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

OPPORTUNITIES FOR ENGAGING LONG-TERM AND POST-ACUTE CARE PROVIDERS IN HEALTH INFORMATION EXCHANGE ACTIVITIES:

EXCHANGING INTEROPERABLE PATIENT ASSESSMENT INFORMATION

APPENDIX G:
LTPAC INTEROPERABILITY TOOLKIT FOR EXCHANGING INTEROPERABLE PATIENT ASSESSMENT INSTRUMENTS

December 2011

TABLE OF CONTENTS

ATTACHMENTS*
Implementation Guide for CDA Release 2 CDA Framework for Questionnaire
Assessments (Universal Realm) and CDA Representation of the Minimum
Data Set Questionnaire Assessment (US Realm)

MDS Conversion/Validation Utilities

CCD Implementation Guide

MDS CDA Narrative Generator

MDS CDA Rendering Style Sheet

MDS CDA Validation Utility

* Files associated with each of these attachments are listed at the end of this Appendix.

OVERVIEW: LTPAC INTEROPERABILITY TOOLKIT

The Office of the Assistant Secretary for Planning and Evaluation (ASPE) has been facilitating the further automation and interoperability capabilities of the long-term and post-acute care (LTPAC) community in part through the development of a LTPAC Interoperability Toolkit to support re-use of standards-enabled, semantically interoperable assessment content from the minimum data set (MDS) and Outcome and Assessment Information Set (OASIS) for patient care summaries (and other documents) that can be exchanged with physicians and other providers. These tools are needed to support the re-use of assessment content.

The LTPAC Interoperability Tool Kit provides a suite of tools that takes into account the current and widely varied electronic capabilities across LTPAC settings to make it as easy as possible for LTPAC systems to exchange interoperable information with health information technology (HIT)/electronic health record (EHR) systems used by other health care providers (e.g., physicians, hospitals, other LTPAC settings). In brief, the Toolkit links HIT content standards to the MDS and OASIS assessment and guides the creation of patient assessment summary documents that re-uses data from the LTPAC provider and can be exchanged with physicians and other providers.

FIGURE G-1: Current State: Data/Document Creation and Exchange in Most LTPAC Providers
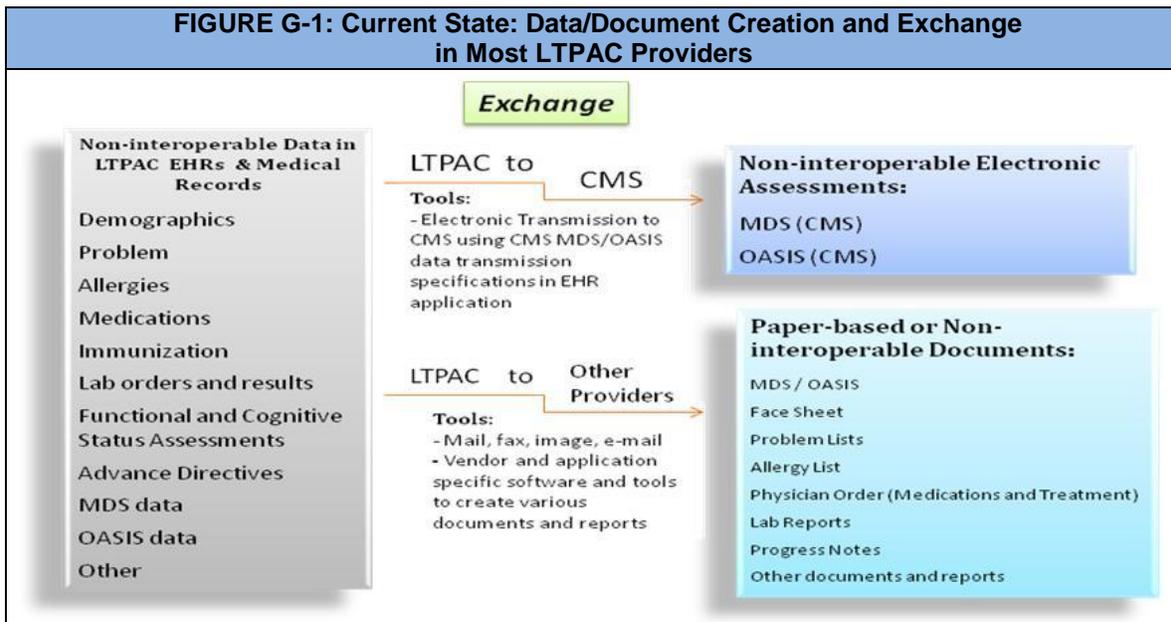
Implementation of the Health Information Technology for Economic and Clinical Health legislation, including requirements for the meaningful use of certified EHRs, and the Patient Protection and Affordable Care Act are creating opportunities for LTPAC providers to electronically exchange and re-use health information to support quality, improve coordination and continuity of care, and increase efficiencies.

Figure G-1 illustrates some of the data in records maintained by LTPAC providers that is used to create and exchange certain documents. As discussed more fully bellow, at present, this data often not digitized and is seldom linked to HIT content standards.

Figure G-2 highlights how data in LTPAC records can be linked with HIT vocabulary standards and re-used to create standardized documents for purposes of interoperable health information exchange (HIE) by LTPAC providers and other health care providers, HIE entities, caregivers, or other authorized entities. Use of HIT standards is expected to lower the cost and complexity of HIE activities. In some cases, the LTPAC provider may wish to directly exchange health information with other providers. Alternatively, HIE Organizations may wish to facilitate the exchange of information between LTPAC providers, other providers, and other entities. Whether the HIE is direct between providers or via HIE Organizations the tools highlighted in Figure G-2 could be used by the exchanging organization to support the exchange of this health information.

FIGURE G-2: Transforming and Exchanging Interoperable LTPAC Provider Data
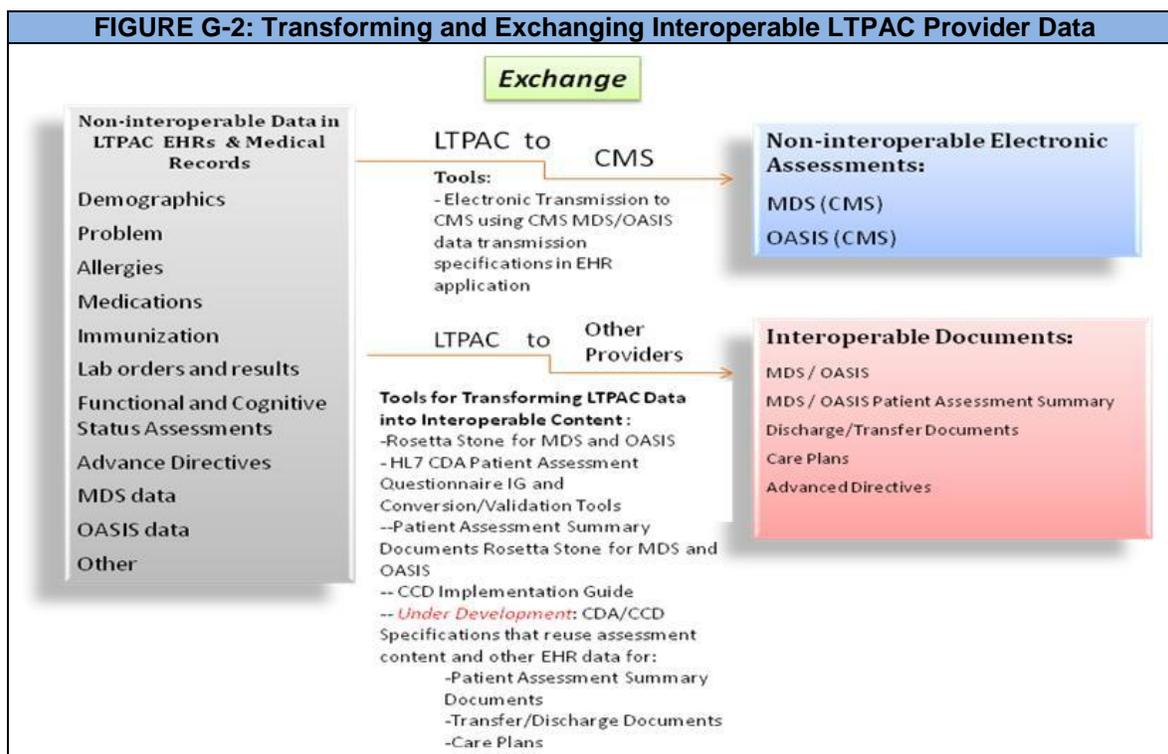
LTPAC EHR systems vary widely in existing capabilities. While most LTPAC settings have electronic means of capturing and communicating the MDS or OASIS assessment instruments, many do not have electronic problem lists, electronic allergy lists, electronic medication lists, etc. Many settings are entirely paper based while some a have full EHR implementations.[1] Plans for implementation of electronic systems

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[1] C. Manning, Stakeholder Interviews -- HIE Interviews conducted by Jennie Harvell, Sue Mitchell, Gay Giannone -- May 2010.

varies across providers. Some centers have placed priority on digitizing order entry, problem lists, or allergies and some have implemented electronic nursing documentation. While some provider's HIT system may include standardized vocabularies, those providers that do have electronic patient data, this data is more often supported by local codes.[2]

A transfer-of-care situation requires an optimal level of information to continue to provide quality care. Too little or missing information could lead to dangerous or life-threatening events, while too much information creates "information overload" that may cause the receiving provider to miss critical quality and safety concerns. In a patient population where recovery and progress is often slow and difficult, even minor delays in the exchange of needed health information can result missed medications, and continuing therapies and treatments that can cause costly weeks of rehabilitation and patient regression.

The stakeholder interviews (Appendix A) repeatedly stated that problem lists, current medications, allergies and recent vital signs were the most important elements in information exchange between settings. In addition, stakeholders felt that functional and cognitive status history would be valuable in continuing uninterrupted care.

LTPAC Interoperability Toolkit

To support LTPAC providers participation in HIE activities an Interoperability Toolkit was created. The Toolkit is expected to lower the costs that LTPAC vendors and implementers would otherwise incur with creating and reusing semantically interoperable assessment content:

- **MDS Rosetta Stone**: A resource for the MDS 3.0 which links assessment items to applicable terminologies and code sets including Logical Observation Identifiers Names and Codes (LOINC), Systematized Nomenclature of Medicine (SNOMED), International Classification of Diseases (ICD-9-CM and ICD-10). (Appendix D)

- **OASIS Rosetta Stone**: A resource for the OASIS-C which links assessment items to applicable terminologies and code sets including LOINC, SNOMED, ICD-9-CM, and ICD-10. (Appendix E)

- **Clinical Document Architecture (CDA) Patient Assessment Questionnaire Implementation Guide (IG)**: Describes how to represent a patient assessment questionnaire that includes functional status content as a standardized CDA compliant document. This IG was developed and balloted as a draft standard and includes the MDS as an example of how to format patient assessment

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[2] C. Chute, Stakeholder Interviews -- FACA Interviews conducted by Jennie Harvell, Sue Mitchell, Gay Giannone -- May 2010. P. Magistro, Stakeholder Interviews -- HIE Interviews conducted by Jennie Harvell, Sue Mitchell, Robert Dolin, Gay Giannone -- May 2010.

questionnaires in a CDA-Extensible Markup Language (XML) compliant format. Health Level 7 is expected to finalize this standard in late 2011/early 2012. (Appendix G)

- **MDS Conversion/Validation Utilities**: Various tools for transforming the MDS from the Centers for Medicare and Medicaid Services (CMS)-required and the CDA-XML format, validating that a MDS in CDA format is conformant, etc. (Appendix G)

- **Continuity of Care Document (CCD) Implementation Guide**: Provides general guidelines on how to construct a valid CCD document. (Appendix G)

- **Patient Assessment Summary Rosetta Stone for MDS**: A resource which identifies a subset of assessment content from the MDS 3.0 to provide a clinical summary or snapshot of the patient for the point in time that the assessment was completed. The Rosetta Stone links the subset of assessment items from the MDS 3.0 to applicable terminologies and code sets including LOINC, SNOMED, ICD-9-CM, and ICD-10. (Appendix K)

- **Patient Assessment Summary Rosetta Stone for OASIS**: A resource which identifies a subset of assessment content from the OASIS to provide a clinical summary or snapshot of the patient for the point in time that the assessment was completed. The Rosetta Stone links the subset of assessment items from the OASIS-C to applicable terminologies and code sets including LOINC, SNOMED, ICD-9-CM, and ICD-10. (Appendix L)

LTPAC INTEROPERABILITY TOOLKIT DETAILS

This section provides additional details on some of the LTPAC Interoperability Toolkit items, introduced above.

Implementation Guide for CDA Release 2 CDA Framework for Questionnaire Assessments (Universal Realm) and CDA Representation of the Minimum Data Set Questionnaire Assessment (US Realm)

The Implementation Guide for Questionnaire Assessments provides a framework for any patient questionnaire assessments to be represented in a CDA Release 2 format. The IG provides an example of how to represent questionnaire assessments in a CDA using the MDS as an example. The MDS CDA IG specifies a standard for electronic submission for CDA questionnaire assessments that allows health care facilities to communicate case reports in an interoperable, industry-standard format. The questionnaire assessments contain multiple questions with specific answers.

The MDS CDA IG defines both a required Model of Use representation (described below) and an optional Model of Meaning representation for each entry in the CDA Body. These models support both a faithful representation of the exact questions and answers on an assessment questionnaire and a semantically interoperable and re-usable representation that encodes their meaning. The EHR system may have data needed to determine the answer to a particular form's question.

MDS Conversion/Validation Utilities

These include various tools for transforming the MDS between CDA and CMS-expected format, validating that a MDS in CDA format is conformant, etc.

MDS CDA Narrative Generator

A CDA document contains a Header and a Body. The Header identifies and classifies the document and provides information on authentication, the encounter, the patient, and the involved providers, etc., while the Body contains the clinical report. For the MDS report, the Body is comprised of structured markup that is further divided into recursively nestable document sections. Each section can contain a single CDA narrative block and any number of CDA entries.

The CDA narrative block contains the human-readable content to be rendered, while the CDA entries contain coded data for machine computation. A proven approach is used to generate narrative block from CDA entries to reduce narrative errors introduced by human editing and maintain a consistent narrative style (i.e., the narrative is derived from the CDA-coded entries).

MDS CDA Rendering Style Sheet

The CDA narrative content is generally in XML format. A rendering style sheet is essential to transform the CDA-XML instance into a human-readable format that can be displayed in a web browser.

MDS CDA Validation Utility

Syntactically, a CDA document must be valid to the XML Schema Document. Semantically, it must be valid by conforming to all pertinent implementation constraints, including (but not limited to) vocabulary, data type, mandatory/optional, cardinality, and value constraints.

The CDA document must always be validated before transmission to a trading partner. The validation utility will be responsible for accurately and effectively performing batch CDA instance validations. A proven CDA validation technology is the Schematron-based CDA template.

Appendix G Files

Implementation Guide for CDA Release 2 CDA Framework for Questionnaire Assessments (Universal Realm) and CDA Representation of the Minimum Data Set Questionnaire Assessment (US Realm)

> http://aspe.hhs.gov/daltcp/reports/2011/SE-G1/CDAR2_QA_DSTUR2_20100421.doc
> http://aspe.hhs.gov/daltcp/reports/2011/SE-G1/CDAR2_QA_DSTUR2_20100421.pdf
> http://aspe.hhs.gov/daltcp/reports/2011/SE-G1/README.txt

MDS Conversion/Validation Utilities

> http://aspe.hhs.gov/daltcp/reports/2011/SE-G2/cda2html.xsl
> http://aspe.hhs.gov/daltcp/reports/2011/SE-G2/cda2mds.xsl
> http://aspe.hhs.gov/daltcp/reports/2011/SE-G2/entries2cda.xsl
> http://aspe.hhs.gov/daltcp/reports/2011/SE-G2/mds_as_entries.xml
> http://aspe.hhs.gov/daltcp/reports/2011/SE-G2/mds_cda.xml
> http://aspe.hhs.gov/daltcp/reports/2011/SE-G2/mds_cda_process_flow.gif
> http://aspe.hhs.gov/daltcp/reports/2011/SE-G2/mds_html_from_cda.html
> http://aspe.hhs.gov/daltcp/reports/2011/SE-G2/mds_voc.xml
> http://aspe.hhs.gov/daltcp/reports/2011/SE-G2/mds_xml_from_cda.xml
> http://aspe.hhs.gov/daltcp/reports/2011/SE-G2/README.txt
> http://aspe.hhs.gov/daltcp/reports/2011/SE-G2/schematron.sch
> http://aspe.hhs.gov/daltcp/reports/2011/SE-G2/schematron.xsl

CCD Implementation Guide

> http://aspe.hhs.gov/daltcp/reports/2011/SE-G3/cda.xsl
> http://aspe.hhs.gov/daltcp/reports/2011/SE-G3/MDS CCD Design Document July2010.docx
> http://aspe.hhs.gov/daltcp/reports/2011/SE-G3/MDS_CCD_Sample.xml

MDS CDA Narrative Generator

> http://aspe.hhs.gov/daltcp/reports/2011/SE-G4/cda2html.xsl
> http://aspe.hhs.gov/daltcp/reports/2011/SE-G4/cda2mds.xsl
> http://aspe.hhs.gov/daltcp/reports/2011/SE-G4/entries2cda.xsl

MDS CDA Rendering Style Sheet

> http://aspe.hhs.gov/daltcp/reports/2011/SE-G5/mds_as_entries.xml
> http://aspe.hhs.gov/daltcp/reports/2011/SE-G5/mds_cda.xml

MDS CDA Validation Utility

> http://aspe.hhs.gov/daltcp/reports/2011/SE-G6/mds.sch
> http://aspe.hhs.gov/daltcp/reports/2011/SE-G6/mds_html_from_cda.html
> http://aspe.hhs.gov/daltcp/reports/2011/SE-G6/mds_schematron.xsl
> http://aspe.hhs.gov/daltcp/reports/2011/SE-G6/mds_voc.xml
> http://aspe.hhs.gov/daltcp/reports/2011/SE-G6/mds_xml_from_cda.xml

These files were created through a subcontract for this project. Users having difficulty accessing these files should contact webmaster.DALTCP@hhs.gov with a full description of the problem.

OPPORTUNITIES FOR ENGAGING LONG-TERM AND POST-ACUTE CARE PROVIDERS IN HEALTH INFORMATION EXCHANGE ACTIVITIES: EXCHANGING INTEROPERABLE PATIENT ASSESSMENT INFORMATION

Files Available for This Report

Main Report   [54 PDF pages]
http://aspe.hhs.gov/daltcp/reports/2011/StratEng.htm
http://aspe.hhs.gov/daltcp/reports/2011/StratEng.pdf

APPENDIX A: Stakeholder Interview Summary   [13 PDF pages]
http://aspe.hhs.gov/daltcp/reports/2011/StratEng-A.htm
http://aspe.hhs.gov/daltcp/reports/2011/StratEng-A.pdf

APPENDIX B: Background Report on Intellectual Property Issues and the Dissemination   [89 PDF pages]
of Standardized Federally-Required Patient Assessments
http://aspe.hhs.gov/daltcp/reports/2011/StratEng-B.htm
http://aspe.hhs.gov/daltcp/reports/2011/StratEng-B.pdf

APPENDIX C: Rosetta Stone Mapping Guidelines and Heuristics   [19 PDF pages]
http://aspe.hhs.gov/daltcp/reports/2011/StratEng-C.htm
http://aspe.hhs.gov/daltcp/reports/2011/StratEng-C.pdf

APPENDIX D: Rosetta Stone MDS and OASIS and Value Sets for MDS   [518 PDF pages]
Full Appendix
http://aspe.hhs.gov/daltcp/reports/2011/StratEng-D.htm
http://aspe.hhs.gov/daltcp/reports/2011/StratEng-D.pdf

Toolkit Overview, Model of Use, Model of   http://aspe.hhs.gov/daltcp/reports/2011/StratEng-D1.htm
  Meaning, and Supporting EHR Observation   http://aspe.hhs.gov/daltcp/reports/2011/StratEng-D1.pdf
  [135 PDF pages]   http://aspe.hhs.gov/daltcp/reports/2011/StratEng-D1.xlsx

MDS Value Sets (Separate Excel files accessible
  through links within HTMLs and PDFs)
  [381 PDF pages]

  Alzheimer's Disease through Cirrhosis   http://aspe.hhs.gov/daltcp/reports/2011/StratEng-D2a.htm
    [184 PDF pages]   http://aspe.hhs.gov/daltcp/reports/2011/StratEng-D2a.pdf

  Coronary Artery Disease through Wound   http://aspe.hhs.gov/daltcp/reports/2011/StratEng-D2b.htm
    Infection [197 PDF pages]   http://aspe.hhs.gov/daltcp/reports/2011/StratEng-D2b.pdf

APPENDIX E: Rosetta Stone OASIS   [71 PDF pages]
http://aspe.hhs.gov/daltcp/reports/2011/StratEng-E.htm
http://aspe.hhs.gov/daltcp/reports/2011/StratEng-E.pdf
http://aspe.hhs.gov/daltcp/reports/2011/StratEng-E.xlsx

APPENDIX F: Current Standards Landscape for Exchanging Interoperable Patient   [9 PDF pages]
Assessment Information
http://aspe.hhs.gov/daltcp/reports/2011/StratEng-F.htm
http://aspe.hhs.gov/daltcp/reports/2011/StratEng-F.pdf

APPENDIX G: LTPAC Interoperability Toolkit for Exchanging Interoperable Patient   [9 PDF pages]
Assessment Instruments
    Overview   http://aspe.hhs.gov/daltcp/reports/2011/StratEng-G.htm
http://aspe.hhs.gov/daltcp/reports/2011/StratEng-G.pdf

    Several attachments are listed separately at the end of this Appendix.

APPENDIX H: Standards Development and Adoption Recommendations   [6 PDF pages]
http://aspe.hhs.gov/daltcp/reports/2011/StratEng-H.htm
http://aspe.hhs.gov/daltcp/reports/2011/StratEng-H.pdf

APPENDIX I: Functional Status Standardization Recommendations   [13 PDF pages]
http://aspe.hhs.gov/daltcp/reports/2011/StratEng-I.htm
http://aspe.hhs.gov/daltcp/reports/2011/StratEng-I.pdf

APPENDIX J: Overview of Patient Assessment Summary   [23 PDF pages]
http://aspe.hhs.gov/daltcp/reports/2011/StratEng-J.htm
http://aspe.hhs.gov/daltcp/reports/2011/StratEng-J.pdf

APPENDIX K: Rosetta Stone MDS Summary   [162 PDF pages]
http://aspe.hhs.gov/daltcp/reports/2011/StratEng-K.htm
http://aspe.hhs.gov/daltcp/reports/2011/StratEng-K.pdf
http://aspe.hhs.gov/daltcp/reports/2011/StratEng-K.xlsx

APPENDIX L: Rosetta Stone OASIS Summary   [127 PDF pages]
http://aspe.hhs.gov/daltcp/reports/2011/StratEng-L.htm
http://aspe.hhs.gov/daltcp/reports/2011/StratEng-L.pdf
http://aspe.hhs.gov/daltcp/reports/2011/StratEng-L.xlsx

APPENDIX M: Terms and Acronyms   [6 PDF pages]
http://aspe.hhs.gov/daltcp/reports/2011/StratEng-M.htm
http://aspe.hhs.gov/daltcp/reports/2011/StratEng-M.pdf

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> 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

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