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Intelligent Choice Architectures in the Life Sciences and Health Care Sectors

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Intelligent Choice Architectures in the Life Sciences and Health Care Sectors

Intelligent choice architectures offer life sciences and health care companies new opportunities to improve patient outcomes and reduce costs.

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Life sciences and health care quality and outcomes fundamentally depend on the quality of decisions made across increasingly interconnected ecosystems of providers, payers, pharmaceutical companies, drug distributors, pharmacy benefit managers, medical technology makers, and others that these broad sectors comprise. Skyrocketing health care costs — 1% of U.S. GDP in 2024 — make it vital to develop cross-ecosystem collaboration solutions and revisit how decisions are made.

Our research finds that organizations using AI to generate high-quality choices — rather than just "answers" or "solutions" — achieve demonstrably better outcomes in clinical care, drug development, supply chain resilience, regulatory compliance, and member services for payer organizations.

A New Framework for Life Sciences and Health Care Decisions

AI-driven systems are now actively shaping how life sciences and health care decisions are made. Expanding upon the concept of choice architectures introduced by Richard Thaler and Cass Sunstein, we developed the idea of ICAs to make sense of how these increasingly capable systems determine available choices and influence decision-making. ICAs harness both generative and predictive AI to create, refine, and present options to decision makers. By incorporating specific use cases and relevant data flows, they continuously generate options while learning from outcomes to improve future choices. Unlike traditional choice architectures, which simply organize the context in which people make decisions, ICAs can personalize decision-making environments, thus empowering decision makers with more robust and tailored choices that increase the odds of making better decisions.

These dynamic systems also work alongside human decision makers, creating feedback loops that encourage innovative thinking while helping to counteract inherent biases. Leading life sciences and health care organizations like Sanofi and Mayo Clinic are already implementing ICAs that combine sophisticated data synthesis, process mining, and human insight. The results speak for themselves: Better options lead to superior outcomes for organizations and patients.

Intelligent Choice Architectures (ICAs)

Intelligent choice architectures are dynamic systems that combine generative and predictive AI capabilities to create, refine, and present choices for human decision makers. They actively generate novel possibilities, learn from outcomes, seek information, and influence the domain of available choices. These choices range from recommendations that assist human decisions to options for augmenting existing processes to opportunities for automating complete workflows where appropriate.

In a highly regulated global market where timely decisions affect millions of lives and billions in costs, creating effective life sciences and health care decision environments requires a delicate balance. Organizations in these sectors are confronting the need to deliver on multiple fronts: improving outcomes, decreasing costs, delivering excellent experiences, and increasing health equity. Clinical excellence must align with scientific rigor, and operational efficiency needs to complement human judgment — all within a framework of regulatory compliance and patient safety. ICAs are becoming increasingly useful in helping organizations meet these equally essential aims.

The effectiveness and ultimate success of ICAs fundamentally rely on better and more accessible data. For industry sectors that have struggled with both internal and ecosystem data siloes, ICAs offer challenges and opportunities. Addressing data governance and metadata management becomes even more critical when exploring generative and predictive AI solutions. Making the necessary changes from both an infrastructure and a cultural standpoint is a prerequisite for AI to deliver benefits in the life sciences and health care sectors. At the same time, health care and life sciences organizations can also use AI to help break down the historical data barriers that have precluded better choices and decision-making, while maintaining compliance and security.

Bringing Intelligent Choice(s) to Life Sciences and Health Care

In these sectors, personal attachments to certain treatment approaches or research pathways have historically impeded optimal decision-making. Emmanuel Frenehard, chief digital officer at multinational pharmaceutical and health care company Sanofi, notes that AI helps remove personal bias from decision-making: "When you move to a world of AI, you're hopefully removing some of that human bias to stay a lot more neutral and a lot less emotional." This is particularly crucial in drug development, where personal hypotheses and sunk costs can skew people's judgment. By separating human intuition from data-driven analysis, Sanofi's ICAs serve as neutral arbiters in complex decision scenarios.

Indeed, life sciences companies are transforming business across their value chains. In drug research, for example, companies are harnessing AI-based capabilities to accelerate a complex, data-intensive, but largely manual drug candidate selection process that often results in high failure rates in the later stages. ICAs with scientists in the loop can transform this process, prioritizing drug candidates with a higher probability of success by analyzing vast sets of genomics, proteomics, and clinical data, speeding drug discovery by 20% to 30% and lowering the related costs by 30% to 40%. ICAs can also help clinical development decision makers optimize patient selection based on genetic, demographic, and clinical parameters, ensuring optimum trial design and thereby reducing trial duration by 20% to 25% and improving their success rates of clinical trials. AI can also empower more adaptive and intelligent supply chains, making proactive recommendations for decision-making and speeding recovery from supply disruptions.

On the provider side, intelligent decision support tools can analyze patient data to recommend evidence-based therapies, which enables physicians to choose the best treatments based on patient data while improving outcomes and lowering treatment costs. AI-generated annotations of digital images likewise can boost the productivity and accuracy of diagnostic decision-making for pathologists.

At Mayo Clinic, physician lead and head of intelligent automation Dr. Anjali Bhagra benefits from the clarity of the organizational mission in driving the development of ICAs: "We are here to transform health care delivery so that we can serve our patients, provide state-of-the-art care, and also empower our staff to focus on mission-critical work." This dual focus on patient care and staff empowerment shapes how health care institutions approach using ICAs to improve outcomes.

Mayo Clinic's transformation of its clinical workflows, for example, has yielded dramatic improvements in patient access and relieved employees of some heavy workloads in health care struggling with burnout. The organization uses AI algorithms to analyze patient inflow patterns to optimize scheduling and resource allocation, reducing wait times from two weeks to 48 hours. Generative AI and automation now streamline the processing of referral faxes by extracting data from them and routing them to appropriate specialists, which reduces scheduling delays and staff workloads. Mayo Clinic also uses natural language

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processing technology to help patients navigate its health care network and direct them to the correct specialty based on analyzed feedback, increasing timely and accurate care delivery.

But there was significant work to be done before strategic, intelligent automation could be introduced. "There was an intense amount of process mining, determining where the bottlenecks were, and determining what aspects of that process could be performed via unattended automation," Bhagra explains. In other words, the workflows and processes were deconstructed into forms that enabled Mayo Clinic to intelligently decide which "automation versus augmentation" choices and trade-offs made the most sense both economically and in terms of outcomes.

On the payer side, ICAs are transforming historically slow processes that have frustrated both providers and their patients. One is the prior-authorization process, which can stand in the way of timely care and interventions. AI can streamline the submission process, easing the administrative burden on already stretched-thin providers and their staffs. ICAs can also triage and approve requests that require minimal adjudication nearly instantly, freeing up staff to review more complex requests.

Trust as the Foundation

In life sciences and health care, trust isn't just an essential feature; it's the foundation upon which all credible innovations are built. Individuals may be wary about the application of AI in health care or algorithmic involvement in health insurance claims determinations. Ensuring that ICAs are trustworthy by design is essential to ensure that both patients and health care and life sciences decision makers are comfortable with the integration of ICAs into decision-making. As Bhagra notes, "The two big things that have allowed us to do what we do are transparency and trust. What doesn't work, we put on top of the table. If things work, we put it on top of the table as well." This commitment to transparency shapes how life sciences and health care organizations implement ICAs. Accountability, transparency, and explainability are key to ensuring that AI systems keep pace with regulatory changes, protect data privacy, and are used fairly and ethically.

Sanofi emphasizes transparency, explainability, and internal audits for AI systems to maintain trust among stakeholders and regulators. Its responsible AI framework, Responsible AI at Sanofi for Everyone (RAISE), comprises the processes, governance, and framework to empower Sanofi teams to build, discover, and leverage AI to its full potential while keeping their patients, people, and partners safe. "One of my biggest fears is not the error from AI. Because if we make a poor decision our safeguards enable us to correct it," says Frenehard. "What is really preoccupying is the micro deviation that happens month after month after month. You don't see it, but it's like a supertanker moving by one degree, one degree, one degree." Mitigating this risk includes implementing systems to identify any drift and look for anomalies. "We are ensuring that AI is as trustworthy as we can make it in today's day and age," Frenehard says. "It's critical."

This focus on system integrity extends to how health care organizations approach automation. As Bhagra explains, "Nothing is linear. There are a lot of advances and good opportunities to study some use cases within the clinical realm which are not patient-facing but still are part of our workflow." For example, Mayo Clinic is using AI

to enhance personalized medication alerts. These more actionable, timely notifications reduce alert fatigue for clinicians and improve patient safety. The organization is also applying AI to automate the analysis of complex genetic and molecular data for early disease detection and personalized treatment plans. This measured approach allows Bhagra's team to experiment internally to determine what can and can't be safely automated versus augmented.

Internal success with personalized medication alerts will help inform the development of AI-powered patient-centered apps to provide tailored health notifications that improve patient engagement and treatment adherence. Likewise, the AI tools that help clinicians analyze genetic data could be adapted to deliver personalized health insights to patients, empowering them to make more informed decisions. In effect, those workflow challenges reframe how choices are characterized, presented, and evaluated before decisions are made.

Expanding Decision Domains

Sanofi's investment decision committee for science demonstrates how ICAs can expand decision domains while maintaining trust. The organization has a companywide app called Plai, codeveloped with Aily Labs, that empowers teams to rethink how to run clinical trials, from study planning to site selection. For example, Sanofi R&D teams can now find and set up better trial sites for their target groups, broadening opportunities for those from historically underrepresented communities to participate in clinical research. Sanofi has found that sites selected using the AI-powered app recruit participants faster than those selected using traditional approaches.

In addition, Frenehard points to the value of "snackable AI" — AI-enabled decision-making apps that anyone can use in the course of their daily workflows. These ICAs democratize data and insight, enabling Sanofi teams to make better decisions, allocate resources more effectively, and deliver better outcomes for patients. Integrating AI into clinical data management has enabled faster decision-making and reduced the need for onsite monitoring visits by more than 30%.

Frenehard also points to the development of an AI agent to help optimize the way the company launches its medicines. "AI gives us a 360-degree view across Sanofi and its competitors," he says. This means that downstream functions, like supply chain and commercial, have access to accurate and up-to-date R&D data to make the best decisions for the company. "For example, someone who is planning launch resources in a market can look at when the product is going to be approved in that market and plan accordingly," Frenehard explains.

Many of Sanofi's ICAs involve what Frenehard calls *compound AI*: blending predictive AI's data-driven forecasting capabilities and generative AI's synthesizing capabilities. "You need generative to analyze all that data, and you need predictive on some things," he says. That becomes the scaffolding for multidimensional choice optimization, expanding the scope and quality of decision environments.

This approach exemplifies how ICAs can be designed to not only analyze past trends but also provide adaptive,

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context-aware recommendations. By integrating disparate data points into cohesive narratives, Sanofi's AI systems showcase the potential for ICAs that can enhance optionality, interconnectivity, and foresight across complex systems.

Such ICAs represent an evolution from "next best action" optimization to improved choice generation. These intelligent systems don't revoke decision rights but serve to empower decision makers and elevate decision-making — an approach that ensures that AI-driven processes align with organizational and human values as they improve outcomes.

Selective, Strategic Implementations

Both Mayo Clinic and Sanofi emphasize how selective, strategic implementations of AI underpin the successful development of ICAs. A measured approach builds internal confidence in these systems and creates a foundation for learning so that the ICA provides better choices (which lead to better decisions and outcomes) over time.

Mayo Clinic has taken a phased approach to AI-enabled automation and augmentation, which is especially important in the high-stakes environment of health care. It was evident when Bhagra joined the organization that it would be best to begin with administrative processes and then "transfer the learnings, with appropriate wraparounds to minimize risks, when we go into clinical practice, research, and some of the other hardcore functions," she says. However, the expansion of AI-enabled decision environments has not been entirely linear. "There are a lot of advances and good opportunities to study some use cases within the clinical realm which are not patient-facing but still are a part of our workflow," Bhagra says.

Mayo Clinic has opted to adopt a collaborative enablement approach to ICAs, engaging with various departments to identify where it might see the most value from automation or augmentation versus unilaterally introducing new decision tools to the organization. "We empower people with the knowledge, the intel, the resources, the tools to perform collaborative value mapping," Bhagra explains. One intelligent decision-making tool that resulted from this collaborative approach is the organization's AI model for cardiac surgery scheduling. By predicting case durations with high precision, the tool can help team members optimize operating room utilization and improve scheduling. Another is the DocAssist faxed referral automation software program mentioned earlier. "This effort leverages document automation and agentic automation to trigger downstream actions based on the insights revealed," says Bhagra. This use case highlights the power of AI to reduce inefficiencies and ensure that patients are connected to the care they need as quickly as possible.

Sanofi, for its part, has pledged to become "the first pharma company powered by artificial intelligence at scale." Everybody is pursuing AI, Frenehard says, adding, "It's the 'at scale' that is the big deal." But Sanofi is expanding its efforts in a measured way. The company's CEO says the Plai app allows employees "to make better everyday decisions." The app can offer better choices that incorporate predictions related to key value drivers (e.g., the probability of clinical trial success, enrollment numbers, or R&D costs) that challenge internal thinking and generate strategic alternatives. "Plai delivers actionable insights and transforms them into recommendations, from strategy to operations. More than 15,000 Sanofians are leveraging more than 1 billion data points to make better decisions in their day-to-day," Frenehard says. For example, the app can offer better choices for site selection or patient recruitment, taking into account future milestones by quarter. As Frenehard explains, "Plai is interactive and capable of giving us recommendations to stop projects at the earliest opportunity to maximize savings, to make smarter investment decisions at an asset level, to dynamically track those over time, and accelerate our programs to beat the competition."

Sanofi's strategic approach of moving beyond isolated proofs of concept is integral to embedding AI in core operations, such as forecasting, pipeline management, and drug launches.

ICAs in the Life Sciences and Health Care Sectors: Six Key Takeaways

Life sciences and health care ICAs represent not just technological innovation but a fundamental rethinking of how life sciences and health care decisions are made, supported, and evaluated.

The efforts at Mayo Clinic and Sanofi help to illustrate six crucial insights about ICAs in health care and life sciences:

1. **ICAs help reduce cognitive bias while preserving valuable human expertise.** As Frenehard notes, AI provides "cold hard facts" while still allowing clinicians, researchers, and underwriters, for example, to apply their judgment. This balance is uniquely important in life sciences and health care, where both objectivity and experienced insight are crucial for better decisions and outcomes.

2. **Sophisticated process mining is necessary before implementation.** Reducing wait times from two weeks to 48 hours at Mayo Clinic and improving drug development decisions at Sanofi required detailed process analysis. This points to the importance of process mining, not just data mining, to developing effective ICA applications.

3. **ICAs focus on empowering decision makers rather than controlling them.** Mayo Clinic's enablement model and Sanofi's compound AI approach reveal that successful health care ICAs constitute a fundamental shift from traditional health care decision support systems, which dictate solutions rather than offering choices. ICAs instead work alongside the experts, mining and contextualizing volumes of data in specific domains to offer them better choices. The better decision-making and outcomes that result can win over tech-resistant doctors and researchers.

4. **Life sciences and health care ICAs require unprecedented transparency into choice generation and evaluation.** Both Sanofi and Mayo Clinic emphasize putting successes and failures "on top of the table" and monitoring for subtle "micro deviations" that could impact the probability of success in drug discovery, the accessibility and efficacy of clinical care or claims decision-making.

5. **Robust infrastructure is essential to innovation.** As Bhagra states, "You can't bring a Ferrari if there are no roads." In other words, life sciences and health care organizations should prioritize organizing and creating data and integrating AI models into workflows in trusted data and research environments to support the implementation of advanced choice architectures. What's more, infrastructure that crosses organizational boundaries (e.g., a digital health decision-making tool developed by a life sciences company, monitored by a physician, and used by a patient) can yield exponential returns for everyone involved.

6. **Cross-ecosystem coordination is nonnegotiable.** The pressing challenge of rising health care costs makes working in silos financially and computationally untenable. ICAs bridge traditional boundaries between providers, payers, pharmaceutical companies, and other stakeholders to create value at intersection points.

Transforming Scientific, Clinical, and Operational Decision-Making

The potential of AI in life sciences and health care lies not just in automation but in fundamentally rethinking how enabling, observing, and networking ICAs creates new opportunities. As Frenehard asserts about the future of AI in life science and health care, "When you can mix reasoning, predictive engines, and AI, that's going to be pretty incredible." Through ICAs, life sciences and health care institutions can create transformative change while deepening trust. As Bhagra concludes, "We are here to solve problems for human beings, and we do it in a way that problem-solving is done by the people for the people."

These human-centered approaches, combined with intelligent digital implementations that keep humans in the loop, generate the way forward for life sciences and health care decision-making. Just as importantly, ICAs can help the range of companies in these sectors to finally bust down their internal and ecosystem data silos to create a 360-degree view for better holistic — and even collaborative — decision-making.

Appendix:
ICAs Transform the Decision Environment

The table below outlines the capabilities of intelligent choice architectures to change decision environments.

Intelligent Choice Architecture (ICA) Capabilities	How ICA Capabilities Change Decision Environments
Elevating Decision Quality Through Expanded Choice Sets	ICAs bring a wider array of high-quality, contextually relevant choices to the forefront. Unlike traditional decision tools, which often present static or limited options, ICAs dynamically generate new alternatives based on evolving data patterns and contextual insights. This expansion means that decision makers are not confined to conventional or habitual choices; instead, they can consider innovative options that may have been previously hidden or overlooked. This boosts the quality of decisions by ensuring that people's choices reflect a more comprehensive understanding of the decision context.
Anticipating Outcomes With Predictive Foresight	By integrating predictive modeling, ICAs provide decision makers with insights into potential outcomes for each option in real time. This anticipatory capacity helps decision makers weigh trade-offs and risks more effectively. For example, a retail manager assessing inventory decisions might see not only the immediate costs but also the projected downstream impacts on sales, supply chain dependencies, and seasonal trends. This predictive foresight helps decision makers align their choices with longer-term strategic goals rather than just short-term gains.
Adapting Choices Through Continuous Learning and Feedback	ICAs learn from previous outcomes, continuously refining their own architecture based on new data and feedback. This means that decision environments are not static; they evolve and improve over time, becoming more aligned with organizational goals and individual decision makers' preferences. In a talent management scenario, for instance, an intelligent choice architecture might identify patterns in employee performance and turnover to adjust its recommendations for promotions, training, or transfers. This adaptability ensures that the system remains relevant and valuable as situations and objectives shift.
Enhancing Decision Confidence by Revealing Hidden Interconnections	ICAs expose the interdependencies between different choices, making it easier for decision makers to understand how one choice impacts others across the organization. This interconnected view is particularly valuable in complex environments where decisions in one area can have cascading effects in others. For example, a marketing manager at a global retailer like Pernod Ricard could see how adjustments to campaign targeting affect inventory needs, distribution channels, and customer engagement. By making these connections transparent, ICAs help decision makers feel more confident and informed since they can see the broader implications of their choices.

Intelligent Choice Architecture (ICA) Capabilities	How ICA Capabilities Change Decision Environments
Decentralizing Decision-Making With Tailored Choice Architectures	By providing context-specific guidance directly to individuals at all levels, not just top leaders, and tailoring decision environments to the needs of different roles, intelligent choice architectures enable more agile and decentralized decision-making across the organization.
Reducing Cognitive Load by Streamlining Complex Information	ICAs filter and prioritize information, presenting decision makers with the most relevant data and choices, which minimizes cognitive overload. Rather than wading through endless reports or raw data, decision makers receive streamlined insights and summaries that highlight essential patterns, anomalies, and recommended actions. For example, in supply chain management, an intelligent choice architecture could surface key inventory adjustments or supplier choices based on real-time demand fluctuations and historical trends, sparing managers from unnecessary complexity. By simplifying complex information, ICAs allow decision makers to focus their attention on critical decisions with clarity and confidence, improving both speed and accuracy in decision-making.
Personalizing and Interacting With Decision-Making Environments	ICAs create an interactive, engaging, and highly customized environment that adapts to each decision maker's preferences, needs, and goals. Rather than offering a one-size-fits-all interface, these architectures adjust dynamically, using user interactions and feedback to shape how information and options are presented. For instance, a retail executive might prioritize metrics like customer lifetime value or churn predictions, while a store manager may need insights on daily inventory and staffing. ICAs can personalize dashboards and recommendations accordingly, making interactions feel more intuitive and responsive. Additionally, intelligent choice architectures can incorporate interactive tools like what-if scenarios, simulations, and decision trees, enabling decision makers to explore potential outcomes in real time and test various options before committing to a course of action. This interactive engagement not only makes the decision process more enjoyable but also boosts confidence, since users can see the immediate effects of adjustments and tailor their decision pathways to better align with strategic priorities.

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