

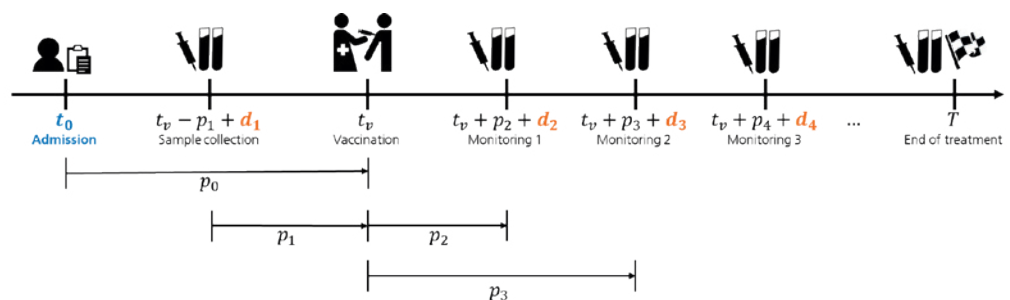
Making Uncertainties Plannable

Testing the efficacy of new medicines or therapies on humans is an important part of biomedicine and pharmaceuticals. However, the path of patient samples to those who process them is riddled with uncertainties.

A pharmaceutical company needs patients who are willing to participate in a study for a new drug. "The uncertainty already starts with the question whether enough patients can be enrolled in the participating clinics during the planned study period," says Dr. Sandy Heydrich, who heads the process planning team at Fraunhofer ITWM. "There's a lot of stochasticity in

workload generated by the clinical trial," says Dr. Heiner Ackermann, deputy head of department "Optimization – Operations Research".

The daily workload of those who process the samples is often uncertain because it depends on the number of incoming samples, some of which have to be processed within a certain



During a drug trial, there are several sources of uncertainty: the start of the trial, samples arriving too early or too late, or treatment ending prematurely.

Contact

Dr. Sandy Heydrich
Team leader "Production Planning
Pharmaceutical Industry and Bio-
processes"
Phone +49 631 31600-4985
sandy.heydrich@itwm.fraunhofer.de



the process. This is because not only is the enrollment of individuals in clinical trials to some degree subject to chance, but the arrival of samples for study is also stochastic.

Goal: Predict workload in the laboratory

The "art of guessing", the basis of stochastics, accordingly characterizes the work in this environment. On behalf of a biotechnology company, the team at Fraunhofer ITWM is looking for mathematical solutions to make the entire process more predictable, up to and including personnel scheduling. "If there were no uncertainties, we could calculate the arrivals of the samples individually and determine the

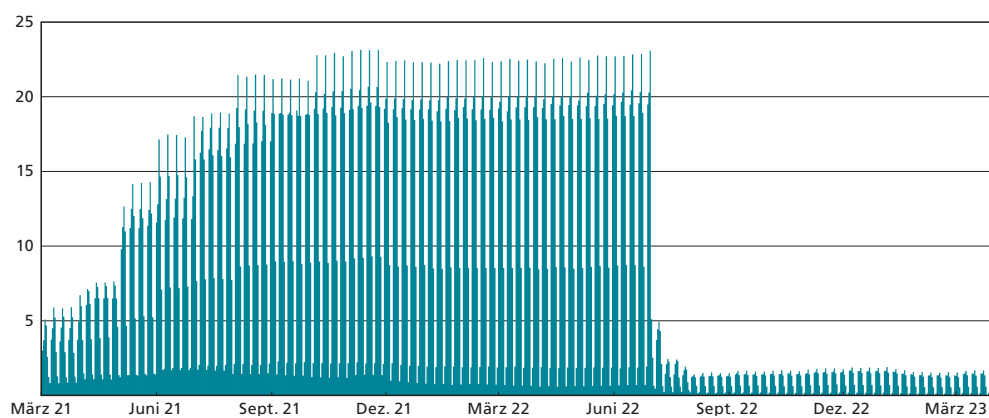
period of time due to their shelf life. The more accurately it is predicted how many samples will arrive and when, the better the workload in the lab can be planned. The team led by Heydrich and Ackermann aims to use a mathematical model to provide answers to many questions, such as: Is the current staff sufficient for the workload that will be generated?

Making every day more predictable

The project partner's goal is to optimize staff scheduling based on the samples that are likely to be received. For this purpose, the researchers are developing a simulation tool that provides a forecast of the number of sample arrivals for each study day. The core of the



© istockphoto/shironosov



Our researchers have developed a simulation tool that uses several parameters to predict the number of sample arrivals on each day of the time horizon. These results are used to perform a what-if analysis, which is used to optimize staff scheduling.

model is a Monte Carlo simulation to estimate the number of sample arrivals at the production site for each day in the time horizon of the study. The influencing parameters are taken into account, but also different scenarios

are represented, such as the fluctuating number of patients. The variable level of detail of the model optimally supports the planning process in every phase.

Kontakt

Dr. Heiner Ackermann
Deputy head of department "Optimization – Operations Research"
Phone +49 631 31600-4517
heiner.ackermann@itwm.fraunhofer.de



More information at www.itwm.fraunhofer.de/layout-cutting-problems