The foundational forces affecting pharma today and beyond

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Each year, leaders from Advisory Board and Optum® Life Sciences unpack major trends that will have the biggest impact on life sciences manufacturers. With this autumn edition in an election year, we're breaking down three foundational forces that will affect the pharmaceutical and biotech sector for years to come and that will require strategic prioritization at your organization.

Read more to:

- Recognize the ecosystem dynamics most likely to affect your organization's success this year and beyond.
- Understand how these trends will shape life sciences leaders' real-world data (RWD) and real-world evidence (RWE) strategies
- Consider the implications of these trends on different stakeholders within the health care ecosystem
- Gather ideas for thoughtful questions to ground strategic planning meetings with your team, cross-functional colleagues and important business partners

The foundational forces affecting pharma today and beyond

The promise and limitations of artificial intelligence (AI) and machine learning (ML)

The urgency of health equity

The role of the patient voice

Identifying the promise and limitations of artificial intelligence and machine learning in drug development

Given the focus across the health care ecosystem on AI and ML, it won't be long before multiple variations of algorithms exist with similar purposes — whether it's to support diagnosis, workflow management, drug discovery or patient care. Stakeholders will need to vet which solutions are "fit for purpose" with the same rigor with which they evaluate the underlying data to create these tools.

Life sciences stakeholders are eager to increase artificial intelligence and machine learning use cases where acceleration or increased efficiencies may have a positive effect on drug discovery and development, clinical trials and patient care. The long-term validity of these advances will depend on the data and human expertise behind them. Organizations will need to balance newfound abilities with the rigor of drug development.

AI played a key role in accelerating the development of COVID-19 vaccines. Researchers used an AI-powered database to design a potential cancer medication in 30 days. And, the U.S. Food and Drug Administration (FDA) granted its first Orphan Drug Designation for a medication discovered and designed using AI. These examples are merely a prelude: the global AI in life science analytics market size was valued at $1.5 billion in 2022, and will grow to $3.6 billion in 2030.

Health care stakeholders — including pharmaceutical manufacturers, real-world data companies, technology companies, biotech and health systems — are developing and deploying AI solutions at unprecedented scale and speed across the health care ecosystem. As with any digital innovation, manufacturers should consider what risks may be created, including cybersecurity vulnerabilities and data privacy concerns.

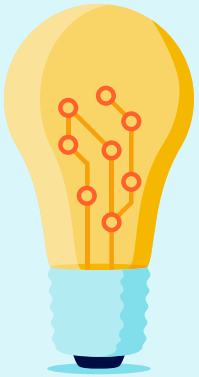
This situation points to a greater need for cross-functional and cross-industry collaboration — whether in working across teams internally or partnering with organizations with AI expertise and other life sciences companies. For example, starting last year, Moderna began investing in IBM generative AI programs to help aid in the design of new mRNA-based treatments and vaccines. Sanofi, Formation Bio and OpenAI are bringing three teams together to develop custom, purpose-built solutions across the drug development lifecycle. And finally, AstraZeneca launched a new health tech business at the end of 2023 to offer other pharmaceutical companies digital and AI solutions for clinical trials.

As collaborations unfold, it will be imperative to determine how to measure the validity and accuracy of algorithms at scale. This may help avoid large missteps that could create harm for patients and the health care system writ large. Sorting through these issues now may become a valuable resource for federal agencies currently grappling with AI governance and applications, and determining who owns the output or intellectual property generated from AI. The FDA's Center for Drug Evaluation and Research (CDER), in collaboration with two other agencies, issued an initial discussion paper earlier this year to explore relevant considerations and solicit feedback for the use of AI/ML in the development of medications and biological products.

Implications for life sciences

President Biden's AI executive order sums up the complex road ahead: "To protect consumers while ensuring that AI can make Americans better off" with the imperative to "advance the responsible use of AI in health care and the development of affordable and life-saving drugs." This spring, Senate Majority Leader Chuck Schumer announced that he would provide a framework for addressing the risks and potential benefits of AI, which will then be translated into piecemeal legislation. The framework will be based on expert input and address issues arising from AI including its effect on intellectual property, labor rights and health care.

In 2024, the federal government developed a strategy for ensuring the safety and effectiveness of AI deployed in the health care sector. The strategy outlines rigorous frameworks for AI testing and evaluation, while also outlining future actions for the U.S. Department of Health and Human Services (HHS) to promote responsible AI development and deployment.



"As you continue down your AI pathway, start with the data. It's the foundation for a robust, representative and unbiased solution. And incomplete data can unravel the best-laid analytic plans."

Lou Brooks
Senior Vice President, Real-world Data and Analytics, Optum Life Sciences

In addition, nondiscrimination requirements from the Affordable Care Act in health programs and activities also continue to apply to the use of AI, clinical algorithms, predictive analytics and other tools. Researchers from the AI Program in the FDA's Center for Devices and Radiological Health (CDRH) will also conduct regulatory science research to ensure patient access to safe and effective medical devices using AI/ML.

As with the increased federal intervention in drug pricing, manufacturers can play a proactive role in sharing best practices that may help reduce the potential harm and risks of using AI throughout the drug development process.

Within organizations, data leaders will need to anticipate the level of evidence or proof needed to demonstrate the effectiveness of AI/ML principles being applied to models and long-term data governance plans. An enterprise-level AI responsible use team can set the high-level strategy for the company to determine the AI solutions and capabilities to develop, identify the strengths and limitations of AI applications, oversee the strategy across AI investments, and reassess use cases and priorities over time based on outcomes.

In the not-so distant future, decision-makers will likely have access to a marketplace of algorithms, which will be evaluated according to FDA standards. These algorithms may recommend a class of drugs to treat a chronic condition for a large population or help identify patients for treatment of a rare disease. Both datasets and the human assumptions the algorithms are built on may make or break our collective success in AI.

Questions to guide your strategy:

- Where can we start creating efficiencies with AI? What necessary resources do we lack that will allow us to deploy AI at scale that we don't currently have?
- How does broader use of AI/ML in our business effect the way we need to interact with data today, and what does that mean for our infrastructure, talent mix and strategy?
- How do my data partners approach the commercialization of algorithms?
- Where does it make sense to partner with other organizations or vendors? Are we ready to "compete" to have the best algorithm?
- How do we define good model development hygiene? Does it move beyond predictive accuracy?
- How can we demonstrate transparency about AI/ML algorithm updates, performance improvements, or labeling changes, to name a few? How can real-world evidence support transparency?
- Have we fully anticipated how a model gets used? Are we risking a HIPAA violation?

Maintaining the urgency of health equity

Manufacturers can continue to play a key role in supporting health equity initiatives in the health care system. While progress around clinical trial inclusion is still needed, life sciences leaders should also recognize other areas where they can lead ecosystem collaborations. Scrutinizing the use of race-based corrections is an emerging opportunity for life sciences to support the delivery of evidence-based care for all patients.

Health care inequities are longstanding, and the life sciences industry has addressed this by continually improving the design and deployment of clinical products, including clinical trials representative of the patient population. These changes are intended to help physicians and patients truly understand the risks and benefits involved with their treatment options.

Despite a focus on clinical trials, the majority of U.S. trials in ClinicalTrials.gov over the past two decades didn't report race/ethnicity enrollment data, and minorities were underrepresented compared to U.S. demographic levels in trials with modest improvement over time. Grouped by disease state, most clinical trials failed to hit representative demographic metrics, which is a useful benchmark, even though it doesn't capture disease burden distribution by ethnic groups. To help address this, the FDA recently issued draft guidance clarifying the requirements for Diversity Action Plans (DAPs), including what clinical studies require them, and how and when they should be submitted to the agency.

Clinical trials in some disease areas, like hematology and infectious disease, are hitting their diversity and representation targets – but others have a long way to go. Leaders must understand that demographic representation of the broader population cannot be the ideal standard, though. There are many conditions where minority groups are overrepresented in terms of disease burden and clinical trials. Real-world data assets will need to account for these types of variations in the quest to deliver necessary clinical insight.

> "Data is the foundation of equitable medicine – we don't know what we don't measure. But current data collection practices often rely on race-based corrections, potentially furthering racial bias. Life sciences organizations need to innovate around access and data sharing with ecosystem partners to accelerate the discovery of solutions for individual patients."
>
> **Amanda Okaka, MPH**
> Research Consultant, Life Sciences, Pharmacy and Diagnostics. Advisory Board

Life sciences firms can also lead in the reevaluation of widely used race-based corrections in health care. This insertion of race was intended to adjust or "correct" outputs or measurements of certain conditions/biological functions on the basis of a patient's race/ethnicity. Unfortunately, many of these corrections – based on racial biases and not evidence – don't support their widespread use. These corrections have serious implications for patient care since physicians use these algorithms to individualize risk assessment and guide clinical decisions.

In health technology, these corrections propagate biases through the proliferation of AI and ML algorithms that are operating on and learning from this biased data. This problem is worth recognizing; we've seen major institutions and clinical guideline governing bodies eliminate these corrections from their systems in the past couple of years.

For example, the estimated glomerular filtration rate (eGFR) correction for Black people overestimated kidney function of Black candidates awaiting transplant. This resulted in Black candidates dying or becoming very ill waiting to be placed on the United Network for Organ Sharing (UNOS) list. In January 2023, UNOS decided that this correction should no longer be included in decision-making for transplant programs and these programs were given a year to update their systems.

All health care professionals must work to urgently address and advocate for policies that address structural inequalities and systemic racism in the industry, including supporting policies that promote equity in research and genetic testing. Life sciences organizations can invest in research to better understand genetic and biological variations among different racial and ethnic groups, while also entering in partnerships that update guidelines to remove harmful corrections.

The unintended consequences of race-based corrections

Measurement	How race is used	Consequences
 **Estimated Glomerular Filtration Rate (eGFR) in renal function**	Race is used as a multiplier, also known as African American coefficient, of 1.16–1.21 (depending on method used) for Black patients because they are presumed to have more muscle mass and a faster creating generation rate compared to white patients.	Black patients may get delayed dialysis and transplant referrals. Researchers at Brigham and Women's Hospital and the University of Pennsylvania found that 1 in 3 patients would have to be reclassed if the race-correction was removed from the equation. eGFR and its calculation is significant for kidney disease diagnosis and management.
 **Pulmonary function test (PFT) for lung function**	Reference values for "normal" FEV 1[1] and FVC[2] are lower for Black patients. Black patients are assumed to have lower lung capacity although there is no biological basis for this correction.	Black patients can potentially be misdiagnosed or underdiagnosed, and experience difficulty getting treatment for pulmonary diseases such as emphysema. Alexander Moffett, MD, and colleagues at the University of Pennsylvania Perelman School of Medicine, found that removing race correction led to an increase of 20.8% in the percentage of patients with any pulmonary defect.
 **Atherosclerotic cardiovascular disease (ASCVD) risk estimation**	Equations used to estimate ASCVD risk are race-specific based on data from the ASCVD Pooled Cohort that were validated among White and Black men and women. Adequate data on Hispanic and Asian people were not collected.	The risk for ASCVD events is higher for Black patients when compared to patients of other races with otherwise equal risk burden. The equations have been found to both over and under-estimate risk and do not account for multi-racial individuals. Researchers report differences in absolute cardiovascular disease risk in Black versus White individuals to be as large as 22.8%. Differences in ASCVD estimates are clinically meaningful and impact clinical decision-making as observed in differential treatment decisions where Black patients are less likely to be prescribed statins compared to Whites.
 **Vaginal birth after cesarean (VBAC) success and risk**	Equation used to calculate likelihood of successful labor for a vaginal delivery after a C-section in a prior pregnancy incorporates race based on two yes/no questions: "African-American?", "Hispanic?"	VBAC scores are lower for African-American and Hispanic patients, indicating lower chance of success if trial of labor is undertaken after primary c-sections. As a result, Black and Hispanic patients are deterred from attempting vaginal birth after cesarean.

Source: Advisory Board

Implications for life sciences

Race-based corrections affect patient journeys and outcomes in subtle and obvious ways alike. Addressing these issues allows life sciences leaders to pair the long-term impact of their clinical trial initiatives with efforts likely to pay dividends for patients in the near-term.

Manufacturers can also work with leading clinicians, societies and other stakeholders to identify the prevalence and effect of these corrections on patients. A coalition recently worked to change guidelines around the use of race-based corrections in kidney care. Beyond the tangible influence on patient care, partnerships like this can foster trust and shared understanding to support other initiatives to drive equitable care.

In the long term, manufacturers can pair this awareness of race-based corrections with initiatives focused on clinical trials. More inclusive trials, especially trials gathering genetic information, can make treatment decisions more accurate. With a scientifically rooted understanding of the differential effect of products and how diseases do or do not manifest based on sociodemographic factors, clinicians can tackle the difficult but worthwhile work of revisiting long-held assumptions about patients and clinical practice.

Questions to guide your strategy:

- How widespread is the use of race-based corrections in the conditions in which we focus and what effect does it have on patient outcomes?
- Which other stakeholders can we partner with to improve clinical guidelines and patient care?
- How do we make sure our organization is learning from initiatives to improve health equity?
- How might this biased data be impacting other elements of our business and products?
- What other long-standing assumptions about treatment decisions should we question?

Elevating the role of the patient voice

Incorporating the patient voice in a meaningful way remains an elusive goal in health care. Moving the needle on patient-reported outcomes (PROs) may require a renewed effort from health care ecosystem leaders to make them more meaningful to all stakeholders. PRO measures can help leaders navigate the new health care dynamics and the broader shift to bespoke, predictive care. They also provide a more complete look at the patient experience when incorporated in real-world studies.

PROs can capture the most meaningful and significant aspects of health and illness for patients. They provide the direct reports of patients' health conditions, offering insights into quality of life, symptom burden and functional status. These insights elude measurement when the focus is on clinical indicators and medical endpoints alone.

Efforts to determine how and when patient-generated data should inform health care delivery, policy and medical decision-making should be part of any strategic planning exercise. Approaches like shared decision-making, patient-focused drug development and value-based care are all predicated on the need to move beyond standardized, one-size-fits-all models to more collaborative and tailored approaches.

The strategic advantages PROs offer remain untapped. Sample use cases include:

- Product differentiation and enhanced market access through the greater understanding of toxicity and tolerability
- Product labeling and treatment indications
- Improved adherence
- Alignment of treatments with patient goals
- Quality of life improvements

There are more methods for capturing these data than ever before thanks to recent technological advancements. Patients can complete PRO surveys using a computer or mobile device, in clinic or remotely, and with greater frequency. Moreover, data can now be transmitted directly to the electronic medical record (EMR), where it can be analyzed and entered into the patient's chart and made available to patients and providers in near real-time.

But challenges remain in the interpretation and use of PROs in routine care and monitoring. These challenges will likely require cross-stakeholder partnerships, development of reporting guidelines and clinician training on the meaningful use of such measures in conjunction with traditional clinical endpoints.

In addition, nuances are frequently left out in industry conversations about patient voice. Three terms in particular — patient-reported outcomes, patient-centered outcomes, and patient-generated data — are frequently used interchangeably. In discussions about patient voice, especially involving stakeholders from different industry segments, it is critical to clarify language to avoid misinterpretation and to find common ground.

Although PROs can be a valuable source of data, it's important to remember that, just because a patient reports an outcome, doesn't necessarily mean it's patient centered. Outcomes are only patient centered if they measure the concepts patients care about, if they're intuitive and not burdensome to report and if they're used to inform care in a way that matters to them.

Implications for life sciences

As the shift toward "bespoke care" continues, integrating PROs will be increasingly fundamental to claims of quality, value, and treatment success and effectiveness. It is no longer sufficient to focus on efficacy and safety alone. Understanding patient expectations and aligning services with patient-defined needs and value will be crucial. Successful transition to this new landscape will require life sciences companies to develop strategies incorporating PROs into clinical care, product development, clinical trials, and value-based reimbursement models.

Advancements in medical science have transformed some conditions from life-limiting to chronic, now manageable over a full lifetime. This means that our model of measuring health care quality must also change, from a model that focuses on evaluating short-term safety and efficacy to a more holistic approach. We must add in additional measures, such as functional status, quality of life, patient preference, and other subjective dimensions of health and well-being.

50%

The percent of adverse events that patients experienced in clinical trials and reported to providers, but are either underreported, or not reported at all by the clinician.[3]

Historically, decision makers, including researchers and policy makers, often looked at claims and EHRs when evaluating for outcomes. Much of a patient's experience happens outside of the exam room, and a health care provider may be limited on the time needed to fully capture a more complete history. While EHRs are valuable, the provider perspective doesn't offer a complete picture of the patient experience. In many cases, PROs capture information that only the patient can provide such as pain levels, nausea, fatigue or depression – and quantifies the information so it can be measured over time.

Collecting PRO data in a consistent way can support a range of important goals. They can provide nuanced insight about the effect of treatments, beyond safety and efficacy. They can serve as a predictor of adherence and outcomes. And they can even help prevent unnecessary utilization by flagging not just when medical intervention is necessary, but also when it's not necessary.

Research shows that clinical integration of PROs improves treatment decision-making, patient-provider communication, satisfaction with care and even presents survival benefits. This alignment is essential for product differentiation and market access, as payers increasingly demand evidence of real-world patient benefits in value assessments and evaluation of treatment effectiveness.

To access the benefits of PROs, stakeholders will need to invest in technologies that facilitate the efficient collection and analysis of PROs remotely and in this clinic setting. Achieving this goal will require collaboration between health care providers, patients and technology partners to develop user-centered design PRO principles that seamlessly integrate into the health care ecosystem.

"A lot of what we measure are things that aren't actually important to the patient. The challenge is we don't always have the tools to measure the things that do matter to patients."

–Patient advocacy leader

Questions to guide your strategy:

- When patients stop taking a medication, do you know why? Is it access, providers not giving enough information, side effects or cost?
- Depending on the research question, who do you want to talk to? Should the provider's voice be included?
- What questions can assess a patient's quality of life while taking a medication? How do we find the reasons a patient may stop a medication, but not want to share with a provider?
- If patients designed your marketing strategy, what would they focus on? What would they say is the greatest benefit of your treatment?

How patient voice can and should play a role in health care[4]

Incorporating patient-outcomes

Outcomes measurement

- Outcomes captured are the ones that matter to patients – including financial, caregiver impact and other domains
- Outcome measurement tools are intuitive and not burdensome
- Outcomes are more accurate because they don't rely on clinician interpretation alone

Treatment management

- Patient-reported, patient-centered outcomes are used as the basis for symptom and side effect monitoring, care plan adaptations and medical intervention
- Well-defined patient-centered outcomes support clear, consistent communication between patient and provider (and patient and health plan)

Quality performance

- Providers' quality and performance measurement includes patient-centered outcomes (e.g. quality-of-life measure, not just survival or adverse events)
- Patient-centered outcomes guide providers' support services and other programmatic offerings

Value analysis

- Patient preferences and patient-centered outcomes are incorporated into value analysis, utilization management, reimbursement and coverage decisions and outcomes-based contracts
- Medical evidence from patient-centered outcomes informs clinical guidelines and pathways

Source: Advisory Board

How patient voice can and should play a role in health care[4]

Collaborating with patients

Treatment development

- Patient-centered understanding of unmet need helps prioritize treatment development opportunities (including label expansion)
- Manufacturers ensure treatments are designed with patient preferences in mind (e.g. formulation side effects)

Clinical trials

- Trial design and operations are developed with patient convenience, access and equity in mind
- Data collection mechanisms are patient-centered (e.g. collect blood pressure from a wearable rather than having patients visit a trial site)

Point of care decisions

- Patient-defined treatment goals are captured and incorporated into treatment plans
- Decision making is shared between provider, patient and patient's family
- Patient-centered evidence helps patients weigh tradeoffs across various treatment options

Source: Advisory Board

Optum

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Notes:

1. Forced expiratory volume = maximum amount of air a person can forcibly exhale in one second.
2. Forced vital capacity = after breathing in deeply, the maximum amount forcibly exhaled.
3. Di Maio M, Gallo C, Leighl NB, et al. Symptomatic toxicities experienced during anticancer treatment: agreement between patient and physician reporting in three randomized trials. *J Clin Oncol.* 2015; 33:910-15.
4. Advisory Board. Internal analysis. 2024.

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