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A Toolbox to Improve Algorithms for Insulin-Dosing Decision Support

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Abstract. Standardized insulin order sets for subcutaneous basal-bolus insulin therapy are recommended by clinical guidelines for the inpatient management of diabe-tes. The algorithm based GlucoTab system electronically assists health care personnel by supporting clinical workflow and providing insulin-dose suggestions. To develop a toolbox for improving clinical decision-support algorithms. The toolbox has three main components. 1) Data preparation: Data from sev-eral heterogeneous sources is extracted, cleaned and stored in a uniform data format. 2) Simulation: The effects of algorithm modifications are estimated by simulating treat-ment workflows based on real data from clinical trials. 3) Analysis: Algorithm perfor-mance is measured, analyzed and simulated by using data from three clinical trials with a total of 166 patients. Use of the toolbox led to algorithm improvements as well as the detection of potential individualized subgroup-specific algorithms. These results are a first step towards individualized algorithm modifica-tions for specific patient subgroups.

Keywords. Decision Support Systems, Clinical; Workflow; Algorithms; Computer Simulation; Diabetes Mellitus Type 2

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