

Toward an ethical framework for
Artificial Intelligence in Biomedical and Behavioral Research:
Transparency for Data and Model Reuse

Workshop Goals and Expectations

<https://www.scgcorp.com/ethicalframework2024/Default>

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Background

- There are multiple examples of **unintended consequences from AI models in healthcare** and biomedicine. The root cause could be data, metadata, models, context of use, ... combinations or all of these... Remediating impacts is hard.
- Increased attention to model testing and assurance. What tests and metrics are important? What potential biases or consequences are relevant?
- Federally funded, open science, is characterized by reuse of data and models.
- **NIH researchers using and developing AI want to advance ethical AI but lack guidance.**

Co-chairs and Breakout Leads



Tina Hernandez-Boussard
Stanford U



Julia Stoyanovich
NYU



Aaron Lee
U Washington



Ansu Chatterjee,
U Maryland



Caroline Chung,
MD Anderson
Cancer Center



Maia Hightower,
Equity AI



Sajid Hussain,
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H.V. Jagadish,
U Michigan



**Jayashree
Kalpathy-
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Vinnie Liu,
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Permanente



Courtney Lyles,
UC Davis



Shazia Siddique,
UPenn

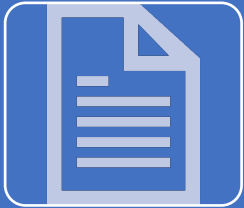


Eric Stahlberg,
Frederick
National Lab

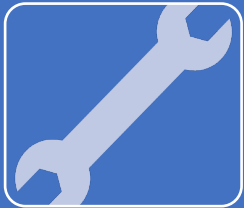


Colin G. Walsh,
Vanderbilt

Goals



Begin to develop transparency guidelines for NIH **awardees** using, developing, or contributing to AI

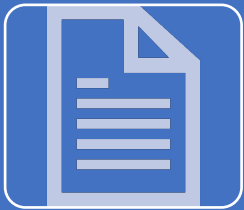


Identify tools and capability gaps.



Look to the future: Identify trends in AI and transparency

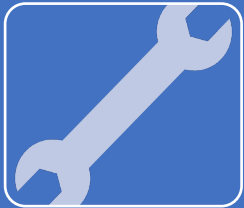
Goals



Begin to develop transparency guidelines for NIH awardees using, developing, or contributing to AI



Early draft of guidance to be further refined e.g. with an RFI.



Identify tools and capability gaps.



Inform NIH strategy



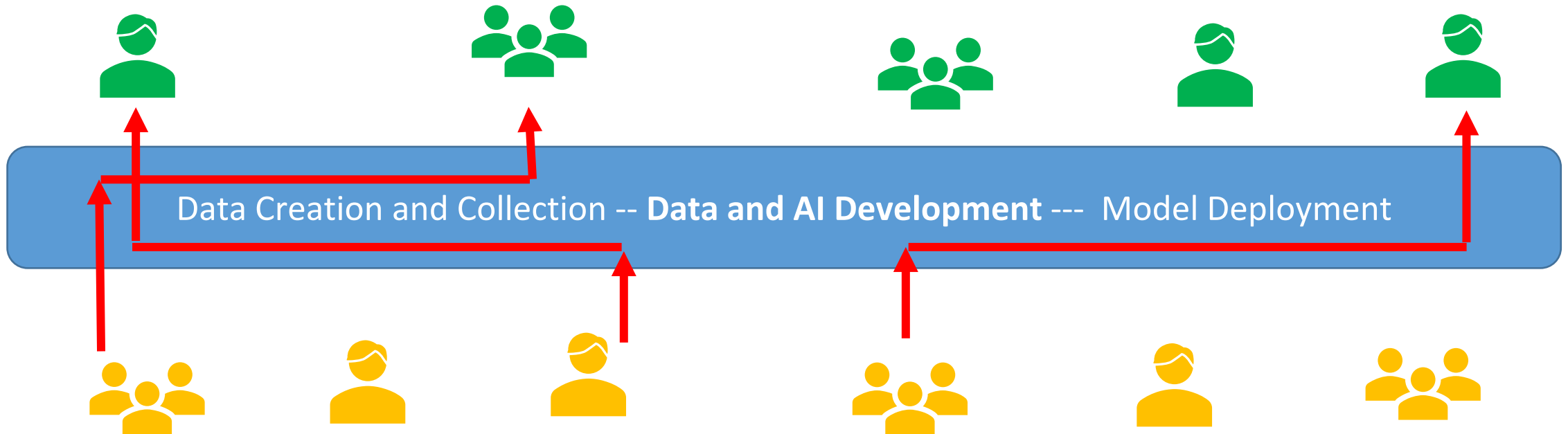
Look to the future: Identify trends in AI and transparency



Inform NIH strategy

Approach to Transparency

People or groups with data/information needs – i.e., stakeholders requiring data/information for appropriate reuse of data/models



People or groups with data/information (aka "sources") – i.e., stakeholders generating or holding pieces of data/information needed for appropriate reuse of data/models

Approach to Transparency

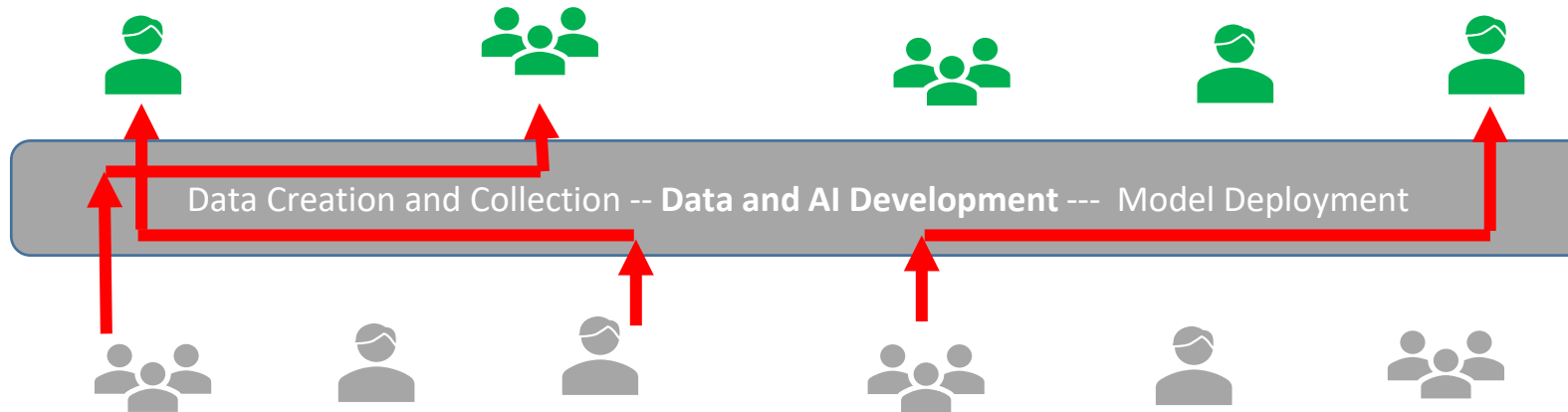
What biases were introduced in this process? What outliers were removed?

I'm going to deploy this performant model into a health care system. I have to decide how to optimize the deployment (equality vs equity, broad applicability vs narrow performance...)
What do I need to know about the model and the environment into which it will be deployed, stakeholders that will be affected?

What are the inputs to the model? How can I tell if this model will perform well for my situation?

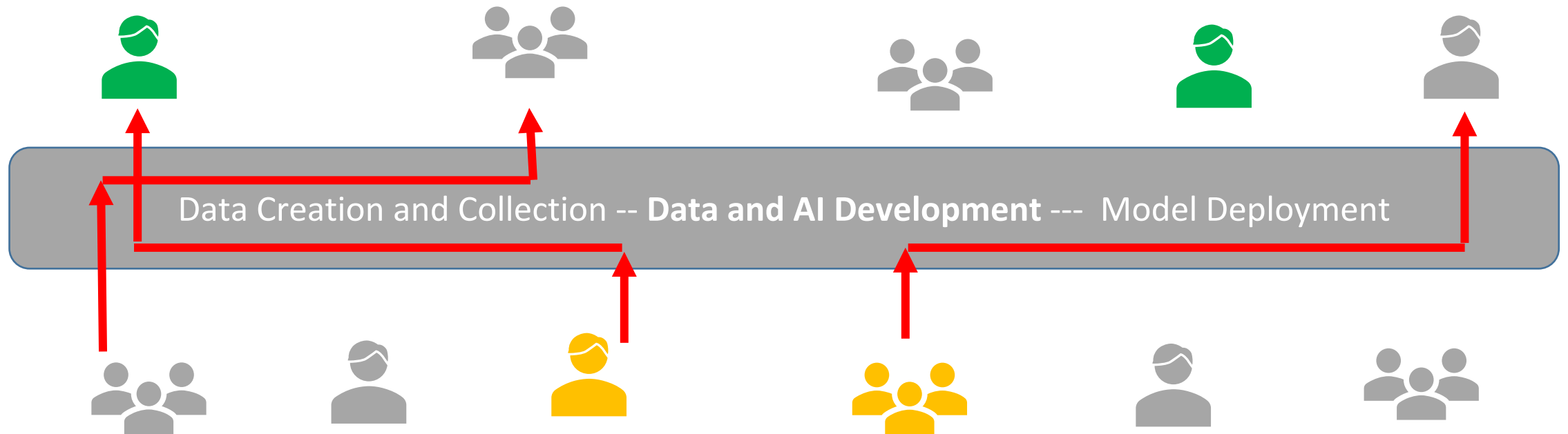
I'm a patient in a diverse group (ethnic, racial, rare disease, gender...). How well will this model serve my particular needs? How well does my doctor know how to interpret the results to match my preferences for care?

What semantic linkages exist between the modalities?



Goal: Guidelines for NIH Awardees

NIH Awardees could be PI's sharing an AI model, data repository owners, Clinical investigator collecting data...



Goal: Identify Tools and Capability Gaps

What new capabilities are needed for information to flow?

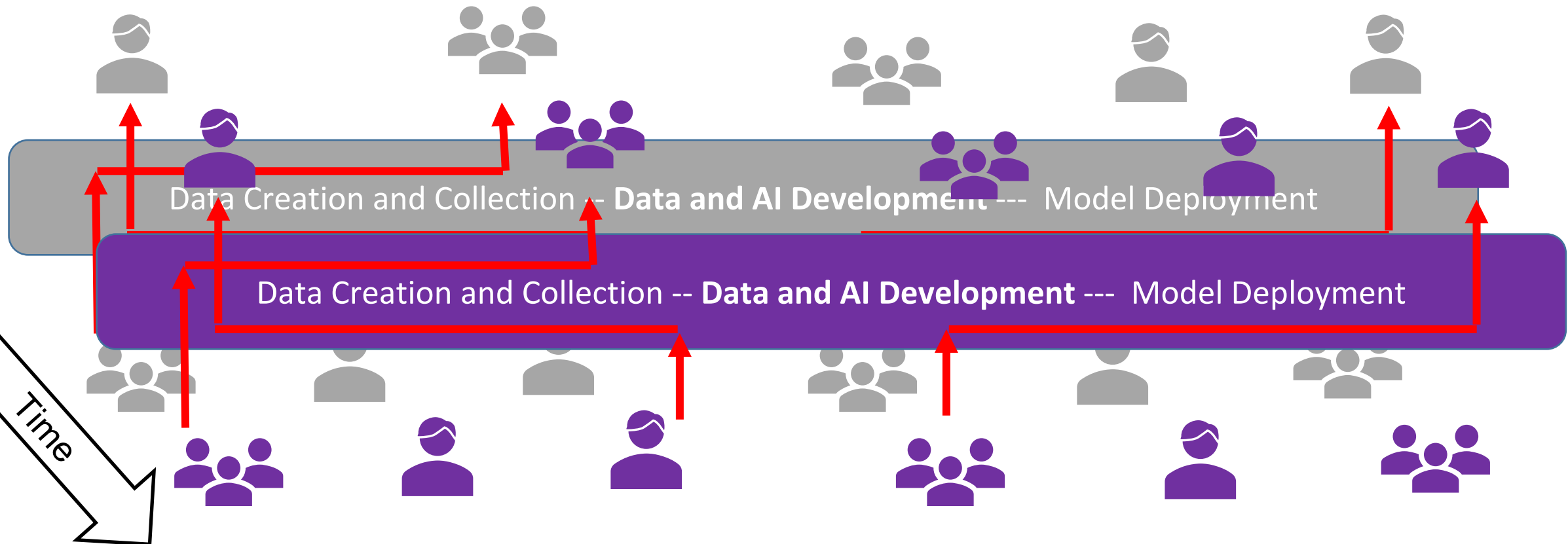


The diagram features a central blue horizontal bar with the text "Data Creation and Collection -- Data and AI Development --- Model Deployment". Above and below this bar are several grey icons representing individuals and groups. Red arrows point from the bar to these icons. Four red wrench icons are placed at various points: one at the start of the bar, one at the end, one below the bar, and one above the bar. The bar is divided into three sections by two dashed lines.

Data Creation and Collection -- Data and AI Development --- Model Deployment

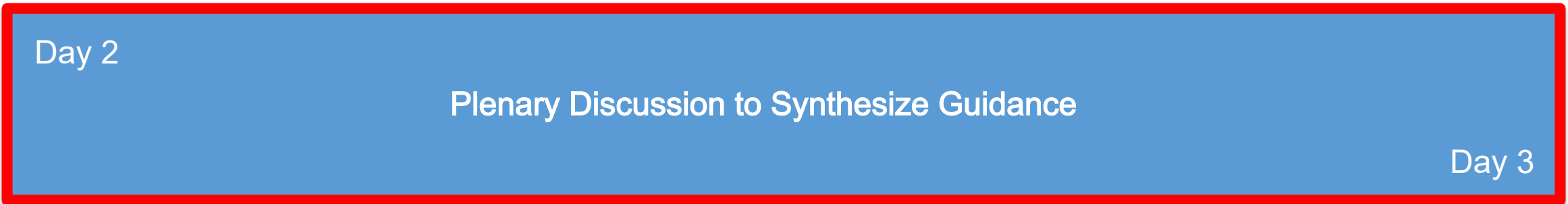
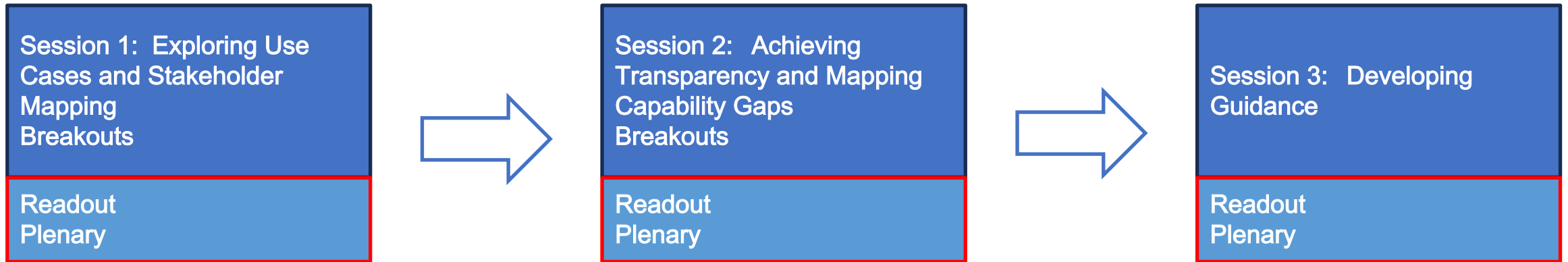
Goal: Look to the Future

What does transparency look like in 3-5 years?



Agenda

Hybrid



Session 1: Use Cases

GOAL: Considering your breakout theme, identify relevant stakeholders and their information needs / concerns / decisions

Outputs

- Stakeholder
- What they are trying to do / decisions
- What information they need
- Implications/ Impact

Themes /
Cross-cutting
observations

Ideas for
next
sessions:
(capability gaps,
future needs)

Schematic for Data and AI Development

Tips:

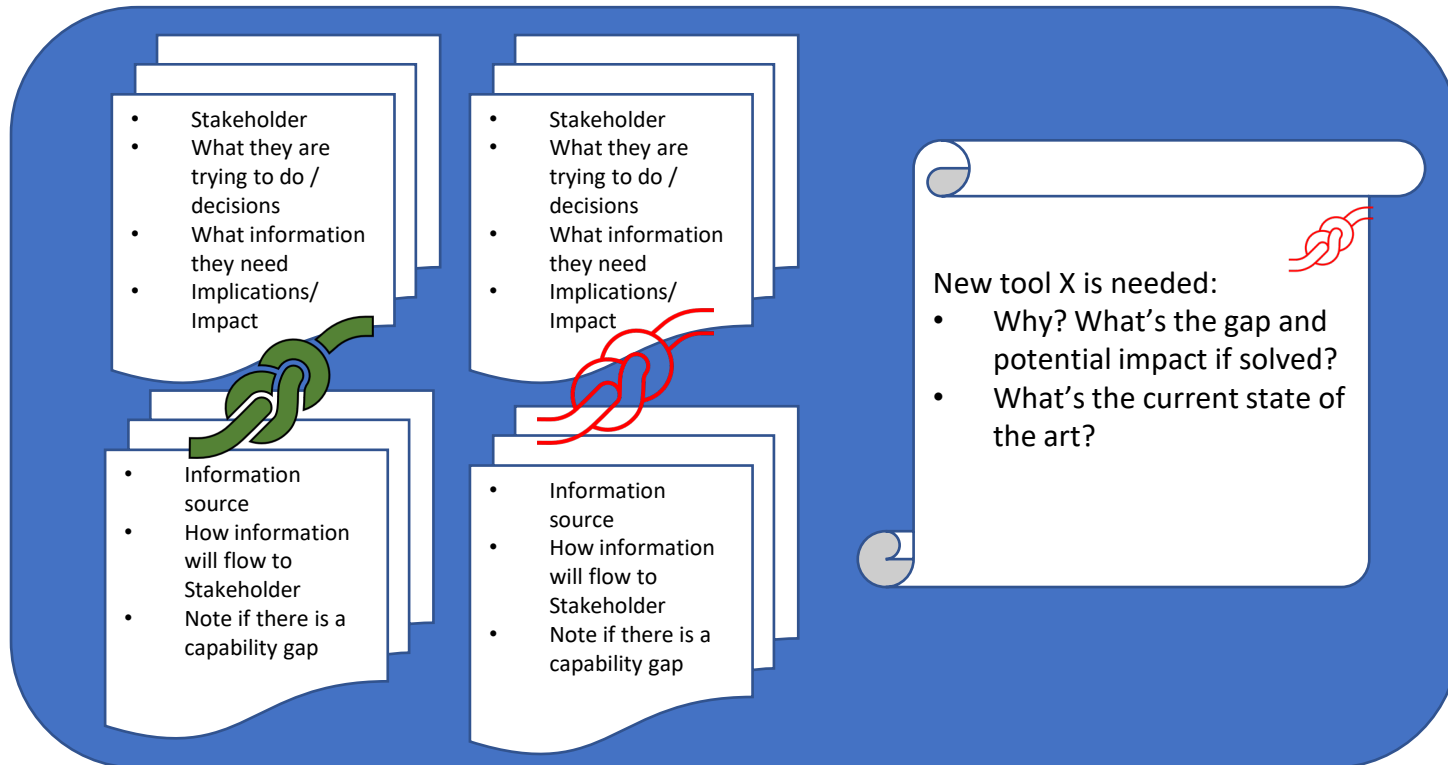
Consider the full data and AI development cycle

Stakeholders could include

- Researchers collecting data
- End users
- Model developers
- Model reusers...

Session 2: Achieving Transparency and Mapping Capability Gaps

GOAL: Considering your breakout theme, Map stakeholder needs to information sources; and identify capability gaps

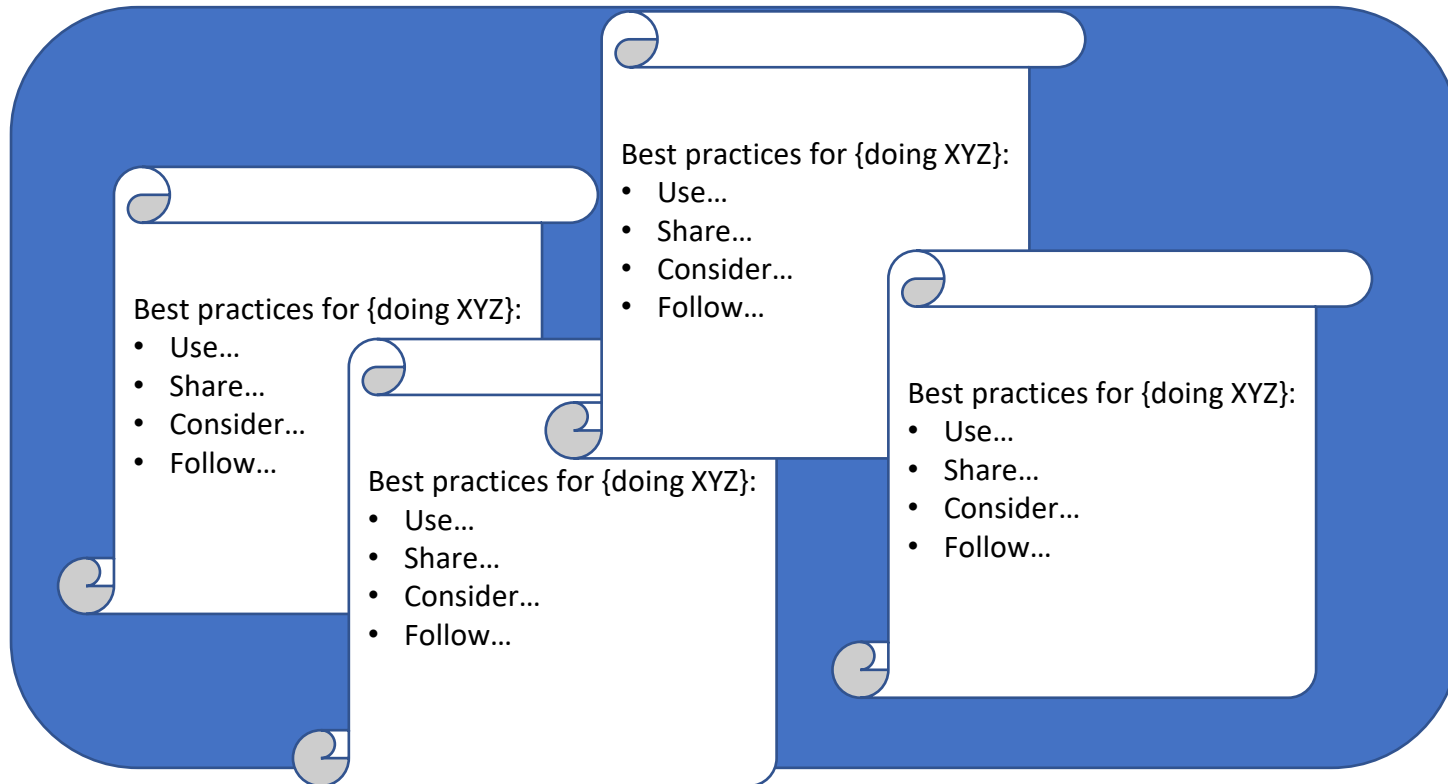


Tips:

- Consider the full data and AI development cycle
- Articulate a desired state → Identify capability gaps

Session 3: Developing Guidance

GOAL: Develop draft guidance/best practices for *actions* taken by NIH awardees



Tips:

Consider actions of NIH awardees.
Examples could be:

- Share data
- Publish an AI model
- Tune a foundation model
- ...

Plenary Discussion: Synthesizing Guidance

GOAL: Review and Synthesize Draft Guidance from Breakouts in Preparation for an RFI

Questions:

Have we covered all relevant actions for NIH awardees? Are there other categories of guidance that need to be developed?

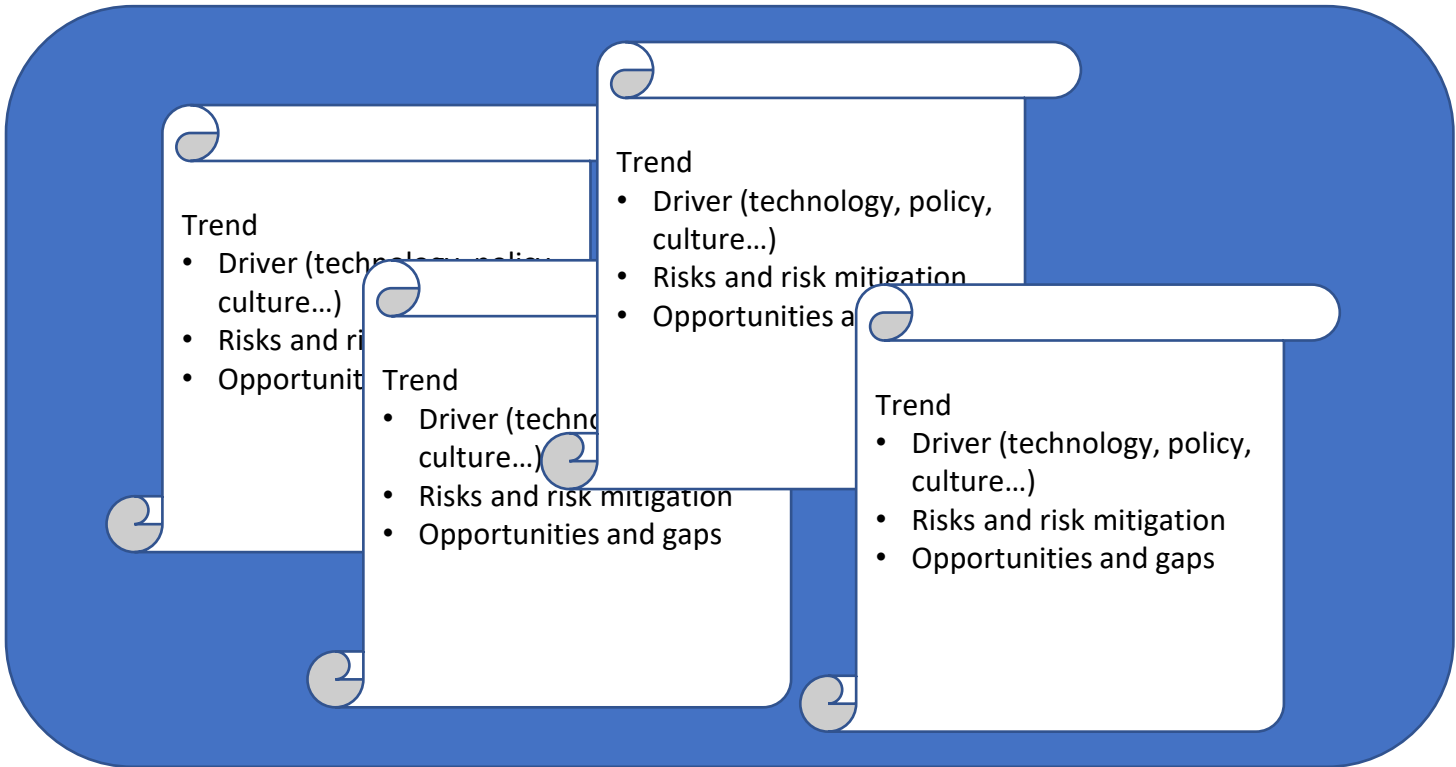
For each action, have we captured best practices and considerations? What additional guidance may be needed?

What tools or capabilities are needed to facilitate adoption of these guidelines?

Session 4: Future Trends

New Breakout Groups

GOAL: Identify trends in AI transparency



Tips:

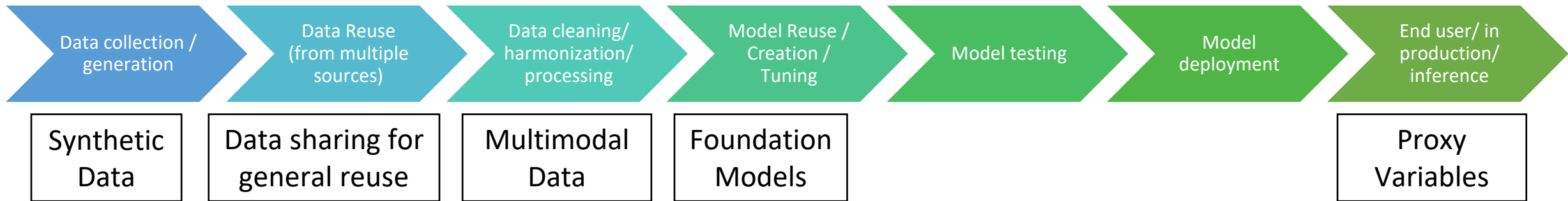
- What factors are driving change? E.g. policy, awareness, technology, cultural changes?
- What are risks and opportunities for ethical AI?

Top tips

- **Our approach to transparency is based on information and decision needs of stakeholders**
- **Transparency vs Moral Judgment**
 - We want to develop systems of tools and practices that allow people to make informed, responsible, and ethical decisions
- **Bias vs Causality vs Prejudice**
- **Breakout themes and instructions are starting points not constraints**
 - Think about meta questions
- **Think about the full data and model development cycle. Think about the full data ecosystem.**
 - There are many different kinds of NIH awardee.
- **Consider both health and biomedical research applications.**
- **One goal of the breakouts is to have all voices heard**

Breakout Themes

<https://www.scgcorp.com/ethicalframework2024/BreakoutGroups>



1.Synthetic Data: This breakout focuses on synthetic data —how they are generated, how they might be used, and how they could have both positive and negative impacts on human health. We will discuss specific considerations for the need for and challenges related to synthetic data, including realism, bias, degradation, ethical concerns, and generalizability.

2.Data Sharing for General Reuse: Responsible reuse of shared data for AI requires technical, operational, ethical, privacy, and regulatory considerations to assess whether the data are fit for purpose.

3.Multimodal Data: This breakout will discuss using multimodal data within artificial intelligence (AI) model development, validation, and translation for clinical implementation (e.g., combining structured data, such as diagnoses, with unstructured data, such as text or images).

4.Foundational Models: This breakout series will explore key concepts behind these models, as well as the implications when creating and using these models in multiple settings involving the clinician, patient, researcher, developer, and community as a whole.

5.Proxy Variables: In this breakout session, we will examine the use of proxy variables in algorithms. Proxy variables are confounders and therefore are used (intentionally or unintentionally) in place of another variable that has a true causal relationship with the outcome.

Breakout Themes and Room Numbers

Sessions 1-3

Synthetic Data

• 270-A



Ansu Chatterjee,
U Maryland



Jayashree
Kalpathy-
Cramer, CU
Anschutz



Colin G.
Walsh,
Vanderbilt

Data Sharing for
General Reuse

• 270-B



Maia Hightower,
Equity AI



Vinnie Liu,
Kaiser
Permanente

Multimodal Data

• 260-F



Caroline Chung,
MD Anderson
Cancer Center



Courtney Lyles,
UC Davis

Foundation
Models

• 280-A



H.V. Jagadish,
U Michigan



Eric Stahlberg,
Frederick
National Lab

Proxy Variables

• 150-A



Shazia Siddique,
UPenn



Sajid Hussain,
Fisk U

Breakout Themes and Room Numbers

Sessions 4

Future Trends

• 270-A



Ansu Chatterjee,
U Maryland



Jayashree
Kalpathy-
Cramer, CU
Anschutz



Colin G.
Walsh,
Vanderbilt

Future Trends

• 270-B



Maia Hightower,
Equity AI



Vinnie Liu,
Kaiser
Permanente

New Room
Assignments
(See your Badge)

• 260-F



Caroline Chung,
MD Anderson
Cancer Center



Courtney Lyles,
UC Davis

Future Trends

• 280-A



H.V. Jagadish,
U Michigan



Eric Stahlberg,
Frederick
National Lab

Future Trends

• 150-A



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NIH Organizing Team



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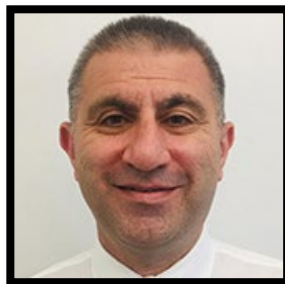
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Deborah Duran
National Institute on Minority
Health and Health
Disparities



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**& NIH AI Ethics
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