Leveraging SMART on FHIR and the FHIR Clinical Reasoning Module to Support Neonatal Bilirubin Management

HL7 Partners in Interoperability
Georgia Institute of Technology, Atlanta, GA
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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

Context

- Part of University of Utah <u>I</u>nteroperable <u>Apps</u> and <u>S</u>ervices (IAPPS) Initiative
  - Goal to improve patient care and the provider experience through innovative, interoperable extension of native EHR functionality
  - Scope includes both SMART on FHIR applications and CDS Web services using the FHIR Clinical Reasoning module and CDS Hooks

Key Focus: Improving MD EHR Experience

Viewpoint

February 9, 2017

Addressing Physician Burnout
The Way Forward

Tait D. Shanafelt, MD[1]; Lotte N. Dyrbye, MD, MHPE[1]; Colin P. West, MD, PhD[1]

For every hour of clinical work, physicians spent 2 hours on clerical work or EHR-related tasks

http://jamanetwork.com/journals/jama/fullarticle/2603408

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Multi-Institutional Collaboration

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

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

Scott Narus, PhD, MS
Chief Clinical Systems Architect

Ricky Bloomfield, MD
Director of Mobile Technology Strategy
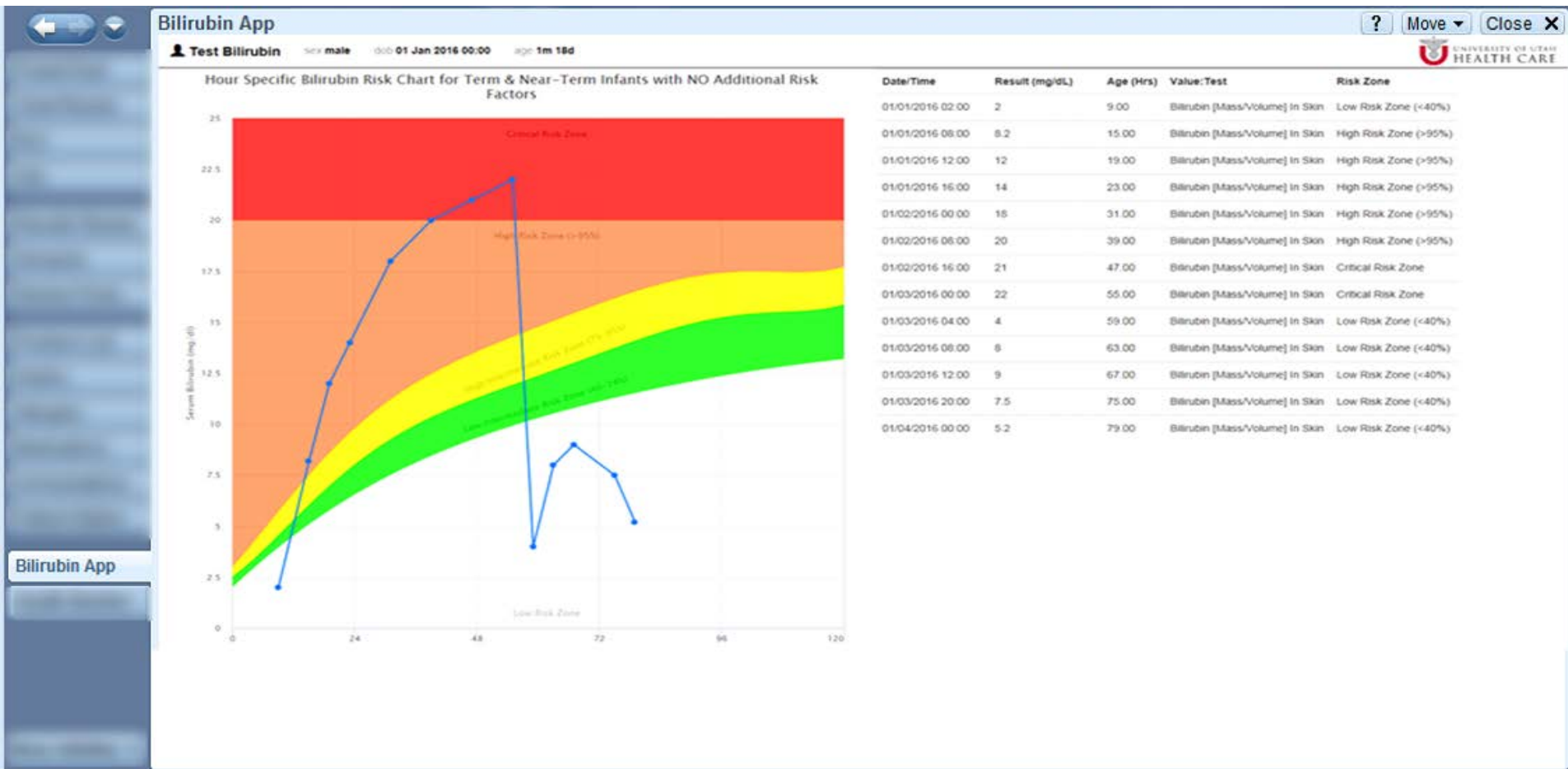
Robert Lenfestey, MD
Neonatologist and Clinical Faculty

Multiple EHR Platforms

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

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Baseline Bilirubin App, Integrated with Epic (developed by Intermountain)
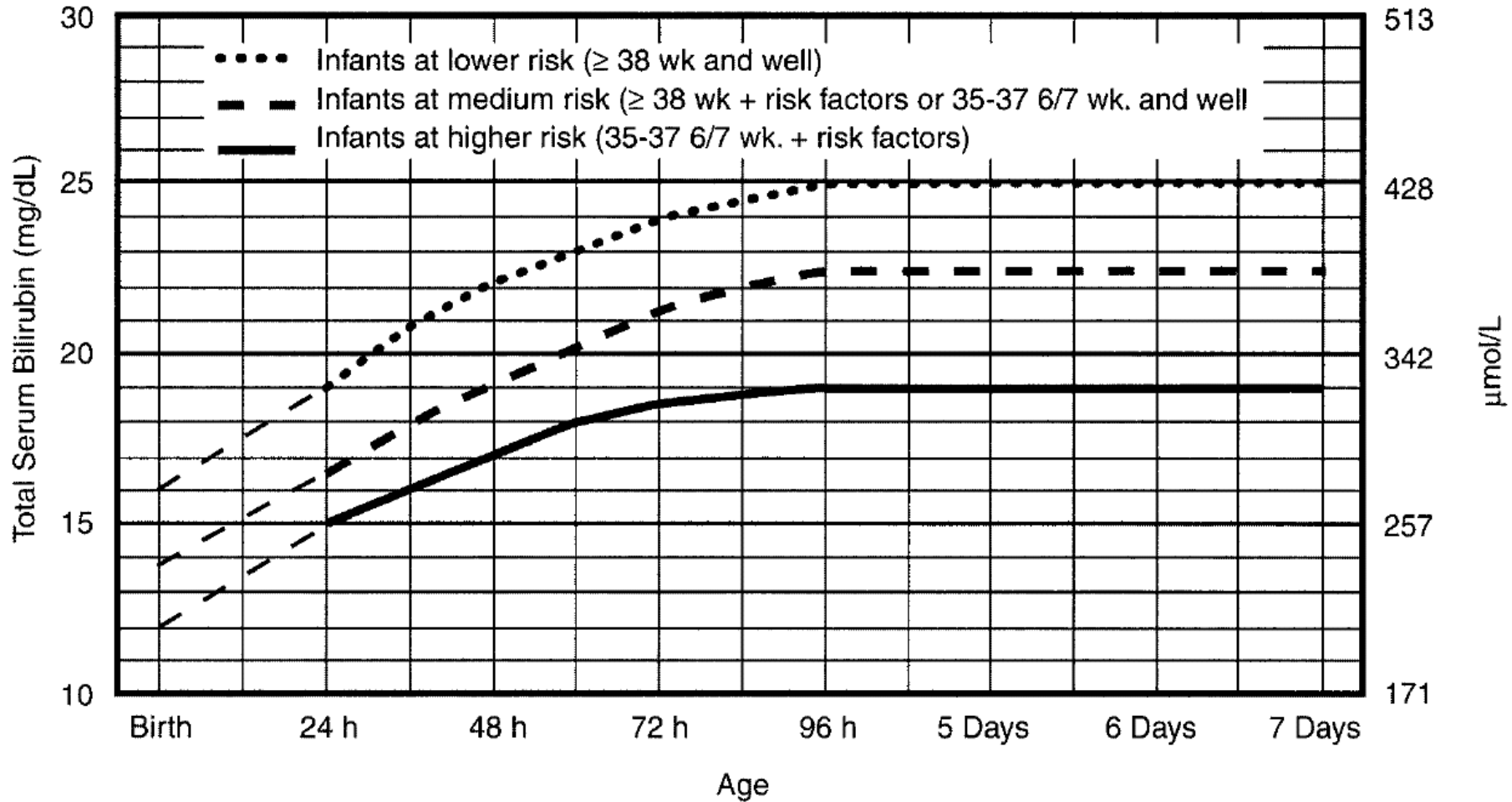
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American Academy of Pediatrics Guidelines for Phototherapy
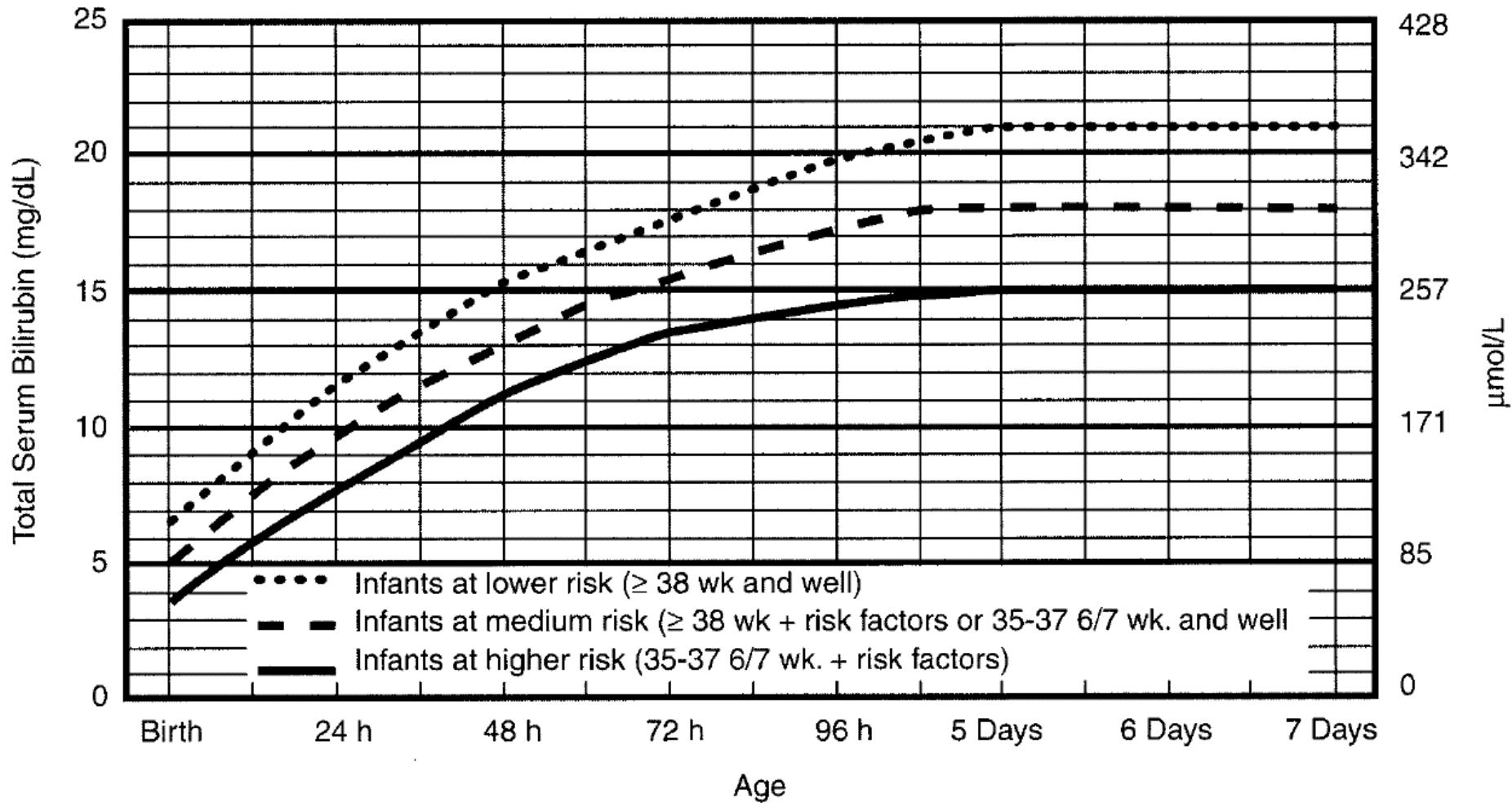
American Academy of Pediatrics. Management of Hyperbilirubinemia in the Newborn Infant 35 or More Weeks of Gestation. *Pediatrics.* 2004 Jul;114(1):297-316.
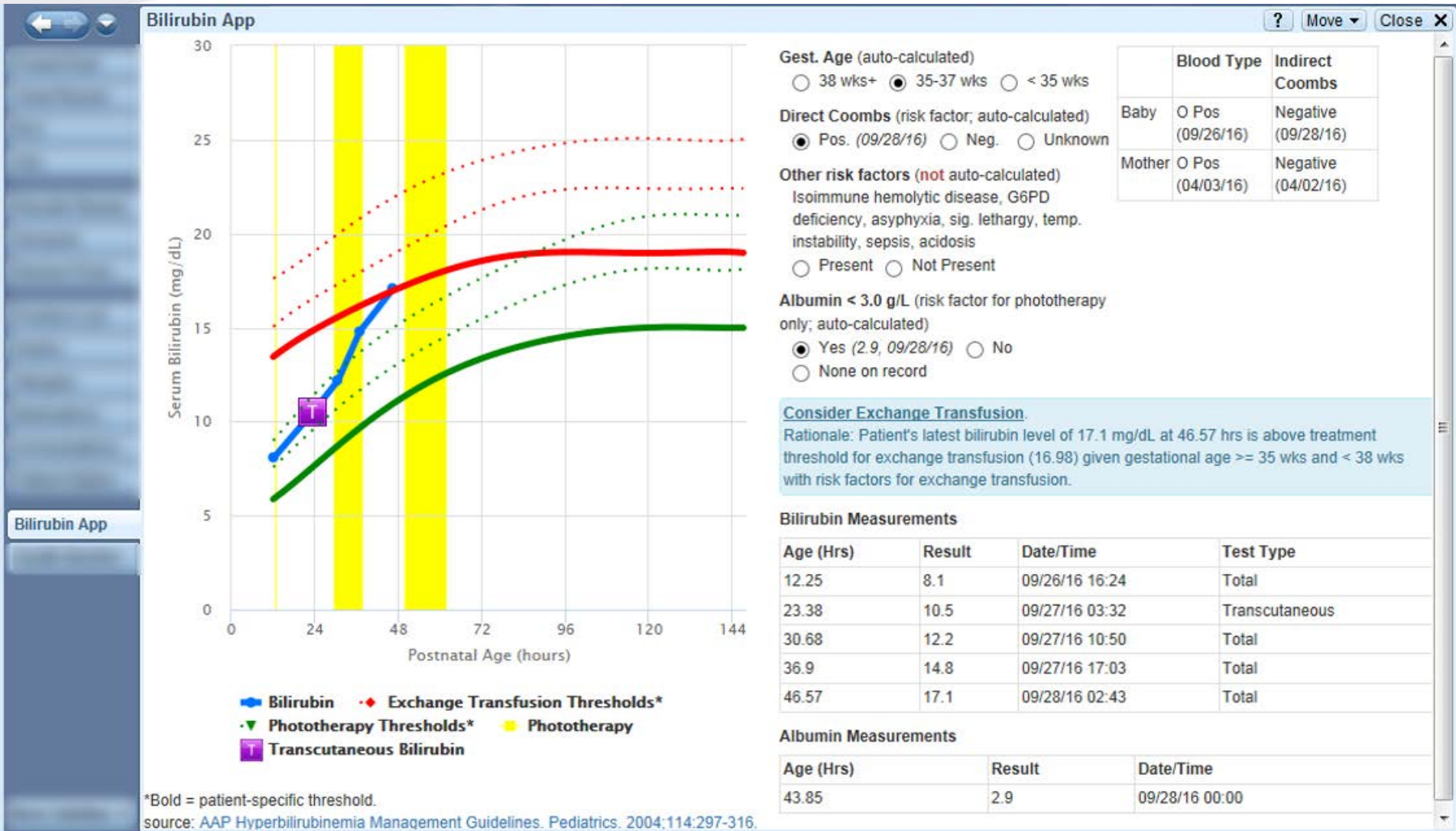
American Academy of Pediatrics Guidelines for Exchange Transfusion

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

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Current Bilirubin Application, in Production Use within Epic

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

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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://hl7-fhir.github.io/clinicalreasoning-module.html)
  - Being unified with CDS Hooks specification (http://cds-hooks.org/)

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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/

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Demo within HSPC CareWeb EHR Platform

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

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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

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Future Directions

- Scale up initiative
- Evaluate impact of Apps and Services
- Influence underlying technical standards
- Prioritize projects with greatest impact potential
  - E.g., via data-driven opportunity identification[1,2]
- Explore potential for expanded collaborations

Ref 1. Kawamoto K et al. Value Driven Outcomes (VDO): a pragmatic, modular, and extensible software framework for understanding and improving healthcare costs and outcomes. *J Am Med Inform Assoc.* 2015;22:223-35.

Ref 2. Lee VS, Kawamoto K et al. Implementation of a Value-Driven Outcomes program to identify high variability in clinical costs and outcomes and association with reduced cost and improved quality. *JAMA.* 2016;316:1061-72.

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Thank You!

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