

- It is good to rub and polish our brain against others...I quote others only in order to better express myself. (Montaigne)



- You are entitled to your opinion. But you are not entitled to your own facts. (Patrick Moynihan)



# What are the facts?



- Everyman hears only what he understands. (Goethe)



I believe in science.



I do my own research.



# Science is in the dock.



# How did this happen?



The scientific community played a role  
in the undermining of “science.”







- Begins in a bedroom of a mansion called Xanadu with media mogul Charles Foster Kane on his deathbed; holding a snow globe he utters the word “rosebud” and dies.
- This is followed by a newsreel obituary that chronicles the life and times of Kane. “Curious about Kane’s dying word, ‘Rosebud,’ an editor assigns a reporter to find out what it meant,” resulting in an investigation into Kane’s life. (Roger Ebert)
- Interviews: flash backs through the eyes of the people who “knew” Kane.



- “Our lives survive only in the memories of others.” (Roger Ebert)
- The real Kane is elusive. Is he the crazy millionaire or the principled newspaper man? Each version of him is believable.
- “I don’t think any word can explain a man’s life. No, I guess the Rosebud is just a piece in a jigsaw puzzle—a missing piece.” (Mr. Thompson)



- Metaphor for today's talk about COVID
- I was there from before the beginning, young fellow, and now it's after the end. (Mr Bernstein)
- Everyone in this room was there before the beginning. Everyone in this room was an eyewitness. In fact, many of us were participants. Insiders.



- Perceive the world through separate “modes of experience.”



- The purpose of my talk this morning is not to persuade that you that my version is the correct one, but rather to convince you that some of the questions and issues raised this morning are real and worth pondering.
- It is the thinking and reflection that are important, not the arrival of some conclusion. (Michael Casey)



# Searching for the “Truth” in a Post-Truth ERA



- There is no desire more natural than the desire for knowledge.  
(Aristotle)



- Knowledge is an excellent drug, but no drug has virtue enough to preserve itself from corruption and decay if the vessel be tainted and impure wherein it is put to keep. (Montaigne)



# Michel de Montaigne

- 16th century French nobleman, magistrate, wine grower
- Bloody religious civil wars
- At the age of 38 he retired from public life and retreated to the tower of his estate



# Nothing is certain

- Personal library of around 1,000 books
- Roof beams painted with classical quotations
- Only one thing is certain: that nothing is certain (Pliny the Elder)



- He began to write; he wrote in the first person
- The first writer to write freely about himself; I am myself the subject of my book
- Invented the “modern” essay



# What do I know?



- Search for knowledge
- Begins from knowledge of oneself
- And from that all knowledge flows



- If others examined themselves attentively, as I do, they would find themselves, as I do, full of inanity and nonsense.
- Get rid of it I cannot without getting rid of myself. We are all steeped in it, one as much as another.
- But those who are aware of it are a little better off—though I don't know.



# What do “we” know?



- Thought must have a starting place — it can have none better than a good definition...a good definition centers the mind. (Michael Oakeshott)



# What is science?



# Philosophy of Science

# Institution of Science



# Philosophy of Science



- Science is more than a body of knowledge. It is a way of thinking. A way of skeptically interrogating the universe with a fine understanding of human fallibility. (Carl Sagan)
- By the [scientific method] we gradually build up our knowledge, and advance from less true to more true. (Michael Oakeshott)



- Science is the belief in the ignorance of experts. (Richard Feynman)



- When someone says, “Science teaches such and such,” he is using the word incorrectly.
- You might ask, “How does science show it? How did the scientist find out? How? What? Where?”
- It should not be “science has shown” but “this experiment, this effect, has shown.”



- And you have as much right as anyone else, upon hearing the experiments-but be PATIENT and LISTEN to all the evidence-to judge whether a sensible conclusion has been arrived at [emphasis mine].
- The experts who are leading you may be wrong.



- What makes science right is the enduring capacity to admit we are wrong. (Lisa Rosenbaum)



# Institution of Science



- Experts
- Journals and conferences
- Interpret evidence, recommendations, policies



# Subjective judgements



- COVID-19 has “thrown into sharp relief the disconnect between science as a philosophy and science as an institution.”



- There's a tension between “ experts” wanting to present a unified and authoritative voice ...[while simultaneously] remaining open-minded and prepared to change its mind. (Matt Ridley)



- Deadly novel virus that mutates
- Unpredictability of human behavior
- Evolving immunity



# Science is in the dock



# Objectivity is genius



- Below the level of consciousness we are influenced by prejudice and ideology. (Michael Casey)



- Bias towards self
- Confirmation Bias
- Conformity Bias



# Bias towards self



- Human knowledge and human reason alone will never contend against those giants, the passion and pride of man. (John Henry Newman)



# Confirmation bias



# Jeff Bezos



- The human understanding, when it has once adopted an opinion... draws all things to support and agree with it. (Francis Bacon)
- History demonstrates how easily trained minds ignore unwelcome facts. (Jacques Barzun)



- We see only what we expect to see. (Michael Casey)



# Mike Tyson



- On February 11, 1990 “Buster” Douglas knocked out Mike Tyson for the heavy weight title of the world
- The announcers and the official scorekeepers, i.e. the experts, were blind to what was transpiring right before them
- Our preemptive interpretations distort the evidence so that everything we perceive confirms our anticipations. (Michael Casey)



# Conformity bias



# Tribalism



- Cognition is influenced not only by our biases but also by the biases of others we identify with. (Jonathan Rauch)
- Our minds unite us into teams, divide us against other teams, and blind us to truth. (Jonathon Haidt)



- What happens when individual biases, especially confirmation bias, interact with the group dynamics of conformity? (Jonathan Rausch)



- Behavior which is rewarding for individuals but self-defeating for communities (Daniel Kahan)



Things are understood by their  
opposite



# Unforced Errors

- Bias towards self; Human pride
- Confirmation bias
- Conformity bias; Tribalism



# Models

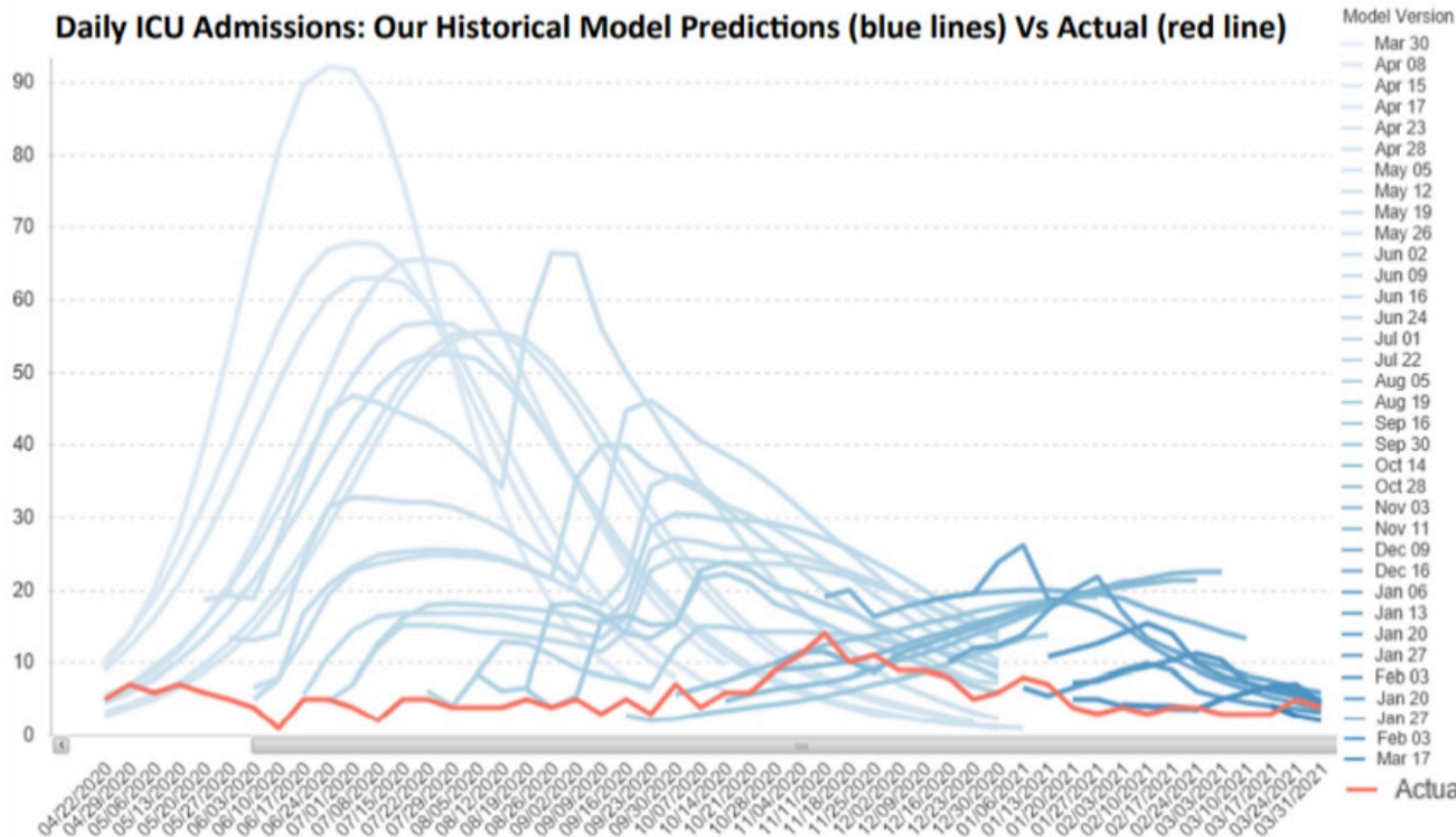


- Statistical modeling combines data with assumptions to yield a quantitative result that is a function of BOTH.
- When reporting and interpreting a model clearly state your assumptions and discuss the extent they are known or not known to be plausible.
- Address the reliability of the data



## COVID-19 Surge Modeling Review

Daily ICU Admissions: Our Historical Model Predictions (blue lines) Vs Actual (red line)



**Comment:** Since the pandemic's onset, Allina and others across the country have attempted to predict surges in COVID cases. Unfortunately, as the graph at left illustrates, this has proved unachievable. Reasons for this are numerous, but include changing human behavior related to masking and social distancing, limited understanding of the virus' infectious properties, vaccines, and the inherent unpredictability of nature.

Instead of emphasizing surge modeling, the team now monitors key leading indicators that precede ebbs and flows in hospital admissions, and can inform near-term decisions.



# Origin of COVID-19



- On March 7, 2020 a correspondence was published in Lancet from 27 public health scientists.
- The rapid, open and transparent sharing of data on this outbreak is now being threatened by rumors and misinformation about [the origins of] COVID-19.
- We stand together to strongly condemn conspiracy theories suggesting that COVID-19 does not have a natural origin.



- On July 5, 2021
- The...intent of our original Correspondence was to express our working view that SARS-CoV most likely originated in nature and not in a laboratory, on the basis of...
- [Based on] new, credible and peer-reviewed evidence...[we believe] that the virus evolved in nature...suggestions of a laboratory leak remain without scientifically validated evidence...



- October 16, 2021
- An appeal for an objective, open, and transparent scientific debate about the origin of SARS-CoV-2.
- There is no direct support for the natural origin of SARS-CoV-2, and a laboratory-related accident is plausible.



# Immunity



- 8/6/21 New CDC Study: Vaccination offers Higher Protection than Previous COVID-19 Infection
- Kentucky residents with previous infections
- The unvaccinated were 2.34 times more likely to be re-infected than the vaccinated



- This was not a head to head comparison between vaccination and natural immunity.
- The unvaccinated were 2.34 more times to be re-infected than the vaccinated.



# Where do “we” go from here?



- Critical appraisal matters
- Distinctions matter
- Everybody matters



# Critical appraisal



# The perfect paper

- There is no such thing as the perfect paper that omits nothing, answers all questions and cannot be criticized on any ground. (Anthony Daniels)
- The process and quality of critical appraisal matters



# Table One

- Included
- Excluded



# Endpoints

- Subjective
- Surrogate
- Composite



# Study design

- Model
- Observational
- RCT



# Distinctions matter



- Thou shall not conflate “scientific” debate with policy debate



- Once the evidence has been clearly established this is the point at which the “political” discussion begins, not ends.



- The benefits of the proposal are weighed...against the resulting disturbance. (Michael Oakeshott)
- There are no solutions...only trade-offs. (Thomas Sowell)



- Thou shall not conflate empirical rationale with the precautionary principle



- Evidence is insufficient
- Benefits of the proposal are unclear
- Precautionary principle



# Everybody matters



- Most of us manage to be honest and dishonest, to display integrity and hypocrisy and to confuse our opinions with the “truth” that make us look ridiculous to people who interpret the world differently.
- Perhaps in the process of accepting that we are the sort of people we truly are—messy, inconsistent, neurotic, as well as noble, earnest and endearing—we can find a new, more realistic level of respect for ourselves and each other. (Hugh Mackay)











- In politics shared hatreds are almost always the basis of friendship.
- Alexis de Tocqueville (The Old Regime and the French Revolution).



- I see men ordinarily more eager to discover a reason for things than to find out whether they are true.
- Michel de Montaigne (Essays).



- Self-knowledge is never procured cheaply.
- I have never met a man or woman or child without the experience of suffering.
- We have public and private tragedies, sufferings and anxieties, and our own deep unspoken fears. This is the stuff of human life.



- [The sign] reflects his vital interest.



# Vaclav Havel

- The Power of the Powerless (1978). Discussion piece on power and freedom.
- Solidarity and Chapter 77. Post-totalitarian rule.
- Can [the dissidents, i.e. the powerless] actually change anything?



- A specter is haunting Eastern Europe, the specter of what in the West is called “dissent.”



- The manager of a fruit-and-vegetable shop places in his window, among the onions and carrots, the slogan



# Workers of the world, unite!



- That poster was delivered to our greengrocer from the enterprise headquarters along with the onions and carrots.
- He put them all into the window simply because it had been done that way for years, because everyone does it, and because that's the way it is done.
- If he were to refuse, there could be trouble.



- Why does he do it?
- What is he trying to communicate?
- Is he genuinely enthusiastic about the idea of unity among workers of the world?



- Havel's essay had a profound impact on Eastern Europe.
- This essay reached us in Ursus factory in 1979 at a point when we felt we were at the end of the road (Zbysgniew Bujak, Solidarity activist).
- Velvet Revolution (1989). President of Czechoslovakia.



- Along with the personal story of Kane, is the history the time period.
- The rise of the tabloid newspapers, the birth of radio, accusations of election fraud, the rise of fascism



- Dollup of humility
- Knowing how much we do not know must surely be at least the beginning of wisdom. (Michael Casey, OCSO)



- It takes a great deal of bravery to stand up to your enemies, but just as much to stand up to our friends. (Albus Dumbledore to Harry Potter )



[an] idea is more surely understood by interrogation; what do I know?  
Which I bear as my motto with the emblem of a pair of scales.



- [It is worth noting] in ancient terms “truth” was viewed as more than correct information. It was seen as a quality of being, taken as a whole, not merely a state of intellect...truth touches not only the mind but also the heart and the emotions. (Michael Casey, OCSO).



- Nonconformity is an empty goal and prevailing against prevailing opinion merely because it is prevailing opinion should no more be praised than acquiescence to it.



- In politics shared hatreds are almost always the basis of friendship.  
(Alex de Tocqueville)



- There are many questions to which we do not have scientific answers, not because they are deep impenetrable issues, but because they are not scientific questions. (Jacques Barzun)



- A wise man proportions his belief to the evidence. (David Hume)



- The purveyors of wisdom take a step back from immediate issues. Their words are directed at modifying attitudes, inviting the people to reflection rather than to decision and action. (Michael Casey)



- Science [aka research] is in the making, it belongs to the unknown, the yet to be discovered, the yet to be discovered future.
- While expertise is based on the past with inbuilt obsolescence.  
(Richard Feynman)



# Conversation

- People say life is the thing, but I prefer conversation.
- Readiness of sympathy, the forbearance from dogmatism, the naive pleasure in the exchange of ideas, the generosity in the giving and the taking...
- In conversation the participants are not engaged in an inquiry or a debate, there is no “truth” to be discovered, no proposition to be proved, no conclusion sought. (Michael Oakeshott)



- All our dignity consists in thoughts...It is by this that we raise ourselves up...Let us work, therefore to think well: for such is the principle of morality. (Blaise Pascal)