

## INTERVIEW

# The Santeon Farmadatabase: using medication data to improve patient value

## Dr. Ewoudt van de Garde

By Anneke Johnson, MSc. – VBHC Center Europe

**Dr. Ewoudt van de Garde**, clinical pharmacologist and hospital pharmacist at the St. Antonius Hospital in Utrecht/Nieuwegein, has been a vital player in Santeon's efforts to develop the Farmadatabase. In 2012, Santeon initiated a project to build a database that would enable them to collect and track data concerning medicine prescriptions across the different Santeon hospitals.

### What is the Farmadatabase and how does it work?

The Santeon Farmadatabase is a robust data infrastructure put in place to measure hospital medication utilization in real time. The Farmadatabase currently\* holds information for almost 19 million medication orders, more than 3,5 million hospital admissions, and over 15 million diagnoses from a population of almost 800.000 patients.

The Farmadatabase contains information about medications prescribed, hospitalization and survival data, diagnosis information, and general patient characteristics (gender and month/year of birth). All patients that have one or more medication orders are included and the database is indication specific, meaning that capturing of data is not restricted to any specific disease. By keeping the database as aspecific as

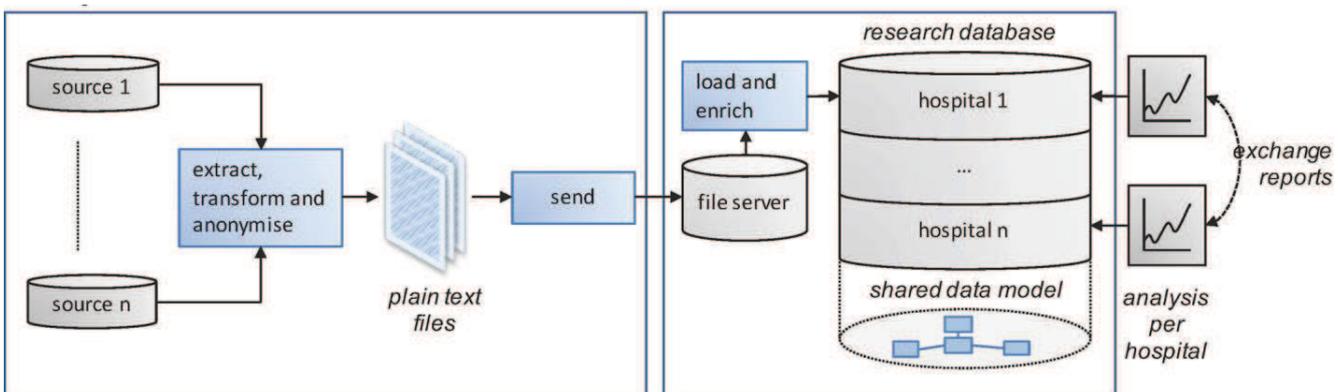
possible we can use the data in as many situations as possible.

The Farmadatabase works as follows (see fig. 1): data is extracted on a weekly basis from electronic health records on-site at each of the 7 Santeon hospitals ([www.santeon.nl](http://www.santeon.nl)). This data is then anonymized, normalized into predetermined categories and reformatted into a fixed-length text file. The subsequent text file is transferred to a central data warehouse where it is checked for integrity and added to the shared database.

### What distinguishes the Santeon Farmadatabase from others?

One of the big differences between the Farmadatabase and other databases across Europe is that the Santeon Farmadatabase is updated weekly, while other databases are only updated through an annual data dump. Our database allows us to evaluate real-life outcomes much faster when new medicines are introduced into the Santeon hospitals.

Another very important aspect of the Farmadatabase is that contains normalized data from multiple hospitals. This gives us the opportunity to benchmark different treatment options and their outcomes across a



**Figure 1.** Data extraction and flow from one hospital to a centralized data warehouse for analysis



wide geographic area, mitigating the influences of a geographic area on outcomes. If the outcomes are different, then you automatically have a lead for potential improvement.

The fact that the Farmadatabase is not restricted to a specific indication is also an element that makes our database unique: there are many, also multi-center databases across the Netherlands, but most started with a single indication. In these cases the data often cannot be used for another indication. There are also many examples of medication-driven databases that house the outcomes of patients that use one specific drug. In these cases there is also only a very limited chance that the data can be used for other purposes or to compare to alternative treatments.

#### What are the applications of this system for real-life care?

One of the main applications that we utilize now is benchmarking performance between Santeon hospitals. For example, many trials have been carried out evaluating when to switch patients from IV to oral antibiotics. This research has shown that if the patient is switched to oral antibiotics when clinically stable you can improve mobility, overall recovery and achieve earlier discharge.

We carried out a benchmark evaluation on what the median time to switch to oral antibiotics was within our network. We found that there was a difference of one day between some hospitals. We then implemented a clinical policy in my hospital that allowed us to screen patient records to identify patients that had not yet been switched to oral antibiotics but were potentially eligible, and called the responsible physicians to discuss the option of transition. The data in the Farmadatabase

and subsequent analysis enabled us to improve our outcomes for patients and return to the benchmark time.

#### Does Santeon plan on using the database for additional applications?

We are actually working on a very interesting project at the moment. When new medications come to the market you only have data from clinical trials that describe for which indications the drug is effective and how effective it is. What we are now trying to do is use the Farmadatabase to compare our patients' outcomes with the clinical trial data, giving us a view of how effective medication is in real life.

#### *“The data in the Farmadatabase and subsequent analysis enabled us to improve our outcomes for patients”*

So far, we have collected outcome data for medications used to treat advanced lung cancer between 2008-2014 (which covers more than 3.000 patients within the Santeon group). We compared the outcomes of our patients with the outcomes reported in the clinical trials and we have seen that, for every drug and drug combination, the outcomes in real life are less than what was reported in clinical trials. We also found that specific patient characteristics influence the difference between trial and real life outcomes.

Following these conclusions, we decided to develop a dashboard that physicians can use in their communication with patients to help give patients a realistic view of their possible treatment outcomes. The chance that patients will have the outcomes we present is higher than the chance that patients will experience outcomes listed in the trial data because our outcomes

## INTERVIEW

are based on real life results from the health care system patients are being treated in. We hope that the dashboard will improve shared decision making between doctors and patients. Santeon has the desire and potential to build a dashboard such as the one described above for every major indication that we see in our VBHC system.

We also hope to be able to use the Farmadatabase for post-market surveillance of a different kind. Until now most clinical trials, especially for cancer treatments, have focused on progression-free survival time or overall survival as outcomes. The data we now have in the Farmadatabase would be sufficient to use for post-market surveillance on these outcomes, but I would like to include additional patient-relevant outcomes to judge the medications on anything other than survival.

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So, what I really like about the Farmadatabase is that it can integrate VBHC by evaluating outcomes that really matter to patients. You could build an outcome set that includes these trial outcomes and much more. It is important to know whether the trial outcomes are met in real life, but it's just as important to know what effect this medication has on other outcomes that are relevant to patients.

### What would Santeon eventually like to achieve with the Farmadatabase?

The vision is to have a “Learning Pharmacotherapy

System” in all of our hospitals. Within this vision we have three different goals we would like to achieve with the help of the Farmadatabase. The first goal is to continue doing ordinary benchmarking to aid in constant internal improvements. The second goal is to use the database to support our various indication-driven VBHC programs. The third goal is to do post-market surveillance to see if new drugs, in the Santeon population, really provide the increase in outcomes that matter and how this matches with claims from clinical trials.

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A possible extension to the post-market surveillance would be to evaluate if the negotiated prices are on par with the real-life achieved outcomes. It would be nice to have a system in place that can take the outcomes delivered by new therapies and use it as a tool to aid in negotiating drug prices. The Netherlands could develop a reimbursement scheme where prices change based on real-life outcomes. However interesting, for me this idea is more of future perspective that uses the Farmadatabase to find a way to approach problems within health care.

#### ADDITIONAL INFORMATION

For more information about the Santeon Farmadatabase please see: van de Garde EMW, et al. Eur J Hosp Pharm 2017; 0:1-5. doi:10.1136/ejhpharm-2017-001329.  
Contact information: e.van.de.garde@antoniuziekenhuis.nl