**Dynamic Patient Flow Model for Predicting Demand Volumes and Sales in Oncology that incorporates Patient Journey and lines of therapy**

When a potential new therapy is discovered, it needs to go through preclinical and clincal trials and a review by FDA before it can be launched in the market. In the process from discovery through commercialization, a pharmaceutical organization would want to know the potential of this new therapy from the perspective of reducing disease burden, improving patient outcomes and the impact to the balance sheet of the company. This future potential is determined through forecasting models that work by incorporating historical data to provide predictions around patient numbers, volumes or sales.

Pharmaceutical companies have always faced challenges accurately forecasting the demand and sales for Oncology drugs. It is very important is to make sure enough doses are being manufactured and ready for distribution to meet the demand, given the complex manufacturing process. Over-forecasting results in wastage and huge write-offs as drugs have a limited shelf life. On the other side under-forecasting results in not being able to meet the need of patients who have a life threating disease.

While it’s easy to predict the demand of primary care therapies used for cardiovascular or metabolic conditions based on the numbers of patients and historicals, it is very tough to forecast the demand for oncology drugs. Oncology is unique and distinct area where physicians/oncologists rely on criteria such as tumor type, stage of the disease, genetic makeup or how they progress through different treatments over a period of time. This helps the oncologist decide the best targeted or personalized treatment pathway at a given stage, that would result in the best outcome. Classifying patients into subgroups and tracking their journey since diagnosis through various treatments in time is called “Patient Journey”. My model incorporates the complete Patient Journey to accurately predict demand for oncology drugs

Currently available forecast models for oncology drugs have always failed to accurately predict the demand as pharmaceuticals companies just tend to use patient numbers which always results in over or under forecasting the disease burden.

My model incorporated multiple variables and complex data within the “Patient journey”. These include factors such as diagnosis, incidence, recurrence, stage of cancer, lines of therapy. The model also has the ability to segment patients by splitting them into smaller groups with similar characteristics. My model dynamically maps patients through different stages and lines of treatment as they progress through the disease.

Time granularity is also a key aspect of this model where the forecast is split by months for greater flexibility to include market or competitor events. From an eagle’s eye perspective, my model simulates a specific cancer market by integrating patient journey, historical data, new competitor approvals and clinical trial results. Advanced statistical techniques – linear and multiple regression are used to identify patterns and predict future values.

In terms of scalability, my model can be used across multiple tumor areas such as lung cancer, breast cancer, melanoma, colorectal cancer, bladder cancer, multiple myeloma, prostate cancer, etc. From a results/value addition perspective, my model has improved decision making with an accuracy of more than 90% which is a new benchmark and never seen so far in the industry.