



INTUITIONLABS / RESEARCH & PRACTICAL GUIDANCE

Pharma AI Upskilling: Workforce Training Strategies

Build practical AI for pharma and biotech with IntuitionLabs. We help life-science teams turn complex information and workflows into useful software, governed knowledge systems and AI tools.

Published by IntuitionLabs · 2026-02-25 · pharmaceutical ai · workforce upskilling · pharma skills gap · generative ai training · drug discovery · digital transformation · regulatory compliance · machine learning education

Original article: <https://intuitionlabs.ai/articles/pharma-ai-training-upskilling-strategies>



In this article

1. Executive Summary
 2. Introduction and Background
 3. The Imperative for AI Upskilling in Pharma
 4. Assessing the AI Skills Gap in Pharma
 5. AI Training Strategies and Educational Programs
 6. Curriculum and Competencies for Pharma AI Training
 7. Case Studies: Real-World Upskilling Initiatives
 8. Outcomes and Impact Analysis
 9. Future Directions and Recommendations
 10. Discussion and Future Implications
 11. Conclusion
-

Executive Summary

The pharmaceutical industry is undergoing a **transformative AI revolution** that is reshaping drug discovery, development, manufacturing, and commercial operations. Realizing its potential depends on having a workforce with the right skills. Training should combine basic AI literacy, role-specific practice, responsible use, and assessment of performance in approved workflows.

This report provides an in-depth analysis of **AI training and upskilling strategies in the pharmaceutical sector**. It covers digitalization, workforce skills, training modalities such as bootcamps, AI simulators and micro-credentials, and the regulatory landscape. The company examples distinguish training participation, platform usage, future completion targets, and vendor-reported learning outcomes. For one dated participation snapshot, AstraZeneca reported more than **12,000 employees** in its AI programme on 11 April 2025 ([AstraZeneca](#)). Later company updates and the limits of the evidence are discussed in the case studies.

Finally, the report discusses the implications of AI upskilling: its impact on productivity, quality, and innovation in pharma, as well as future trends. **Key recommendations** are highlighted, such as establishing cross-functional AI training standards, integrating AI ethics into curricula, and measuring ROI of training investments. By presenting comprehensive data, diverse perspectives, and actionable insights, this guide equips pharmaceutical leaders and learning & development professionals with the knowledge needed to build an *AI-ready* workforce and maintain a competitive edge in the rapidly evolving industry.

Introduction and Background

The AI Opportunity in Pharma

Artificial intelligence (AI) is poised to **dramatically accelerate pharmaceutical innovation**. AI and machine learning (ML) technologies are being applied across the drug value chain – from target identification and lead optimization to clinical trial design, manufacturing optimization, supply chain management, and personalized medicine. For example, advanced AI tools like DeepMind’s AlphaFold have revolutionized protein structure

prediction (unlocking new drug targets), and generative models (e.g. for molecule design or synthesizing medical literature) are rapidly maturing. Strategy& models an additional **US\$254 billion in annual operating profit worldwide by 2030**, assuming a high degree of industrialization of AI use cases across pharma (Strategy&). This is a conditional projection, rather than a measured result from workforce training.

However, these gains will only materialize if the workforce is prepared to leverage new AI tools. In practice, most pharmaceutical employees (scientists, clinicians, quality engineers, marketers, etc.) have little formal training in data science or AI. Many have never written code or used machine-learning systems, and their traditional education and job roles did not include such competencies. Industry analyses repeatedly identify a **skills gap**: current pharma workforces generally lack the data literacy and algorithmic understanding needed to safely and effectively use AI in practice (intuitionlabs.ai) (www.linkedin.com). The dated survey evidence and its respondent populations are set out in the skills-assessment section below.

This mismatch (“AI skills gap”) is already causing concern at the highest levels of pharma leadership. A recent survey by Define Ventures found that **70%** of pharmaceutical executives regard AI as an “immediate priority,” and **85%** of leaders at top 20 pharma firms agree, with **80%+** of companies increasing their AI budgets (www.fiercepharma.com). At the same time, many leaders worry about the consequences of workforce complacency. A PwC report noted that globally **37%** of respondents fear automation will put jobs at risk by 2030, even though a larger share (74%) say they are willing to retrain for future roles (www.pwc.com). As one executive put it, “AI won’t replace people; people who know AI will replace people” (www.linkedin.com). In this high-stakes environment – where regulatory pressures and global competition are intensifying – failure to upgrade employee skills quickly could mean falling behind.

Historical Context: Digital Transformation in Pharma

The pharmaceutical industry has a long history of adopting new technologies (e.g. high-throughput screening, genomics, big data analytics). In recent years, “Pharma 4.0” initiatives have pushed toward digitalization of manufacturing, quality, and supply chain (analogous to Industry 4.0 concepts). However, AI represents a more radical shift. Early AI in pharma consisted of computational chemistry algorithms and rule-based expert systems, but modern *deep learning* and *generative* techniques are far more powerful and general-purpose. Breakthroughs like DeepMind’s AlphaFold (2021) have shown AI’s potential to solve fundamental problems (protein folding). Commercially, AI adoption accelerated around 2018–2020, with initial use cases in target discovery and image analysis. According to FDA data, **AI usage in drug development and regulatory submissions “has exponentially increased”** since 2016 (www.fda.gov). By now, numerous large pharma companies (J&J, Roche, Merck, Novartis, etc.) report active AI initiatives, and even startups leverage ML from day one.

That said, **education and training have lagged behind technology**. Traditional pharma training programs focus on regulatory SOPs, safe laboratory practices, and established quality standards (www.pharmaceuticalonline.com). These programs typically assume manual processes rather than data-driven automation. Consequently, many employees, even at major companies, have had little exposure to AI concepts. This gap is why there is now a “training imperative” across the industry – to rapidly build internal capability. Modern regulatory bodies are also responding: the FDA’s January 2025 draft guidance proposes a risk-based credibility assessment framework for AI models in a particular context of use; it remains a draft with

non-binding recommendations ([FDA](#)), and the European Medicines Agency provides material on AI in medicines development (www.ema.europa.eu). These signal that companies must train employees not only in technical use of AI, but also in compliance and quality aspects of AI systems.

The remainder of this report delves deeply into **how to implement effective AI upskilling** in the pharma context. It reviews the current state (with hard data), explores educational strategies, showcases case studies, and looks ahead to future needs.

The Imperative for AI Upskilling in Pharma

Drivers of the Upskilling Imperative

Pharmaceutical companies face **unprecedented pressure** to harness AI. Operations that used to take months or years (compound screening, quantitative modeling) can now be accelerated by ML algorithms. Clinical trial design, patient selection, and even regulatory document preparation can be aided or largely automated by AI ([dailythebusiness.com](#)) ([dailythebusiness.com](#)). Many top-performing companies report tangible benefits: for example, Recordati (an Italian pharma) applied an AI analytics platform in manufacturing and achieved a **1.5% yield increase** and **2% reduction in cost of goods** (COGS) in just three months ([ispe.org](#)). Takeda has begun using generative AI tools to streamline global quality investigations (e.g. using Monte Carlo simulations in root cause analysis) ([ispe.org](#)). Modelled opportunities include the following: a PwC study found that industrializing AI use cases could **double operating profit** for pharma firms (www.strategyand.pwc.com).

Yet this potential will not be realized if employees cannot use the technology. Many stakeholders recognize this. The Define Ventures survey noted that as AI budgets rise (>80% of firms reporting increased spend (www.fiercepharma.com)), companies are shifting from “hope teams figure it out” to actively training staff. Johnson & Johnson CIO Jim Swanson has stated: “We had to really create a curriculum and a mindset around upskilling” to use AI effectively ([dailythebusiness.com](#)). Similarly, AstraZeneca executives have emphasized that AI is a collaborative tool requiring “awareness and readiness” training so employees feel equipped to experiment with emerging tools responsibly (www.astrazeneca.com).

Use the dated surveys in the skills-assessment section as inputs to an internal needs assessment. Leaders should identify which roles need AI literacy, which require technical expertise, and where training must address the company’s approved workflows and controls.

Consequences of Inaction

The **cost of falling behind** can be severe. A Vivanti whitepaper warns that if a company’s workforce remains unprepared while competitors leverage AI, it risks losing market share, slowing innovation, and eroding profitability (vivanti.eu). In practical terms, this could mean slower time-to-market for new drugs (when AI could otherwise shorten discovery timelines by testing hypotheses (www.biosciencetoday.co.uk), or missed revenue from inefficient sales and marketing (when gen-AI tools could help reps cover more physicians with personalized virtual visits).

Regulatory training should distinguish applicable legal requirements from proposed recommendations. The FDA’s January 2025 AI guidance remains a **draft, not for implementation, with non-binding recommendations** ([FDA](#)). Its proposed credibility assessment is specific to an AI model’s context of use.

Teams should learn to review outputs, document decisions, and escalate questions to quality and regulatory specialists; a general training-ROI percentage should not substitute for evidence from the workflow being assessed.

Collectively, these factors create a “**training imperative**” in pharma: to harness AI’s benefits, companies must **accelerate workforce development**. As one expert summarized, “To seize the opportunities, we will need to upskill our workforce to a generational level” ([dailythebusiness.com](https://www.dailythebusiness.com)). The following sections explore how to do exactly that.

Assessing the AI Skills Gap in Pharma

Scope of the Skills Gap

Pharmaceutical organizations employ a diverse array of roles – bench scientists, clinical researchers, data scientists, IT professionals, regulatory affairs specialists, quality assurance (QA) personnel, commercial teams, etc. Nearly every role is being touched by AI, but the required competencies vary widely. A core issue is that **traditional education and training for most pharma staff did not cover AI or data science**. For example, a quality engineer trained on manufacturing processes may have augmented reality (AR) or predictive analytics tools newly introduced on the factory floor, without prior background in data modeling. A clinical-trials manager may now encounter AI-driven patient matching algorithms when selecting sites. Unless personnel are taught to understand these tools, they cannot use them effectively or safely.

In practice, many firms report concrete skill deficits. A survey cited by IntuitionLabs found that **biologists and chemists often lack data science training, while data scientists lack domain knowledge** (intuitionlabs.ai). A LinkedIn report on “AI-ready” pharma workforce notes the new skill is “*AI fluency*” – the ability to understand and question AI outputs – rather than full data-science expertise for everyone (www.linkedin.com). However, reaching fluency requires foundational understanding of concepts like machine learning, model bias, and data quality, on top of life-science knowledge. Without systematic training, there is a clear risk of misinterpretation: e.g. a chemist overtrusting an ML-predicted compound, or a quality manager misreading an AI-generated batch anomaly.

The talent crunch is intensified by workforce trends. Many pharma workers are approaching retirement, leading to a loss of institutional knowledge. Industry analysts note that **mass retirements and L&D budget cuts have deepened the skills gap** (www.pharmamanufacturing.com). Meanwhile, demand for AI talent far exceeds supply. Pharma competes with tech and finance for machine-learning engineers, pushing salaries up. Rather than hire exclusively new talent, most companies realize they must **reskill existing staff** who already know the pharma context. Hence the focus on internal training programs.

Quantifying the Gap through Surveys and Studies

Survey findings are useful when their dates, populations and subject matter remain visible:

- **Historical AI/ML evidence:** Pistoia Alliance’s May 2019 release reported that **44%** of respondents identified lack of skills as a barrier to AI/ML adoption. The research involved **190 webinar respondents from the US and Europe**, surveyed between **October 2018 and February 2019** ([Pistoia Alliance](https://pistoiaalliance.org)). This

is a historical respondent result, rather than an estimate of the current pharmaceutical workforce.

- **Broader digital-transformation evidence:** GlobalData's 15 November 2024 release reported that **49%** selected lack of specific skills and talents as the top hindrance to digital transformation. Its survey involved **109 pharmaceutical industry professionals**, fielded from **15 August to 11 October 2024** (GlobalData). The question concerned digital transformation generally; it did not measure AI proficiency across the entire workforce.

Use these findings to frame questions for a company assessment. Establish a baseline for each role through practical tasks, knowledge checks and review of approved-tool use. Do not infer a current industry-wide AI capability percentage from these different surveys.

These dated surveys identify barriers reported by their respondents. An organization should establish its own role-specific training needs before selecting a curriculum.

AI Training Strategies and Educational Programs

Pharmaceutical firms are deploying a mix of approaches to upskill employees. Broadly, strategies fall into four categories: **internal training programs, partnerships with educational providers, experiential projects, and AI-enabled learning tools**. The most effective training initiatives combine these elements.

Internal Corporate Training Initiatives

Company-wide programmes should provide a foundation in responsible AI use and role-specific pathways. Two documented examples illustrate different scopes:

- **AstraZeneca:** On 11 April 2025, the company reported more than **12,000 participants** in its AI upskilling programme, achieving Bronze, Silver and Gold certifications (AstraZeneca). The later participation update appears in the case study below.
- **Novartis:** Coursera's November 2019 announcement documents a partnership launched that September to make its course catalogue available across Novartis's workforce (Coursera). Separately, Novartis US announced on **16 September 2026** that approximately **6,000 employees were expected to complete the initial level by year-end** (Novartis). This is a US completion target, not a verified global count of completed learners.

The Johnson & Johnson, Merck and Lilly case studies below distinguish reported training activity, tool usage and planned certification requirements.

Industry associations also contribute: for instance, the Pistoia Alliance (a pharma consortium) is offering an **online AI/ML certificate program** in 2025, covering drug discovery use cases with expert speakers from academia and companies (pistoiaalliance.org). Such programs help set a baseline of common knowledge across the industry.

The following is a recommended implementation sequence, rather than a table of claimed company outcomes:

Stage	Accountable owner	Assessment criterion	Outcome measure
Map roles and workflows	Business lead with L&D	Identify approved use cases and skill gaps for each role	Baseline task quality and completion time
Teach responsible-use fundamentals	L&D with privacy, security and quality teams	Demonstrate safe data handling, output checking and escalation	Knowledge retention and policy-compliant tool use
Practise role-specific tasks	Functional lead with subject experts	Complete a reviewed task using approved materials and tools	Time to competency, accuracy and rework
Evaluate a controlled pilot	Business lead with quality and finance	Compare results with a documented baseline and account for other changes	Cycle time, error rate and cost of delivery
Refresh and reassess	L&D with regulatory and tool owners	Update training when policies or tools change	Sustained competency and unresolved training needs

Formal Training & Certifications

In addition to internal programs, many firms encourage formal education routes:

- **Certificate Programs:** Select courses or credentials that match the role and the tools used at work. An exact credential to evaluate for technical ML roles is **AWS Certified Machine Learning Engineer – Associate**, which validates implementation and operationalization of ML workloads ([AWS](#)). Studying TensorFlow remains distinct from earning its certificate: TensorFlow’s official page states that its certificate exam is closed ([TensorFlow](#)). Review the current exam version and language availability before enrolling staff.
- **Vendor-led Training:** Many AI software vendors partner with pharma clients to provide training on their tools. For instance, when a company invests in an AI platform (e.g. a clinical trial analytics suite), the vendor will often deliver a training curriculum. These are usually technical and role-specific (e.g. “How to use X AI platform for predictive analytics in manufacturing”). Pharmaceutical training departments coordinate with vendors so that employees receive hands-on instruction.
- **Academic Partnerships:** Consider working with an educational provider on a curriculum for the organization’s actual workflows. Options include executive education, technical coursework and co-designed practical projects. Verify the provider, syllabus, assessment and availability before presenting a partnership as a company example.

Experiential and On-the-Job Learning

Beyond formal courses, experiential learning plays a key role. AI concepts are often best learned by doing:

- **AI Pilot Projects:** Companies encourage interested employees to participate in cross-functional AI pilot teams. For example, a project team might be formed to apply an AI model to a pilot problem (e.g. predicting equipment failures on the production line). By working alongside data scientists, an engineer or scientist gains practical skills. Such hands-on projects, coupled with mentorship, are sometimes framed as “capstone” exercises of training programs.

- **Hackathons and Challenges:** Consider internal innovation contests in which mixed teams work on approved problems and datasets. Set judging criteria for usefulness, accuracy and responsible use, and provide mentoring and follow-up support.
- **Virtual Simulations and Role Play:** AI can also be a tool for training. Quantified reports that Novartis had piloted AI roleplay ([Quantified](#)). The case study below presents the reported cohort and learning results. Distinguish learning a commercial task with an AI simulator from learning to develop or govern AI systems.
- **Mentoring and “AI Champions”:** Designate trained peers to coach colleagues in approved tools and workflows. Give them clear escalation routes and protected time.

AI-assisted Learning Tools

Interestingly, AI technology itself is increasingly applied to employee training. AI can personalize and streamline learning content. For example:

- **Adaptive e-Learning Platforms:** Learning management systems can be evaluated for course recommendations and remedial exercises. If an employee struggles with statistical modelling, for example, offer targeted practice. Measure learning quality, time and delivery costs separately; no general training-time saving is assumed here.
- **Real-time Tutoring:** Chatbot tutors and virtual assistants (powered by LLMs) can answer trainee questions interactively. For example, a QA specialist might ask an AI tutor for clarification on an SOP, getting an immediate answer. Evaluate such tutors for accuracy, access controls and escalation to a qualified instructor before using them in training.
- **Skill Assessment Analytics:** AI can analyze resume texts, performance metrics, and training history to identify skill gaps across the workforce. Advanced analytics tools are being piloted (e.g. at J&J's “MySkills” platform ([cistr.mit.edu](#))) to map employees against needed competencies and recommend learning plans. In effect, the company uses ML to recommend each person's next skill development steps.

Overall, the **training ecosystem** is becoming AI-augmented. Employees are both *users* of AI and *subjects* of AI-influenced education. This dual role requires carefully designed programs to ensure that (for instance) AI tutors themselves are accurate and that employees learn to critically evaluate AI answers.

Curriculum and Competencies for Pharma AI Training

Determining *what* to teach is crucial. AI upskilling in pharma often spans multiple competency areas:

1. **Data Literacy and Fundamentals of AI/ML:** Almost all programs start here. Employees need baseline knowledge of how AI works (data sets, features, models, training vs. inference). This includes understanding key terms (neural networks, algorithms, overfitting, etc.) and concepts (data labeling, model validation). Add pharmaceutical context through role-specific examples and a review of applicable requirements and company policies.

2. **Domain-Specific Applications:** Training should tie AI concepts to the learner's domain. For R&D scientists, this might cover AI in molecular modeling, omics data analysis, and virtual screening. For quality personnel, modules on AI-based process analytics and anomaly detection are relevant. Sales and marketing teams learn about AI for customer segmentation or personalized messaging. Regulatory staff need to learn about AI use in submissions. In essence, each function has tailored content – a medical rep, for example, might learn about generative AI tools for crafting presentations, whereas a manufacturing engineer learns about predictive maintenance algorithms.
3. **Tools and Platforms:** Practical familiarity with specific AI software is taught where possible. This includes learning Python or R for data analysis (often via hands-on labs), and using vendor tools (e.g. TensorFlow, KNIME, cloud ML services, or industry-specific platforms). Some programs simulate work by having employees train a simple ML model on sample datasets. The goal is not to make everyone an AI engineer, but to ensure they can navigate a data pipeline or evaluate model outputs.
4. **Data Management and Ethics:** Because pharma is highly regulated, curriculum must include **AI ethics, data privacy, and regulatory compliance**. For instance, courses should address applicable electronic-record requirements and data integrity principles for the intended workflow. Employees learn how to document AI model development, maintain audit trails, and work within approved algorithms. Ethical training addresses bias, transparency, and patient trust – topics especially important in healthcare. Distinguish applicable binding requirements from draft recommendations: the FDA's January 2025 AI guidance remains a draft with non-binding recommendations ([FDA](#)).
5. **Culture and Mindset:** A less tangible but critical component is mindset training. Employees are encouraged to adopt a growth mindset towards technology, see AI as a collaborator, and become comfortable with continuous learning. Some companies hold "AI curiosities" sessions or lunch-and-learns to destigmatize AI (e.g. showing medical drills improved by AI rather than replaced). Include change management, peer coaching and opportunities to practise with feedback.

A prerequisite to these curricula is often **baseline digital skills** – e.g. employees may first need training in data security, software use, or general IT literacies before tackling AI. Many programs are multi-tiered (e.g., "AI 101", "AI 201", etc.) so employees can progress. Assigning competency levels (beginner, intermediate, advanced) helps structure the learning paths.

```
<div class="table-responsive"> <table class="markdown"> <thead> <tr> <th>Core Competency</th>
<th>Training Content/Examples</th> </tr> </thead> <tbody> <tr> <td><strong>Data Literacy</strong></td>
<td>Understanding data types, quality, preprocessing. Basics of statistical thinking and data analytics. Pharma
case: interpreting clinical trial data, genomics datasets.</td> </tr> <tr> <td><strong>AI/ML
Fundamentals</strong></td> <td>Key concepts (algorithms, model training, overfitting). Types of AI
(supervised, unsupervised, generative). Demonstrations using pharma-relevant examples (e.g. ML model
predicting molecule activity).</td> </tr> <tr> <td><strong>Tools & Platforms</strong></td> <td>Hands-on labs
using Python/R or specialized pharma AI tools. Training on LLMs (prompt engineering) and AI analytics
software. Example: building a simple predictive model on historical manufacturing data.</td> </tr> <tr> <td>
<strong>Domain Applications</strong></td> <td>Customized modules per department: R&D (AI in drug
design), Manufacturing (AI for process control), Clinical Ops (AI for patient matching), Commercial (AI for
CRM), Quality (AI for defect detection), Regulatory (AI in submission documents).</td> </tr> <tr> <td>
```

Regulatory & Ethics	Applicable regulatory, electronic-record and data-protection requirements for the workflow; distinguish binding obligations from draft AI recommendations. Ethical considerations: bias, transparency, patient impact. Company policies on approved AI use.
Soft/Change Management	Workshops on innovation mindset. Collaborative projects and discussion forums. Case studies illustrating AI/biopharma success, to inspire adoption.

Table: Key competency areas in AI training for pharma employees, with sample content.

Courses are delivered via a blend of formats: instructor-led classroom sessions (especially for hands-on labs or ethics seminars), e-learning modules, and microlearning (short videos/quizzes). Many organizations track completion rates, quiz scores, and on-the-job AI usage metrics to measure learning outcomes. The goal is not only knowledge transfer but observable skill application (e.g. an engineer using an AI-based SPC tool).

Case Studies: Real-World Upskilling Initiatives

Below are illustrative examples of how actual companies have approached AI training. These cases demonstrate concrete strategies and results.

Johnson & Johnson: Scaling AI Literacy and Digital Bootcamps ([dailythebusiness.com](https://www.dailythebusiness.com))

Context: With a global workforce of ~135,000, J&J recognized that broad AI adoption required structured training pathways. **Initiative:** J&J implemented a **company-wide mandate**: employees must complete an introductory generative AI course before using generative AI technology internally ([dailythebusiness.com](https://www.dailythebusiness.com)). This course covers AI fundamentals and company-specific guidelines. In parallel, J&J's technology team built an internal "MySkills" platform (see MIT CISR study below) that leverages machine learning to map employees' skills and suggest development plans (c isr.mit.edu). The company also ran a "digital immersion" program – a 6-week series of 90-minute workshops on AI and other emerging tech – engaging more than 2,500 participants in 2024, following its 2023 pilot ([dailythebusiness.com](https://www.dailythebusiness.com)). A follow-up "AI & Automation Bootcamp" was offered to 14,000 employees, accumulating over 37,000 training hours ([dailythebusiness.com](https://www.dailythebusiness.com)).

Outcomes: Business Insider's March 2025 reporting describes course participation and training hours. Those measures document training activity; they do not by themselves establish productivity, confidence or clinical outcomes. The company's six-week programme was piloted in 2023, with more than 2,500 employees participating in 2024 ([Business Insider Japan](https://www.businessinsider.com)).

Merck: Embedding AI into Workflow via GPTeal

Initiative: Merck coupled its internal GPTeal platform with self-service digital courses, monthly generative-AI webcasts and software-developer bootcamps. The platform provides access to large language models while, according to Merck, keeping company data secure from external exposure ([Business Insider Japan](https://www.businessinsider.com)). Apply the company's approved-platform and data-handling policies.

Reported usage: In Business Insider's **10 March 2025** interviews, CTO Ron Kim said more than **50,000 employees used GPTeal regularly** ([Business Insider](https://www.businessinsider.com)). This is a platform-usage figure, not a verified training-completion count. The report does not provide a training-completion total or a workforce fraction for that figure.

Novartis: AI-Powered Learning Simulations

Initiative: Quantified's current vendor case describes Novartis's use of AI roleplay for verbal assessments in a **2024** onboarding programme ([Quantified](#)).

Vendor-reported outcomes: The case reports that the field force doubled and onboarding fell from **five weeks to just over two**. More than **150 new specialists and 18 field leaders** practised and completed verbal assessments through AI roleplay. In that programme, assessment scores rose **59% on average after practice**. These are vendor-reported cohort results, rather than independently verified industry-wide effects.

This case illustrates **AI as a tool for learning a commercial task**, rather than evidence that employees mastered AI development or governance skills. Assess the suitability of a simulator against approved content, scoring criteria and human review.

Eli Lilly: Cultural Shift Toward Generative AI

Context: Eli Lilly & Company wanted to lead industry in adopting generative AI for research productivity.

Initiative: Lilly's CIO Dr. Diogo Rau publicly promoted the use of ChatGPT-like tools internally. Lilly's leadership **encouraged** employees to experiment with generative models (if used responsibly) ([dailythebusiness.com](#)). The company ran an "AI Games" contest to gamify adoption ("tell an AI to write you an email to a colleague" challenge) ([dailythebusiness.com](#)). The reporting distinguishes encouragement from a planned requirement: Lilly encouraged employees and managers to use generative AI for year-end reviews in **2024**. As reported in March 2025, the company planned to require senior leaders and managers to obtain an AI certification in **2025** ([Business Insider Japan](#)).

Evidence limit: A planned requirement is not a completed-badge count. Do not infer how many managers earned a credential or that clinical and patient-communication tasks routinely began with AI from this account.

AstraZeneca: Dated Participation Reports

April 2025 snapshot: On 11 April 2025, AstraZeneca reported more than **12,000 participants**, achieving Bronze, Silver and Gold certifications in its AI upskilling programme ([AstraZeneca](#)).

Later 2025 update: In its learning and development update, AstraZeneca reported more than **37,700 employees participating so far that year** in its *Thriving in the Age of AI* programme ([AstraZeneca](#)). Participation is the reported measure; it should not be equated with a completed-training total or a demonstrated business outcome.

These participation reports illustrate the scale of a learning programme. They do not establish a causal effect on productivity or safety.

Smaller Companies and Startups

Smaller biotechs may choose external learning options as they grow. For example, **Blue Earth Therapeutics** (a 20-person radiopharma startup) does not yet have formal AI training due to its small size, but plans to "use online courses and AI certifications" as it grows ([dailythebusiness.com](#)).

These examples offer several approaches to compare: internal courses, tool-specific training and external learning options. Choose a programme for the organization's roles, resources and approved use cases, and measure practical competency rather than assuming that course completion demonstrates business impact.

Outcomes and Impact Analysis

Early Evidence of Benefits

Assess reported activity and training examples separately from demonstrated business effects:

- **Productivity Gains:** As mentioned, organizations report that tasks once taking hours are now done in minutes with AI. For instance, Merck notes that scientists are no longer spending time “being copy-editors” on documentation — generative AI drafts these texts, accelerating the review process ([dailythebusiness.com](https://www.dailythebusiness.com)). Commercial teams with chatbots or LLM assistants can reach and service more clients per day, leveraging AI-generated call summaries.
- **Innovation Speed:** For an R&D or clinical pilot, record the baseline milestone or enrolment timeline, define the intended use of the AI tool, and measure results alongside other changes to the workflow. Do not assume a training-specific speed improvement from AI adoption alone.
- **Quality and Compliance:** JAR Matrix's training-vendor article describes an anonymous **sterile injectables site using scenario-based eLearning for aseptic processing** ([JAR Matrix](#)). That intervention is not identified as AI or VR training. The example should not be used as proof of AI-upskilling outcomes or as an independently verified effect estimate.
- **Employee Engagement:** Measure engagement and retention directly rather than assuming that AI training improves either. Use consistent survey questions and compare cohorts while considering other changes to pay, management and working conditions.

Quantifying impact requires a defined baseline, a specific intervention and an appropriate comparison. Finance and the business owner should track delivery costs, employee time, rework and workflow outcomes, while quality staff review error and deviation data. Do not present illustrative ROI calculations or anonymous vendor cases as measured industry-wide returns. No general ROI range, clinical-enrolment speed gain, turnover improvement or training-cost saving is assumed here.

Persisting Challenges

Despite progress, challenges remain. Some common issues reported include:

- **Skill Heterogeneity:** Not all employees advance at the same pace. Companies find it hard to bring novices to a high level of AI fluency quickly. Specialized roles (e.g. machine-learning engineers) still need extensive training or outside hires, since workflow engineers or chemists take longer to adopt advanced ML skills.
- **Integration with Workflows:** Training can be disconnected from actual work. If employees learn about AI in abstracts (e.g. generic courses), they may struggle to see how to apply it to their job. Firms mitigate this by ensuring *case-based* learning (teaching AI within real pharma scenarios) and by aligning

training calendars with project timelines (so employees can immediately apply what they learn).

- **Technical Infrastructure:** Upskilling is most effective when employees actually have access to tools. Some companies must invest additionally in cloud computing, data platforms, and IT support to make real-world AI experiments possible. Training without underlying infrastructure yields frustration (“nice to know, nowhere to try”).
- **Regulatory Burden:** Align training with applicable requirements and company procedures. The FDA’s January 2025 AI guidance is a **draft with non-binding recommendations, not for implementation** (FDA). Train employees to distinguish proposed AI recommendations from binding requirements and to seek quality or regulatory review for the intended workflow.
- **Continuous Learning Requirement:** AI technology evolves rapidly. A training module on “state-of-the-art models” can become outdated in a year. Companies must plan for ongoing refreshers. Some address this by subscription to AI learning platforms or by annual “AI refresher weeks.” The continuous learning culture is still developing, and companies are experimenting with how best to sustain it.

Future Directions and Recommendations

Sustaining AI Learning Programs

As AI becomes more embedded in pharma, **AI training must become a permanent part of L&D** strategy. It is no longer a one-off initiative. Recommendations for future action include:

- **Make AI Training Continuous, Not Static:** Create a curriculum roadmap that evolves yearly. For instance, initial courses on data literacy should be followed by advanced modules on new AI domains (e.g. quantum machine learning for drug simulation). Provide incentives for employees to pursue advanced AI skills (e.g. internal certification levels, acknowledgement in career development plans). Some pharma companies are exploring “AI competency badges” that employees earn after demonstrating skills on real projects.
- **Integrate Training into Talent Planning:** Companies should include AI skill requirements in job descriptions and performance reviews. HR and business leaders might set targets (e.g. 50% of marketing staff attain intermediate AI proficiency by 2027). In large organizations, dedicated “AI Skills Hubs” or internal platforms (like J&J’s MySkills (cistr.mit.edu)) can track competencies and match employees to projects.
- **Leverage AI Tools for Personalized Learning:** Use AI-driven LMS systems to tailor learning paths. For example, a data analytics manager who struggles with coding can be offered more practical Python exercises, whereas a data scientist weak on regulatory might get targeted compliance modules. Adaptive quizzing (AI to adjust difficulty based on answers) can help solidify knowledge.
- **Measure Outcomes with Data:** Apply data analytics to monitor how training correlates with business outcomes. Metrics might include number of AI-augmented projects, speed improvements, or reduction in training-related errors. Use these insights to refine the training. For instance, if a certain training module has low engagement but high importance, adjust its format or mandate completion.

- **Cross-Industry Collaboration:** The skill gap is a common challenge across life sciences. Industry consortia, academic alliances, and regulatory bodies should collaborate on shared training resources. Joint programs (like Pistoia) help avoid duplication and set common standards. Regulators (FDA/EMA) could even sponsor or endorse training guidelines (akin to Good Clinical Practice training) for AI in drug development.

The Evolving Role of Workers

As AI handles routine tasks, the **nature of many pharma jobs will change**. Training should therefore not only cover current AI tools, but also prepare workers for future roles. For example, as quality control becomes more automated, QA specialists might transition into roles overseeing AI systems or interpreting their outputs. Clinical trial monitors may need to augment their medical expertise with data science skills. Leadership development should include training on digital-savviness.

Crucially, while corporate training is essential, **cross-disciplinary training** is also key. A data scientist in pharma needs some understanding of biology and regulatory constraints, while a medicinal chemist should grasp machine learning basics. Programs that bring together people from different functions (e.g. science+IT teams) can foster this interdisciplinary competence. As Mousumi Mukherjee observes, today's pharma AI strategies include "fostering cross-disciplinary learning" so that insights flow between data scientists, researchers, and business leaders (www.linkedin.com).

Monitoring the Environment

Assign an owner to monitor changes in AI tools, company policies and applicable requirements and update training accordingly. As of **11 October 2026**, the European Commission states that **Article 4 of the EU AI Act applied from 2 February 2025**, was amended in **mid-July 2026**, and came under national supervision and enforcement from **2 August 2026**. Providers and deployers must take measures supporting staff AI literacy; the amended provision does not mandate a particular individual proficiency level (European Commission). Review training in light of the tools, roles and contexts in which AI is used.

Discussion and Future Implications

The **implications** of upskilled pharma teams are profound. In the near term, better-trained employees will bring *incremental improvements* – faster analyses, fewer errors, and the ability to pilot advanced AI projects with confidence. In the medium term, we can expect structural shifts: R&D cycles compress, manufacturing becomes more adaptive, supply chains more predictive. Firms that excel at workforce development will likely capture larger market share by bringing innovations to market first.

Over a longer horizon (5–10 years), the cumulative effect could reshape the industry's labor needs. New hybrid roles (e.g. "bioinformatics engineer", "AI clinical lead", "algorithmic quality auditor") will emerge. Traditional roles will evolve; some may disappear, but many existing employees will move into higher-skilled positions implementing AI. The vision is a "cognitive partnership" where human expertise and AI collaborate. As noted in industry publications, success will depend on training workers to "speak both the language of biology and AI" (dailythebusiness.com).

However, this future carries challenges. Ethical use of AI remains paramount in healthcare: ensuring AI-driven decisions are fair, explainable, and clinically valid will require vigilance. Upskilling must include robust ethics training (e.g. biases in AI and their impact on patient care). There will also be societal implications: for example, as pharma becomes more technology-heavy, recruitment pipelines will need to change (more data science entrants into life sciences). Governments and educational institutions will need to adapt curricula – for instance, medical and pharmacy schools may start including data science courses.

Importantly, continued research into **effective training methods** is needed. Pharma companies should share best practices and metrics. Academic studies on upskilling ROI or learning outcomes in this context would be valuable. Conferences like “AI for Pharma” are already including tracks on workforce transformation – this trend will likely accelerate.

Conclusion

The integration of AI in pharma is not a distant prospect – it is happening now. Across drug discovery, clinical trials, manufacturing, and beyond, companies are using AI to make better decisions and speed up processes. But technology alone cannot drive innovation; it must be wielded by skilled people. This report has documented the **urgent need to upskill pharmaceutical workforces** in AI and the many strategies being employed. We have shown that leading firms are treating training as a strategic priority – developing formal curriculum, leveraging AI-based learning tools, and even developing internal platforms to manage employee skills. Evaluate training against business and quality metrics that leadership already tracks, rather than assuming that participation demonstrates a return (**JAR Matrix**).

For L&D leaders and executives in pharma, the message is clear: **Build your AI training program now, and build it to last.** Start with helping employees gain basic data literacy and comfort with AI tools, then progressively dive into deeper AI knowledge. Align your training with your corporate AI strategy (select use cases, compliance needs, and business priorities). Measure training impact with hard metrics (e.g. improvements in cycle time, reduction in errors, number of AI-driven projects launched). Collaborate with academia and industry peers to pool learning resources. And institutionalize a culture of continuous learning – after all, AI technology itself will keep evolving.

By taking these steps, pharmaceutical companies can transform the “AI skills gap” from a barrier into a competitive advantage. With a workforce primed for AI, these companies will be well positioned to **bring therapies to patients faster, safer, and more efficiently** – fulfilling core healthcare missions while staying ahead in a rapidly changing world. The era of the AI-enabled pharmaceutical professional is not coming; it is here, and upskilling is the key to thriving within it.

Source links

Links cited in this article, in order of first appearance. Full addresses are provided for readers using extracted text.

1. <https://www.astrazeneca.com/media-centre/articles/2025/upskillingAI.html>
2. <https://www.strategyand.pwc.com/de/en/industries/pharma-life-sciences/re-inventing-pharma-with-artificial-intelligence.html>
3. <https://intuitionlabs.ai/articles/pharma-ai-skills-gap>

4. <https://www.linkedin.com/pulse/reskilling-ai-era-pharma-professionals-dr-andr%C3%A9-bates-2d2sf>
5. <https://www.fiercepharma.com/marketing/ai-tech-immediate-priority-most-big-pharmas-many-plan-open-their-pockets-further-ai>
6. <https://www.pwc.com/kz/en/publications/publications-new/workforce.html>
7. <https://www.fda.gov/news-events/press-announcements/fda-proposes-framework-advance-credibility-ai-models-used-drug-and-biological-product-submissions>
8. <https://www.pharmaceuticalonline.com/doc/upskilling-your-quality-team-for-the-ai-revolution-in-pharma-0001>
9. <https://www.fda.gov/regulatory-information/search-fda-guidance-documents/considerations-use-artificial-intelligence-support-regulatory-decision-making-drug-and-biological>
10. <https://www.ema.europa.eu/en/about-us/how-we-work/data-regulation-big-data-other-sources/artificial-intelligence>
11. <https://dailythebusiness.com/how-pharmaceutical-companies-are-training-their-workers-on-ai/>
12. <https://ispe.org/pharmaceutical-engineering/ispeak/ai-action-case-studies-transforming-pharma-40tm>
13. <https://www.astrazeneca.com/media-centre/articles/2025/upskillingAI.html%20>
14. <https://vivanti.eu/en/news/ai-upskilling-your-team>
15. <https://www.biosciencetoday.co.uk/the-training-imperative-upskilling-your-team-for-the-pharma-ai-revolution/>
16. <https://www.linkedin.com/pulse/ai-ready-workforce-your-2025-competency-guide-future-banday-phd-dowyc>
17. <https://www.pharmamanufacturing.com/production/unit-operations/article/33014252/empowering-the-pharma-workforce>
18. https://pistoiaalliance.org/ai/ai_life_sciences_held_back_may2019/
19. <https://www.globaldata.com/media/pharma/lack-skills-talent-still-top-hindrance-digital-transformation-pharma-says-globaldata/>
20. <https://blog.coursera.org/novartis-goes-big-on-learning-by-offering-employees-top-data-science-masters-degrees-on-coursera/>
21. <https://www.novartis.com/us-en/stories/novartis-us-invests-data-and-ai-capabilities-6000-employees>
22. <https://pistoiaalliance.org/eventdetails/ai-ml-training-2025/>
23. <https://aws.amazon.com/certification/certified-machine-learning-engineer-associate/>
24. <https://www.tensorflow.org/certificate>
25. <https://www.quantified.ai/case-studies/novartis-ready-for-launch-three-months-sooner>
26. https://cistr.mit.edu/publication/MIT_CISRwp461_JohnsonandJohnsonAIDrivenSkills_VanderMeulenTonaSomehWixomLeidner
27. <https://www.businessinsider.jp/article/johnson-and-johnson-ai-training/>
28. <https://www.businessinsider.com/pharmaceutical-companies-embrace-ai-in-drug-discovery-efforts-2025-3>
29. <https://www.astrazeneca.com/media-centre/articles/2025/empowering-inclusive-lifelong-learning-development.html>
30. <https://www.jarmatrixpharma.com/2026/01/28/training-roi-in-pharma-does-better-training-save-money/>
31. <https://www.linkedin.com/pulse/empowering-pharma-workforce-how-ai-training-industry-mukherjee-arhjc>
32. <https://digital-strategy.ec.europa.eu/en/policies/ai-talent-skills-and-literacy>

THE PUBLISHER

About IntuitionLabs

IntuitionLabs is an AI consulting, custom software development and data engineering firm serving pharmaceutical, biotechnology, medical-device and other life-science organizations. We work with clinical, regulatory, medical-affairs, commercial, quality and IT teams to connect technology decisions with the work people need to accomplish.

AI consulting and adoption

Our AI enablement services cover readiness assessments, use-case selection, governance and policies, team workshops, adoption measurement and ongoing advisory support. We help organizations structure the information layer behind AI: source material, context, permissions and maintained knowledge that make generated answers useful and reviewable. Private LLM inference and hosted AI options support teams evaluating how to operate AI with appropriate control over their data and infrastructure.

Software, data and life-science workflows

IntuitionLabs develops custom software for pharma and biotech, integrates enterprise systems, and builds data engineering and business intelligence solutions. Areas of focus include AI agents, regulatory research, medical writing, medical affairs, CMC information, competitive intelligence and clinical-document workflows. Our eTMF intelligence work includes cross-system reconciliation and inspection-readiness support.

Enterprise platforms and regulated delivery

We provide Veeva services, application support, managed services, integrations and custom applications, alongside enterprise content work involving platforms such as Egnyte. For regulated workflows, our services include GxP enablement, computer-system validation and software development addressing 21 CFR Part 11 requirements. The applicable controls, validation responsibilities and acceptance criteria are defined for each engagement.

Work with IntuitionLabs

Explore [AI enablement](#), [pharma and biotech software development](#), [data engineering and BI](#), and [Veeva services](#). [Contact IntuitionLabs](#) to discuss your workflow, information sources and implementation needs.

IntuitionLabs publishes educational research to help life-science teams make informed technology decisions. Coverage of a product or organization does not imply a client relationship, endorsement or partnership.

Website: <https://intuitionlabs.ai>

This article is educational. Verify consequential medical, legal, financial, regulatory and technical decisions with appropriate professionals and the cited primary sources. Company services are described separately from the article's research findings.