Clinical Workflow Modeling in Obstetrics: Hepatitis B in Pregnancy

Fadi Shamoona,b, Harald Leitichc, Jeroen S. de Bruinb,d, Andrea Rappelsbergerd, Klaus-Peter Adlassnigb,d

a University of Applied Sciences FH Campus Wien, Favoritenstraße 226, A-1100 Vienna, Austria
b Medexter Healthcare GmbH, Borschkegasse 7/5, A-1090 Vienna, Austria
c ... Vienna, Austria
d Section for Artificial Intelligence and Decision Support, Center for Medical Statistics, Informatics, and Intelligent Systems, Medical University of Vienna, Spitalgasse 23, A-1090 Vienna, Austria

Abstract

Evidence-based clinical guidelines positively affect physician decision-making. Actionable clinical guidelines that actively trigger alerts, reminders, and instructive texts will increase effectiveness. We applied Activiti, a Business Process Model and Notation language system to model a clinical guideline for the prevention of mother-to-child transmission of hepatitis B as a computerized clinical workflow. Furthermore, we implemented an interconnected Arden-Syntax-based medical rule engine, which is part of the ARDENSUITE software.

Keywords:
Practice Guidelines; Decision Support Systems, Clinical; Pregnancy Complications.

Introduction

This study addresses the (partial) implementation of the “Hepatitis B in pregnancy” guideline: a clinical workflow providing evidence-based instructions on preventing mother-to-child transmission of hepatitis B during delivery. The guideline is in use at the Department of Obstetrics and Gynecology at Vienna General Hospital, Austria (Figure 1).

Methods

Business Process Model and Notation: the open-source workflow platform Activiti for the development of Business Process Model and Notation (BPMN) workflows [1, 2].
Arden Syntax: data access and knowledge-based clinical guidelines were implemented in HL7’s standard notation Arden Syntax part of the ARDENSUITE solution [3-5].

Results

BPMN translation permitted automation or the provision of reminders to the pediatrician of the following tasks:
- Active and passive immunization after childbirth
- Specific breastfeeding recommendation depending on the results of HBeAg and hepatitis B PCR testing
- Availability of order forms for in-house or external lab testing for HBsAg or HBeAg and/or hepatitis B

Conclusion

We presented a clinical workflow implementation connecting a BPMN-based workflow using the ARDENSUITE. This simplifies complex clinical guidelines by dividing them into workflow, knowledge processing, and data access steps and separates patient data access and knowledge-based decisions from the actual workflow/workflow decisions. This is essential for integrating evidence-based clinical guidelines into the patient care process.

References


Address for correspondence
Dr. Klaus-Peter Adlassnig, FACMI
E-mail 1: klaus-peter.adlassnig@meduniwien.ac.at;
E-mail 2: kpa@medexter.com