

Agenda

- Introduction
- Explanation about the data
- Data Science Approaches
- Timeline / Conclusions

Introduction

The Partner - Providence Health Care

- Providence Health Care (PHC) is a non-profit organization.
- Almost 9,000 people working at their 16 facilities - 6,000 staff, 1,000 medical staff/physicians, 200 researchers, 1,600 volunteers.
- PHC is the provincial centre for the care of six groups of people with often-intensive health needs:
 - heart and/or lung diseases;
 - kidney disease;
 - mental illnesses;
 - Older British Columbians (residential care, seniors, & geriatrics);
 - HIV/AIDS; and
 - urban health issues (homelessness, drug & alcohol-related issues & malnutrition).

Objective

The purpose of this project aims to predict demanding forecasting for staffing need in healthcare on weekly basis, giving some insight about how many back up staff PHC needs to have a full staff.

Final Product

The final product will consist of:

- a dashboard (developed in R Shiny or Tableau)
- the scripts containing the code used to proceed with the analysis; and
- a report outlining the methodologies and findings.

Data Description

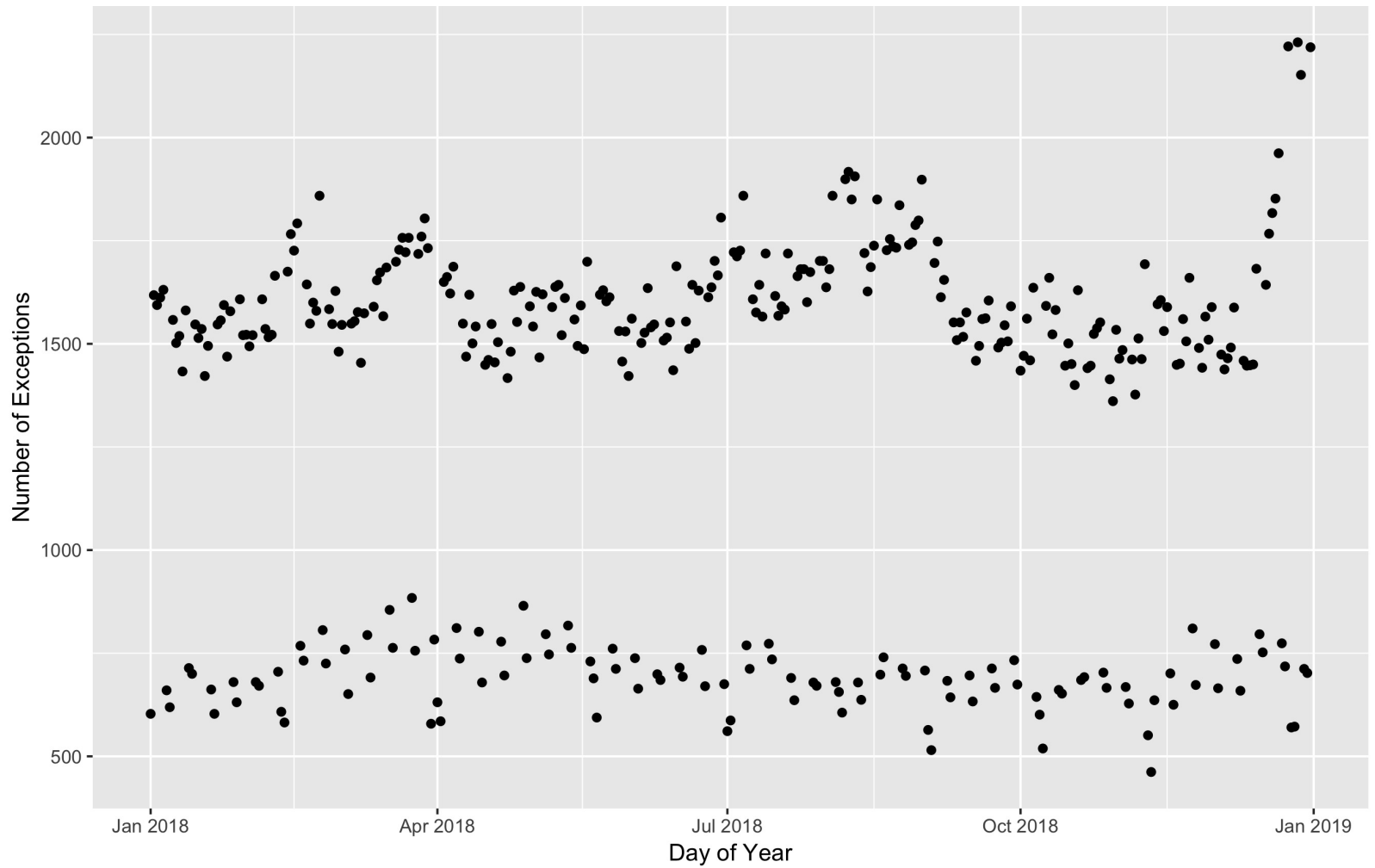
EXCEPTION_CREATION_DATE	EXCEPTION_GROUP	JOB_FAMILY_DESCRIPTION	JOB_TITLE	PROGRAM	SUB_PROGRAM	SHIFT_DATE	EARNING_CATEGORY
2017-10-25	Leave of Absence	Registered Nurse-DC1	RN Vacation Relief	HEART LUNG	BARBARA HALL	2018-01-01	Relief Not Needed
2018-01-01	Casual Sick or Cancelled	Licensed Practical Nurse	Licensed Practical Nurse	MEDICINE	MSJ NURSING UNITS	2018-01-01	Relief Not Needed
2017-11-15	Swap	Registered Nurse-DC1	Registered Nurse	HEART LUNG	MELANIE MULDER	2018-01-01	PT Over FTE
2017-11-30	Vacancy	Care Aide (Resident)	Resident Rehab Care Attendant	SENIORS CARE	RES SVCS LAN	2018-01-01	Regular Relief Utilized
2016-10-04	Vacancy	Clerical Other	Clerk IV	SURGERY	OR PAR SPH	2018-01-01	PT Over FTE

Data Science Approaches

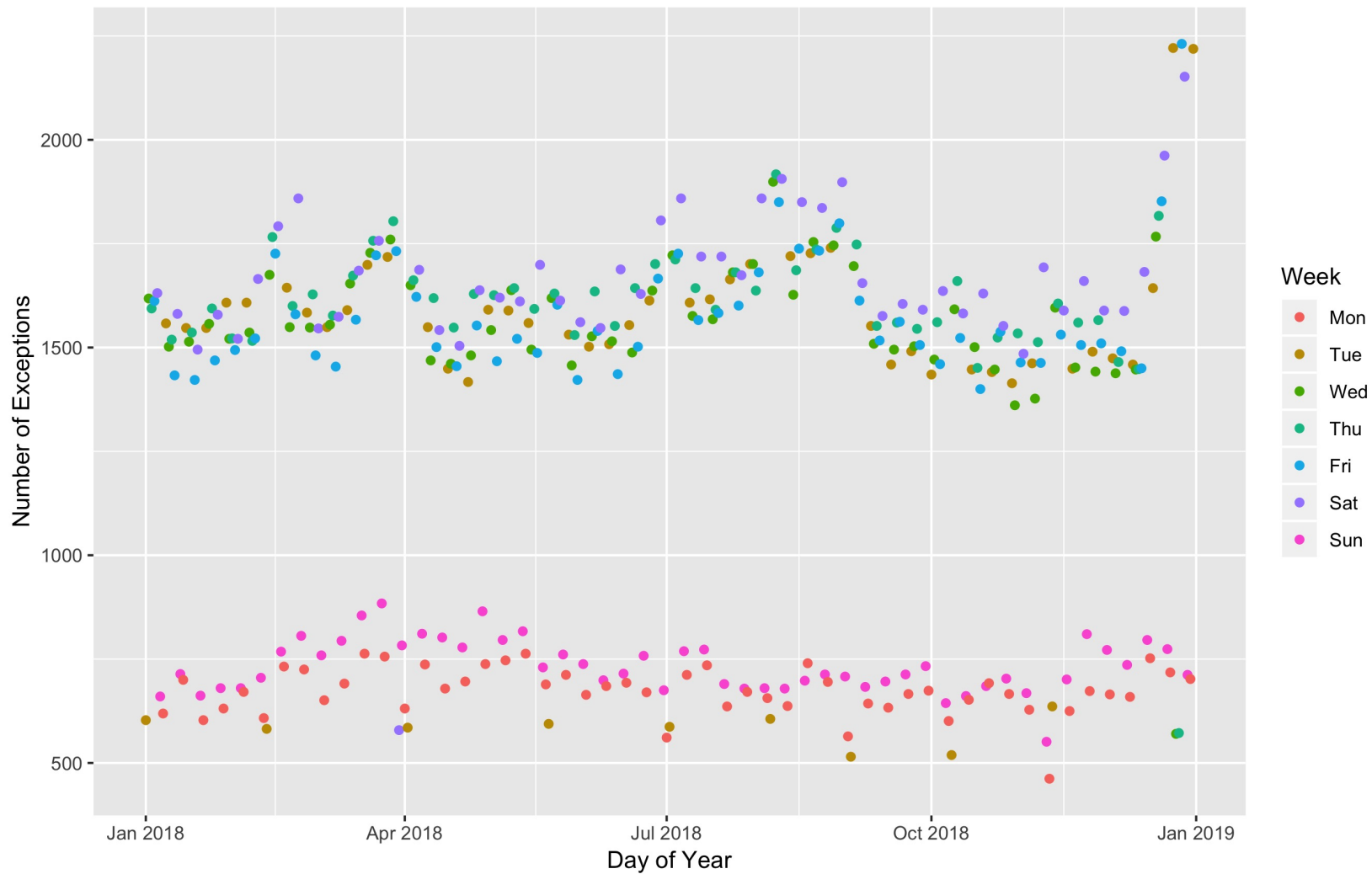
- Time Series
- Linear Regression
- Neural Network

Time Series

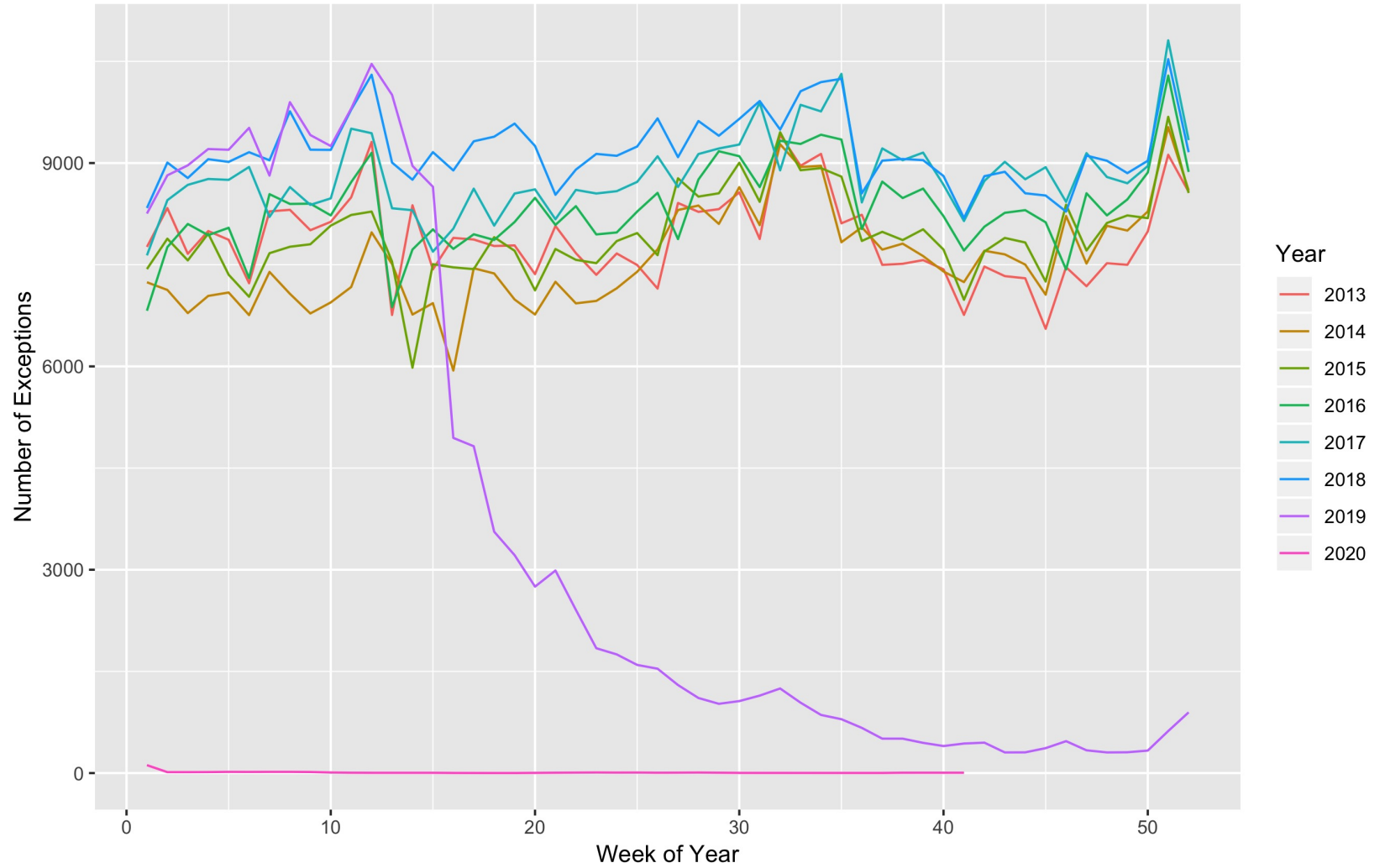
Exception Records by Day, 2018



Exception Records by Day, 2018



Exception Records by Week for each Year



Linear Regression

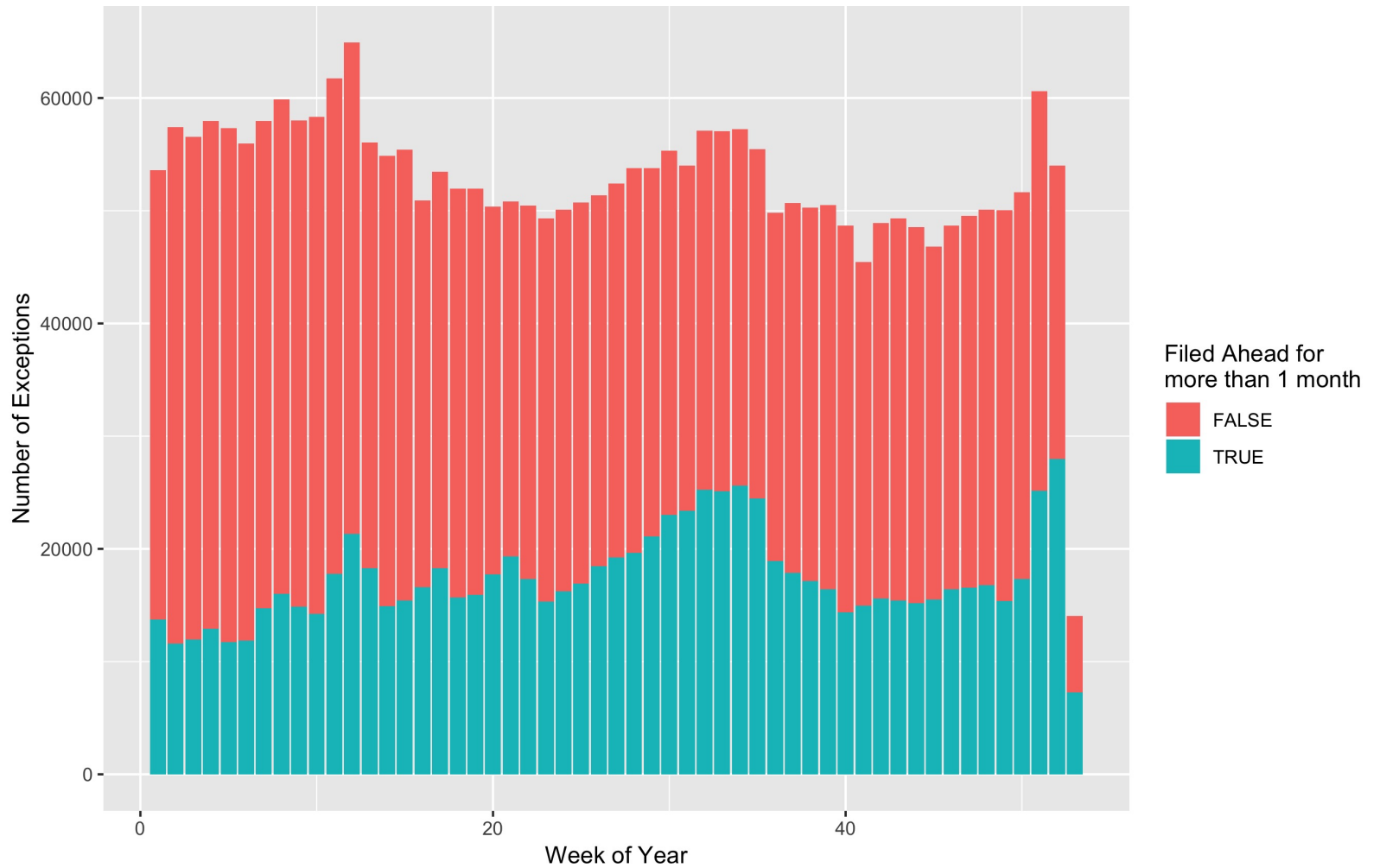
Data Wrangling

- Raw data is based on exception record: one entry per record
- To apply linear regression: make each row a day, summarise the related variables
- Feature selection needed

Exception Records, Filed Ahead or Not



Exception Records, group by Exception Groups



Feature Selection

- Select correlated variables among 33 columns and other wrangled variables
- Some potential related variables:
 - Numbers/Hours of exceptions that are filed ahead
 - Exception Group
 - Job Family
 - Program

Neural Network

Timeline/Conclusion

Time Period	Milestone
Week 1	Finalize the proposal report to send to our mentor and partner
Week 2	Data wrangling and feature selection (and more EDA)
Week 3 - 4	Explore different approaches to fit the models
Week 5	Build algorithms, testing, adjusting
Week 6	Improve the dashboard, wrapping up
Week 7	Presentations and reports

Thank you!