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# 10 Practical Takeaways From FDA's Biopharma AI Guidance

By **Joe Franklin, Olivia Dworkin and Sarah Cowlishaw** (March 21, 2025, 6:26 PM EDT)


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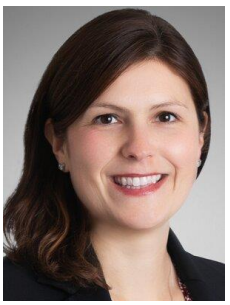
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An increasing number of regulatory submissions made to the U.S. Food and Drug Administration by drug and biological product manufacturers have included artificial intelligence elements.

Yet until very recently, biopharma companies and AI developers building tools for the life sciences sector have had limited direction from the FDA on its expectations for AI models used in drug development, during clinical trials, or as part of other aspects of the highly regulated drug life cycle.

This changed in January when the FDA finally released its first guidance document focused on the use of AI by biopharma.[1]

The draft guidance focuses on a discrete but critical FDA issue: For a biopharma company that wishes to use an AI model to produce information to support regulatory decision-making regarding safety, effectiveness or quality for drugs, how should the company determine whether the AI model is adequate for a specific use?

According to the FDA, this regulatory assessment is crucial because of the unique challenges posed by AI, including due to the complexity of some AI models, the potential for bias and uncertainty about the accuracy of an AI model's output.

Drawing from a similar approach that the FDA has applied in the regulated medical device context, the draft guidance proposes a risk-based framework for assessing the risk and credibility of AI models used in the drug life cycle.

Below, we address 10 practical implications for biopharma companies and AI developers.

**1. What is the scope of regulatory decision-making covered by the draft guidance?**

The broad definition of "regulatory decision-making" used by the FDA in the draft guidance includes both regulatory determinations made by the agency itself, and "actions taken by sponsors and other interested parties in conformance with FDA's regulatory authority."

The FDA emphasizes that the concepts in the draft guidance apply not only to uses of AI to produce

information for regulatory submissions, but also in the context of FDA-regulated activities for which biopharma sponsors maintain documentation that is made available to the FDA upon request, such as during an inspection by the FDA.

In other words, the FDA's draft guidance covers a broad set of AI-informed decisions throughout various phases of the drug life cycle, from AI uses in drug development, such as nonclinical and clinical studies, to AI uses in manufacturing and in the post-market phase, such as post-marketing pharmacovigilance.

**2. Which specific AI use cases will be reviewed by the FDA, and how might the draft guidance inform regulatory planning?**

From a compliance perspective, a threshold question for a specific AI use case is whether the FDA will expect to review AI model assessment results and documentation, either as part of a regulatory submission or during an FDA inspection.

The draft guidance does not directly address this question. What the draft guidance does provide is a description of which uses of AI models are within the scope of the recommendations in the draft guidance and which uses are not.

The recommendations in the draft guidance apply to AI uses "in the drug product life cycle, where the specific use of the AI model is to produce information or data to support regulatory decision-making regarding safety, effectiveness, or quality, for drugs."

Conversely, the recommendations do not apply to uses of AI models (1) in drug discovery or (2) "when used for operational efficiencies ... that do not impact patient safety, drug quality, or the reliability of results from a nonclinical or clinical study."

While the draft guidance leaves open some meaningful questions about which uses of AI will, or will not, be reviewed by the FDA, it's focus on regulatory decision-making echoes an approach taken by the FDA in other guidance over the past few years, including in the real-world evidence context.[2]

Biopharma companies would be prudent to consider updating their AI governance or regulatory planning checklists to include a step that evaluates whether any regulatory decision-making, as defined in the draft guidance, will be informed by a proposed AI use.

**3. What factors will inform the AI model risk assessment?**

A central question when applying the FDA's credibility framework is whether the evidence to support a specific use of AI is sufficient, taking into account the model risk.

The FDA states that model risk incorporates two factors: (1) model influence, which weighs the contribution of the model output relative to other sources of information; and (2) decision consequence, which weighs the significance of an adverse outcome resulting from an incorrect decision.

The draft guidance emphasizes in several places that the credibility framework activities should be commensurate with model risk, so biopharma companies should have some flexibility in their approach.

**4. For a use of an AI model that is within the scope of the draft guidance, what assessments and other documentation may be necessary for regulatory submissions or an inspection by the FDA?**

The draft guidance provides many details about the proposed contents of the documentation that should be produced under the FDA's credibility framework, including: (1) a description of the model, including model architecture and parameters; (2) the data used to develop the model, including information about the reliability and relevance of training and tuning data; (3) the process of training the model; and (4) the model evaluation process.

Biopharma companies who are not already using a similar framework to evaluate certain AI models may need to consider updating current model assessment methods and the associated documentation for FDA review.

**5. Will life cycle maintenance be needed?**

Whether and the extent to which an AI model requires "life cycle maintenance" — defined in the draft guidance as the management of changes to AI models to ensure the model remains fit for use over the drug product life cycle for its context of use — should be included on the regulatory checklist for AI deployment.

For uses of AI to support regulatory decision-making that "extend[] over the drug product life cycle," such as the application of AI modeling in pharmaceutical manufacturing, the draft guidance emphasizes that "life cycle maintenance of the credibility of AI model outputs is critical."

Additionally, if the use of the AI model — or aspects of the AI model itself — changes over time, this may necessitate reexecution of the model assessment.

The draft guidance recommends including detailed plans about life cycle maintenance in a manufacturing site's pharmaceutical quality system, with a summary included in the marketing application. Other regulatory tools may be available to support life cycle maintenance, including post-approval change management plans.

**6. What are the implications for AI tool acquisition and contracting?**

Biopharma companies often use AI models from third-party developers rather than developing AI in-house. Even though this approach is prevalent in the life sciences sector, the draft guidance does not speak to it directly.

However, companies still will need to consider what information about a third-party model they will need to have access to for any future regulatory submissions, and whether the biopharma company may need to collaborate with the third-party AI developer to perform model assessments.

Because these questions should be considered at the transaction stage, companies should ensure that regulatory planning and contracting workstreams are coordinated.

The draft guidance does not address the use of a mechanism, similar to a drug master file, that would allow an AI developer to submit confidential information about a model to the FDA and authorize a biopharma applicant to reference the information in a drug submission.

However, the FDA has explored the use of model master files in certain contexts, and the use of a master file mechanism may be an important topic for biopharma applicants or AI developers to discuss

with the FDA.

**7. What about emerging technologies?**

Despite the prevalence of large language models and generative AI, the draft guidance does not provide specific recommendations for these technologies.

The draft guidance also does not address how a biopharma company should approach the credibility framework when using third-party foundation models, which often are trained on general datasets and not developed for specific conditions of use.

Biopharma companies or AI developers may want to engage with the FDA if they have questions about how to incorporate these technologies into drug development, pharmacovigilance or other parts of the drug life cycle.

**8. What is the optimal strategy for engaging with the FDA for feedback on model use?**

The draft guidance encourages biopharma companies to engage early with the FDA on questions about AI and provides a list of existing engagement options.

Companies will want to review these options closely, given the many questions that may arise during the development of a credibility assessment plan.

Although the FDA has provided an overview of engagement opportunities related to AI in drug development before, including at an August 2024 workshop sponsored by the agency on the use of AI in drug and biological product development, the list in the draft guidance provides more detail and underscores the many different groups at the FDA that may weigh in on a planned use of AI in the drug life cycle, depending on the use case.

Notably, the draft guidance acknowledges that some AI may be deployed in parts of the drug life cycle, such as post-marketing pharmacovigilance, that lack a clear option for meeting with the FDA to discuss the agency's expectations.

The FDA states that "[i]n such cases, sponsors may choose to complete all of the steps outlined in the guidance without seeking early engagement with the Agency," but that biopharma company sponsors remain responsible for complying with statutory and regulatory requirements.

**9. How does the FDA's approach align with other regulatory bodies?**

The draft guidance is comparable in many respects to the approach taken by the European Medicines Agency in the EU, particularly the EMA's reflection paper on the use of AI in the medicinal product life cycle, which was finalized in September 2024.[3]

EMA, along with the Heads of Medicines Agencies, which represents the medicines regulatory authorities across the European Economic Area, also published an AI work plan in December 2023, covering the period through 2028, to embrace the opportunities of AI across the life sciences sector.[4]

Outside of the EU, the FDA under the Biden administration collaborated with international regulators such as Health Canada and the U.K. Medicines and Healthcare products Regulatory Agency on guiding

principles for AI-enabled medical devices.

It remains to be seen whether the agency will consider global harmonization for AI in the drug sector as well, and where international collaboration on AI issues will rank among other priorities for FDA under the Trump administration.

**10. How should the draft guidance inform an organization's regulatory planning activities or AI governance?**

It is not yet clear when the draft guidance will be finalized, particularly given the changes taking place at the FDA and across the federal government. If finalized, the FDA may make changes in response to feedback received on the public docket or any shifts in new administration priorities.

It is conceivable that the FDA under the Trump administration may modify the approach taken in this AI policy, which was issued in the waning days of the previous administration.

However, in the absence of any new information about the future of the draft guidance, it provides the best indication of the FDA's current review expectations for uses of AI in the drug life cycle.

Moving forward, it is reasonable to expect that the analysis of whether an AI use informs regulatory decision-making will be an important checkpoint in the regulatory planning process.

Biopharma companies and AI developers can confirm that they have processes in place to evaluate whether a specific use of AI might trigger FDA review expectations and, if so, plan the appropriate assessments and documentation.

Additionally, the agency flagged two other areas — cybersecurity and human subjects protections — that, while outside the scope of the draft guidance, should be considered when developing or deploying AI modeling in the drug product life cycle.

Incorporating these regulatory questions into an organization's AI governance process may be a way to streamline and coordinate reviews of AI use cases by different internal functions, including privacy and intellectual property.

The FDA is seeking feedback on the draft guidance through a public docket, which is open for comments until April 7.

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[1] FDA, Considerations for the Use of Artificial Intelligence to Support Regulatory Decision-Making for Drug and Biological Products: Draft Guidance for Industry and Other Interested Parties (Jan. 2025), available at https://www.fda.gov/media/184830/download.

[2] See, e.g., FDA, Considerations for the Use of Real-World Data and Real-World Evidence To Support Regulatory Decision-Making for Drug and Biological Products: Guidance for Industry (Aug. 2023), available at https://www.fda.gov/media/171667/download.

[3] EMA, Reflection paper on the use of Artificial Intelligence (AI) in the medicinal product lifecycle (Sep. 2024), available at https://www.ema.europa.eu/en/documents/scientific-guideline/reflection-paper-use-artificial-intelligence-ai-medicinal-product-lifecycle_en.pdf.

[4] EMA, Artificial intelligence workplan to guide use of AI in medicines regulation (Dec. 2023), available at https://www.ema.europa.eu/en/news/artificial-intelligence-workplan-guide-use-ai-medicines-regulation.