The value of medicine prescription data

Kempenhaeghe treats patients with epilepsy, a neurological disorder that can only be controlled by medicines. The prescription of the right medicines is crucial for a patient’s quality of life. Kempenhaeghe has logged medicine prescriptions for more than three decades, and is interested to get more insight in medicine prescription behavior. Typical questions are to find preferred (combinations of) medicines by physicians, how cautious they are with prescribing high doses, and whether this behavior changes over time.

To answer such questions, we have developed an interactive visualization system. A key idea is that prescription data can be viewed from at least three perspectives. Current systems typically focus on the patient’s perspective, showing important events in the lives of patients. Also, the perspective of medicines can be used, for instance to study trends in their usage. A third perspective is that of physicians, such that they can reflect on their prescription behavior and compare it with their colleagues.

Our approach was evaluated by six neurologists at Kempenhaeghe. We found that after a short introduction the system enabled them to answer specific questions and to explore their prescription data. Some reactions we got were “This project surprised be in a pleasant way, we certainly have to go further with this.” and “A beautiful project, especially for audits.”

The Three Table View

Three entities play an important role in this problem: doctor, patient, and medicine. Each of these has specific properties, like the patient’s date of birth. An intuitive way to present this data is by using a table for each entity. Using a novel technique, called Row Relation Glyphs (RRGs), we can also display the relations between doctors, patients, and medicines. Once a table row is selected, a colored box (RRG) appears in front of other rows indicating a relation with the selected row. This technique forms the basis of our Three Table View, and allows for powerful visual queries on the data.

The Prescription View

Besides information about doctors, patients, and medicines, we can present various statistics for a selection of prescriptions. The Three Table View can be used to select prescriptions of interest: all prescriptions with Carbamazepine by doctor Jansen for example. The Prescription View thereafter shows the distribution of these prescriptions for various metrics. Examples of these metrics are initial dose, average dose, and the set of set of medicines that is prescribed simultaneously.

We have built a prototype based on the Three Table View and the Prescription View. The screenshots below show its functionality on a database with 30,000 patients and 300,000 dose changes.