

BEHAVIORAL SCIENCE AND HUMAN FACTORS CONSIDERATIONS IN HEALTH AI PRODUCT DEVELOPMENT

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DISCLOSURES



University of Pittsburgh, Post-doctoral fellow:
T32 MH16804



Fairness, Equity, Bias workgroup lead:
Coalition for Health AI (CHAI)
No financial disclosure

BACKGROUND



PhD in Clinical psychology



Research in decision-making and cognitive/affective neuroscience in healthy and psychiatric patient populations



12+ years studying how and why people behave the way they do and the factors that impact individual differences in human behavior

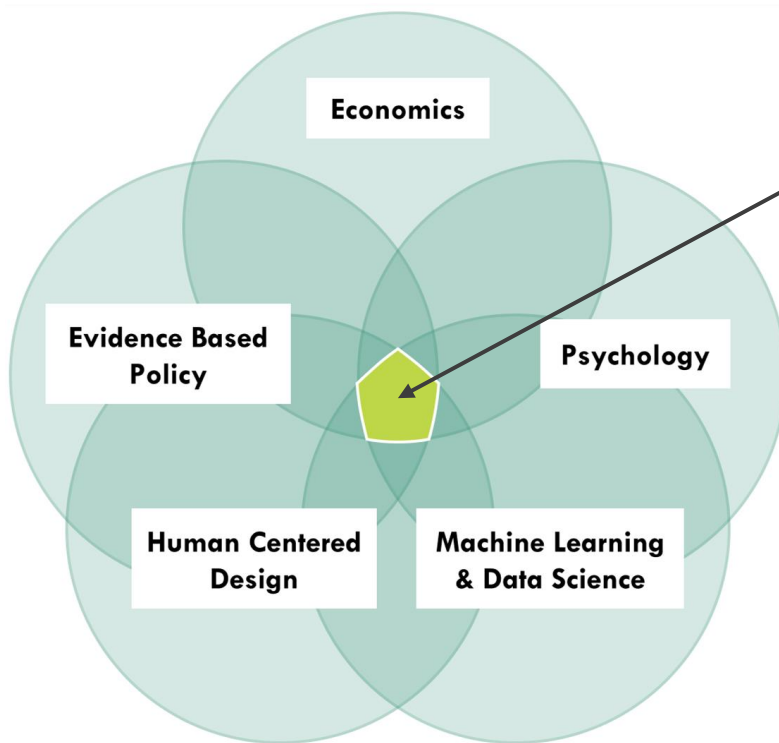


Applying this research to understand the dynamics between human decision-making and AI in healthcare.

OUTLINE

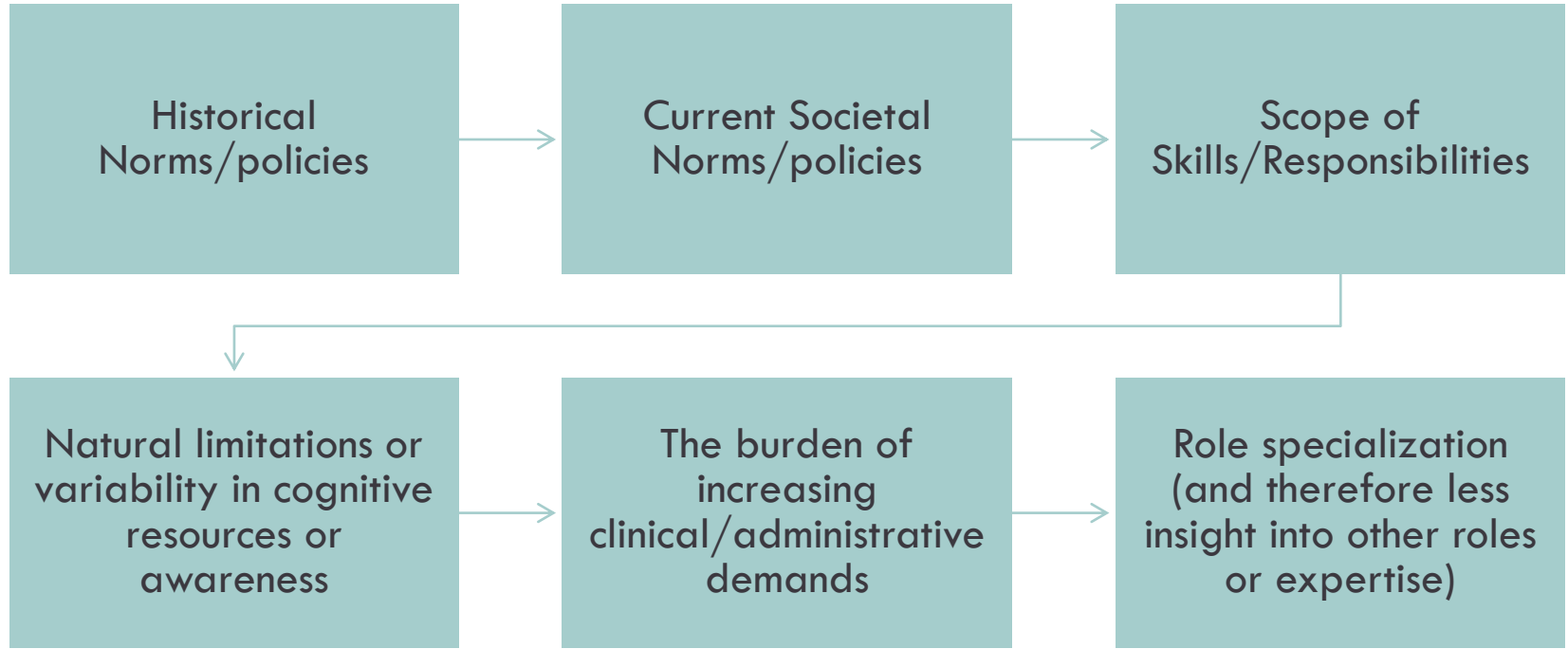
- What is behavioral science?
- What is bias and why does it matter for health AI
- Promise and potential of health AI
- Existing gaps in health AI product design
- Examples
- Recommendations

WHO IS IDEAS42?



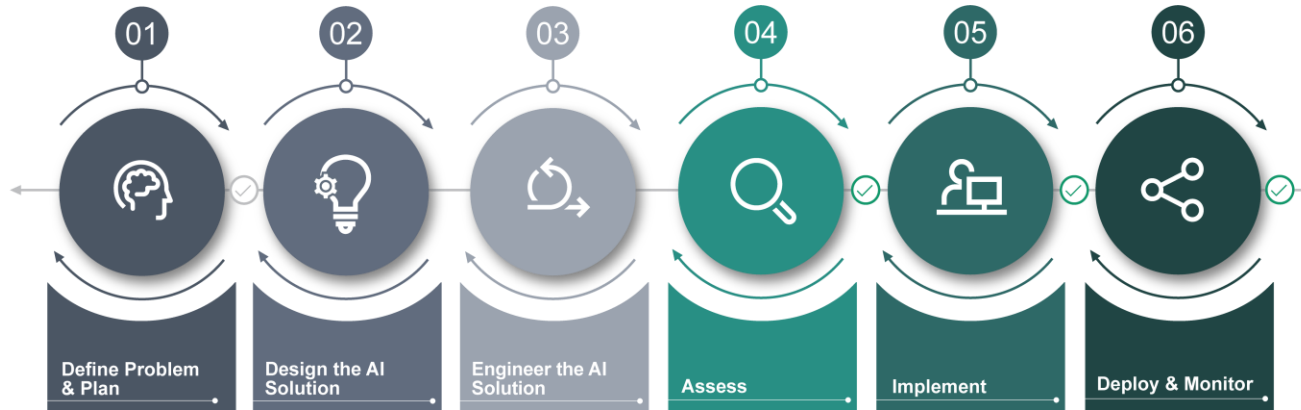
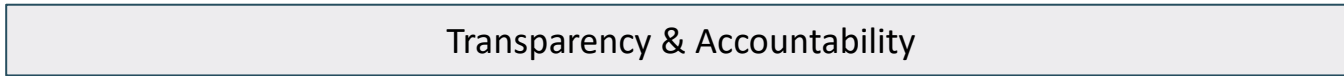
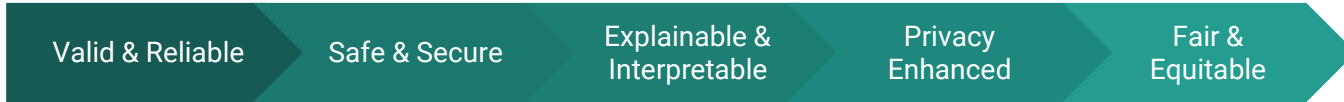
ideas⁴²

BIASES AND WHY THEY MATTER FOR HEALTH AI



Individual, group-level, and systemic tendencies that stem from:

PRINCIPLES FOR RESPONSIBLE HEALTH AI



WHAT DOES THIS LOOK LIKE?

Attention
Bias

Availability
Bias

Confirmation
Bias

Status Quo
Bias

Automation
Bias

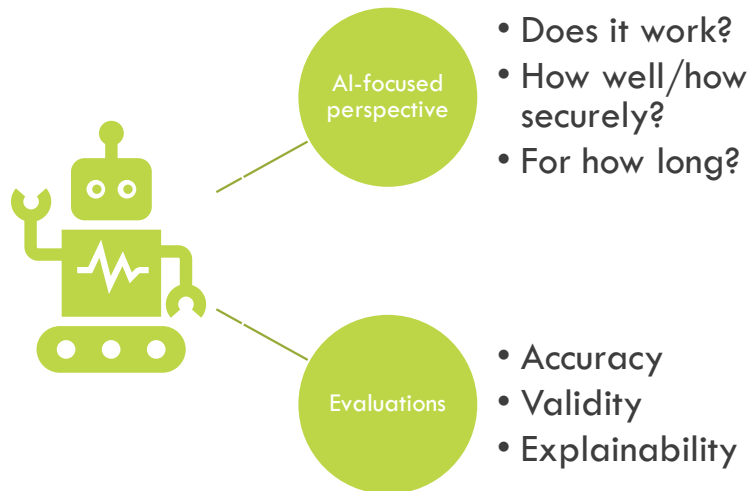
Base-rate
Fallacy

THE POTENTIAL FOR AI IN HEALTHCARE

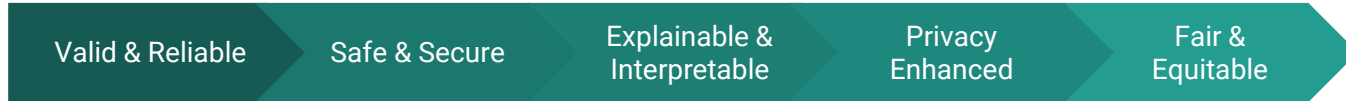
- Reducing clinical and operational burden
 - Increase in aging population
 - Maternal and child health gaps
- Improving diagnosis and treatment by bridging skill gaps in under-resourced areas
- Increasing access
- Reducing bias/improving health equity
- Reducing mistakes through automation



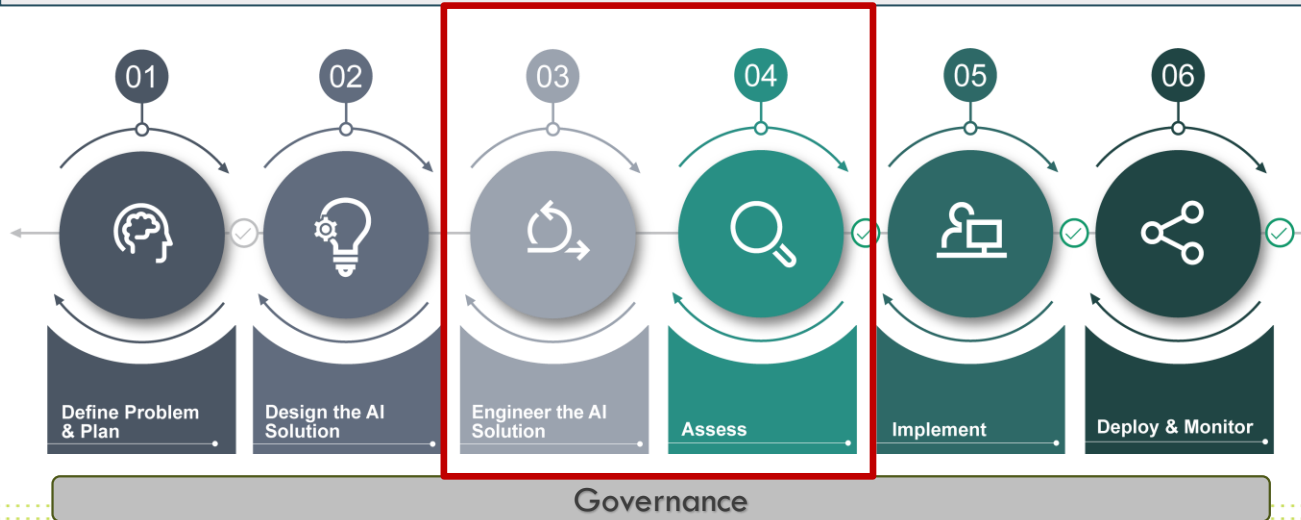
STATE OF THE FIELD: MACHINE-CENTERED APPROACH



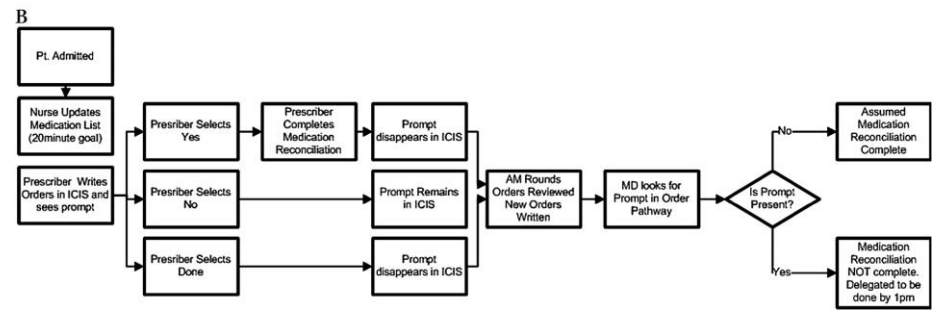
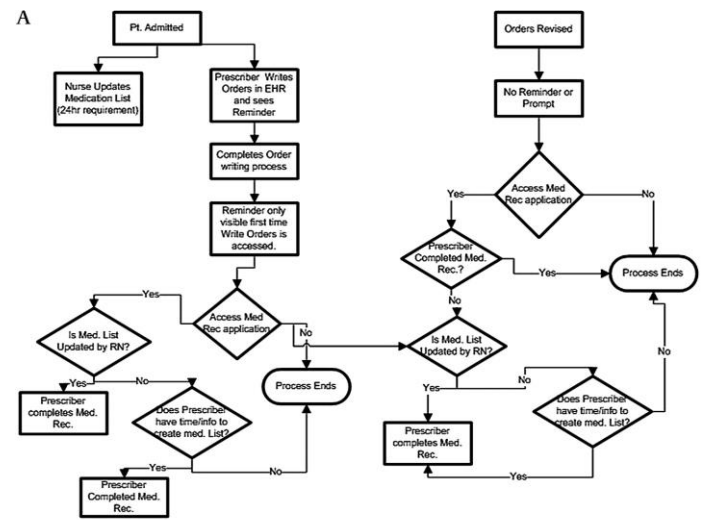
PRINCIPLES FOR RESPONSIBLE HEALTH AI



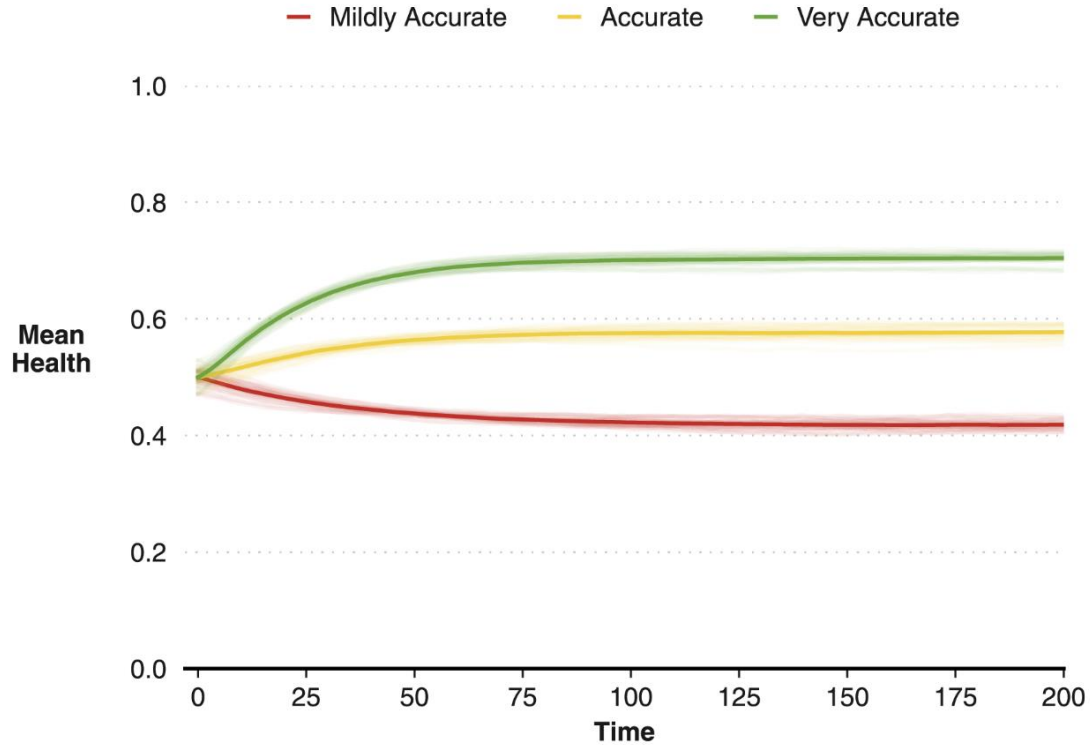
Transparency & Accountability



THE PROBLEM



ILLUSTRATIVE EXAMPLE

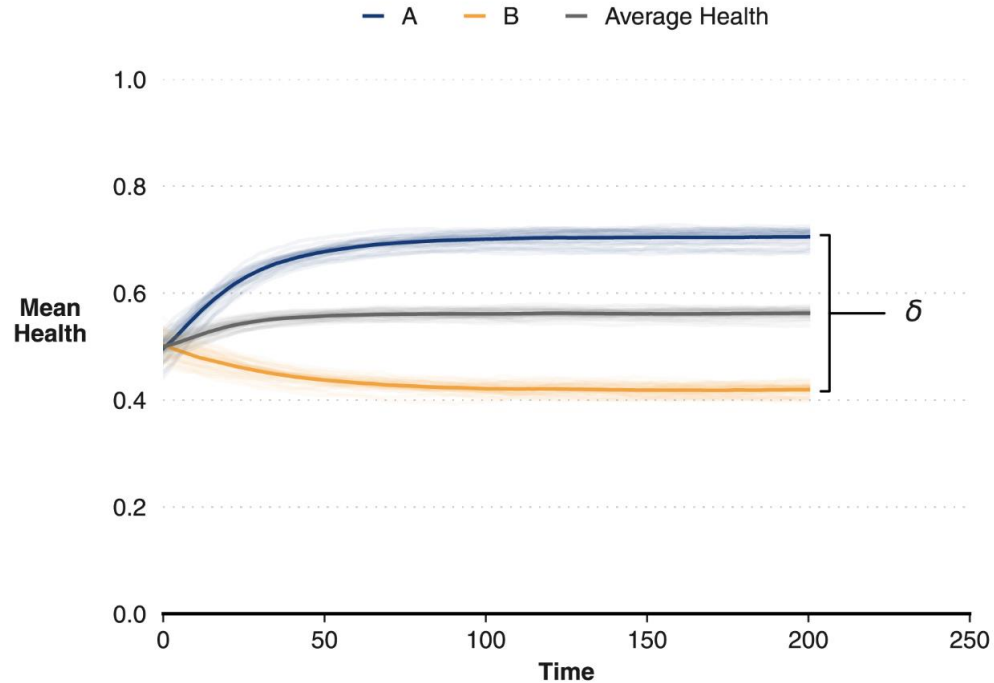


Kasman, Sedlack, Hammond, 2024; Brookings Center on Social Development and Policy

ILLUSTRATIVE EXAMPLE

Accurate but Biased AI

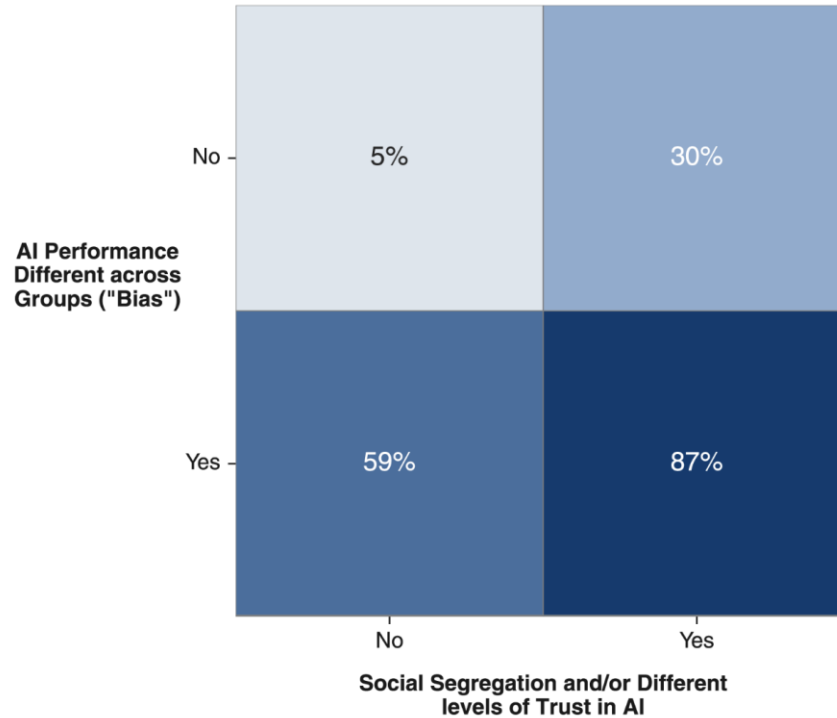
Average health of groups A and B after interacting with an accurate but biased AI.



Kasman, Sedlack, Hammond, 2024; Brookings Center on Social Development and Policy

ILLUSTRATIVE EXAMPLE

Proportions of simulation runs across condition categories in which we observed a statistically significant difference in health outcomes across two population groups.



Kasman, Sedlack, Hammond, 2024; Brookings Center on Social Development and Policy

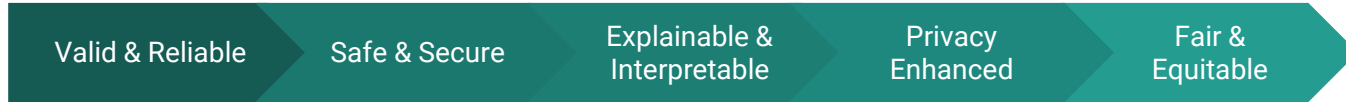
OTHER AREAS WHERE BEHAVIORAL SCIENCE MATTERS

- How we choose to document and be transparent about the intended use, performance, and risks of a model.
- How we effectively use these tools to increase trust
- E.g. standard model cards/resources for users and patients
- Remember: transparency and usability tools should be: Salient, Simple, Timely, and Actionable

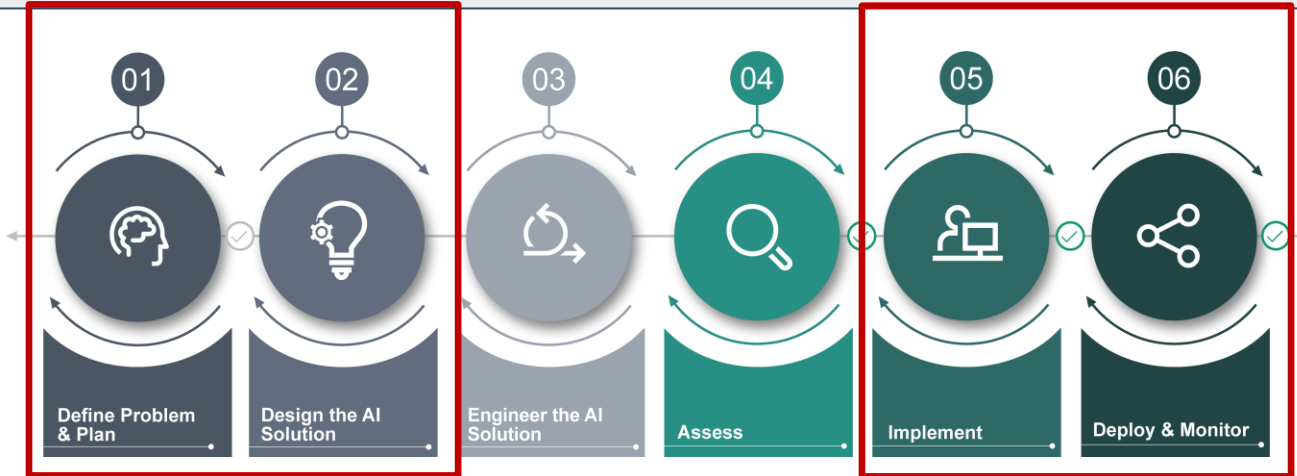
FOR EFFECTIVE AND RESPONSIBLE HEALTH AI: BEHAVIORAL AND HUMAN-CENTERED APPROACH



PRINCIPLES FOR RESPONSIBLE HEALTH AI



Transparency & Accountability



Governance

RECOMMENDATIONS



Ask the right questions, and include the right people (as early as possible)



Use behavioral science informed methods of qualitative and quantitative research.



Do not limit models and design to data available



Understand and plan for human biases and tendencies.



Develop behaviorally informed tools to standardize documentation & training.



Develop methods for motivating & monitoring end-user behavior as well as user-feedback loops



Provide infrastructure & governance that allow for inclusivity across differently sized and resourced health systems

QUESTIONS?



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