leape Institute. Order from chaos: Accelerating care integration. Boston, MA; 2012.
33. Kripalani, S. Care transitions. In *Perspectives on Safety*. AHRQ Web M&M; 2013.
34. Allen J, Ottmann G, Roberts G. Multi-professional communication for older people in transitional care: A review of the literature. *Int J Older People Nur*; 2012; 7(4).
35. Burton R. Improving care transitions. Health Aff and Robert Wood Johnson Foundation; 2012; 10.1377/hpb2012.17.
36. U.S. Department of Health and Human Services. Roadmap to better care transitions and fewer readmissions. Available at <http://www.healthcare.gov/compare/partnership-for-patients/safety/transitions.html#BackgroundonCareTransitions>. Accessed August 6, 2012.
37. Terrell KM, Miller DK. Challenges in transitional care between nursing homes and emergency departments. *J Am Med Dir Assoc*; 2006; 7(8): 499-505.
38. National Transitions of Care Coalition. Improving transitions of care: The vision of the national transitions of care coalition. Washington, DC; 2008.
39. Brown RS, Peikes D, Peterson G, et al. Six features of Medicare coordinated care demonstration programs that cut hospital admissions of high-risk patients. *Health Aff*; 2012; 31(6): 1156-1166.
40. Bez A. Preventing unnecessary hospitalizations for nursing home residents. Podcast on Internet; 2012.

41. Metzger J. Preventing hospital readmissions: The first test case for continuity of care. Falls Church, VA: Computer Sciences Solutions Global Institute for Emerging Healthcare Practices; 2012; WA12_0155 HCG.
42. Rutherford P. Reducing readmissions -- First, for the patient. Cambridge, MA: Institute for Healthcare Improvement; 2012.
43. Joynt KE, Jha AK. A path forward on Medicare readmissions. *N Engl J Med*; 2013; 368(13): 1175-1177.
44. Agency for Healthcare Research and Quality. Medication Reconciliation. Available at <http://www.psnet.ahrq.gov/primer.aspx?primerID=1>. Accessed January 27, 2012.
45. Centers for Medicare and Medicaid Services. Eligible professional meaningful use menu set measures, measure 7 of 10: Medication reconciliation. Available at http://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/downloads/7_Medication_Reconciliation.pdf. Accessed August 28, 2013.
46. Frisse ME, Johnson KB, Nian H, et al. The financial impact of health information exchange on emergency department care. *J Am Med Inform Assoc*; 2012; 19(3): 328-333.
47. Kind A, Jensen L, Barczi S, et al. Low-cost transitional care with nurse managers making mostly phone contact with patients cut rehospitalization at a VA hospital. *Health Aff*; 2012; 21(12): 2659-2668.
48. Health Information Exchange Roadmap: The landscape and a path forward. ONC Grant #7U24AE000006-02. Washington, DC: National eHealth Collaborative; 2012.
49. Hansen LO, Young RS, Hinami K, et al. Interventions to reduce 30-day rehospitalization: A systematic review. *Ann Intern Med*; 2011; 155(8): 520-528.
50. Phillips CO, Wright SM, Kern DE, et al. Comprehensive discharge planning with post-discharge support for older patients with congestive heart failure. *J Am Med Assoc*; 2004; 291(11): 1358-1367.
51. Ouslander JG, Lamb G, Tappen R, et al. Interventions to reduce hospitalizations from nursing homes: Evaluation of the INTERACT II collaborative quality improvement project. *J Am Geriatr Soc*; 2011; 59(4): 745-753.
52. Coleman EA. The care transitions program. Available at <http://www.caretransitions.org/>. Accessed August 6, 2012.
53. Boston University. Project RED. Available at <http://www.bu.edu/fammed/projectred/presentations.html>. Accessed August 6, 2012.
54. Institute for Clinical Systems Improvement, Minnesota Hospital Association and Stratis Health. Reducing avoidable readmissions effectively (RARE). Available at <http://www.rareadmissions.org/resources/collaboratives.html>. Accessed November 19, 2012.

55. Boulton C, Green AF, Boulton LB, et al. Successful models of comprehensive care for older adults with chronic conditions: Evidence for the Institute of Medicine's "retooling for an aging America" report. *J Am Geriatr Soc*; 2009; 57(12): 2328-2337.
56. Healthcentric Advisors. Safe Transitions Project. Available at <http://www.healthcentricadvisors.org/safe-transitions-cp.html>. Accessed August 6, 2012.
57. Society of Hospital Medicine. Project BOOST: Better outcomes for older adults through safe transitions. Available at <http://www.hospitalmedicine.org/AM/Template.cfm?Section=Home&CONTENTID=27659&TEMPLATE=/CM/HTMLDisplay.cfm>. Accessed August 6, 2012.
58. Centers for Medicare and Medicaid Services. EHR Incentive Programs: Stage 2. Available at http://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/Stage_2.html. Accessed June 14, 2013.
59. Metzger J. Preparing for accountable care: Coordinated care. Falls Church, VA: Computer Sciences Solutions Global Institute for Emerging Healthcare Practices; 2012; WA12_0280 HCG.
60. eCaring LLC. Preventable readmissions: A prime target for healthcare innovation. Available at <http://blog.ecaring.com/preventable-readmissions-a-prime-target-for-healthcare-innovation/>. Accessed July 18, 2013.
61. McClellan M, McKethan AN, Lewis JL, et al. A national strategy to put accountable care into practice. *Health Aff*; 2010; 29(5): 982-990.
62. Pioneer Accountable Care Organization Model: General fact sheet. CMS, Center for Medicare and Medicaid Innovation; 2012.
63. American College of Physicians. What is the patient-centered medical home? Available at http://www.acponline.org/running_practice/delivery_and_payment_models/pcmh/understanding/what.htm. Accessed August 30, 2013.
64. Centers for Medicare and Medicaid Services. State Demonstrations to Integrate Care for Dual Eligible Individuals. Available at <http://www.cms.gov/Medicare-Medicaid-Coordination/Medicare-and-Medicaid-Coordination/Medicare-Medicaid-Coordination-Office/StateDemonstrationsToIntegrateCareforDualEligibleIndividuals.html>. Accessed October 28, 2013.
65. Centers for Medicare and Medicaid Services. Initiative to Reduce Avoidable Hospitalizations Among Nursing Facility Residents. Available at <http://www.innovations.cms.gov/initiatives/rahnfr/index.html>. Accessed November 20, 2013.

66. Centers for Medicare and Medicaid Services. New program to increase quality in nursing facilities. Available at <http://www.cms.gov/apps/media/press/release.asp?Counter=4454&intNumPerPage=10&checkDate=&checkKey=&srchType=1&numDays=3500&srchOpt=0&srchData=&keywordType=All&chkNewsType=1%2C+2%2C+3%2C+4%2C+5&intPage=&showAll=&pYear=&year=&desc=&cboOrder=date>. Accessed November 20, 2012.
67. Centers for Medicare and Medicaid Services. Details for Regulation #CMS -1600-P. Available at <http://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/PhysicianFeeSched/PFS-Federal-Regulation-Notices-Items/CMS-1600-P.html>. Accessed August 8, 2012.
68. Colorado Foundation for Medical Care. Links/resources/tools for providers -- care transitions improvement efforts. Available at http://www.cfmc.org/integratingcare/provider_resources.htm. Accessed July 14, 2013.
69. Office of the National Coordinator for Health Information Technology. Meaningful use -- What is meaningful use? Available at <http://www.healthit.gov/policy-researchers-implementers/meaningful-use>. Accessed July 14, 2013.
70. Dougherty M, Williams M, Millenson M, et al. EHR payment incentives for providers ineligible for payment incentives and other funding study. Washington, DC: Prepared for Office of Disability, Aging and Long-Term Care Policy, Office of the Assistant Secretary for Planning and Evaluation, U.S. Department of Health and Human Services; 2013. Available at <http://aspe.hhs.gov/daltcp/reports/2013/EHRPI.shtml>. Accessed July 14, 2013.
71. LTPAC Collaborative, State HIE Toolkit Module: Vulnerable populations and HIE. 2010.
72. Harvell J, Harr M, Hall EP, et al. Implementing health information exchange in the long-term and post-acute care community -- Perspectives for LTPAC providers and their affiliated organizations. Webinar, December 12, 2012.
73. ECRI Institute and s2a. Crossing the connectivity chasm: Pinpointing gaps in readiness to exchange health information. Plymouth Meeting, PA; 2012.
74. Office of the National Coordinator for Health Information Technology. Health IT Policy Committee. Available at <http://www.healthit.gov/policy-researchers-implementers/health-it-policy-committee>. Accessed June 13, 2013.
75. Office of the National Coordinator for Health Information Technology. Principles and strategy for accelerating health information exchange (HIE). Washington, DC: Office of the National Coordinator for Health Information Technology; 2013. Healthcare Information Technology Standards Panel. HITSP enabling healthcare interoperability. Available at http://www.hitsp.org/about_hitsp.aspx. Accessed August 6, 2013.
76. Office of the National Coordinator for Health Information Technology. Federal health information technology strategic plan, 2011-2015. Washington, DC: Office of the National Coordinator for Health Information Technology; 2011.

77. Office of the National Coordinator of Health Information Technology. Initial set of standards, implementation specifications, and certification criteria for electronic health record technology. 2010:45 CFR Part 170.
78. LeadingAge Center for Aging Services Technology. EHR for LTPAC: A primer on planning and vendor section. Washington, DC: LeadingAge Center for Aging Services Technology; 2013.
79. Certification Commission for Health Information Technology. CCHIT certified products. Available at <https://www.cchit.org/find-cchit>. Accessed June 14, 2013.
80. HL7 International. HL7 EHR system long-term care functional profile, release 1 -- U.S. realm. Available at http://www.hl7.org/implement/standards/product_brief.cfm?product_id=134. Accessed August 28, 2013.
81. Alwan M. Personal communication about LeadingAge members and participation in health information exchange of electronic medical record data. LeadingAge; 2012.
82. Metz K, Russell W. Improving transitions of care in LTPAC: An update from the theme 2 Challenge Grant awardees. Washington, DC: Office of the National Coordinator for Health Information Technology; 2013.
83. Office of the National Coordinator of Health Information Technology. Beacon Community program. Available at <http://www.healthit.gov/policy-researchers-implementers/beacon-community-program>. Accessed December 20, 2012.
84. Smith L. "Direct" your attention to Mass Health Information Exchange (HIE). Massachusetts eHealth Institute (MeHI) Newsletter; 2012.
85. Hsiao CJ, Hing E. Use and characteristics of electronic health record systems among office-based physician practices: United States, 2001-2012. NCHS Data Brief No. 111. Hyattsville, MD: National Center for Health Statistics; 2012.
86. King J, Patel V, Furukawa M. Physician adoption of electronic health record technology to meet Meaningful Use objectives: 2009-2012. ONC Data Brief, No. 7. Washington, DC: Office of the National Coordinator for Health Information Technology; 2012.
87. Jha AK, DesRoches CM, Kralovec PD, et al. A progress report on electronic health records in US hospitals. Health Aff; 2010; 29(10): 1951-1957.
88. Charles D, King J, Patel V, et al. Adoption of electronic health record systems among U.S. non-federal acute care hospitals: 2008-2012. ONC Data Brief, No. 9. Washington, DC: Office of the National Coordinator for Health Information Technology; 2013.
89. Coleman EA, Bennett RE, Dorr D, et al. Report on health information exchange in post-acute and long-term care. Washington, DC: U.S. Department of Health and Human Services, Office of the Assistant Secretary for Planning and Evaluation, Office of Disability, Aging and Long-Term Care Policy; 2007. Available at <http://aspe.hhs.gov/daltcp/reports/2007/HIErpt.htm>.

90. Decker SL, Jamoom EW, Sisk JE. Physicians in nonprimary care and small practices and those age 55 and older lag in adopting electronic health record systems. *Health Aff*; 2012; 31(5): 1108-1114.
91. Caffrey C, Park-Lee E. Use of electronic health records in residential care communities. Hyattsville, MD: National Center for Health Statistics; 2013; No. 128.
92. National Center for Health Statistics. National study for long-term care providers, 2011. Available at http://www.cdc.gov/nchs/data/nsltcp/NSLTCP_FS.pdf. Accessed August 20, 2013.
93. Hsiao CJ, Hing E. Adoption of health information technology among U.S. ambulatory and long-term care providers. National Conference on Health Statistics. Washington, DC: 2012. Available at http://www.cdc.gov/nchs/ppt/nchs2012/SS-03_HSIAO.pdf. Accessed August 20, 2013.
94. Richard A, Kaehny M, May K, et al. Literature review and synthesis: Existing surveys on health information technology, including surveys on health information technology in nursing homes and home health. Washington, DC: Office of the Assistant Secretary for Planning and Evaluation; 2009. Available at <http://aspe.hhs.gov/daltcp/reports/2009/hitlitrev.htm#table2>.
95. Resnick HE, Alwan M. Use of health information technology in home health and hospice agencies: United States, 2007. *J Am Med Inform Assoc*; 2010; 17: 389-395.
96. Wolf L, Harvell J, Jha AK. Hospitals ineligible for federal meaningful use incentives have dismally low rates of adoption of electronic health records. *Health Aff*; 2012; 31(3): 505-513.
97. Desroches CM, Charles D, Furukawa MF, et al. Adoption of electronic health records grows rapidly, but fewer than half of US hospitals had at least a basic system in 2012. *Health Aff (Millwood)*; 2013; 32(8): 1478-1485.
98. Adler-Milstein J, DesRoches C, Jha A. Health information exchange among US hospitals. *Am J Manag Care*; 2011; 17: 761-768.
99. Furukawa MF, Patel V, Charles D, et al. Hospital electronic health information exchange grew substantially in 2008-12. *Health Aff (Millwood)*; 2013; 32(8): 1346-1354.
100. CapSite. 2012 U.S. Health information exchange study. CapSite; 2012.
101. Bipartisan Policy Center. Clinician perspectives on electronic health information sharing for transitions of care. Washington, DC: Bipartisan Policy Center; 2012.
102. Adler-Milstein J, Bates DW, Jha AK. Operational health information exchanges show substantial growth, but long-term funding remains a concern. *Health Aff (Millwood)*; 2013; 32(8): 1486-1492.
103. Cagel JG, Rokoske FS, Durham D, et al. Use of electronic documentation for quality improvement in hospice. *Am J of Med Qual*; 2012; 27(4): 282.

104. Oakes SL, Gillespie SM, Ye Y, et al. Transitional care of the long-term care patient. *Clin Geriatr Med*; 2011; 27(2): 259-271.
105. Office of the National Coordinator for Health Information Technology. Health IT in long-term and post-acute care. Washington, DC: ONC; 2013.
106. Cherry B, Carter M, Owen D, et al. Factors affecting electronic health record adoption in long-term care facilities. *J Healthc Qual*; 2008; 30(2): 37-47.
107. S&I Framework. IMPACT transfer of care dataset 20OCT2012. Available at [http://wiki.siframework.org/LCC+Long-Term+Post-Acute+Care+\(LTPAC\)+Transition+SWG](http://wiki.siframework.org/LCC+Long-Term+Post-Acute+Care+(LTPAC)+Transition+SWG). Accessed July 15, 2013.
108. National Quality Forum. Critical paths for creating data platforms: Care coordination. Washington, DC: National Quality Forum; 2012.
109. Folkemer D. Telephone discussion. 2013.
110. Arizona Strategic Enterprise Technology Office. Arizona health information exchange environmental scan: Long-term care. CFDA #93.719. Phoenix, AZ: Arizona Strategic Enterprise Technology; 2012.
111. Centers for Medicare and Medicaid Services. Current work -- what are QIOs doing? Available at <http://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/QualityImprovementOrgs/Downloads/10thSOWSlides.pdf>. Accessed August 28, 2013.
112. Caradigm. Low-cost health IT connectivity for skilled nursing facilities enables clinicians to provide better, more coordinated patient care. Available at <http://www.caradigm.com/pages/en-us/press/2012-08-09-data-share-nursing-facilities.aspx>. Accessed December 2012.
113. Garber L. Massachusetts Technology Park Corporation: Improving long-term and post-acute care transitions. Washington, DC: Office of the National Coordinator for Health IT, State Health Information Exchange Challenge Program; 2012.
114. SaferHealthCare. What is SBAR and what is SBAR communication? Available at <http://www.saferhealthcare.com/sbar/what-is-sbar>. Accessed December 2012.
115. National Quality Forum. MAP pre-rulemaking report: 2013 recommendations on measures under consideration by HHS, final report. ISBN 978-1-933875-47-7. Washington, DC: National Quality Forum; 2013.
116. Hincapie AL, Warholak TL, Murcko AC, et al. Physicians' opinions of a health information exchange. *J Am Med Inform Assoc*; 2011; 18(1): 60-65.
117. Overhage JM, Dexter PR, Perkins SM, et al. A randomized, controlled trial of clinical information shared from another institution. *Ann Emerg Med*; 2002; 39(1): 14-23.
118. Vest JR. Health information exchange and healthcare utilization. *J Med Syst*; 2009; 33(3): 223-231.

119. Vest JR, Jaspersen J. What should we measure? Conceptualizing usage in health information exchange. *J Am Med Inform Assoc*; 2010; 17(3): 302-307.
120. Kern LM, Wilcox A, Shapiro J, et al. Which components of health information technology will drive financial value? *Am J Manag Care*; 2012; 18(8): 438-445.

LONG-TERM AND POST-ACUTE CARE PROVIDERS ENGAGED IN HEALTH INFORMATION EXCHANGE: Final Report

Files Available for This Report

MAIN REPORT

Executive Summary <http://aspe.hhs.gov/daltcp/reports/2013/HIEengagees.shtml>
HTML <http://aspe.hhs.gov/daltcp/reports/2013/HIEengage.shtml>
PDF <http://aspe.hhs.gov/daltcp/reports/2013/HIEengage.pdf>

APPENDIX A. SELECTED PROGRAMS AND INITIATIVES THAT SUPPORT CARE COORDINATION AND INFORMATION EXCHANGE FOR PERSONS RECEIVING LTPAC/LTSS

HTML <http://aspe.hhs.gov/daltcp/reports/2013/HIEengage.shtml#appendA>
PDF <http://aspe.hhs.gov/daltcp/reports/2013/HIEengageA.pdf>

APPENDIX B. FRAMEWORK TO CHARACTERIZE HEALTH INFORMATION EXCHANGE TO SUPPORT CARE COORDINATION FOR PERSONS RECEIVING LTPAC/LTSS

HTML <http://aspe.hhs.gov/daltcp/reports/2013/HIEengage.shtml#appendB>
PDF <http://aspe.hhs.gov/daltcp/reports/2013/HIEengageB.pdf>

APPENDIX C. ENVIRONMENTAL SCAN AND LITERATURE REVIEW SOURCES

HTML <http://aspe.hhs.gov/daltcp/reports/2013/HIEengage.shtml#appendC>
PDF <http://aspe.hhs.gov/daltcp/reports/2013/HIEengageC.pdf>

APPENDIX D. PROMISING COMPONENTS AND INTERVENTIONS TO REDUCE READMISSIONS

HTML <http://aspe.hhs.gov/daltcp/reports/2013/HIEengage.shtml#appendD>
PDF <http://aspe.hhs.gov/daltcp/reports/2013/HIEengageD.pdf>

APPENDIX E. SUMMARY OF LITERATURE ON HEALTH INFORMATION EXCHANGE OUTCOMES AND RELATED MEASURES

HTML <http://aspe.hhs.gov/daltcp/reports/2013/HIEengage.shtml#appendE>
PDF <http://aspe.hhs.gov/daltcp/reports/2013/HIEengageE.pdf>

APPENDIX F. EXAMPLES OF COMMUNITY-BASED CARE TRANSITION PROGRAM WITH LTPAC/LTSS PARTICIPATION

HTML <http://aspe.hhs.gov/daltcp/reports/2013/HIEengage.shtml#appendF>
PDF <http://aspe.hhs.gov/daltcp/reports/2013/HIEengageF.pdf>

APPENDIX G. HEALTH INFORMATION EXCHANGE INTERVENTIONS AND ACTIVITIES IDENTIFIED THAT SUPPORT CARE COORDINATION FOR PERSONS RECEIVING LTPAC/LTSS

HTML <http://aspe.hhs.gov/daltcp/reports/2013/HIEengage.shtml#appendG>
PDF <http://aspe.hhs.gov/daltcp/reports/2013/HIEengageG.pdf>

APPENDIX H. SITE VISIT SUMMARY: RUSH UNIVERSITY MEDICAL CENTER, CARE TRANSITIONS PROGRAM, BRIDGE PROGRAM

HTML <http://aspe.hhs.gov/daltcp/reports/2013/HIEengage.shtml#appendH>
PDF <http://aspe.hhs.gov/daltcp/reports/2013/HIEengageH.pdf>

APPENDIX I. SITE VISIT SUMMARY: BEACHWOOD HOMES

HTML <http://aspe.hhs.gov/daltcp/reports/2013/HIEengage.shtml#appendI>
PDF <http://aspe.hhs.gov/daltcp/reports/2013/HIEengageI.pdf>

APPENDIX J. SITE VISIT SUMMARY: EASTERN MAINE HEALTH SYSTEM, EASTERN MAINE HOME CARE

HTML <http://aspe.hhs.gov/daltcp/reports/2013/HIEengage.shtml#appendJ>
PDF <http://aspe.hhs.gov/daltcp/reports/2013/HIEengageJ.pdf>

APPENDIX K. SUMMARY OF INFORMATION ROUTINELY EXCHANGED BY THE THREE SITES VISITED, BY CARE COORDINATION FUNCTION

HTML <http://aspe.hhs.gov/daltcp/reports/2013/HIEengage.shtml#appendK>
PDF <http://aspe.hhs.gov/daltcp/reports/2013/HIEengageK.pdf>

APPENDIX L. STANDARDS AVAILABLE TO SUPPORT HEALTH INFORMATION EXCHANGE OF LONG-TERM AND POST-ACUTE CARE DATA

HTML <http://aspe.hhs.gov/daltcp/reports/2013/HIEengage.shtml#appendL>
PDF <http://aspe.hhs.gov/daltcp/reports/2013/HIEengageL.pdf>

APPENDIX M. GLOSSARY

HTML <http://aspe.hhs.gov/daltcp/reports/2013/HIEengage.shtml#appendM>
PDF <http://aspe.hhs.gov/daltcp/reports/2013/HIEengageM.pdf>

To obtain a printed copy of this report, send the full report title and your mailing information to:

U.S. Department of Health and Human Services
Office of Disability, Aging and Long-Term Care Policy
Room 424E, H.H. Humphrey Building
200 Independence Avenue, S.W.
Washington, D.C. 20201
FAX: 202-401-7733
Email: webmaster.DALTCP@hhs.gov

NOTE: All requests must be in writing.

RETURN TO:

Office of Disability, Aging and Long-Term Care Policy (DALTCP) Home
http://aspe.hhs.gov/office_specific/daltcp.cfm

Assistant Secretary for Planning and Evaluation (ASPE) Home
<http://aspe.hhs.gov>

U.S. Department of Health and Human Services (HHS) Home
<http://www.hhs.gov>