Virtual Medical Record *for* Clinical Decision Support

HL7 Project # 184

Clinical decision support guides medical professionals by providing alerts, reminders, and recommendations to support decision making in patient care.

1. Introduction

The HL7 Clinical Decision Support (CDS) work group established the "**HL7 vMR *for* CDS**" project in 2007 with the goal of identifying existing HL7 v.3 messaging standards that were capable of transmitting clinical information *between* medical systems and clinical decision support services.

Given the heterogeneity of electronic medical record systems, the evolution of computer-enabled CDS, and the urgent healthcare business need this presents, the project set out to:

(a) Outreach to HL7 work groups and technical committees to explore *existing* HL7 v.3 RIM messaging standards that met the requirements for CDS data transmissions, *and*

(b) Develop a series of recommendations on HL7 v.3 messaging standards that could act as components, with the initial focus on Chronic Disease Management for 4 conditions: Diabetes Type 2, Hypertension, Breast Cancer, and Unruptured Cerebral Brain Aneurysm, and

2. HL7 Comment-only Ballot (2008)

The HL7 vMR Work Group developed several business use cases, specifically for type 2 diabetes, hypertension, breast cancer and asymptomatic cerebral aneurysm.

The use cases illustrated the variety of data inputs and outputs from decision support services based on computer-interpretable guidelines for chronic disease management.

The data inputs and outputs are summarized in the following tables.

3. vMR – Inputs to CDS, aligned to Care Record DSTU

The data elements included in this table are drawn from the four (4) business use cases developed for "Chronic Disease Management".

vMR CDS "Inputs"	Business Use Cases* 1	2	3	4	HL7 Alignment
Patient - Identifier	X	X	X	X	Patient.id
Patient - Gender	X	X	X	X	CareStatement Observation
Patient - Date of Birth	X	X	X	X	Person.birthTime
Patient – Height; Weight; Blood Pressure	X	X	X	X	CareStatement Observation
Patient - Race	X		X	X	Person.raceCode
Patient – Symptoms	X		X	X	CareStatement Observation
Patient – Diagnoses (past; present)	X	X	X	X	CareStatement Observation
Patient – Allergies					CareStatement Observation
Patient – Lab Test Results	X	X	X	X	CareStatement Observation
Patient – Genetic Results			X	X	Clinical Genomics Genotype
Patient - Radiology Results	X	X	X	X	CareStatement Observation
Patient – Surgical Procedures	X		X	X	CareStatement Procedure
Patient - Medications	X	X	X	X	CS SubstanceAdministration
Patient - Pregnancy Status	X		X	X	CareStatement Observation
Patient – Menopausal Status	X		X	X	CareStatement Observation
Patient – Wish to have additional children	X		X	X	CareStatement Observation
Patient – Smoking Status		X	X	X	CareStatement Observation

* BUC 1: Diabetes; 2: Hypertension; 3: Breast cancer risk assessment; 4: Cerebral aneurysm

3. vMR – Inputs from CDS – cont'd.

vMR CDS "Inputs"	Business Use Cases*				HL7 Alignment
	1	2	3	4	
Family History of Disease:	X	X	X	X	Clinical Genomics Pedigree
- Relative Id	X	X	X	X	
- Relative Type	X	X	X	X	
- Relative Diagnosis	X	X	X	X	
- Age of Onset	X	X	X	X	
- Age at Death	X	X	X	X	
Clinical Examination – Assessment / Observation Description	X			X	CarePlan: PlannedCare ObservationIntent
Clinical Examination – Assessment / Observation Recommendation	X			X	CarePlan: PlannedCare ObservationIntent
Answers to Risk Assessment Questionnaires	X	X	X	X	CarePlan: PlannedCare ObservationIntent
Request for CDS Risk Assessment			X		CarePlan ProcedureIntent
CDS Recommended Action Confirmed Or Declined	X	X	X	X	CarePlan: PlannedCare ActIntent

4. vMR – Outputs from CDS, aligned to Care Record DSTU.

vMR CDS "Outputs"	Business Use Cases*				HL7 Alignment
	1	2	3	4	
Patient - Identifier	X	X	X	X	Patient.id
Risk Assessment Questions & Potential Responses	X	X	X	X	CarePlan: DefinedCare ObservationDefinition
CDS Alerts	X		X	X	CarePlan ActDefinition
CDS Decision Recommendations:	X	X	X	X	CarePlan ActDefinition
- Supporting Arguments	X	X	X	X	To be decided
- Argument Pros & Cons	X	X	X	X	To be decided
- Provenance for Arguments		X	X	X	To be decided
CDS Recommended Actions **(Dynamically Generated Order Set)**		X		X	CarePlan: DefinedCare ActDefinition
Executable Guideline State Audit File	X	X	X	X	To be decided
****Types of CDS Recommendations**					
CDS Differential Diagnosis		X			
- Diagnosis Options		X			CarePlan: DefinedCare ObservationDefinition
- Supporting arguments		X			To be decided
- Provenance for Arguments		X			To be decided
CDS Risk Determination:	X	X	X	X	
- Risk Assessment Score (numeric)	X	X	X		CarePlan: DefinedCare ObservationDefinition
- Risk Assessment Options (categoric)				X	CarePlan: DefinedCare ObservationDefinition
- Supporting Arguments	X	X	X	X	To be decided
- Provenance for Arguments	X	X	X	X	To be decided
CDS Disease Stage/Classification:		X			
- Disease Stage Options		X			CarePlan: DefinedCare ObservationDefiniton
- Supporting Arguments		X			To be decided
- Provenance for Arguments		X			To be decided

4. vMR – Outputs from CDS – cont'd.

vMR CDS "Outputs" (contd)	Business Use Cases*				HL7 Alignment
	1	2	3	4	
**Types of CDS Recommendations					
CDS Therapeutic Recommendations	X	X	X	X	
- Drug Therapy Options	X	X	X		CarePlan: DefinedCare SubstanceAdmnDefinition
- Non-drug Therapy Options	X	X	X	X	
Procedures	X	X	X	X	CarePlan: DefinedCare ProcedureDefinition
- Supporting arguments	X	X	X	X	To be decided
- Provenance for Arguments	X	X	X	X	To be decided
CDS Target/Goals:	X	X			
- Target/Goal Options	X	X			CarePlan: DefinedCare ObservationDefinition ObservationGoal
- Supporting Arguments	X	X			To be decided
- Provenance for Arguments	X	X			To be decided
CDS Follow-up Recommendations		X	X	X	
- Follow-up Options		X	X	X	CarePlan: DefinedCare EncounterDefinition
- Supporting Arguments		X	X	X	To be decided
- Provenance for Arguments		X	X	X	To be decided
CDS Clinical Progress	X				
- Clinical Progress Options	X				CarePlan: DefinedCare ObservationDefinition
- Supporting arguments	X				To be decided
- Provenance for Arguments	X				To be decided

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Notes:

o   CareStatement would carry pre-existing patient data that is input into the CDS service
o   CarePlan DefinedCare would carry guideline recommendation outputs that have been customized by CDS
o   CarePlan PlannedCare would carry clinician responses to DefinedCare recommendations back to the CDS service.