



The Office of the National Coordinator for
Health Information Technology

Consumer Health Data Aggregator Challenge & Provider User Experience Challenge

March 20, 2017





Provider User Experience Challenge Winners

Phase 1

- Duke Health System / Intermountain Healthcare / University of Utah Health Care
- Herald Health Technologies
- PHRASE Health
- WellSheet

Phase 2

- First Prize: Herald Health Technologies
- Second Prize and Connector Award: Duke Health System / Intermountain Healthcare / University of Utah Health Care
- Honorable Mention: PHRASE Health

Interoperability In Action Day

Herald Health

Slides Not Provided

Multi-Institutional, Multi-EHR Collaboration to Enhance a Neonatal Bilirubin SMART on FHIR Application with Clinical Decision Support

ONC Interoperability in Action Day

March 20, 2017

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On behalf of the project team from:
University of Utah Health Care
Intermountain Healthcare
Duke Health



Disclosures

- In the past year, I have been a consultant or sponsored researcher on clinical decision support for:
 - Office of the National Coordinator for Health IT*
 - McKesson InterQual
 - Hitachi

*via ESAC, SRS, A+ Government Solutions, and Hausam Consulting



Multi-Institutional Collaboration



UNIVERSITY OF UTAH
HEALTH CARE

Kensaku Kawamoto, MD, PhD, MHS
Associate CMIO
Steering Member, IAPPS

Carole Stipelman, MD, MPH
Medical Director, University Pediatric Clinic



Intermountain®
Healthcare

Scott Narus, PhD, MS
Chief Clinical Systems Architect

Ricky Bloomfield, MD
Director of Mobile Technology Strategy



DukeHealth

Robert Lenfestey, MD
Neonatologist and Clinical Faculty



Multiple EHR Platforms

- Epic
 - Univ. of Utah
 - Duke
- Cerner
 - Intermountain
- CareWeb
 - Healthcare Services Platform Consortium (HSPC)
- Others TBD

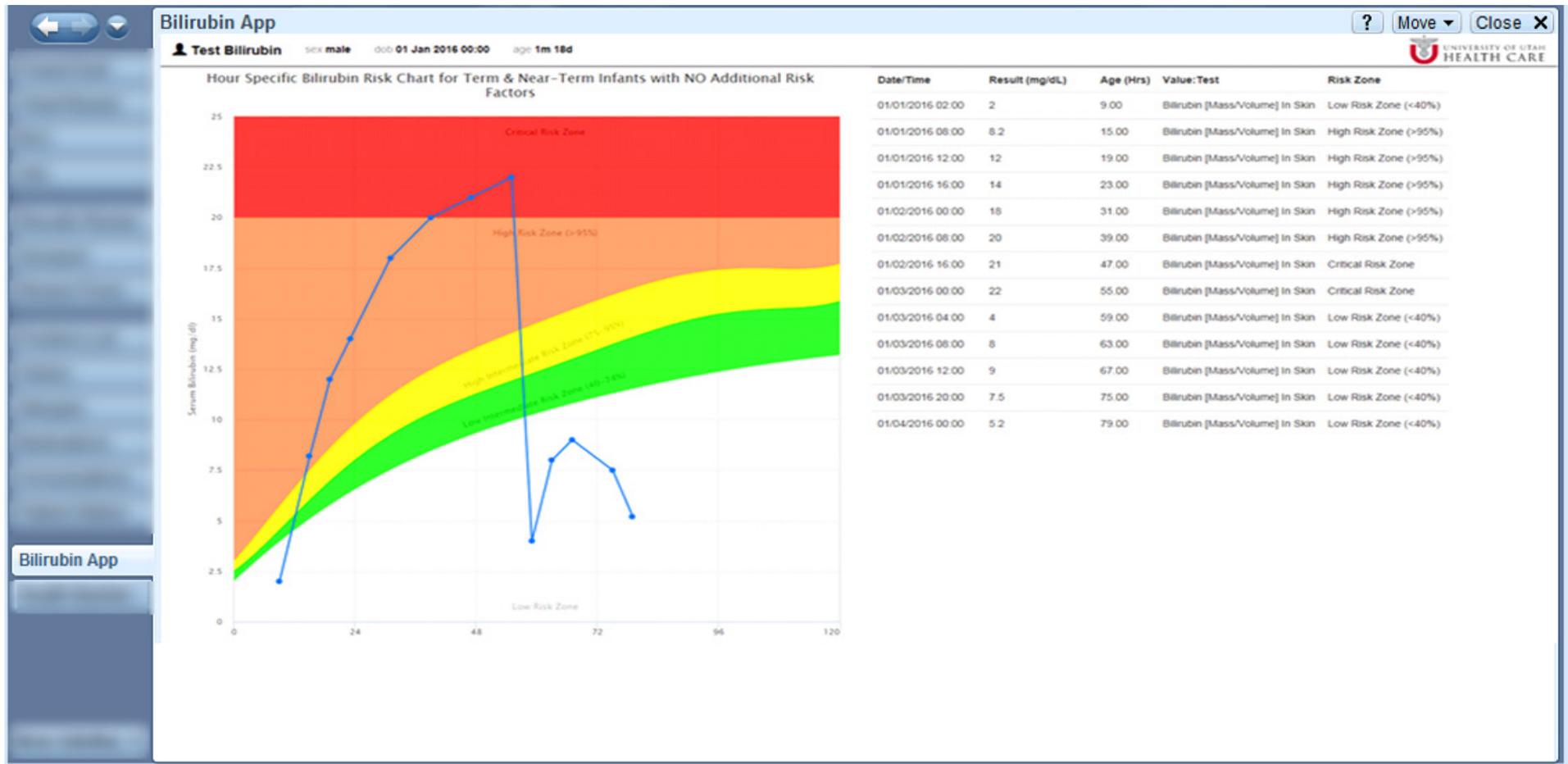


Project Background/Motivation

- EHR vendors are increasingly supporting SMART on FHIR to extend the EHR through interoperable “Apps”
- Healthcare organizations across various EHR platforms could mutually benefit through collaborative development of SMART on FHIR Apps
- Univ. of Utah, Intermountain, and Duke are collaborating to extend an existing bilirubin App with decision support as requested by our physicians
- We welcome collaborators and will make all content available free and open source



Baseline Bilirubin App, Integrated with Epic (developed by Intermountain)



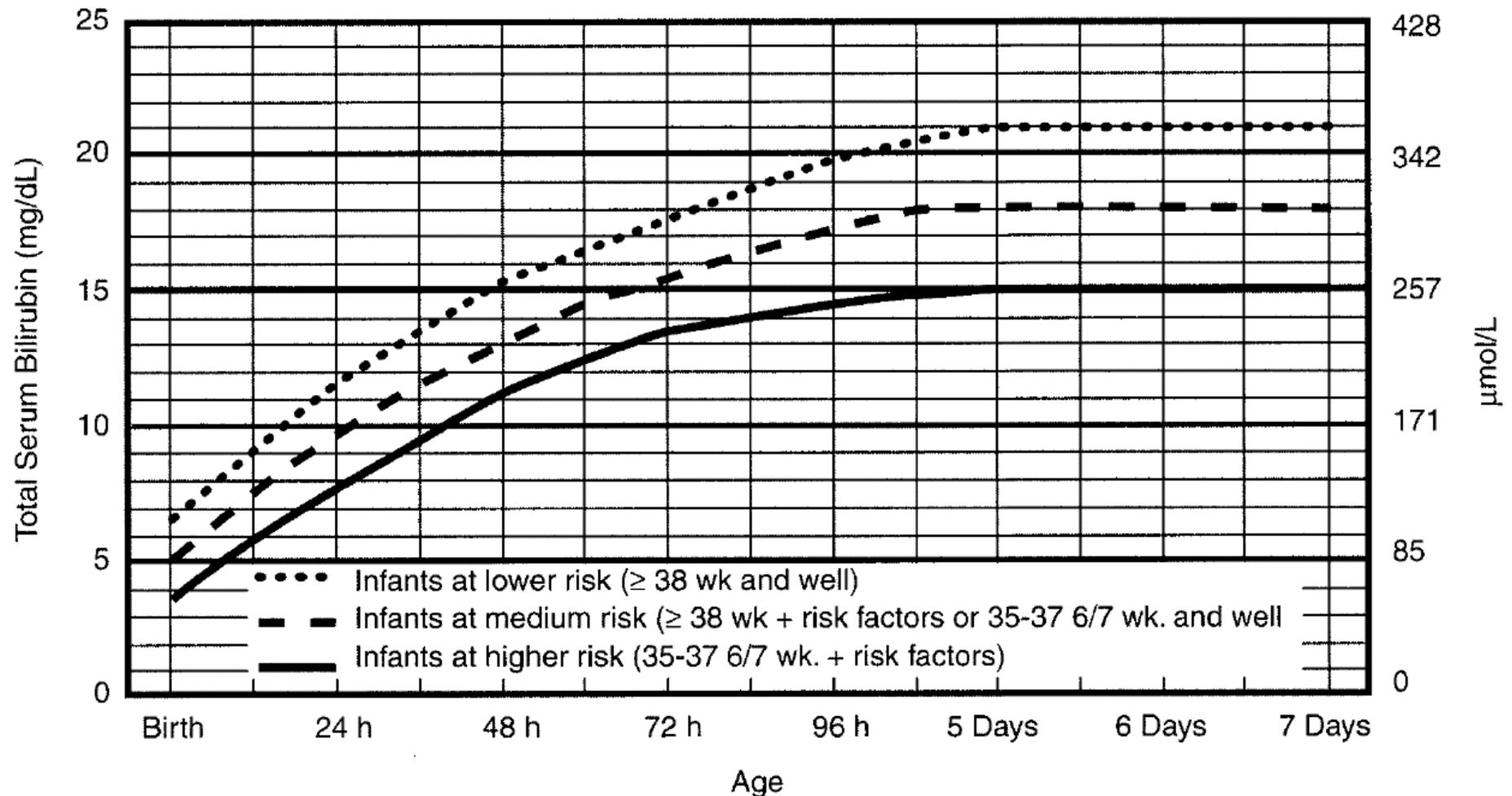
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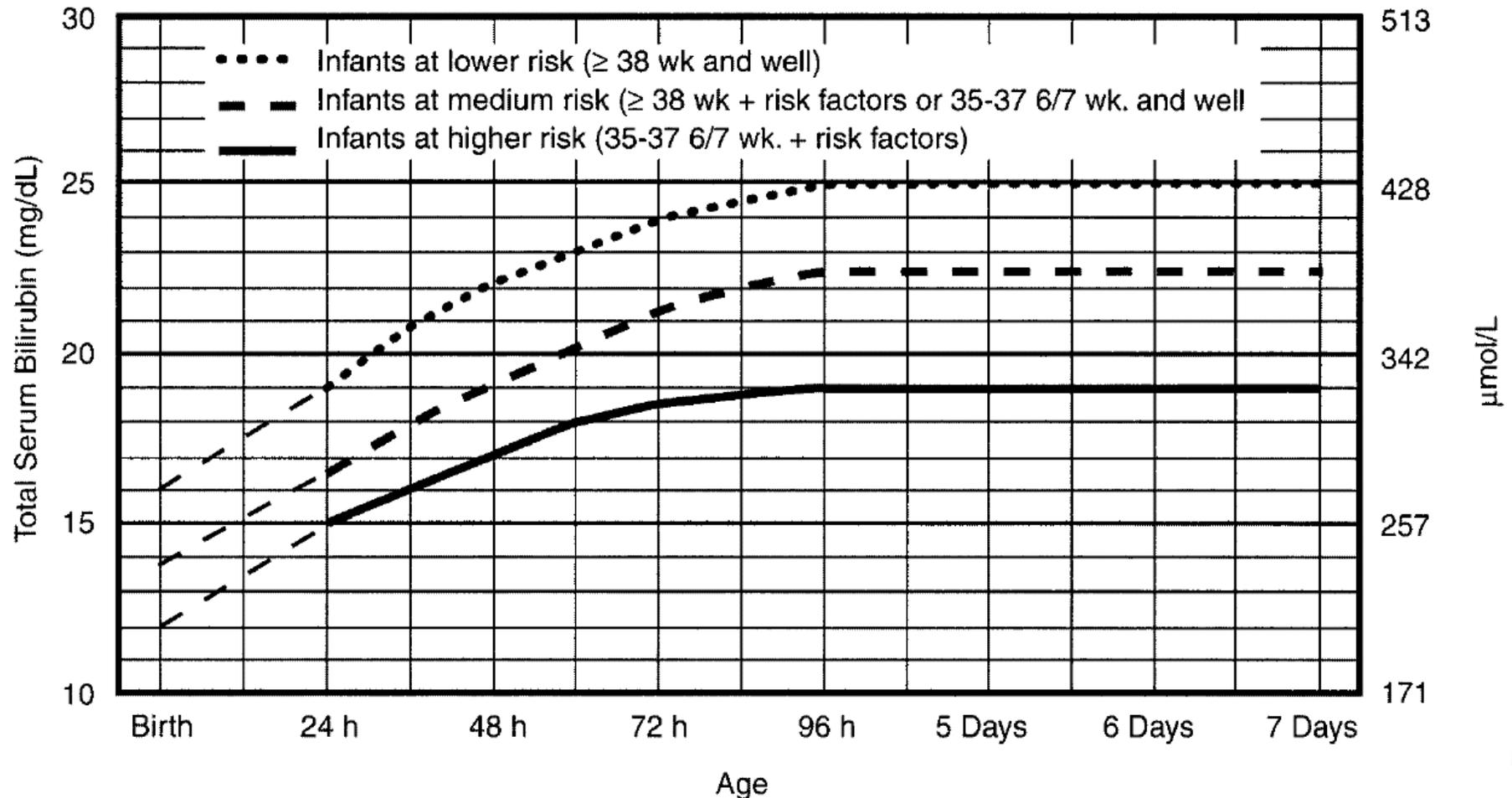
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HEALTH CARE

American Academy of Pediatrics Guidelines for Phototherapy



American Academy of Pediatrics. Management of Hyperbilirubinemia in the Newborn Infant 35 or More Weeks of Gestation. *Pediatrics*. 2004 Jul;114(1):297-316.

American Academy of Pediatrics Guidelines for Exchange Transfusion



American Academy of Pediatrics. Management of Hyperbilirubinemia in the Newborn Infant 35 or More Weeks of Gestation. *Pediatrics*. 2004 Jul;114(1):297-316.



Current Bilirubin Application, in Production Use within Epic

Bilirubin App

*Bold = patient-specific threshold.
source: AAP Hyperbilirubinemia Management Guidelines. Pediatrics. 2004;114:297-316.

Gest. Age (auto-calculated)
 38 wks+ 35-37 wks < 35 wks

Direct Coombs (risk factor; auto-calculated)
 Pos. (09/28/16) Neg. Unknown

Other risk factors (not auto-calculated)
 Isoimmune hemolytic disease, G6PD deficiency, asphyxia, sig. lethargy, temp. instability, sepsis, acidosis
 Present Not Present

Albumin < 3.0 g/L (risk factor for phototherapy only; auto-calculated)
 Yes (2.9, 09/28/16) No
 None on record

Consider Exchange Transfusion.
 Rationale: Patient's latest bilirubin level of 17.1 mg/dL at 46.57 hrs is above treatment threshold for exchange transfusion (16.98) given gestational age >= 35 wks and < 38 wks with risk factors for exchange transfusion.

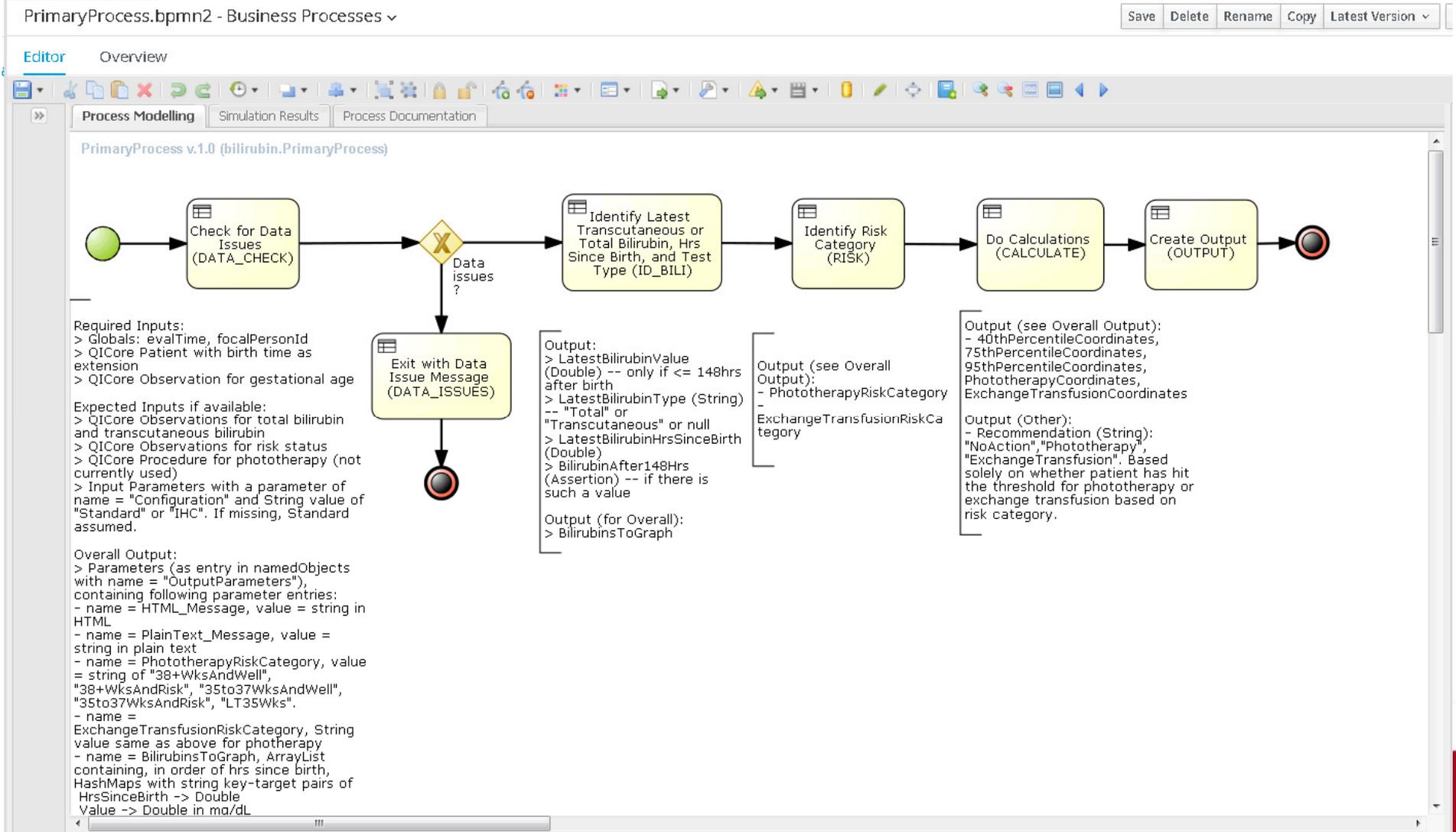
	Blood Type	Indirect Coombs
Baby	O Pos (09/26/16)	Negative (09/28/16)
Mother	O Pos (04/03/16)	Negative (04/02/16)

Bilirubin Measurements			
Age (Hrs)	Result	Date/Time	Test Type
12.25	8.1	09/26/16 16:24	Total
23.38	10.5	09/27/16 03:32	Transcutaneous
30.68	12.2	09/27/16 10:50	Total
36.9	14.8	09/27/16 17:03	Total
46.57	17.1	09/28/16 02:43	Total

Albumin Measurements		
Age (Hrs)	Result	Date/Time
43.85	2.9	09/28/16 00:00

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Encapsulation of Decision Support Logic within OpenCDS (www.opencds.org)



Support of HL7 Decision Support Standards

- Quality Improvement Core (QICore) FHIR Profiles (<http://hl7.org/fhir/current/qicore/>)
- HL7 Decision Support Service (http://www.hl7.org/implement/standards/product_brief.cfm?product_id=12)
- FHIR Clinical Reasoning Module (<http://build.fhir.org/clinicalreasoning-module.html>)
 - Being unified with CDS Hooks specification (<http://cds-hooks.org/>)



Status

- 1.0 Release complete
- Full integration with Epic & CareWeb EHRs
- In production clinical use at University of Utah
- Positive provider feedback
- Enhancement requests being incorporated for v2.0
- Aiming for wide dissemination of 2.0 Release
- Awarded HHS Provider User Experience App Challenge Awards

<https://www.challenge.gov/challenge/provider-user-experience-challenge/>



Demo within HSPC CareWeb EHR Platform

<http://docker.bmi.utah.edu:8081/cwfdemo-webapp/>



Lessons Learned

- Initial learning curve fairly high
 - Hopefully will become easier as Interoperable Apps and Services become more “mainstream”
- Security is a critical consideration
- Standards (e.g., FHIR) are still evolving and require greater specificity for true plug-and-play interoperability
- Cross-institutional (and cross-platform) collaboration can significantly accelerate development



Thank You!

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