Patient-level prediction #1:
Amongst patients presenting with COVID-19, influenza, or associated symptoms, who are most likely to be admitted to hospital in next 30d?

Jenna Reps
Janssen Research and Development

Background

- Can we predict who is going to be hospitalized at the point they have their first outpatient visit with flu/covid19 or flu-like symptoms?

- This could be used to aid the **'do I hospitalize or send this patient home?'** decision that doctors will need to make

- Simple model could potentially be used for phone screen (patient calls medical staff and model answers questions)

Methods

T1: GP/OP/ER visits of patients presenting with Covid-19, flu or flu-like symptoms AND no symptoms or pneumonia in prior 60d

O1: Hospitalizations with pneumonia **(narrow)**

O2: Hospitalizations with pneumonia or ARDS or sepsis or AKI **(broad)**

O3: Hospitalizations with pneumonia or ARDS or sepsis or AKI requiring intensive services or resulting in death in 30d **(severe)**

O4: Death **(severe)**

TAR: 0-30d

Preliminary results

Analysis	Dev	Val	T	O	Model	TAR start	TAR end	AUC	AUPRC	T Size	O Count	O Incidence (%)
Analysis_2	optumDod	optumDod	[COVID ID13 v1] GP/OP/ER visits of patients presenting with Covid flu or flu-like symptoms AND no symptoms or pneumonia in prior 60d	[COVID19 ID26 V1] Hospitalizations with pneumonia or ARDS or sepsis or AKI	Lasso Logistic Regression	0	30	0.8721	0.3542	37500	2617	6.9787
Analysis_6	optumDod	optumDod	[COVID ID13 v1] GP/OP/ER visits of patients presenting with Covid flu or flu-like symptoms AND no symptoms or pneumonia in prior 60d	[COVID19 ID26 V1] Hospitalizations with pneumonia or ARDS or sepsis or AKI	Lasso Logistic Regression	0	30	0.8387	0.2625	37499	2616	6.9762
Analysis_2	optumDod	ccae	[COVID ID13 v1] GP/OP/ER visits of patients presenting with Covid flu or flu-like symptoms AND no symptoms or pneumonia in prior 60d	[COVID19 ID26 V1] Hospitalizations with pneumonia or ARDS or sepsis or AKI	Lasso Logistic Regression	0	30	0.7876	0.1358	3146729	53842	1.711
Analysis_2	optumDod	HIRA	[COVID ID13 v1] GP/OP/ER visits of patients presenting with Covid flu or flu-like symptoms AND no symptoms or pneumonia in prior 60d	[COVID19 ID26 V1] Hospitalizations with pneumonia or ARDS or sepsis or AKI	Lasso Logistic Regression	0	30	0.74	0.082	6011	165	2.745
Analysis_2	optumDod	ipci	[COVID ID13 v1] GP/OP/ER visits of patients presenting with Covid flu or flu-like symptoms AND no symptoms or pneumonia in prior 60d	[COVID19 ID26 V1] Hospitalizations with pneumonia or ARDS or sepsis or AKI	Lasso Logistic Regression	0	30	0.76241	0.00585	27610	36	0.13039
Analysis_2	optumDod	jmdc	[COVID ID13 v1] GP/OP/ER visits of patients presenting with Covid flu or flu-like symptoms AND no symptoms or pneumonia in prior 60d	[COVID19 ID26 V1] Hospitalizations with pneumonia or ARDS or sepsis or AKI	Lasso Logistic Regression	0	30	0.679683	0.006628	1276478	1011	0.079202
Analysis_2	optumDod	mdcd	[COVID ID13 v1] GP/OP/ER visits of patients presenting with Covid flu or flu-like symptoms AND no symptoms or pneumonia in prior 60d	[COVID19 ID26 V1] Hospitalizations with pneumonia or ARDS or sepsis or AKI	Lasso Logistic Regression	0	30	0.819	0.307	536410	53319	9.94
Analysis_2	optumDod	mdcr	[COVID ID13 v1] GP/OP/ER visits of patients presenting with Covid flu or flu-like symptoms AND no symptoms or pneumonia in prior 60d	[COVID19 ID26 V1] Hospitalizations with pneumonia or ARDS or sepsis or AKI	Lasso Logistic Regression	0	30	0.709	0.351	248964	48170	19.348

Discussion and next steps

- Made a simple score model: 7 variables + age + gender model - shiny: https://data.ohdsi.org/Covid19PredictionSimpleHospitalizationModel/

- External validation of OHDSI score model

- External validation existing risk models