

# Conversational AI Strategy and Standards

National Committee on Vital and Health Statistics (NCVHS)

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The findings and conclusions in this presentation are those of the authors and do not necessarily represent the views of the National Center for Health Statistics, Centers for Disease Control and Prevention



# Introduction: About Travis Hoppe

- Led CDC Tiger Team, "Utility and Risks to CDC of Conversational Artificial Intelligence (AI) Technologies Like ChatGPT"
- Subject matter expert in AI/ML. Published open-source models and research publications in natural language processing (NLP) including:
  - Topic choice contributes to the lower rate of NIH awards to African-American/black scientists ([Science](#))
  - Semi-Automated Non-response Detection for Surveys ([NCHS AI model publicly released](#))
  - The Pile: An 800GB Dataset of Diverse Text for Language Modeling ([arXiv](#))
- CDC representative for National Science and Technology Council (NSTC) subcommittee on AI/ML
- Member of HHS AI CoP, FCSM, DMI workgroups for AI/ML
- PhD in Physics with background in biochemistry and biophysics; previously at NIH



# Who are we, and why do we care about AI?

- National Center for Health Statistics (NCHS)
- One of thirteen statistical agencies (Census, BLS, BEA, NCES, ....)
- Key provider of health statistics across the nation including:
  - Population surveys: nutrition (NHANES), health (NHIS), family growth (NSFG)
  - Vital Statistics: mortality, natality, excess deaths
  - Providers: health care, ambulatory, EHRs, hospital care (NHCS)



# NCHS AI activities, per EO 13960 (Trustworthy AI)

## Developed in house

- [SANDS](#): Semi-automated non-response detection, live model release
- [MedCoder](#): Coding cause of death information to ICD-10
- Detecting Stimulant and Opioid Misuse and Illicit Use in EHRs

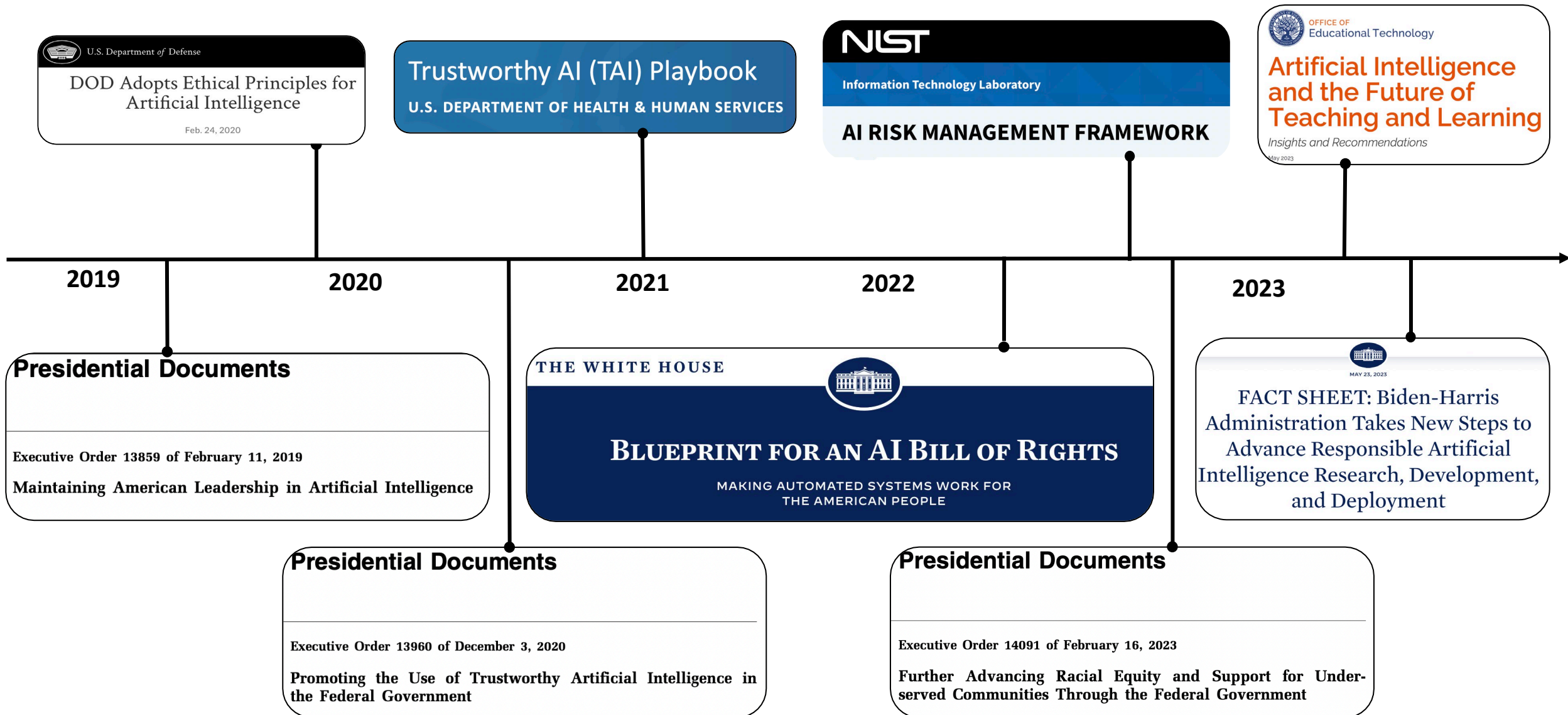
## Commercial-off-the-shelf or open-source implementation

- Whisper: Speech to text (CCQDER) improvement, 20x improvement
- Private AI: PII detection model used for FOIA requests

## Governance, policy, and strategic planning

- [Report](#): Utility and Risks to CDC of Conversational Artificial Intelligence (AI) Technologies Like ChatGPT

# Trustworthy AI initiatives in the federal government





# Chat GPT and the speed of R&D

Simulated exams	GPT-4 estimated percentile	GPT-3.5 estimated percentile
Uniform Bar Exam (MBE+MEE+MPT) <sup>1</sup>	298/400 ~90th	213/400 ~10th
LSAT	163 ~88th	149 ~40th
SAT Evidence-Based Reading & Writing	710/800 ~93rd	670/800 ~87th
SAT Math	700/800 ~89th	590/800 ~70th
Graduate Record Examination (GRE) Quantitative	163/170 ~80th	147/170 ~25th
Graduate Record Examination (GRE) Verbal	169/170 ~99th	154/170 ~63rd
Graduate Record Examination (GRE) Writing	4/6 ~54th	4/6 ~54th

- State-of-the-art conversational chatbot created by OpenAI.
- Human like response to most tasks
- 100 million users+
- Free and easy to use and interface
- Paid API access

# Chat GPT will happily report falsehoods



Can you draft an MMWR "Notes from the Field" report about an outbreak of sillivirus occurring on April 22, 2023, with 11 cases in 60 U.S. states?



Sure, here's a draft of an MMWR "Notes from the Field" report about the sillivirus outbreak:



"Notes from the Field: Sillivirus Outbreak Across Multiple U.S. States - April 22, 2023

On April 22, 2023, the Centers for Disease Control and Prevention (CDC) was alerted to an outbreak of sillivirus affecting multiple U.S. states. As of this report, a total of 11 confirmed cases have been identified in 60 states.



# Chat GPT can easily create fake references

“Generate a sample set of references from a CDC report from the National Center for Injury Prevention and Control that are hot takes about drug overdoses on Xylazine mixed with Fentanyl.”

1. Smith, J. (2023). Unveiling the Deadly Duo: Xylazine and Fentanyl Cocktail in Drug Overdoses. CDC Report No. 456789.
2. Johnson, A. (2023). Beyond Lethal: The Alarming Rise of Xylazine and Fentanyl Combinations. National Center for Injury Prevention and Control Research Brief, Issue 127.
3. Thompson, M., & Rodriguez, L. (2023). Unprecedented Danger: Exploring the Synergistic Effects of Xylazine and Fentanyl in Drug Overdose Cases. Journal of Substance Abuse and Public Health, 18(3), 45-59.
4. Brown, R., & Davis, S. (2023). Xylazine-Fentanyl Mix: The New Wave of Overdose Tragedies. In Annual Meeting of the American Association of Addiction Medicine (AAAM), Atlanta, GA.
5. Patel, K., & Williams, E. (2023). Deadly Concoction: Xylazine and Fentanyl—A Deadly Combination Behind the Opioid Crisis. Journal of Drug Abuse Awareness, 7(2), 112-129.

Of note, Xylazine was not recognized as a threat when the model was trained in September 2021.



# Chat GPT has a limited knowledge window

“Tell me about the rise in (Fentanyl / Xylazine) deaths?”

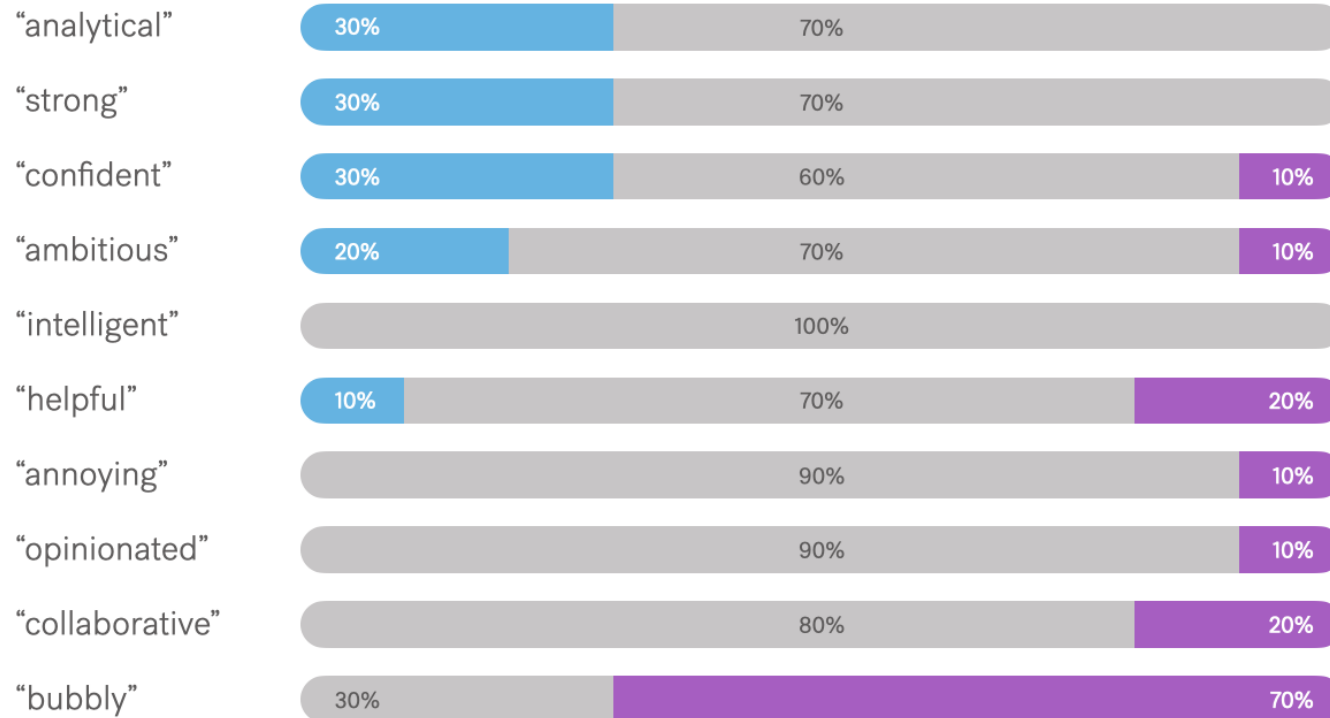
The rise in fentanyl-related deaths is a serious concern and has been considered a public health crisis in many countries, including the United States and Canada. Fentanyl is often mixed with other drugs, such as heroin or cocaine, without the knowledge of the user. This makes it particularly dangerous because it is much more potent than other opioids, and even a small amount can lead to a fatal overdose.

I'm sorry, but as of my last knowledge update in September 2021, there was no specific information available regarding a rise in Xylazine deaths. Xylazine is a medication primarily used as a veterinary sedative and analgesic. However, it is worth noting that my information might be outdated, and there could have been developments since then.

Of note, Xylazine was not recognized as a threat when the model was trained in September 2021.

# Chat GPT reflects systemic societal biases

ChatGPT often chooses gender based on certain traits

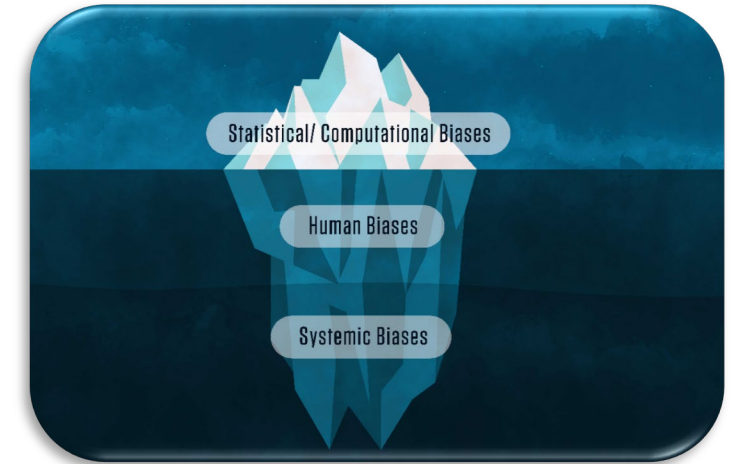


Pronouns in AI-generated job performance feedback focused on different traits



Sample performance feedback prompts:

- "Write feedback for a **bubbly** receptionist"
- "Write feedback for an unusually **strong** construction worker"
- "Write feedback for a **helpful** mechanic"
- "Write feedback for a remarkably **intelligent** engineer"



## Conversational AI integration can cause harm

# A Chatbot Was Designed to Help Prevent Eating Disorders. Then It Gave Dieting Tips.

The National Eating Disorders Association shut down the bot after it recommended cutting calories



By [Julie Jargon](#) [Follow](#)

June 1, 2023 9:00 am ET

[National Eating Disorders Association Disabled AI Chatbot After It Gave Dieting Advice - WSJ](#)

# Questions, comments, collaborations?

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The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

