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# The AI Maturity Roadmap: A Framework for Effective and Sustainable AI in Health Care

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## Abstract

### BACKGROUND

Though many health systems are starting to deploy artificial intelligence (AI) and machine learning for clinical applications, there is limited guidance available to benchmark progress and assess maturity on a sector-wide scale.

### METHODS

The Health Management Academy, Microsoft and Nuance convened the AI Collaborative in 2022. The group comprises more than 50 AI decision-makers from leading health systems across the United States, who worked together in three workstreams to create the first iteration of the AI Maturity Roadmap. The workstreams covered assessing the solution landscape, establishing clinical AI use cases, and creating the initial roadmap.

### RESULTS

The AI Maturity Roadmap defines six key focus areas for health systems: Culture, Governance, Business Implementation, Value, Maintenance and Operations, and Information Architecture. Within these areas, there are several granular themes. To benchmark progress against these themes, there are five levels of maturity, ranging from "awareness" at level one to "transformational" at level five.

In the first instance, 24 health systems in the AI Collaborative have been benchmarked against the model. There is a range of maturity that currently skews toward the lower levels, with most self-reporting that their efforts are at level two, "active," or level three, "operational."

### CONCLUSIONS

Even among industry leaders, there is a wide variety in maturity levels, as health systems approach AI from different angles and baselines. This roadmap will be a valuable tool for guiding best practices, investments, and conversations, and aligning progress to help health systems take advantage of sector-wide advancement.

The AI Collaborative continues to meet, discuss, and refine the AI Maturity Roadmap, with plans to expand the Business Implementation, Value, Maintenance and Operations, and Information Architecture sections. For more information about the AI Maturity Roadmap, please visit The Health Management Academy.

# Introduction

Artificial intelligence (AI), machine learning (ML), and related technologies are emerging into a complex landscape for the health care industry as more health systems target widespread adoption. Broad workforce shortages are continually exacerbated by increasing demand, growing burnout, and the lingering effects of the coronavirus pandemic.

The United States is in the midst of an epidemiological shift as the population ages and their health declines, with a growing incidence of complex and chronic conditions. The number of people aged 50 and older is predicted to reach 221.13 million in 2050, a 61.11% increase from 2020. This research also forecasts a 99.5% increase in over-50s with at least one chronic disease and a 91.16% increase in multimorbidity.[1]

These factors put increasing pressure on both the clinical workforce and those in supporting roles, leading to unprecedented levels of burnout. More than half (53%) of U.S. physicians now report pervasive and persistent burnout, with nearly two-thirds (62%) experiencing feelings of burnout for 13 months or longer.[2] Alongside care requirements, clinicians and the teams that work around them are burdened by bureaucratic tasks and the increasing computerization of practice.

Researchers expect the deficit of primary care physicians to reach as much as 55,200 by 2033, and a shortage of non-primary specialty physicians of up to 86,700. This is due to a combination of the factors above, and intensified by the fact that more than two-fifths of currently active physicians will reach the standard retirement age within the next decade.[3] With so many experiencing burnout, it's likely that these physicians will seek to accelerate their retirement, rather than extend their careers.

Assessing the challenges of U.S. health care, it's clear that any new technologies must target the biggest sources of bottlenecks, cognitive load, and provider stress. Overworked clinicians, treatment delays, and limited access all have a pronounced effect on the quality of care patients receive,[4] AI has the potential to significantly reduce some of the burdens providers carry, improving their working lives and the outcomes of their patients.

Many health care organizations are starting to experiment with AI and ML, exploring use cases such as automated meeting minutes and assisted radiology reading. However, there is little sector-specific guidance, benchmarking, or best practice available to help individual health systems effectively prepare, deploy, and refine AI.

Such guidance already exists for academic and enterprise environments,[5] but health care requires a more nuanced approach, with even more stringent guardrails for the safe, ethical application of emerging technologies.

# The AI Collaborative

The AI Collaborative is a progressive peer community of technology executives and practicing clinicians from leading health systems across the United States. Its purpose is to take on this responsibility and lead the conversations around practical, responsible, and sustainable AI use in health care.

Sharp HealthCare, St. Luke's University Health Network, University of Michigan Health-West, University of Wisconsin and more. Members joining the project are C-level decision-makers responsible for AI investment within their health systems.

The initial in-person summit in September 2022 centered around discussing the industry's challenges and of the need to validate best practices, as well as define the purpose and desired outputs for the group.

Through regular virtual discussions and workshops, the AI Collaborative created the first iteration of the core deliverable, the AI Maturity Roadmap, between January 2023 and September 2023 (Fig. 1). This collaborative initiative was supported by two other workstreams, one aimed at addressing the AI solution landscape and one for creating a catalogue of use cases.

FIGURE 1

*Renee DeSilva, CEO, The Health Management Academy, and Joe Petro, Corporate Vice President, Microsoft Health and Life Sciences, Discussing the Responsible Application of AI in Health Care at the 2023 AI Collaborative Member Summit in Boston.*

## The AI Maturity Roadmap

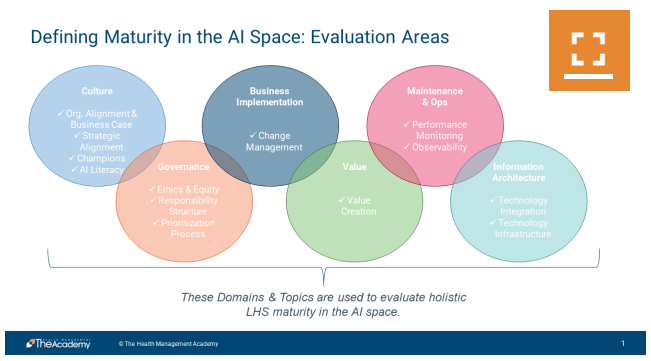
The AI Maturity Roadmap was drafted in line with three objectives:

- Help organizations assess their AI maturity and know what to work on next
- Make inclusive consideration of human, technology, and process factors
- Strike the right balance of flexible versus opinionated, especially in factors such as vendor strategy

The initial workstream defined six main pillars for the roadmap: Culture, Governance, Business Implementation, Value, Maintenance and Operations, and Information Architecture (Fig. 2). These are the foundational factors that the AI Collaborative believes must be in place for AI deployment to be successful in the long term.

The top-level pillars serve as overarching themes to categorize a variety of key topics health systems should be focusing on. For example, within Culture, health systems need to dedicate specific effort to organizational alignment, organizational business case, strategic alignment, champions, and AI literacy. In Governance, there is further consideration for ethics and equity, responsibility structure, and the prioritization process.

FIGURE 2




*Defining Maturity in the AI Space: Evaluation Areas.*

Making effective use of AI is about much more than a technology shift; for most health systems, initiatives must be accompanied by a broad cultural change. AI is rapidly moving away from being a niche technology for data scientists and evangelists, which means more members of the organization should be educated on how to deploy, manage, and maximize the value of AI in their departments. A more AI-literate workforce means greater alignment between decision-makers, shared ownership of projects, and more voices to champion AI initiatives across the health system.

Governance is also foundational for AI maturity, and the AI Collaborative believes health systems that are taking a technology-first approach should step back and assess whether their governance structure is fit for purpose.

There is sector-wide work to do regarding agreed principles of ethics and equity, but individual health systems should establish clearly defined standards, assessment processes, and responsible stakeholders before implementing AI. This structure should answer key questions around who contributes to ethics and equity reviews, where human intervention is required, how to effectively protect people and data, and how to preserve transparency. To be effective, teams in charge of AI initiatives should coordinate processes such as technical architecture review, ethics assessment, and risk evaluation with their health system's existing processes, to align expectations, timelines, and approval criteria.

## Five Levels of AI Maturity

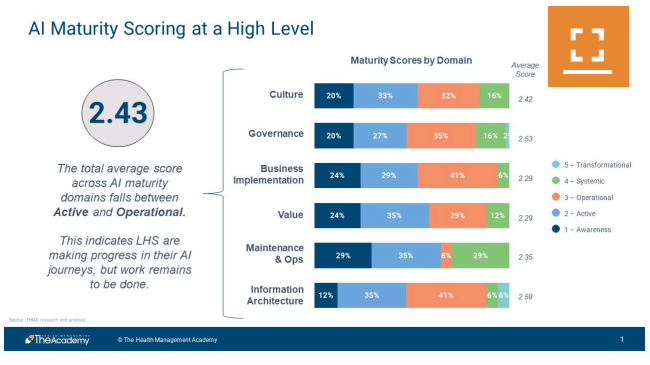
The roadmap applies five levels of maturity, originally defined by Gartner, Inc.,[6] that health systems can benchmark each sub-component against:

- Level 1: Awareness
  - Early AI interest with risk of overhyping
- Level 2: Active
  - AI experimentation, mostly in a data science context
- Level 3: Operational
  - AI in production, creating value by process optimization or product/service innovations
- Level 4: Systemic
  - AI is pervasively used for digital process transformation and disruptive new digital business models
- Level 5: Transformational
  - AI is part of business DNA

To test the accuracy of this initial roadmap, 24 of the AI Collaborative's health system contributors benchmarked their own progress against each section (Fig. 3). Within this cohort, most placed themselves at level 2: active, or level 3: operational. For example, 47% rated their AI literacy (Culture) at level 2, while 41% believe their change management (a Business Implementation sub-component) is at level 3.

At these early stages of AI and ML's widespread adoption in health care, the AI Collaborative believes that most organizations will currently be working at level 1: awareness, or level 2: active.

FIGURE 3




*AI Maturity Scoring at a High Level.*

## Three Uses for the AI Maturity Roadmap

Though it is described as a roadmap, there are several ways the matrix can be used within a health system. The AI Collaborative set out to create a framework that is flexible and widely applicable, rather than prescriptive, so different organizations can plot their own path to AI maturity.

It is up to individual health system leaders to apply the matrix in the way that makes the most sense for their organization. For example, they may use it as:

- A blueprint for maturity
  - Leaders may choose to follow the roadmap step by step, using each component and level as a sequential guide to the best way to achieve maturity within their health system. This approach can support health systems that begin at Level 1 across the board, or those that plan to launch their initiatives at a higher level from the start. They may use it to support work on a specific topic, such as Governance, or as a whole.
- A compass for AI
  - The matrix can also be used as a wayfinding tool for health systems, providing a light framework for progress without dictating how they should approach or achieve success. The document will continue to evolve, establishing best practices and validated principles for AI deployment in health care settings.
- A communication tool

- Without alignment between C-level executives, those implementing the AI, and those using it day-to-day, deployments are rarely successful. The matrix can be a valuable document to bring into conversations between these parties, supporting the business case for investment in the technology and the broader cultural changes required.

Fundamentally, the AI Collaborative believes that progress will likely not be linear for most organizations. They may skip stages entirely, or experience setbacks as their needs and the AI landscape evolve. Each health system will use the roadmap in a different way, and this live application of the roadmap will be key to further iterations and improvements.

## Conclusion and Next Steps

The AI Collaborative continues to work on the AI Maturity Roadmap. The initial sessions focused primarily on the Culture and Governance sections, so the group plans to expand the Business Implementation, Value, Maintenance and Operations, and Information Architecture sections.

As more health systems map their progress to the various components, the AI Collaborative will be able to see a broader picture of overall maturity and identify areas for iteration and improvement. With further use cases to assess against the roadmap, the AI Collaborative can also add more granularity and detail to the document and provide a greater catalogue of example outcomes for health systems to use in their own strategies.

Adding a validity layer to the AI Maturity Roadmap will be crucial in the coming stages, where health systems' self-reported maturity levels are additionally assessed by a neutral third party. This will bring the roadmap in line with other industry frameworks and provide further value for leaders and decision-makers.

Deployed strategically, AI has a key role to play in the future of health care, supporting everything from individual diagnoses to broad organizational strategy. As it continues to evolve, the AI Maturity Roadmap can function as a framework for all health systems on this journey. For more information about the AI Maturity Roadmap, please visit The Health Management Academy.

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