Appendix: Content Summaries of Best Papers for the Decision Support Section of the 2020 IMIA Yearbook

Hendriks MP, Verbeek XAAM, van Vegchel T, van der Sangen MJC, Strobbe LJA, Merkus JWS, Zonderland HM, Smorenburg CH, Jager A, Siesling S

Transformation of the National Breast Cancer Guideline into data-driven clinical decision trees

Since clinical practice guidelines are still narrative and described in large textual documents, the aim of this work was to model complex guidelines as data-driven clinical decision trees (CDTs) that could be still human-interpretable while computer-interpretable for implementation in decision support systems. The Dutch national breast cancer guidelines were translated into CDTs. Data items, which characterize the patient and the tumor and represent decisional criteria, were encoded unambiguously using existing classifications and coding systems related to breast cancer when feasible. In total, 60 CDTs were necessary to cover the whole guidelines, driven by 114 data items. Of all data items, 101 (89%) could be coded using existing classification and coding systems. All 60 CDTs represented 376 unique patient subpopulations. Complex guidelines could be transformed as systematically constructed modular data-driven CDTs that are clinically interpretable and executable in a decision support application.

Kamišalić A, Riaño D, Kert S, Welzer T, Nemec Zlatolas L

Multi-level medical knowledge formalization to support medical practice for chronic diseases

This research is focused on knowledge representation to support the medical processes involved in chronic diseases management, which can be viewed as a procedural and sequential application of knowledge. An intuitive, easy, and effective mechanism for medical knowledge formalization is proposed through a formalism called extended Timed Transition Diagram (eTTD). This formalism allows for the consistent representation of three basic levels of decision making that should be taken into account in the prescription and adaptation of long-term treatment: therapy strategy, dosage, and intolerances. The methodology can be manually applied to build eTTDs from clinical practice guidelines. eTTDs implementation is demonstrated by modeling clinical practice guidelines for the therapeutic management of arterial hypertension. The obtained models can be used as a baseline framework for the development of decision support systems involving medical procedures.

Khalifa M, Magrabi F, Gallego B

Developing a framework for evidence-based grading and assessment of predictive tools for clinical decision support

Deciding to choose a clinical predictive tool in clinical practice should be guided by its correctly assessed effectiveness. The objective of this work is to developp a conceptual and practical framework to Grade and Assess Predictive tools (GRASP) and provide clinicians with a standardised, evidence-based system to support their search for and selection of efficient predictive tools. The GRASP framework grades predictive tools based on published evidence across three dimensions: phase of evaluation, level of evidence, and direction of evidence. The final grade of the tool is based on the phase of evaluation that gets the hightest grade, supported by the highest level of positive or mixed evidence that supports a positive conclusion. This framework was successfully applied to five predictive tools. GRASP report updates could be a way to maintain a data base that documents the evidence of predictive tools.