Foundations of Data Analysis

8.23.22

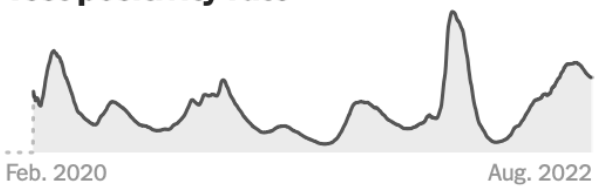
Masks and Vaccines

for CS/DS 3190 / COMP 5960

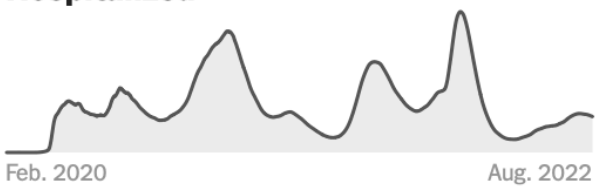
Jeff Phillips | Aug 23, 2022

Back to normal?

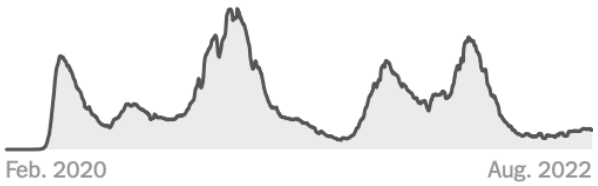
Test positivity rate



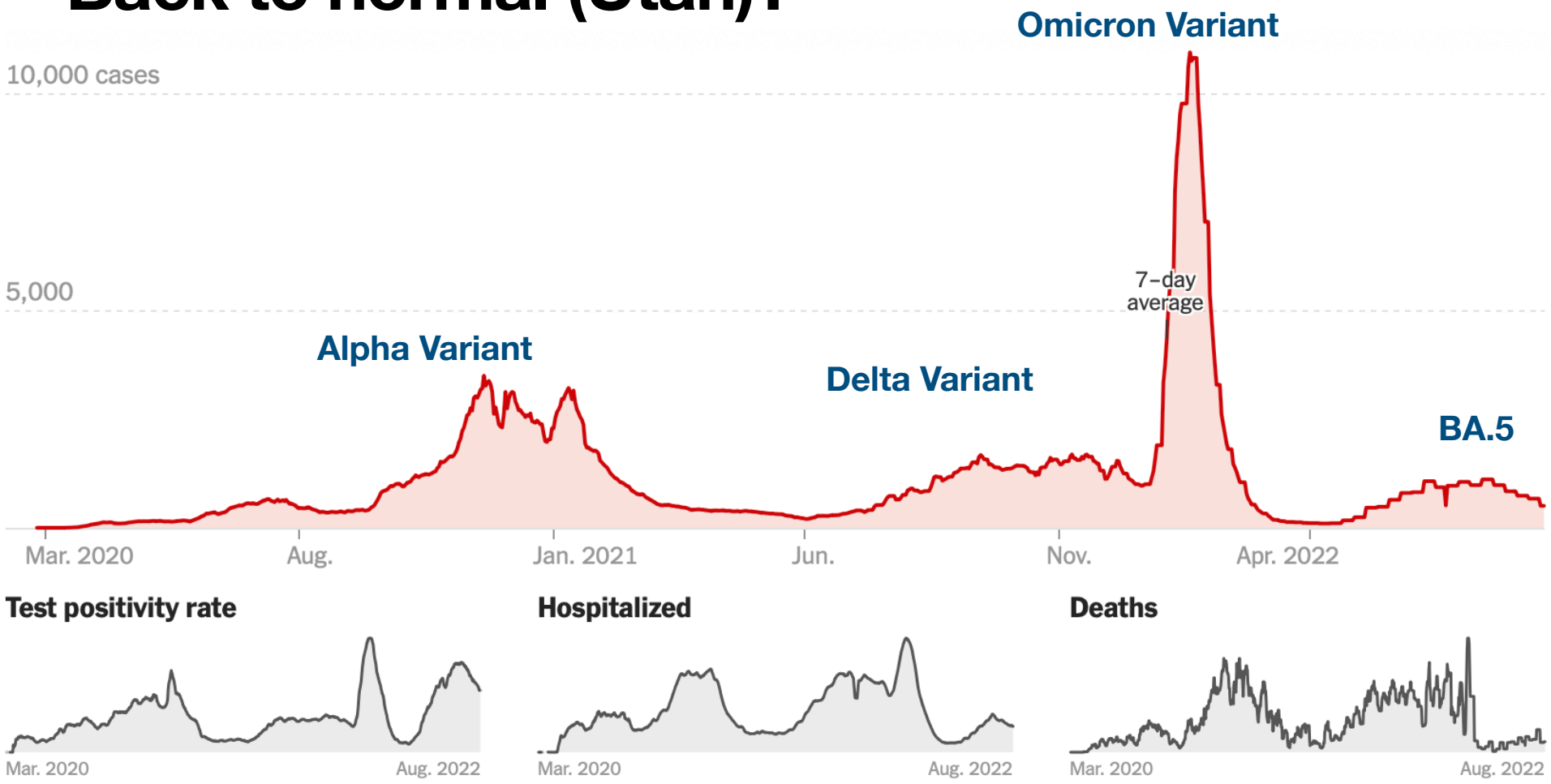
Hospitalized



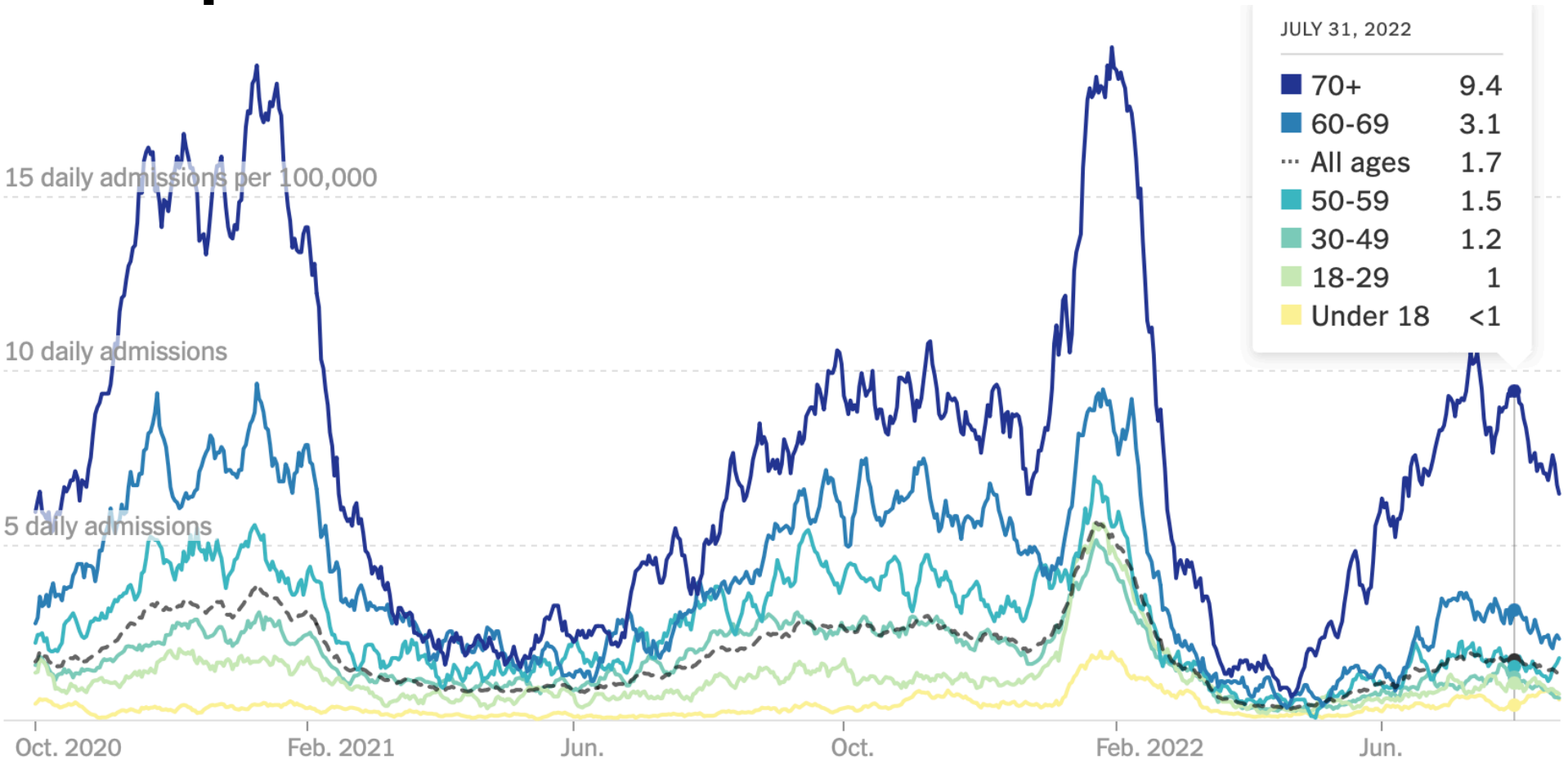
Deaths



Back to normal (Utah)?



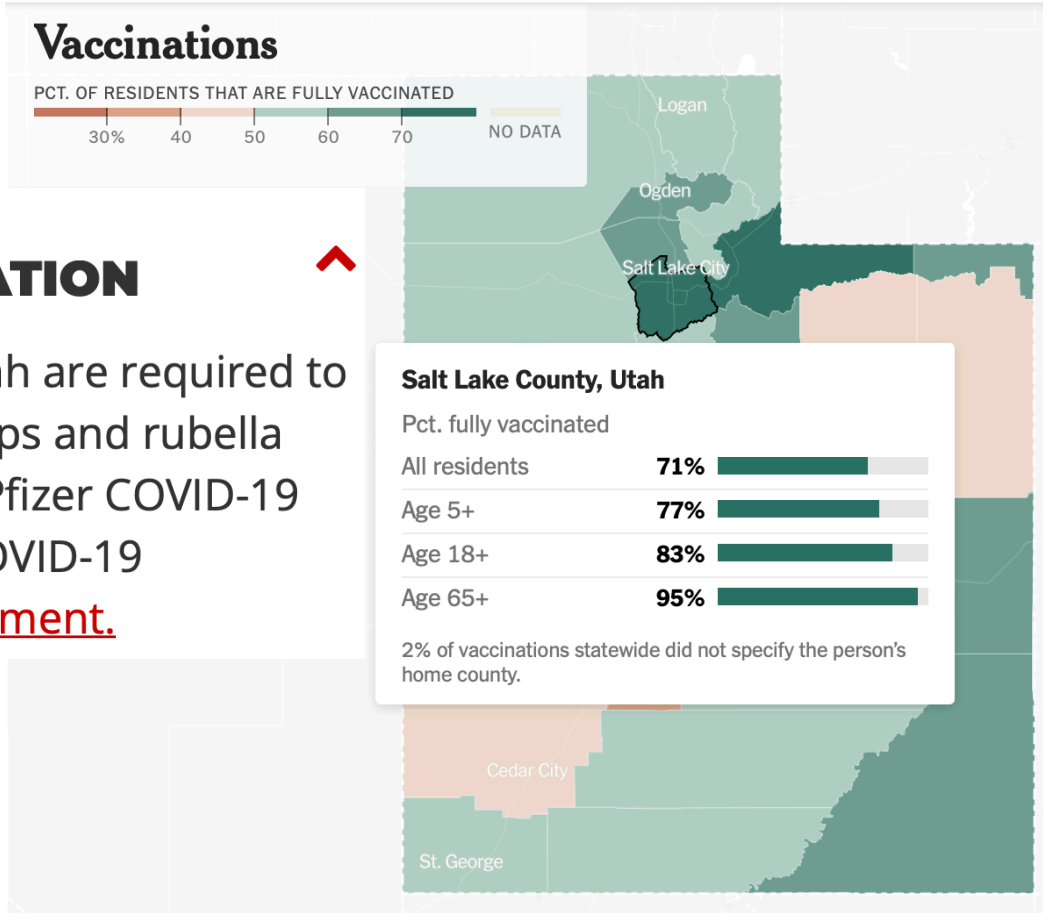
Hospitalizations in Utah



Vaccines

VACCINATION INFORMATION

Students who attend the University of Utah are required to be fully vaccinated against measles, mumps and rubella (MMR). With the full FDA approval of the Pfizer COVID-19 vaccine, the university is also requiring COVID-19 vaccination. Read more about the requirement.

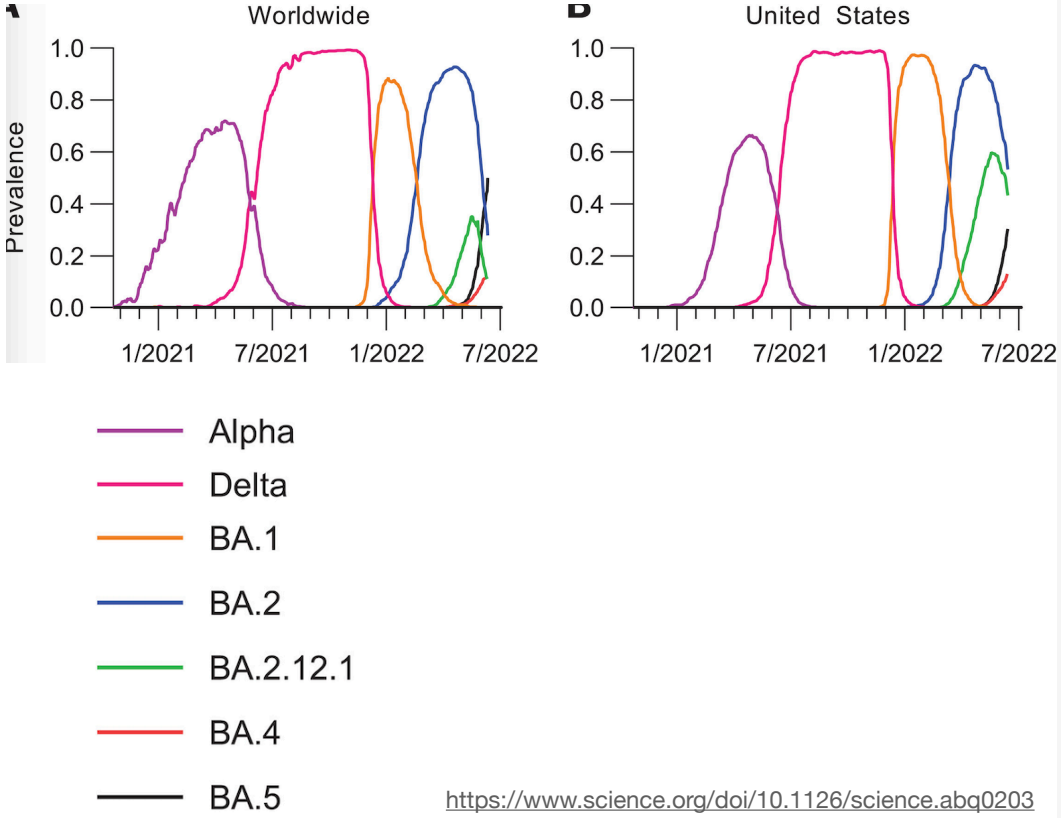


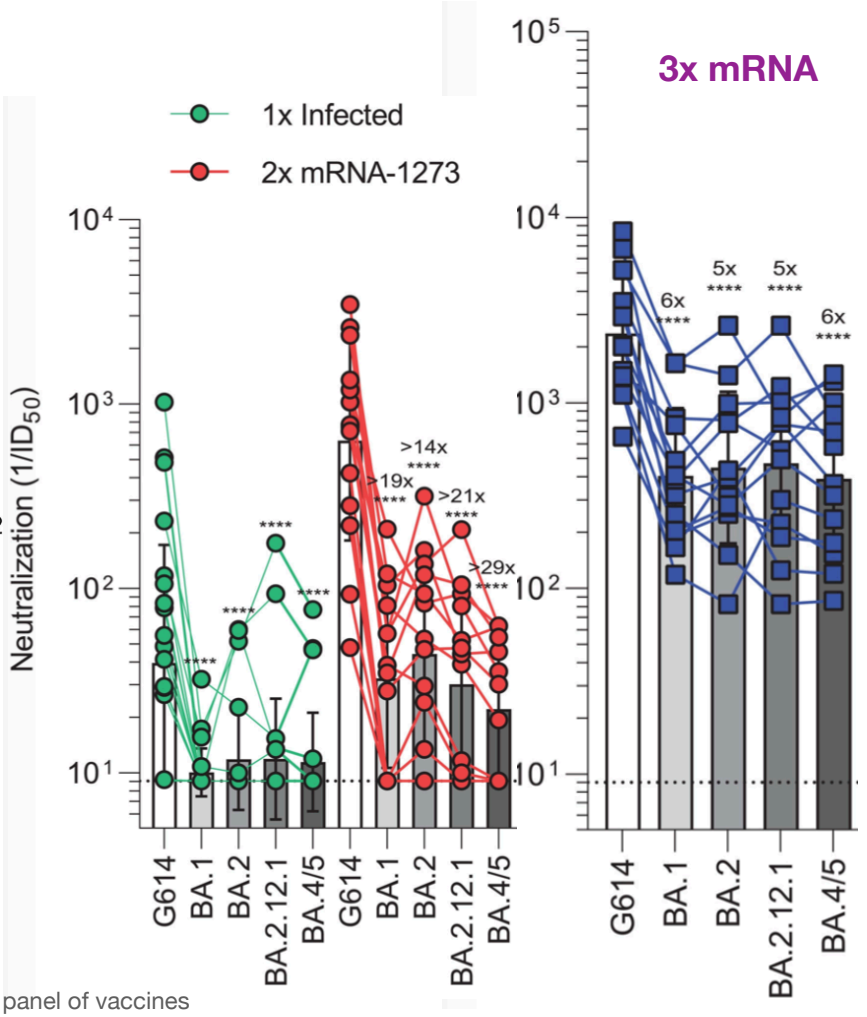
Vaccines work! (Alpha variant)

Age	Population (%)		Severe cases		Efficacy
	Not Vax %	Fully Vax %	Not Vax per 100k	Fully Vax per 100k	vs. severe disease
All ages	1,302,912 18.2%	5,634,634 78.7%	214 16.4	301 5.3	**67.5%**
<50	1,116,834 23.3%	3,501,118 73.0%	43 3.9	11 0.3	**91.8%**
>50	186,078 7.9%	2,133,516 90.4%	171 91.9	290 13.6	**85.2%**

(from Isreal — Pfizer)
www.covid-datascience.com

BA.4/BA.5





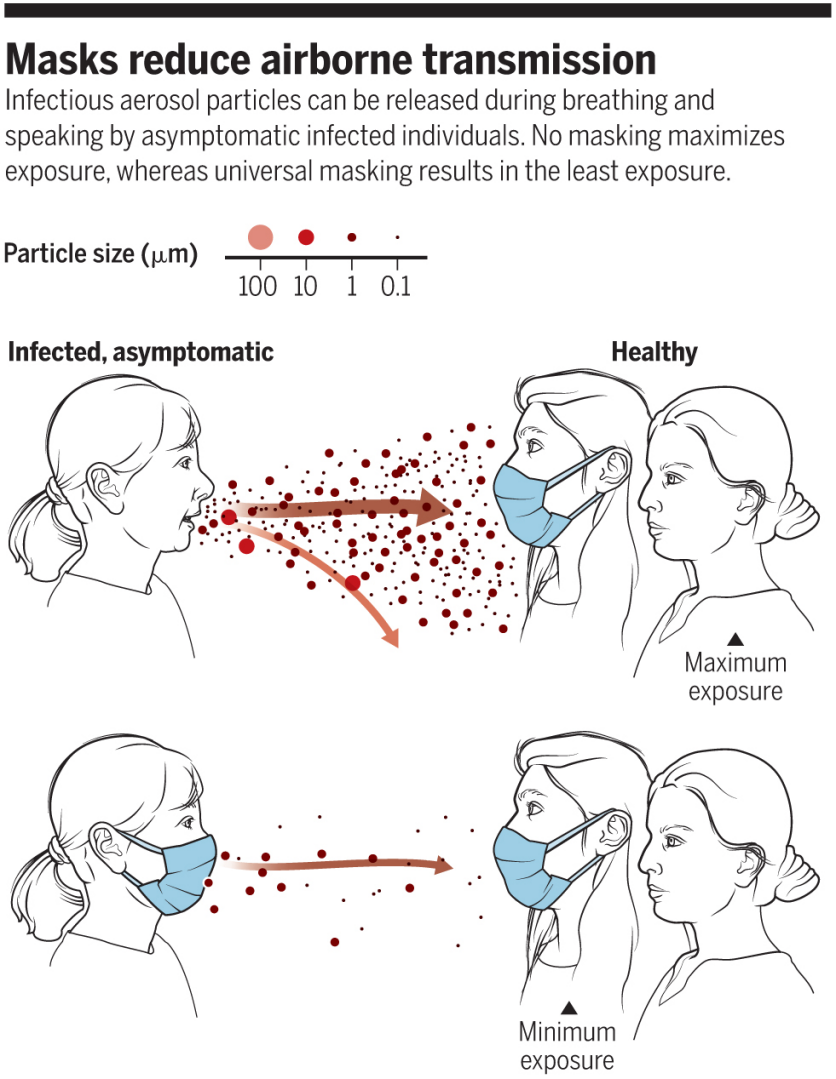
https://www.science.org/doi/10.1126/science.abq0203

Omicron spike function and neutralizing activity elicited by a comprehensive panel of vaccines
Bowen etal. **Science** July 2022

Masks work!

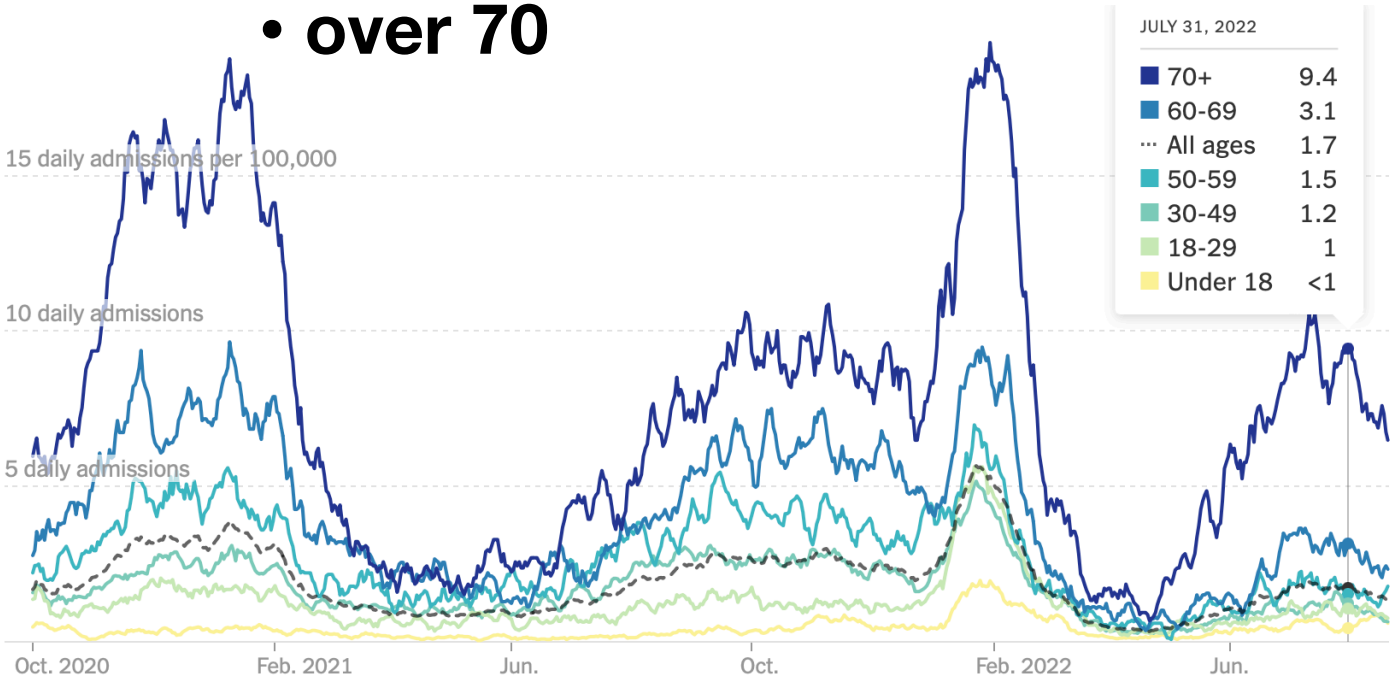
Protect you the most:
N96, KN-95, K94

Good at protecting others
surgical



Despite Vaccines, some still vulnerable

- **Immunocompromised**
- **over 70**



UU's Guidance

We are a mask friendly campus

When students and faculty return to campus for the Fall 2022 semester, masks will not be required in indoor spaces on main campus.

- Test weekly for COVID-19, even if asymptomatic
- Get vaccinated against COVID-19 and get a booster when eligible
- If you test positive, or are unvaccinated and exposed to COVID-19, follow the 5-5-5 rule*

https://coronavirus.utah.edu

Language of Data

Probability

Data $X = \{x_1, x_2, \ldots, x_n\} \overset{iid}{\sim} \mu$ distribution

Property R

$\Pr[x_i \text{ has } R]$

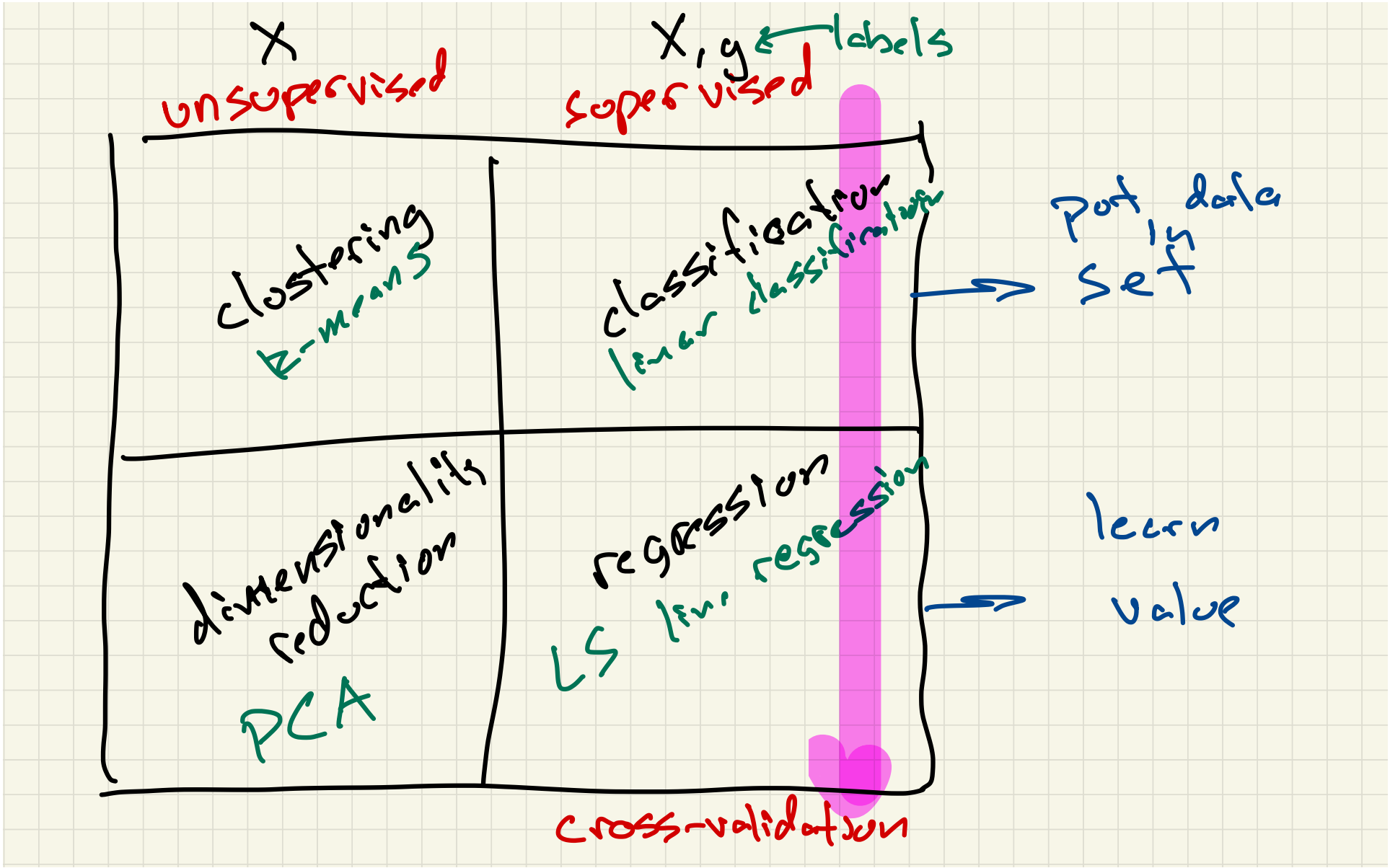
$\hat{x} = \frac{1}{n} \sum_{i=1}^{n} x_i$

Linear Algebra

vectors & matrices

$x_i = \begin{bmatrix} x_{i1} \\ x_{i2} \\ \vdots \\ x_{id} \end{bmatrix} \in \mathbb{R}^d$

$X = \begin{bmatrix} — & x_1^T & — \\ — & x_2^T & — \\ & \vdots & \\ — & x_n^T & — \end{bmatrix}$


X
unsupervised
X, y
labels
supervised
clustering
K-means
classification
linear classification
Put data in set
dimensionality reduction
PCA
regression
LS
lin. regression
learn value
cross-validation

Gradient Descent

1. Build cost function $f : \alpha \to \mathbb{R}$

parameters $\alpha \in \mathbb{R}^n$

$f_\alpha = f_{M_\alpha}$

$M_\alpha(x) \to$ predict

model α ↑ data