Mölnlycke Case Report

Calvin Smith

Patient Medical Trajectory

Timeline of conditions

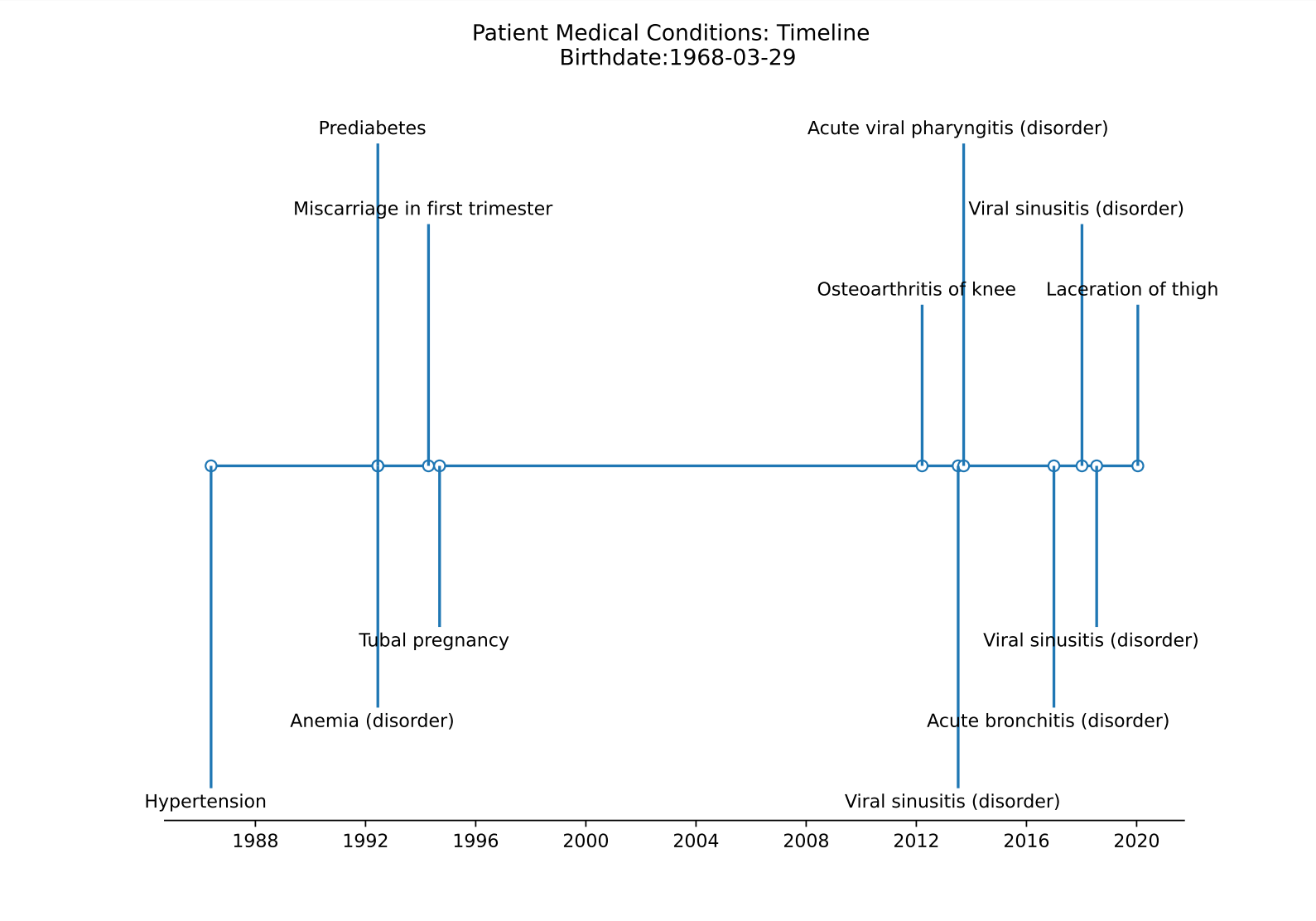

Figure 1: Example of a timeline of diagnosed conditions for a random patient.

Patient prescribed medications for each condition

Condition	Medication
Acute bronchitis (disorder)	Acetaminophen 325 MG Oral Tablet
Hypertension	amLODIPine 5 MG / Hydrochlorothiazide 12.5 MG ...
Osteoarthritis of knee	Naproxen sodium 220 MG Oral Tablet

Figure 2: Prescribed medications.

Patient procedures

Year	Procedure	Condition
2010	Medication Reconciliation (procedure)	NaN
2011	Medication Reconciliation (procedure)	NaN
2012	Medication Reconciliation (procedure)	NaN
2013	Medication Reconciliation (procedure)	NaN
2015	Medication Reconciliation (procedure)	NaN
2016	Medication Reconciliation (procedure)	NaN
2016	Measurement of respiratory function (procedure)	Acute bronchitis (disorder)
2017	Medication Reconciliation (procedure)	NaN
2017	Medication Reconciliation (procedure)	NaN
2018	Colonoscopy	NaN
2018	Medication Reconciliation (procedure)	NaN
2020	Suture open wound	Laceration of thigh

Figure 3: Patient procedures by year, procedure and condition.

Common conditions

Most common conditions by total number of cases

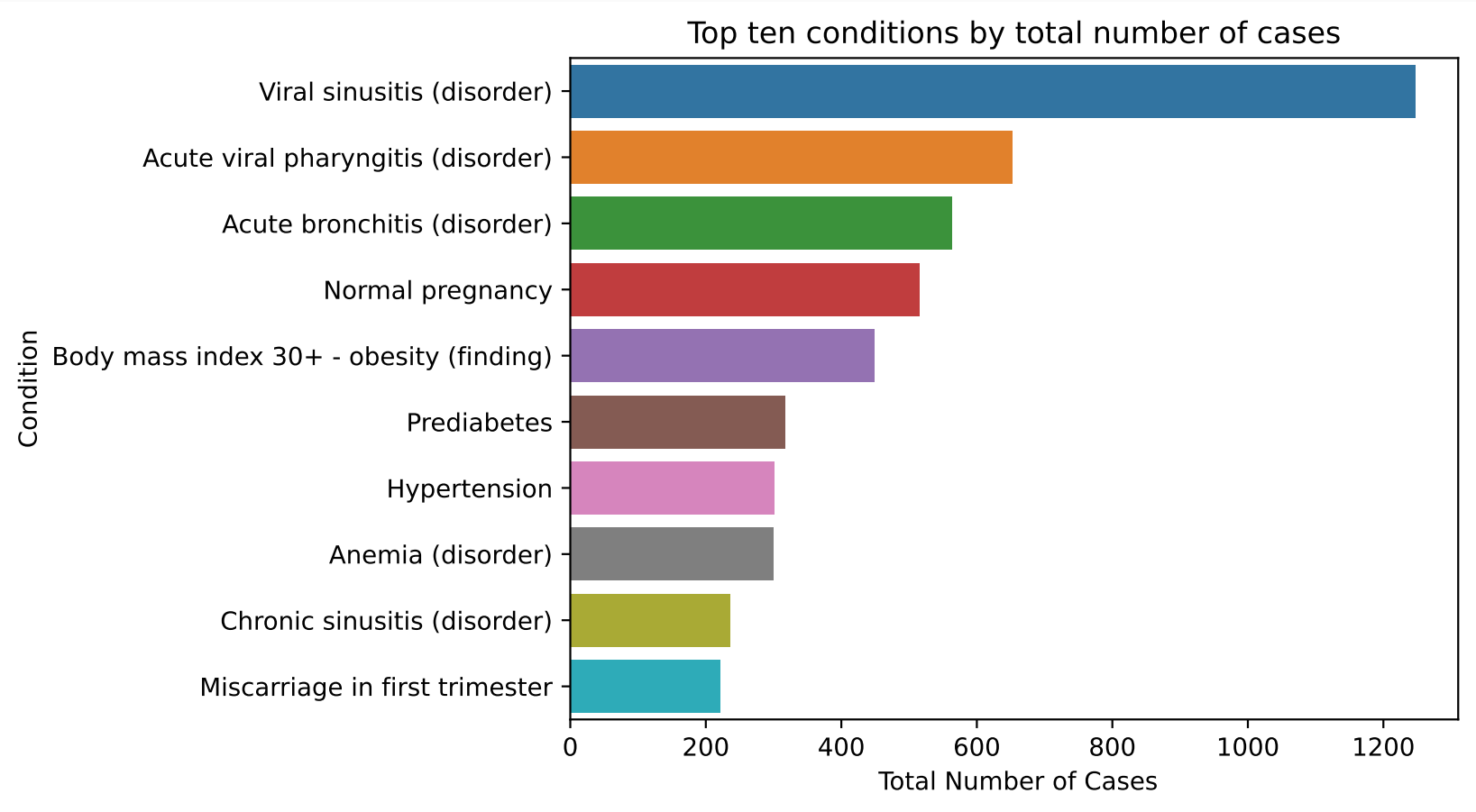

Figure 4: Top ten conditons by total number of cases

Most common conditions by percentage of people affected

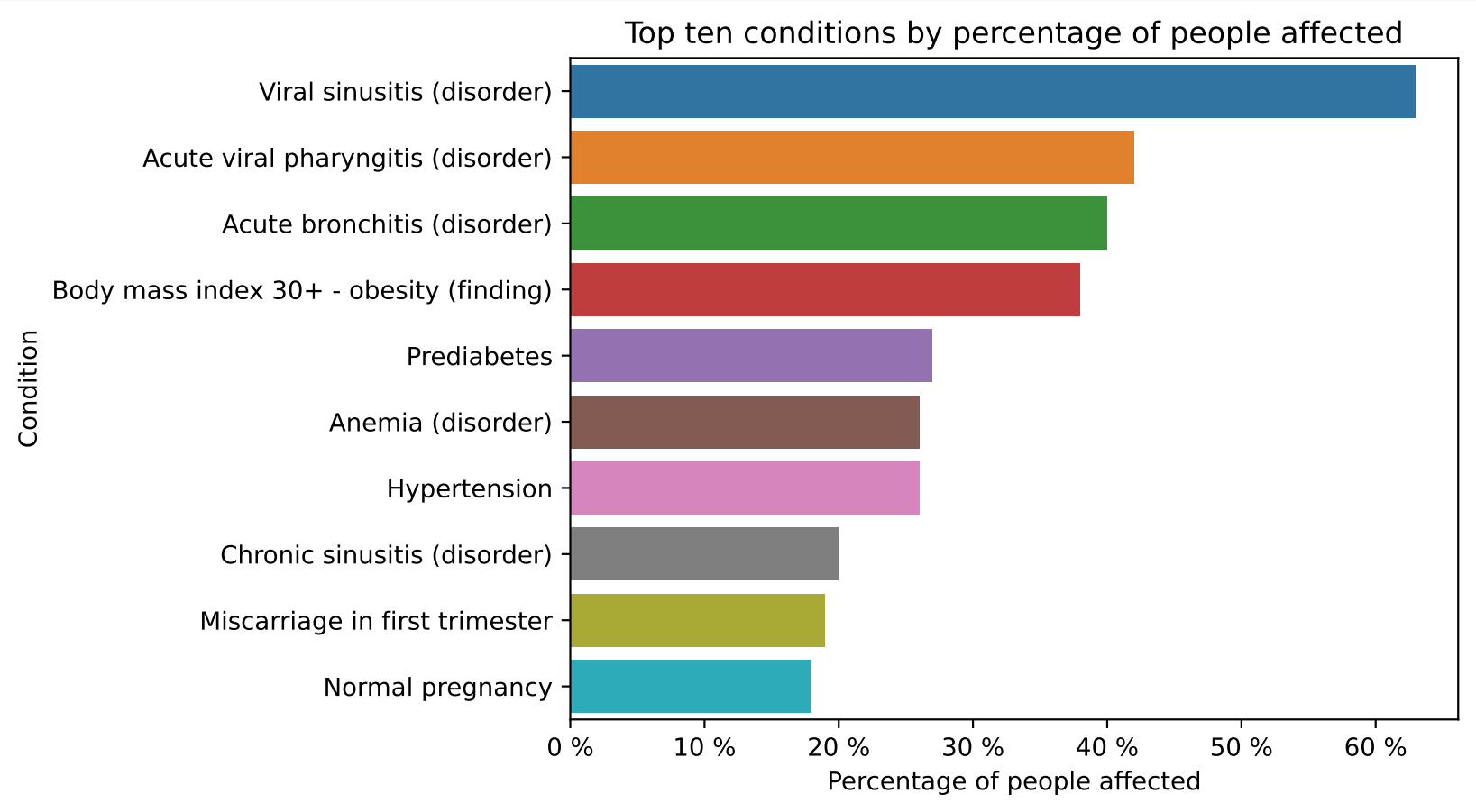

Figure 5: Top ten conditions by percentage of people affected.

Commons conditions

- The three most common conditions are:
  - Viral sinusitis
  - Acute viral pharyngitis
  - Acute bronchitis
- Notable: Almost 40% of patients have obesity and 25% have high blood pressure (hypertension).

How are the three most common conditions treated?

Medications:

condition	medication	prescribed	cases	percentage
Acute bronchitis (disorder)	Acetaminophen 21.7 MG/ML / Dextromethorphan Hy...	126	563	0.22
Acute bronchitis (disorder)	Acetaminophen 325 MG Oral Tablet	440	563	0.78
Acute viral pharyngitis (disorder)	Penicillin V Potassium 250 MG Oral Tablet	9	653	0.01
Viral sinusitis (disorder)	Amoxicillin 250 MG / Clavulanate 125 MG Oral T...	247	1248	0.20

Procedures:

condition	procedure	counts	cases	percentage
Acute bronchitis (disorder)	Measurement of respiratory function (procedure)	288	563	0.51
Acute bronchitis (disorder)	Plain chest X-ray (procedure)	39	563	0.07
Acute bronchitis (disorder)	Sputum examination (procedure)	113	563	0.20
Acute viral pharyngitis (disorder)	Throat culture (procedure)	241	653	0.37

Are there any differences by age and gender?

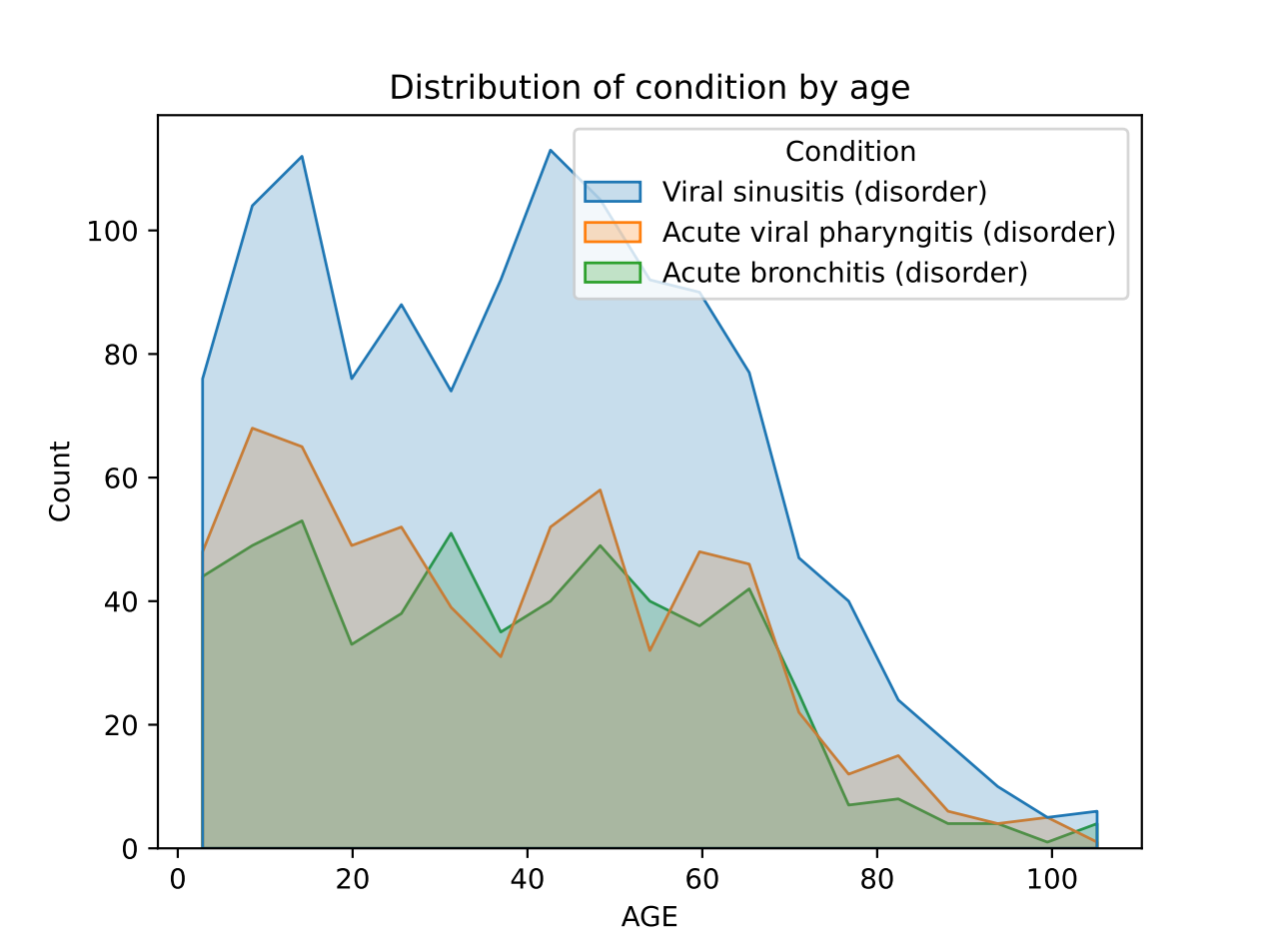

Figure 6: Distribution of conditions by age.

Are there any differences by age and gender?

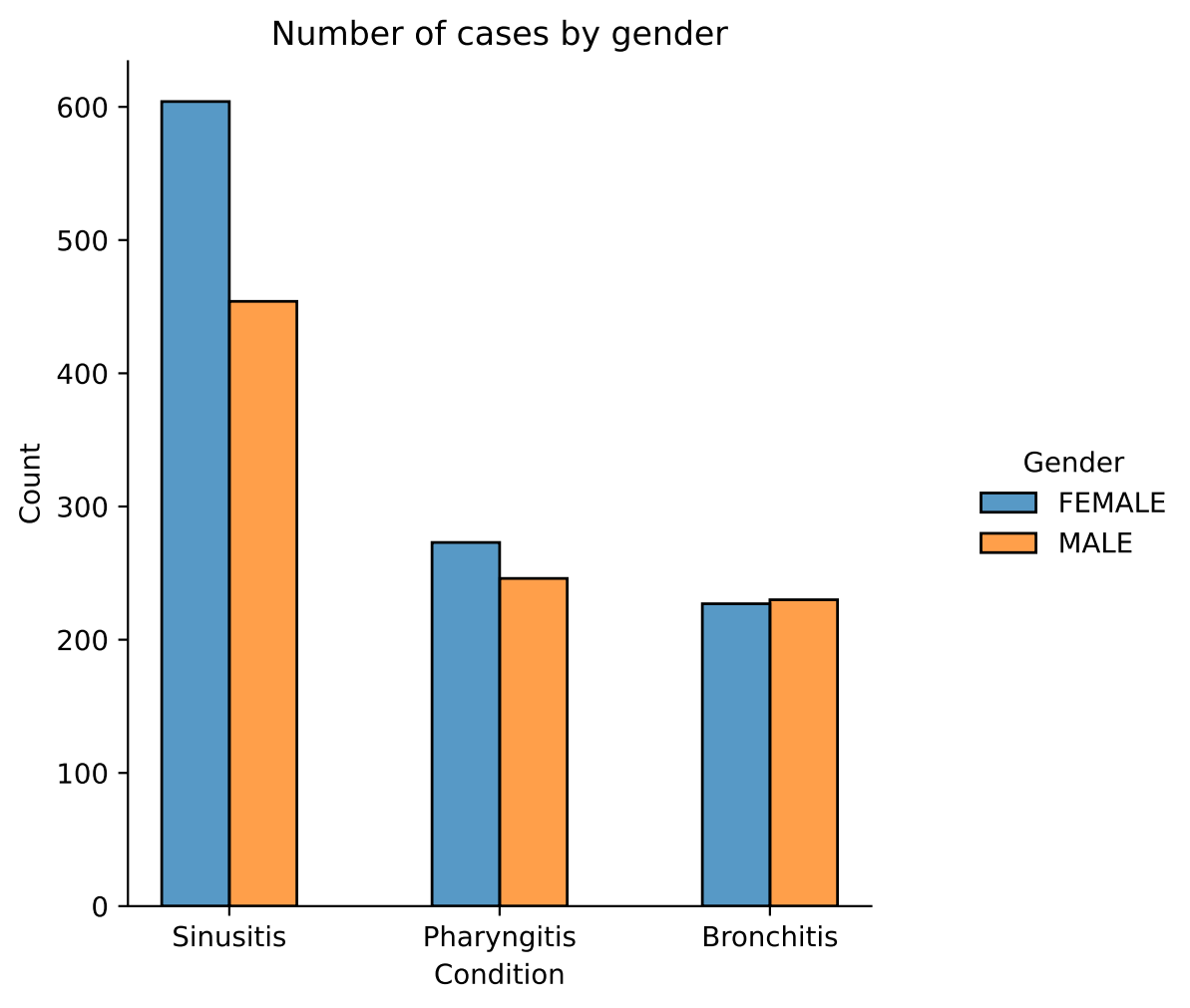

Figure 7: Number of cases by gender.

Are there any differences by age and gender?

- Most people affected by the conditions are children (younger than 20) and adults between 40 and 60.
- Women are affected by Viral Sinusitis to a higher degree than men.

Further research from a Machine Learning perspective

Questions

1) Evaluation of ML models for predicting diseases in patients. Especially looking at the differences between black box models and interpretable models.

2) Using ML to develop a better understanding of what causes specific diseases. Since the Synthea dataset contains so much information, it might be possible to find new and unexpected correlations.

3) Transformers are specifically designed to handle sequential data. A persons medical trajectory (life up until a specific disease or death) could be modelled sequentially with the Synthea dataset. This would be interesting to look into and could have many use cases like predicting age, diseases and costs.

Thank you!