MANAGING SOC WORKLOAD WITH DEMAND – SUPPLY MATRIX
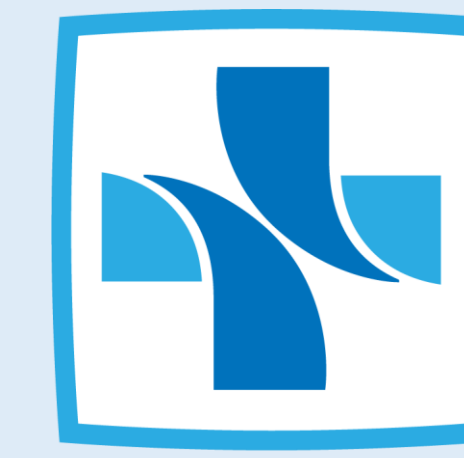
Singapore Healthcare Management 2018

DEMAND   SUPPLY
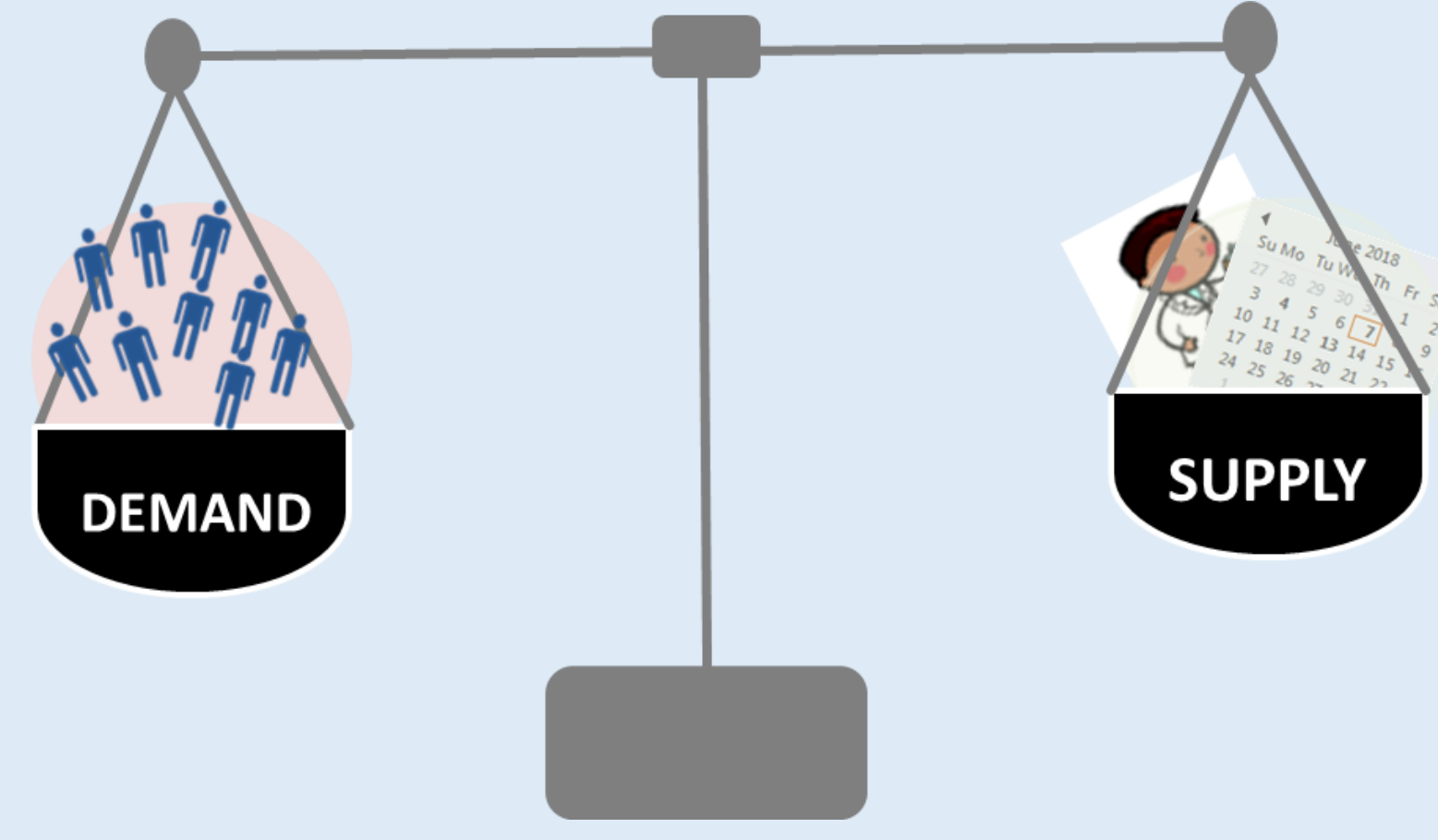
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Aim(s) (Project Background)

One of the challenges for Specialist Clinics is to plan for appropriate capacity to meet the demand so that patients receive timely care. Exogenous demand and supply shocks such as surges in referral numbers or staff turnover can result in disequilibrium. With time, this can then lead to a substantial buildup of backlog cases which further stresses the system with its limited resources.

Aim of this project is to address the long wait time faced by some patients, to get the first outpatient appointment.

Changes (Methods)

To understand the problem, we first engaged a few Clinical HODs with long wait time and went through simple descriptive analysis. We discussed demand trends, referral sources and break down to sub-specialties performances. We progressed to model the problem with a demand and supply matrix $_1$ ("DD-SS") which took into account the full workload (without reporting exclusions) and backlog of patients to be seen in the current month referred from earlier months.
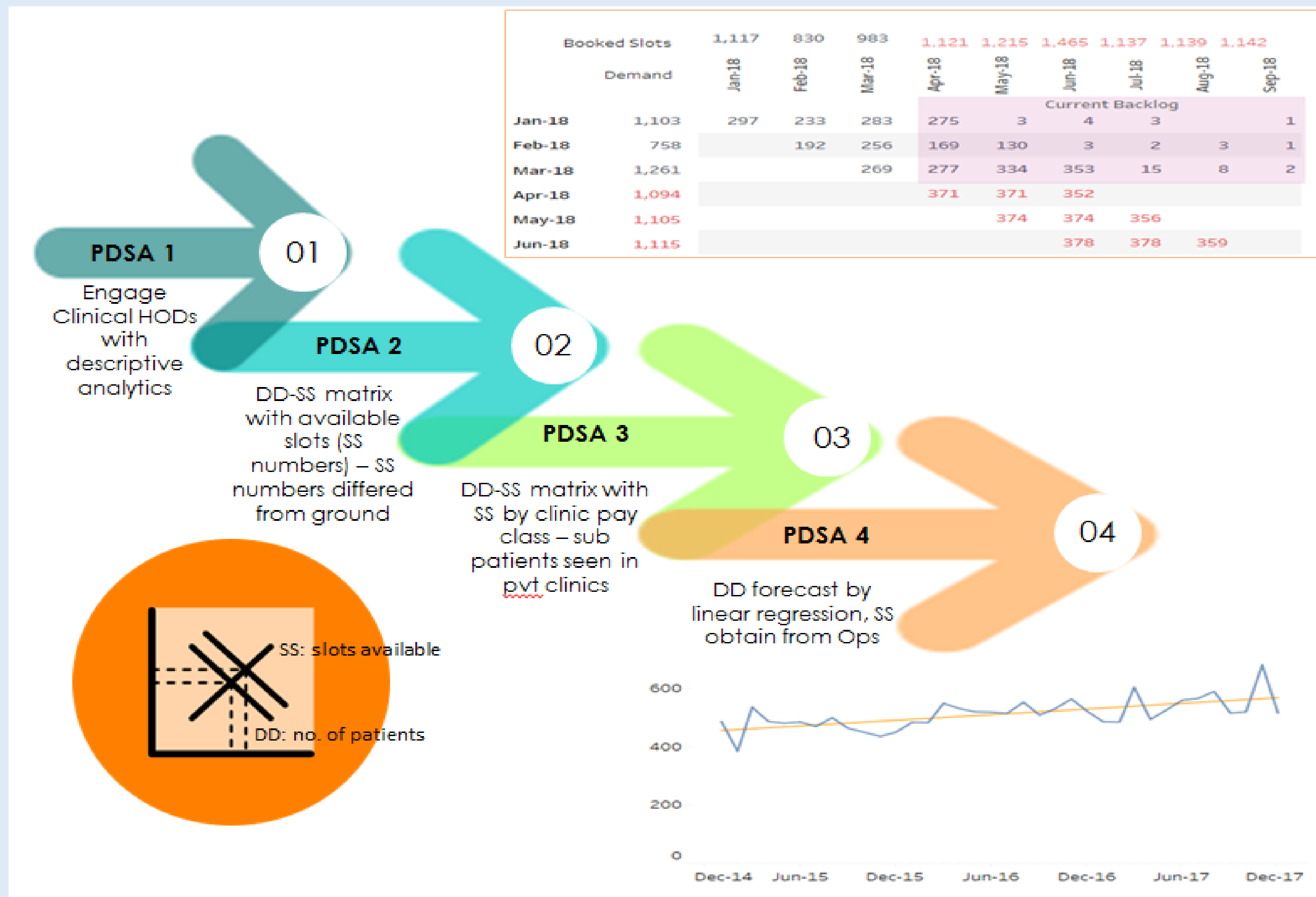

Figure 1: PDSA Cycles

After a few Plan-Do-Study-Act (PDSAs), adapting from feedbacks from key stakeholders, we settled with Weighted Linear Regression Model using three years of historical data to predict future demand. R^2 values ranges up to 0.66, and the standard error of the regression model was sufficiently low enough to provide an acceptable degree of precision.

The information is being disseminated to all Clinical department HODs and our Operations colleagues via monthly automated email. This is aimed at allowing for better planning of resources, with greater visibility on the slots needed to meet the demand.

For the supply, as departments' resource set ups, operational practices and demand trends varies, we work with Operations to obtain the available slots which have taken into consideration resource availability.
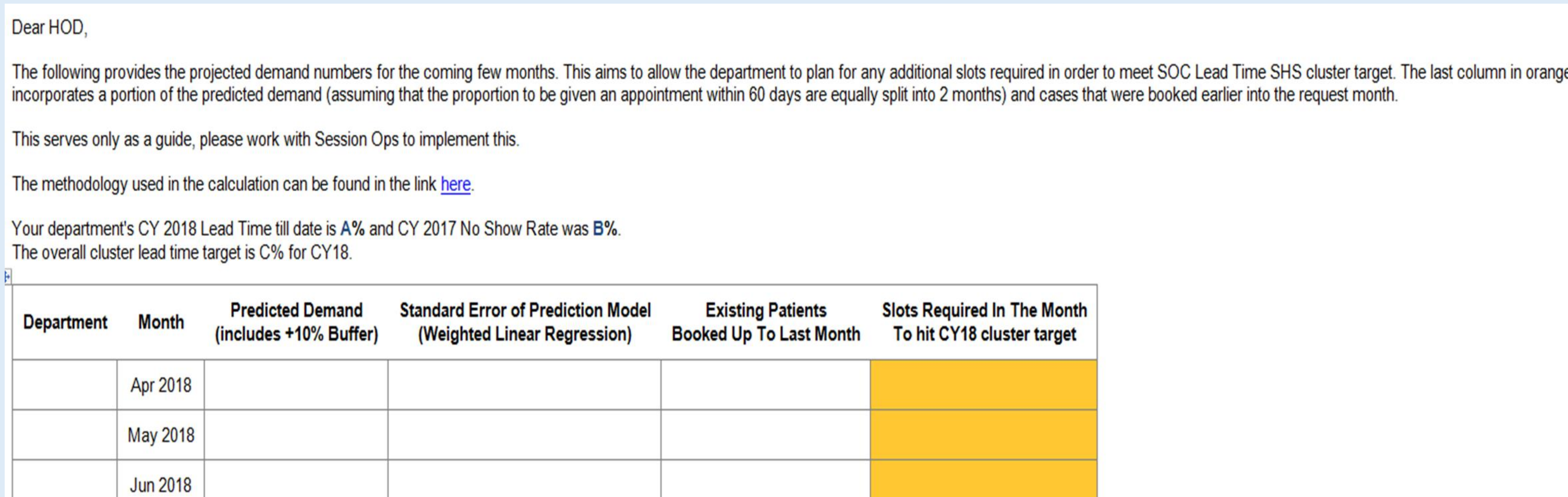

Figure 2: Monthly Automated Email

Measures (Results , Outcomes and Figures)

We have approached 12 specialties with the above methodology, of which 9 showed improvements in their appointment waiting time. Cardiology, Gastroenterology, Neurology have improved most significantly by 45%, 67% and 71% respectively. Neurology performance has been sustained over last 13 months while Cardiology and Gastroenterology is maintaining over last consecutive 6 months. Over the last 2 months, lead time of General Surgery has improved to 0% and for Orthopaedic Surgery, we have seen a slight improvement in the recent month performance.

Hospital-wide, the lead time has also shown improvement. May 18's performance is at 14.1%, and a downward trend is observed. We will continue to monitor for sustained improvement.
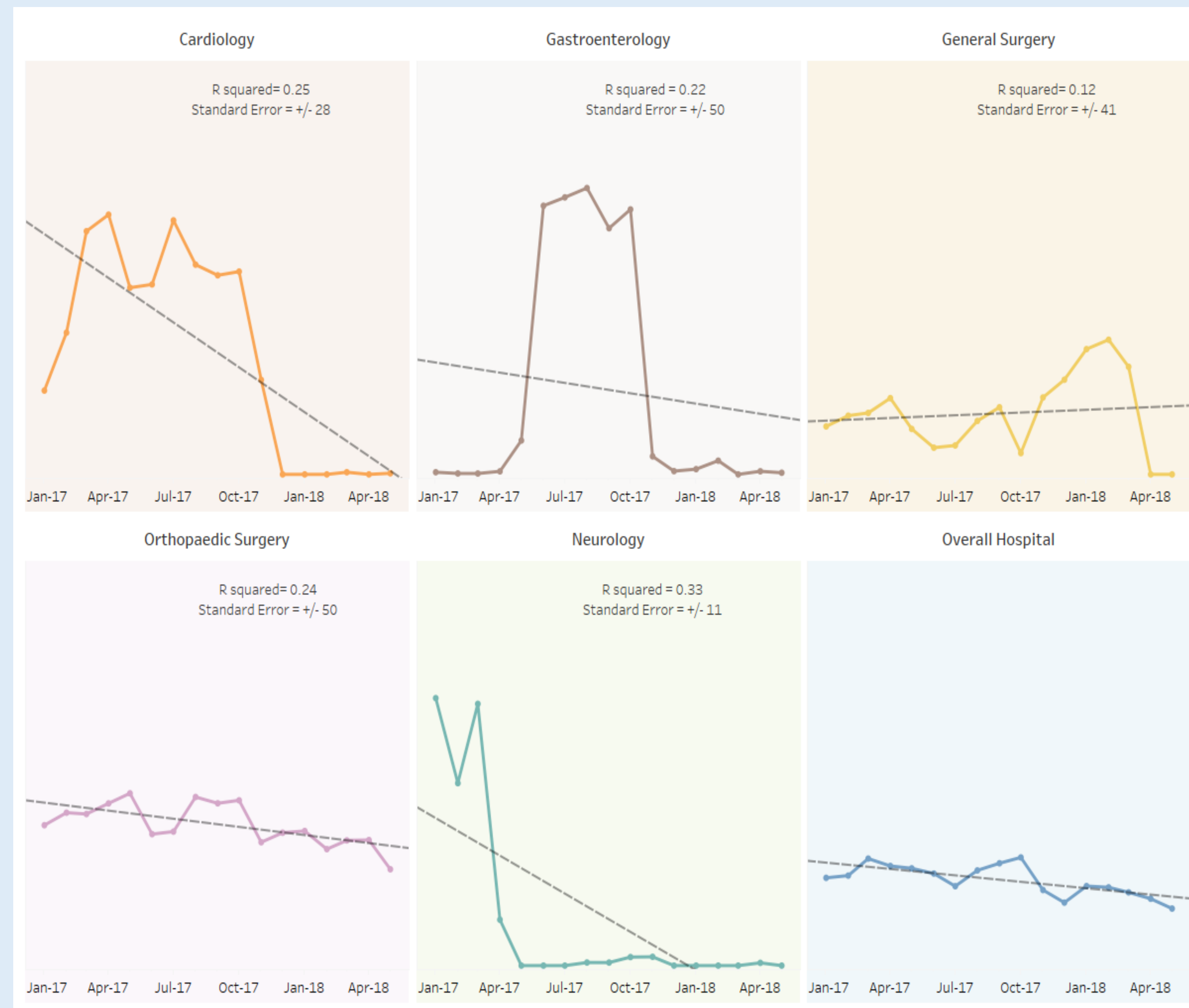

Figure 3: Lead Time Trends

Specialty	Percentage Improvement
Neurology	71%
Gastroenterology	67%
Cardiology	45%
Overall	4.6%

Figure 4: Improvement in Lead Time

Conclusion

Engagement with Clinical HODs was important to design interventions to cater to the departments' needs. One of the design considerations was reproducibility and transferability of information to all specialties in a prompt manner.

The prediction model is being reviewed and refined constantly to include more explanatory variables.

Reference:
$_1$ T. K. (2010). *Development Of A Supply/Demand Matrix For Optimal Specialist Outpatient Clinic (SOC) Capacity Planning To Meet A Target Appointment Waiting Time. Health Services & Outcomes Research 2010, 32-33.*