PHARMBOTAI

Implementing AI in Community Pharmacy

A Practical Framework for Safe, Effective and Accountable Use

SAFE
Protect patients and data

EFFECTIVE
Enhance care and outcomes

ACCOUNTABLE
Clear roles and human oversight

RESPONSIBLE
Use AI ethically and transparently

Asif Mukhtar MRPharmS
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June 2026

PharmBot AI Limited

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This framework reflects the views of the author and is intended to support discussion and implementation of AI governance in community pharmacy. It does not constitute regulatory guidance and should not be interpreted as replacing guidance issued by the GPhC, MHRA, NHS England or other relevant bodies."

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Contents

Foreword

Community pharmacy has always been asked to do more with less. More patients, more complexity, more clinical responsibility and consistently less resource, less recognition, and less infrastructure to match the ambition. Artificial intelligence is now being added to that list of expectations, often by people who have never stood behind a dispensary counter, never managed a Pharmacy First consultation alone, and never tried to reconcile clinical governance obligations with a twelve-minute lunch break.

This framework exists because the guidance that does exist is not enough.
The General Pharmaceutical Council published its AI position statement in April 2026. The Royal Pharmaceutical Society published its policy in January 2025. Both are welcome. Both are right in what they say. But neither tells a superintendent pharmacist in a single-handed community pharmacy what they actually need to do on Monday morning when a sales team arrives offering an AI clinical decision support tool. Neither explains what due diligence looks like in practice, what a governance structure should contain, or how to tell a patient that an algorithm was involved in their care.

The gap between principle and practice is where patients get harmed.

This framework is an attempt to close that gap. It is written by a pharmacist, for pharmacists but also for the commissioners, regulators and system leaders who shape the environment in which pharmacy operates. It draws on clinical experience, on building AI infrastructure for community pharmacy, and on a conviction that community pharmacy is not a secondary setting. It is, increasingly, the front door of the NHS. The AI tools deployed within it deserve and demand the same rigour applied anywhere else in the health system.

The recommendations here are practical, not aspirational. They are intended to be implemented, not filed.

If the GPhC, the Royal College of Pharmacy, NHS England, or any other body finds this useful as a foundation for formal guidance, that conversation is welcome. But this framework does not wait for that conversation to begin.

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Section 1 — The State of Play

Artificial intelligence is no longer an emerging technology in healthcare. It is already here in radiology departments reading scans, in GP surgeries transcribing consultations, in hospital pharmacies checking dispensing accuracy, and increasingly in the tools being marketed to community pharmacy. The question is no longer whether AI will be used in pharmacy. It is whether it will be used well.

The regulatory and professional landscape has begun to respond. The General Pharmaceutical Council published its position statement on AI in April 2026, establishing that existing professional standards apply when AI is in use and that accountability remains with the individual practitioner. The Royal Pharmaceutical Society published its AI policy in January 2025, recognising the opportunities AI presents while calling for responsible deployment and investment in workforce capability. The Medicines and Healthcare products Regulatory Agency has convened a National Commission on AI regulation in healthcare, with recommendations expected later in 2026. At the system level, NHS England's medium-term planning framework identifies AI as a strategic enabler and requires integrated care boards to support its adoption across primary care.

These are meaningful developments. But they share a common limitation: they describe what AI should not undermine rather than what good implementation looks like. They establish floors, not frameworks.

Community pharmacy sits in a particularly exposed position within this landscape. It is the most accessible point of contact in the NHS with over one million patient interactions every day across England and it is operating in an environment of rapidly expanding clinical responsibility. Pharmacy First, independent prescribing pathways, and the NHS ten-year plan's vision of community pharmacy as a cornerstone of neighbourhood health services have all accelerated the complexity of what is expected at the pharmacy counter. AI tools are being developed and marketed specifically for these settings, often ahead of any guidance on how to evaluate, implement or govern them.

At the same time, community pharmacy operates under structural conditions that make responsible AI adoption genuinely difficult. Many pharmacies are single-handed or small-team operations without dedicated governance infrastructure. Superintendent pharmacists carry regulatory accountability for their premises but rarely have access to the legal, technical or clinical governance expertise that a hospital or integrated care system can call upon. Procurement decisions are often made under commercial pressure, with limited ability to conduct meaningful due diligence. And the consequences of getting it wrong fall directly on patients — and on the professionals who served them.

This is not an argument against AI in community pharmacy. The potential is real: better clinical decision support, reduced dispensing error, more consistent triage, and the ability to do more for patients in less time. The argument is for implementation that matches the ambition rigorous, accountable, and grounded in the realities of the setting.
The framework that follows is structured around that argument.

Section 2 — A Taxonomy of AI in Pharmacy

Not all artificial intelligence is the same. This matters enormously for pharmacy, because the governance requirements, competency demands, risk profiles and accountability structures differ substantially depending on what type of AI is being used and what role it is playing in the clinical or operational workflow. A framework that treats all AI as equivalent will either over-regulate the benign or under-regulate the dangerous.

This section establishes a working taxonomy of AI as it applies to pharmacy settings. It is not exhaustive the technology is evolving faster than any classification system can track but it provides the conceptual foundation for the implementation guidance that follows.

2.1 Clinical Decision Support AI

Clinical decision support AI assists pharmacists and prescribers in making clinical judgements. In community pharmacy, this includes tools that support triage and consultation (such as Pharmacy First pathways), flag potential drug interactions or contraindications, recommend treatment options based on patient-reported symptoms, or assist in medicines optimisation and review.

This is the highest-risk category in the taxonomy. The output of these tools directly informs decisions that affect patient safety. Errors whether through algorithmic bias, poor training data, hallucination, or misapplication can result in missed diagnoses, inappropriate treatment, or harm. The fact that a pharmacist retains final accountability does not diminish the risk; it means the pharmacist must be equipped to critically evaluate AI output rather than simply act on it.

Whether a clinical decision support tool meets the MHRA definition of a software medical device depends on its intended purpose, not its vendor's characterisation of it. A tool that generates clinical recommendations, pathway guidance or risk stratification outputs warrants specific scrutiny on this question, irrespective of whether it produces a formal diagnosis. Pharmacy owners should assess each tool against the MHRA's published guidance on software as a medical device and should not rely solely on vendor assurances.

2.2 Dispensing Automation and Accuracy Checking AI

AI-enabled dispensing systems use machine vision and pattern recognition to verify that the correct medicine, dose and labelling have been prepared. These tools are well-established in high-volume dispensing environments and have a strong evidence base for reducing dispensing error.

The risk profile here is different from clinical decision support. The AI is operating within a tightly defined, highly structured task matching a physical product against a digital record. Failure modes are generally detectable and the consequences, while serious, are more likely to be caught within the dispensing workflow. Nevertheless, over-reliance on automated

checking the assumption that the machine has verified what the human no longer needs to represents a genuine and documented risk.

2.3 Administrative and Generative AI

Generative AI tools, large language models capable of producing text, summaries and structured outputs are increasingly being used across pharmacy for administrative tasks: drafting patient communications, summarising consultation records, generating referral letters, producing standard operating procedures, and supporting revalidation documentation.

These tools carry a different but underappreciated risk profile. The output is text, not a clinical recommendation, and the immediate patient safety implications appear lower. But inaccurate summaries of clinical encounters, hallucinated drug information in patient communications, or AI-generated revalidation records that misrepresent actual practice all carry real consequences for patients, for professionals and for the integrity of the wider system.

The GPhC has been explicit that AI-generated revalidation submissions are not acceptable. The same principle applies more broadly: generative AI should support documentation, not substitute for the clinical encounter or professional reflection it is meant to record.

2.4 Patient-Facing AI

AI tools deployed directly to patients symptom checkers, medication reminder systems, chatbots triaging queries before they reach a pharmacist occupy a distinctive position in this taxonomy. The pharmacist may not be present at the point of interaction, and the patient may not understand they are engaging with an automated system.

This category raises the sharpest questions about transparency, consent and liability. If a patient-facing AI tool directs a patient away from seeking care they needed, or provides information that is inaccurate or contextually inappropriate, the harm may not be apparent until significantly later. Pharmacy owners deploying patient-facing AI tools carry accountability for the interactions those tools generate, even when no pharmacist is directly involved.

2.5 Operational and Workforce AI

AI tools are also being used to manage pharmacy operations: demand forecasting, stock management, workforce scheduling, and identification of patients due for medicines reviews or vaccinations. These tools sit furthest from direct clinical care and carry the lowest immediate patient safety risk.

They are not without consequence, however. Algorithmic workforce scheduling that consistently under-resources dispensing at peak times creates systemic pressure that increases error risk. Stock management AI that fails to anticipate supply chain disruption can

result in patients being unable to access critical medicines. The operational and the clinical are not as separate as they might appear.

2.6 Risk Classification Summary

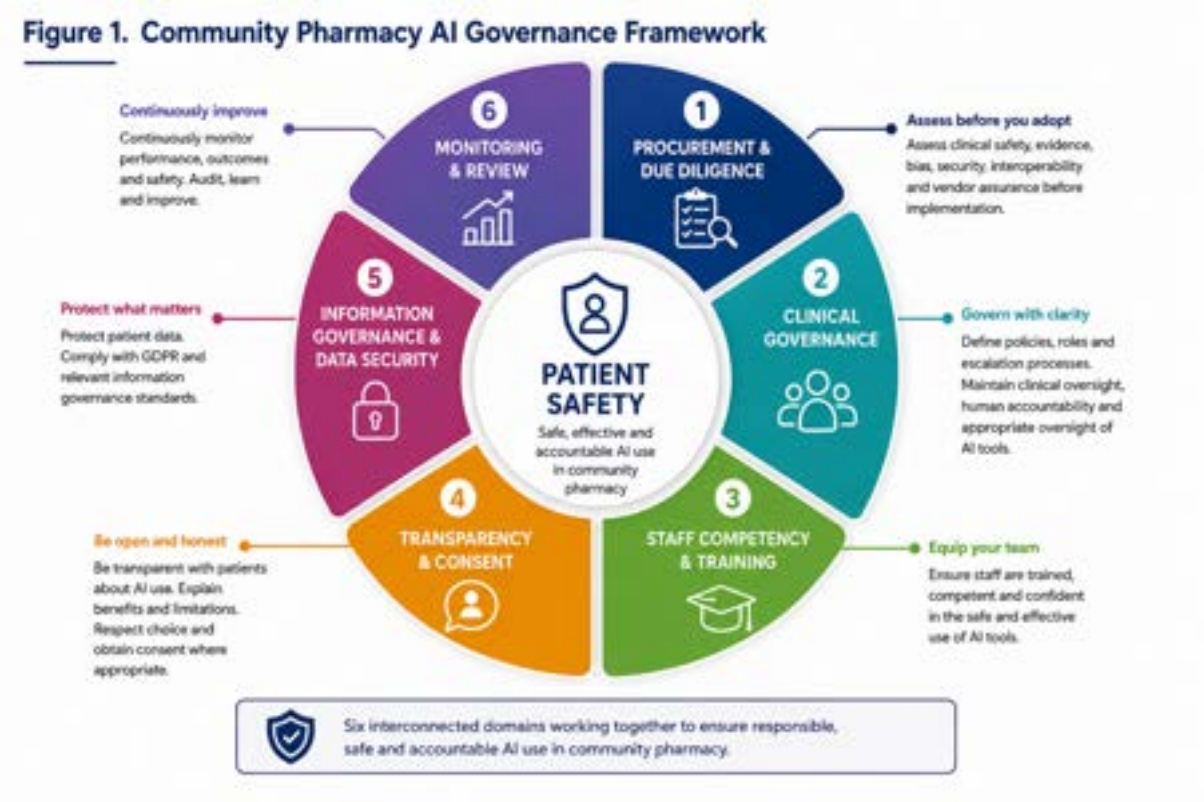
These five categories can be understood across two axes: proximity to clinical decision-making, and directness of patient contact. **Clinical decision support** sits highest on both. Patient-facing AI sits high on patient contact but variable on clinical proximity depending on design. **Dispensing automation** is high on clinical consequence but operates within a structured workflow. **Administrative and generative AI** sits lower on both axes but is the most widely used and least governed in practice. **Operational AI** sits lowest on both but creates systemic conditions that affect all the others.

The implementation framework in Section 3 applies across all five categories, but the weight given to each domain of governance will differ depending on which category of AI is being deployed. A pharmacy deploying only administrative AI has different obligations from one deploying clinical decision support. This taxonomy is the tool for making that distinction.

Section 3 — The Implementation Framework

The following framework is structured around six domains of governance. Together they constitute the minimum conditions for responsible AI implementation in a pharmacy setting. They are not sequential steps they operate in parallel and should be revisited continuously as tools evolve, teams change and clinical contexts shift.

Each domain is addressed in terms of what is required, why it matters, and what it looks like in practice.



3.1 Procurement and Due Diligence

What is required

Before any AI tool is deployed in a pharmacy setting, the pharmacy owner and superintendent pharmacist must be satisfied that the tool is safe, appropriate and fit for the purpose for which it is being used. This obligation exists regardless of whether the tool is provided by an NHS-commissioned supplier, a commercial vendor, or a third party embedded within existing pharmacy software.
Due diligence should address the following as a minimum:

Regulatory status. Whether the tool meets the MHRA definition of a software medical device depends on its intended purpose, not its vendor's characterisation. A tool that generates clinical recommendations, pathway guidance or risk stratification outputs warrants specific scrutiny on this question, irrespective of whether it produces a formal diagnosis.

Pharmacy owners should assess each tool against the MHRA's published guidance and should not rely solely on vendor assurances.

Clinical evidence. What is the evidence base for the tool's clinical performance? Has it been validated in settings comparable to the intended deployment specifically community pharmacy, not secondary care or research environments? What are the known limitations of the tool, including the populations and clinical scenarios for which it has not been validated?

Algorithmic transparency. Can the vendor explain, in terms accessible to a clinical professional, how the tool reaches its outputs? Black-box systems require a higher threshold of scrutiny and a more robust human oversight structure.

Data provenance. What data was the tool trained on? Does the training data reflect the demographic, clinical and operational characteristics of the patient population it will serve? Bias in training data produces bias in output, and the consequences fall disproportionately on already underserved communities.

Contractual accountability. What does the contract with the vendor specify about liability in the event of harm? What are the data processing arrangements, and do they comply with UK GDPR and the NHS Data Security and Protection Toolkit where applicable? What are the arrangements for ongoing maintenance, updates and notification of significant changes to the tool's behaviour?

Exit arrangements. What happens to patient data if the contract ends? Can the pharmacy transition to an alternative tool without clinical disruption? Dependency on a single vendor without adequate exit provisions represents both a clinical governance and a business continuity risk.

Why it matters

The commercial AI market is moving faster than regulation. Tools are being marketed to pharmacies with claims that outrun the evidence, and procurement decisions are often made under time pressure and without access to independent technical expertise. The due diligence framework above will not eliminate all risk, but it creates a documented record of reasonable steps taken which is both a professional protection and a patient safety measure.

What it looks like in practice

A pharmacy owner considering a Pharmacy First clinical decision support tool should request the vendor's MHRA regulatory assessment documentation, a summary of clinical validation studies, a data processing agreement, and a plain-English explanation of how the tool generates its recommendations. These should be reviewed before any contract is signed and retained as part of the pharmacy's governance records.

3.2 Clinical Governance

What is required

Clinical governance for AI in pharmacy is not a separate system it is an extension of the governance structures that should already exist. The question is not whether to create new

governance but whether existing governance is adequate for the additional risks that AI introduces.

As a minimum, the following governance elements should be in place before an AI tool is deployed in a clinical context:

A designated lead. Someone within the pharmacy, in most community settings this will be the superintendent pharmacist must hold named accountability for the oversight of each AI tool in use.

A standard operating procedure. Every AI tool in clinical use should have a written SOP that specifies the clinical scenarios in which the tool should be used, the circumstances in which the tool's output should be overridden, the process for escalating concerns, and the documentation requirements for consultations in which AI was used.

An override culture. Governance structures must actively support pharmacists and pharmacy technicians in exercising professional judgement that contradicts AI output. The SOP should specify that overrides are not only permitted but expected when clinical judgement requires it, and that override decisions should be documented without adverse consequence for the practitioner.

Incident reporting. Near misses and adverse events involving AI tools must be captured through the pharmacy's existing incident reporting framework and, where appropriate, reported externally to the MHRA's Yellow Card scheme for medical device concerns, and to the GPhC where a fitness to practise or standards issue arises.

Regular review. AI tools should be subject to periodic structured review — at minimum annually, and following any significant incident, software update, or change in the clinical context in which the tool operates.

Why it matters

The GPhC's position statement is clear that pharmacy professionals remain personally accountable for their decisions when AI is involved. Personal accountability without supporting governance structures places an unreasonable burden on individual practitioners. Governance is what converts accountability from a liability into a framework for safe practice.

What it looks like in practice

A community pharmacy using AI-assisted Pharmacy First triage should have a written SOP specifying that the AI output is a clinical aid, not a clinical decision; that the consulting pharmacist must document their own clinical reasoning independently of the AI recommendation; that any instance where AI output was overridden should be recorded; and that the superintendent pharmacist reviews a sample of AI-assisted consultations monthly to assess quality and identify emerging concerns.

3.3 Staff Competency and Training

What is required

Deploying an AI tool without ensuring that staff are competent to use it safely is not a training gap it is a governance failure. Competency in AI use in pharmacy has two distinct components that must both be addressed.

Technical competency. Staff must understand how to operate the tool correctly: what inputs it requires, what outputs it produces, how to interpret those outputs, and what the tool's known limitations are.

Critical competency. Staff must be able to evaluate AI output critically to recognise when a recommendation is inconsistent with clinical presentation, when a patient's circumstances fall outside the tool's validated scope, and when professional judgement should take precedence over algorithmic output. This competency cannot be provided by a vendor. It must be developed through clinical training, reflective practice and a workplace culture that values and exercises professional judgement.

Training should be documented, role-specific and refreshed regularly. Agency staff, locums and new starters must be included — the risks associated with AI use do not pause for the unfamiliar.

Why it matters

The most significant risk associated with AI in clinical settings is not that the AI will be wrong it is that the human will not notice, or will not feel empowered to act on that recognition. Automation bias, the documented tendency of humans to defer to algorithmic outputs even when their own judgement suggests otherwise is a training and culture issue as much as a technology issue.

What it looks like in practice

A pharmacy deploying a new clinical AI tool should conduct a structured induction for all clinical staff before go-live, covering the tool's scope, limitations and override process. A quarterly case review examining a sample of AI-assisted consultations provides an ongoing mechanism for identifying competency gaps and reinforcing critical evaluation.

3.4 Patient Transparency and Consent

What is required

Patients have a right to know when AI is involved in their care. This is not a courtesy it is a professional obligation grounded in the GPhC's standards on person-centred care, and it is increasingly a legal expectation under data protection and equality legislation.

Transparency should address three questions from the patient's perspective: Is AI being used? What is it doing? Does it change anything about my care?

Disclosure should be proportionate to the role AI is playing. A tool that assists a pharmacist in checking a drug interaction in the background requires less active disclosure than a tool that generates a triage recommendation that directly shapes the consultation. Patient-facing AI requires the clearest and most explicit disclosure of all.

Pharmacy owners must ensure that disclosure is accessible. Patients with lower health or digital literacy, patients whose first language is not English, and patients with communication needs must be able to understand when and how AI is involved in their care. Generic privacy notices in small print do not meet this standard.

Why it matters

Trust is the foundation of the pharmacist-patient relationship. Patients who discover after the fact that an AI tool shaped their consultation without their knowledge are likely to feel that trust has been violated. The credibility of AI-enabled pharmacy services at a system level depends on patients having genuine confidence that their care is transparent and accountable.

What it looks like in practice

A pharmacy using AI-assisted Pharmacy First triage should inform patients at the start of the consultation verbally and, where appropriate, in written form that a clinical decision support tool is being used to help the pharmacist assess their symptoms, that the pharmacist makes the final clinical decision, and that the patient can ask questions about the process at any time. This disclosure should be documented as part of the consultation record.

3.5 Data Protection and Information Governance

What is required

AI tools in pharmacy operate on patient data. In many cases they generate new data, consultation records, clinical recommendations, interaction flags, that itself becomes part of the patient record. The information governance obligations that apply to patient data in pharmacy apply with equal force to data processed by or generated through AI tools.
As a minimum, pharmacy owners must ensure the following:

Lawful basis. There must be a clear and documented lawful basis under UK GDPR for each category of personal data processed by the AI tool. In most clinical contexts this will be Article 9(2)(h) processing necessary for the provision of health care, but this must be assessed for each tool and each data flow, not assumed.

Data minimisation. AI tools should process only the personal data necessary for their function. Vendors who require access to data beyond what is clinically necessary should be challenged, and contracts should specify data minimisation obligations explicitly.

Data storage and transfer. Where is patient data stored? If data is transferred outside the UK, including to cloud servers in other jurisdictions, this must comply with UK GDPR international transfer requirements.

NHS Data Security and Protection Toolkit. Pharmacies registered with the NHS and handling NHS patient data are required to meet the standards of the NHS DSPT. AI tools that process NHS patient data must be assessed against these standards as part of the procurement process.

Subject access and rights. Patients retain their data rights including the right of access, rectification and erasure — in relation to data processed by AI tools. Pharmacy owners must be able to respond to subject access requests that include AI-generated data.

Why it matters

Failures of information governance in AI result in patient data being processed without consent, shared with third parties without knowledge, or used for purposes including training future AI models that patients have not agreed to. The consequences range from regulatory enforcement by the Information Commissioner's Office to the erosion of patient trust that undermines the entire enterprise of AI-enabled care.

What it looks like in practice

Before deploying any AI tool that processes patient data, the pharmacy owner should complete a Data Protection Impact Assessment. This must address: what data is processed, on what lawful basis, for what purpose, by whom, where it is stored, and what the risks are. The pharmacy's privacy notice should be updated to reflect AI tool use before deployment, not after.

3.6 Monitoring and Review

What is required

Deployment is not the end of governance, it is the beginning of a continuous obligation to ensure that the AI tool continues to perform safely and appropriately in the conditions in which it is actually being used.

Performance monitoring. Are the tool's outputs consistent with clinical expectation? Are there patterns of recommendations that seem inconsistent with patient presentations? Are override rates increasing or decreasing in ways that warrant review?

Incident tracking. Every incident involving an AI tool should be recorded, regardless of outcome. Near misses are as important as adverse events. Patterns across incidents may indicate a systemic issue that no individual incident would reveal alone.

User feedback. The pharmacists and pharmacy technicians using the tool every day are the most sensitive monitoring instrument available. Their observations should be actively sought, not passively received.

Vendor communication. Contracts should specify that vendors must notify the pharmacy of any update that materially changes the tool's behaviour, scope or data processing arrangements.

External horizon scanning. The regulatory and evidence landscape for AI in pharmacy is evolving rapidly. Pharmacy owners should monitor updates from the MHRA, GPhC, ICO and NHS England, and should review governance arrangements in response to significant regulatory developments.

Why it matters

AI tools are not static. They change, through updates, through drift in the populations they encounter, through changes in the clinical context in which they operate. A governance framework that was adequate at deployment may become inadequate without any deliberate decision having been made. Monitoring is what ensures that governance keeps pace with the tool it is governing.

What it looks like in practice

A pharmacy should maintain a simple AI governance log a single document recording each AI tool in use, the date of deployment, the date of last review, any incidents recorded, any updates received from vendors, and the date of the next scheduled review. This does not need to be complex. It needs to exist, to be maintained, and to be available for inspection.

Section 4 — Community Pharmacy Specific Considerations

The framework set out in Section 3 applies across healthcare settings. This section addresses what is different about community pharmacy the structural, operational and clinical realities that generic NHS AI guidance does not reach, and that determine whether the framework above is actually implementable in practice.

This is not a list of excuses for lower standards. It is an argument for guidance that is honest about the environment it is asking people to operate in.

4.1 The Single-Handed Reality

The governance frameworks that inform AI implementation across the NHS were largely designed with organisations in mind, trusts, ICBs, primary care networks with dedicated governance leads, legal teams, information governance officers and clinical safety functions. The majority of community pharmacies in England are not organisations in that sense. They are small businesses, often owner-operated, frequently single-handed or running with a skeleton clinical team, and carrying regulatory accountability structures that were designed for a simpler clinical landscape.

A superintendent pharmacist in a single-handed community pharmacy is simultaneously the clinical lead, the governance lead, the data protection officer in practice if not in title, the line manager, and often the person dispensing. Asking that individual to conduct a DPIA, review regulatory documentation, establish an AI governance log, and deliver structured staff training while managing a Pharmacy First appointment list and an over-the-counter queue, is not unreasonable in principle. It requires acknowledgement in practice.

Implementation guidance that does not account for this reality will not be implemented. The framework in this document is designed to be proportionate — the obligations are real, but the mechanisms for meeting them should be scaled to the setting. What matters is that the substance of governance is present, not that it resembles what a hospital trust would produce.

ICBs, professional bodies and regulators have a corresponding obligation: to provide community pharmacy with the support infrastructure template documents, shared due diligence resources, accessible training that makes proportionate governance achievable rather than aspirational.

4.2 Pharmacy First and the Clinical AI Frontier

Pharmacy First represents the most significant expansion of clinical responsibility in community pharmacy in a generation. Pharmacists are now conducting consultations, making clinical decisions and managing conditions that previously sat entirely within general practice. AI tools are being developed and deployed specifically to support this work and

community pharmacy is, in many respects, the setting where clinical AI is being tested at scale in primary care.

This creates both opportunity and exposure. Well-designed clinical decision support can improve the consistency and quality of Pharmacy First consultations, reduce the risk of missed diagnoses, and support pharmacists in managing clinical complexity with confidence. But AI tools validated in controlled research settings or secondary care environments may not perform with equivalent accuracy in the community pharmacy context.

Pharmacy owners and superintendent pharmacists deploying clinical AI for Pharmacy First should specifically interrogate whether the tool has been validated in community pharmacy settings, with community pharmacy patient populations, and for the specific clinical pathways in which it will be used. Validation in a hospital outpatient setting is not validation for a Pharmacy First pathway in a high-street pharmacy.

4.3 Independent Prescribing

The rollout of independent prescribing in community pharmacy is accelerating. NHS England's medium-term planning framework commits to introducing prescribing-based services in community pharmacies through 2026/27, and the pathfinder programme has demonstrated both the clinical potential and the practical complexity of this shift. Independent prescribing pharmacists working in community settings face a specific challenge in relation to AI: the tools available to support prescribing decisions were largely designed for general practice or secondary care prescribers. They may not reflect the formulary, referral pathways or clinical governance structures of community pharmacy prescribing, and they may not account for the dual clinical and supply role the pharmacist occupies.

As the community pharmacy prescribing landscape develops, there is an urgent need for clinical decision support AI that is designed for not retrofitted to the community pharmacy prescribing context. In the interim, independent prescribing pharmacists using AI tools designed for other settings must apply particular scrutiny to the tool's scope and limitations.

4.4 Locum and Agency Workforce

Community pharmacy has a significant and structurally embedded reliance on locum and agency pharmacists. A locum pharmacist arriving at a pharmacy for a single session has no prior exposure to the AI tools in use at that premises. They have not received the induction training, have not been assessed for competency, and may not even be aware that AI tools are in use until they begin a consultation.

Pharmacy owners have a clear obligation to ensure that locum and agency staff are briefed on any AI tools in use at their premises before they begin clinical work. This should be a standard element of the locum induction not an optional addendum and should be documented.

Professional bodies and locum agencies have a corresponding role: ensuring that pharmacists working in locum capacity have baseline AI literacy as part of their professional development, rather than leaving it entirely to individual pharmacy owners to provide at the point of each engagement.

4.5 Under-Resourced Governance and the ICB Gap

The governance obligations set out in this framework assume a level of infrastructure support that many community pharmacies simply do not have access to. Hospital trusts have clinical safety officers, Caldicott Guardians, information governance leads and legal teams. GP practices operate within primary care networks with shared governance resource. Community pharmacy, in most ICB areas, operates largely alone.

ICBs have both a contractual relationship with community pharmacy and a system responsibility for the quality and safety of care delivered within their geography. At a minimum, ICBs should consider: providing template governance documentation for common AI tool categories; establishing a shared due diligence resource for AI tools being deployed across multiple pharmacies; including AI governance in pharmacy contract monitoring and quality visits; and creating accessible routes for community pharmacists to raise concerns about AI tools without fear of commercial consequence.

4.6 The Patient Population

Community pharmacy serves everyone, including the populations that other parts of the health system reach least effectively. Older patients, patients with multiple long-term conditions, patients from ethnic minority communities, patients with lower health literacy, patients in areas of high deprivation. These are also the populations most likely to be underrepresented in the training data of AI tools developed in research or secondary care settings, and most likely to experience the consequences of algorithmic bias.

This is not a reason to withhold AI-enabled services from community pharmacy. It is a reason to hold the AI tools deployed in community pharmacy to a higher standard of validation, transparency and monitoring in relation to these populations specifically. Pharmacy owners should ask vendors directly: how does this tool perform across different ethnic groups, age groups and deprivation quintiles? If the vendor cannot answer that question, the tool has not been adequately validated for community pharmacy use.

Section 5 — A Worked Example

AI-Assisted Clinical Decision Support in a Pharmacy First Consultation

The following example walks through a complete Pharmacy First consultation in which AI clinical decision support is in use. It is designed to illustrate how the framework in Section 3 applies in practice — what good looks like at each stage, and where the risks concentrate. It is intentionally grounded in the operational reality of community pharmacy rather than an idealised clinical environment.

The scenario is vendor-neutral. The AI tool described is a composite representation of the category of clinical decision support tools currently available for Pharmacy First pathways. It is not a description of any specific product.

5.1 The Scenario

A 34-year-old woman presents at a community pharmacy on a Monday morning. She reports a two-day history of dysuria and increased urinary frequency. She has no fever, no loin pain and no vaginal discharge. She is not pregnant. She has no relevant past medical history and takes no regular medication. She has been unable to get a same-day GP appointment and has been directed to the pharmacy by NHS 111.

The pharmacy is a single-handed operation. The superintendent pharmacist is the only clinical staff member on duty. There are four people waiting at the dispensary counter and

two more in the consultation room queue. The pharmacist is using an AI clinical decision support tool integrated into the Pharmacy First consultation workflow.

5.2 Before the Consultation: Governance Preconditions

For this consultation to proceed safely with AI support, the following governance preconditions should already be in place established before the tool was ever deployed, not assembled in the moment.

The tool has been evaluated against the due diligence framework in Section 3.1. The pharmacist knows it has been validated in community pharmacy settings for lower urinary tract infection pathways, and processes patient data under a data processing agreement that complies with UK GDPR. The pharmacy's privacy notice has been updated to reflect AI tool use.

There is a written SOP for AI-assisted Pharmacy First consultations. The pharmacist knows what inputs the tool requires, what outputs it produces, under what circumstances its recommendation should be overridden, and how to document the consultation.
The pharmacist has received training on the tool including its limitations. They know, specifically, that the tool has not been validated for patients with recurrent UTI, patients who are immunocompromised, or presentations where systemic symptoms are present.

5.3 Opening the Consultation: Patient Transparency

The pharmacist invites the patient into the consultation room. Before beginning the clinical assessment, they explain briefly and in plain language that a clinical decision support tool will be used to help structure the consultation and assist in the assessment. They explain that the tool helps ensure a thorough and consistent approach, that the pharmacist makes the final clinical decision, and that the patient can ask questions about the process at any point.

This disclosure takes approximately thirty seconds. It is documented in the consultation record.

5.4 The Consultation: AI as Clinical Aid

The pharmacist conducts the clinical assessment. They take a structured history, ask about red flag symptoms, and conduct the clinical examination appropriate to the presentation. The AI tool prompts structured data entry and generates a recommendation in real time as information is entered.

The tool recommends supply of a Pharmacy First UTI treatment in line with the current clinical pathway. It flags no red flag symptoms based on the data entered. It generates a structured consultation summary for the patient record.

The pharmacist reviews the recommendation. It is consistent with their own clinical assessment. They note, however, that the patient mentioned in passing, not in response to a

direct question that this is her third UTI in six months. The AI tool has not flagged this as clinically significant because recurrent UTI was not entered as a data point it emerged conversationally, after the structured data entry was complete.
This is the moment the framework is designed for.

5.5 Clinical Override: Professional Judgement in Practice

The pharmacist recognises that a third UTI in six months meets the threshold for further investigation and falls outside the standard Pharmacy First UTI pathway. The AI tool's recommendation is clinically appropriate for an uncomplicated first or second presentation, but not for this patient's actual clinical situation.

The pharmacist does not follow the AI recommendation without modification. They supply the treatment for the current episode which remains clinically appropriate but they also provide written safety-netting advice, document the recurrent presentation in the consultation record, and generate a referral letter to the patient's GP flagging the pattern for investigation.

The override is documented. The pharmacist records their clinical reasoning not just what they decided, but why and notes that the AI recommendation was modified on the basis of clinical information that emerged outside the structured data entry process.

This documentation serves three purposes: it protects the patient by ensuring continuity of care; it protects the pharmacist by demonstrating that professional judgement was exercised; and it contributes to the pharmacy's monitoring data a pattern of similar overrides might indicate that the tool's structured data entry process needs to prompt more systematically for recurrence history.

5.6 After the Consultation: Governance in Continuing

The consultation is complete. The AI-generated consultation summary is reviewed by the pharmacist, amended to reflect the override and the referral, and filed in the patient record. The pharmacist's own clinical reasoning is documented alongside it not replaced by it. The near-miss is recorded in the pharmacy's AI governance log. If three similar cases emerge in the next month, the superintendent pharmacist has the information needed to review the tool's performance, update the SOP, and notify the vendor.

The consultation has taken eleven minutes. The AI tool has contributed to efficiency the structured data entry and automated summary have reduced documentation time. But the clinical outcome has been determined by the pharmacist's knowledge, judgement and willingness to act on information the algorithm did not capture. That is what good looks like.

5.7 What Could Have Gone Wrong

It is worth naming explicitly what the failure modes look like in this scenario, because they are not hypothetical.

If the pharmacist had been a locum with no induction to the tool, they may not have known that recurrent UTI falls outside the tool's validated scope, and may have followed the recommendation without the contextual awareness to recognise its limitation.

If the governance culture prioritised speed over scrutiny if overriding the AI felt professionally awkward, or if the consultation queue created implicit pressure to accept the recommendation and move on the override may not have happened.

If the tool had not been validated for community pharmacy patient populations, its recommendation may have been based on a clinical evidence base that did not reflect the presentation profile of the patients actually using this pharmacy.

If the pharmacy had no AI governance log, the near-miss would have been invisible. The pattern would not have emerged. The SOP would not have been updated. The vendor would not have been informed.

Each of these failure modes is addressed by a specific element of the framework in Section 3. The worked example is not an illustration of a perfect system. It is an illustration of what the framework is designed to prevent.

Section 6 — Recommendations

The following recommendations are addressed to four audiences. They are intentionally concise — this section is designed to be extracted, circulated and acted upon.

6.1 For Pharmacy Owners and Superintendent Pharmacists

- Before deploying any AI tool in a clinical context, assess it against the MHRA's published guidance on software as a medical device. Do not rely on vendor assurances. A tool that generates clinical recommendations, pathway guidance or risk stratification outputs warrants specific scrutiny on this question, irrespective of whether it produces a formal diagnosis.
- Ensure a written SOP exists for every AI tool in clinical use before deployment begins. The SOP must specify the tool's scope, its limitations, the override process, and the documentation requirements. It must be accessible to all staff — including locums.
- Complete a Data Protection Impact Assessment before deploying any AI tool that processes patient data. Update your privacy notice to reflect AI tool use. Do not do this retrospectively.
- Establish and maintain an AI governance log. Record every tool in use, every incident, every update received from vendors, and every scheduled review. This document should be available for GPhC inspection.
- Brief every locum and agency pharmacist on AI tools in use at your premises before they begin clinical work. This is not optional. It is a governance obligation and a patient safety measure.
- Do not allow operational pressure, consultation queues, dispensing volume, commercial relationships with vendors — to erode the clinical override culture that your governance framework should protect.
- Review AI tools at minimum annually, and following any significant incident, software update, or change in clinical context.

6.2 For Frontline Pharmacists and Pharmacy Technicians

- Treat every AI output as a clinical aid, not a clinical decision. Your professional registration is not protected by the fact that an algorithm agreed with you. It is protected by the fact that you applied your own clinical reasoning and can demonstrate that you did so.
- Document your clinical reasoning independently of the AI-generated summary. If you followed the recommendation, say why. If you overrode it, say why.
- Raise concerns about AI tool performance through your pharmacy's incident reporting framework. If a tool is producing outputs that seem inconsistent with clinical presentation, that concern should be documented and escalated.

- Invest in your own AI literacy. Understanding the limitations of the tools you use is now a core professional competency. It belongs in your revalidation as genuine reflection, not as an AI-generated summary of your practice.
- If you are working as a locum and arrive at a premises where AI tools are in use without any induction having been provided, ask for one before you begin clinical work. You are entitled to that briefing. Your patients are entitled to a clinician who has received it.

6.3 For Commissioners and Integrated Care Boards

- Provide community pharmacies in your area with template governance documentation for AI tools, DPIA templates, SOP frameworks, governance log structures. These do not need to be bespoke. They need to exist and be accessible.
- Establish a shared due diligence resource for AI tools being deployed across multiple pharmacies in your ICB area. The due diligence burden on a single-handed pharmacy owner assessing an AI tool in isolation is unreasonable.
- Include AI governance in pharmacy contract monitoring and quality visits. Ask to see the AI governance log. Ask about staff training. Ask about incident reporting.
- Create accessible routes for community pharmacists to raise concerns about AI tools without fear of commercial or contractual consequence.
- Recognise community pharmacy as a priority setting for AI governance support — not because it is the weakest link, but because it is carrying the greatest clinical expansion with the least infrastructure behind it.

6.4 For Regulators and Professional Bodies

- Develop implementation-level guidance that addresses the operational realities of community pharmacy specifically. Generic NHS AI guidance does not translate to a single-handed pharmacy without active interpretation and support.
- Clarify the MHRA medical device boundary for AI tools commonly used in community pharmacy. The current landscape in which vendors make varied and sometimes contradictory claims about the regulatory status of their tools creates a due diligence burden that pharmacy owners are not equipped to resolve alone.
- Build AI governance competency into initial education and training standards, foundation year frameworks and revalidation requirements. AI literacy is now a core professional skill. It should be treated as such in the standards that govern entry to and continuation in the profession.
- Engage with the community pharmacy sector as an equal partner in the development of AI governance frameworks, not as a downstream recipient of guidance developed elsewhere.
- Consider this framework as a starting point for that conversation. Formal engagement, whether through consultation, co-badging, or incorporation into regulatory guidance would accelerate the translation of these recommendations into practice. That conversation is open.

Appendix A — Self-Assessment Checklist

Use this checklist before deploying any AI tool in a clinical or operational context, and as part of your annual governance review. It is not a substitute for the full framework it is a prompt to ensure nothing has been missed.

Section A: Procurement and Due Diligence

- ☐ I have assessed whether this tool meets the MHRA definition of a software medical device, using the MHRA's published guidance — not solely the vendor's characterisation
- ☐ If the tool is a medical device, I have verified its MHRA registration and confirmed it holds appropriate conformity marking
- ☐ I have reviewed the clinical evidence for this tool, including the settings and patient populations in which it has been validated
- ☐ I have confirmed the tool has been validated in community pharmacy settings, or have documented the limitations of its validation evidence
- ☐ I have requested and reviewed the vendor's algorithmic transparency documentation
- ☐ I have assessed the tool's training data for potential bias in relation to the patient population my pharmacy serves
- ☐ I have a signed data processing agreement with the vendor
- ☐ I have confirmed the vendor's data storage arrangements comply with UK GDPR international transfer requirements where applicable
- ☐ I have reviewed the contract for liability provisions in the event of harm arising from tool use
- ☐ I have documented exit arrangements — what happens to patient data and clinical continuity if the contract ends

Section B: Clinical Governance

- ☐ A named individual holds accountability for oversight of this tool
- ☐ A written SOP exists for this tool before deployment
- ☐ The SOP is accessible to all staff, including locums and agency pharmacists
- ☐ The governance culture actively supports clinical override
- ☐ Incident reporting arrangements cover AI tool incidents and near-misses
- ☐ A schedule for periodic review of this tool is documented — at minimum annually
- ☐ The AI governance log has been updated to include this tool

Section C: Staff Competency and Training

- ☐ All permanent clinical staff have received structured induction training for this tool before go-live
- ☐ Training covers both technical operation and critical evaluation — including the tool's known limitations and failure modes
- ☐ Training is documented for each member of staff
- ☐ A process exists for briefing locum and agency staff on this tool before they begin clinical work
- ☐ Competency assessment is included in ongoing supervision and appraisal
- ☐ A mechanism exists for refreshing training following significant tool updates

Section D: Patient Transparency and Consent

- ☐ A disclosure process is in place for informing patients when AI is involved in their care
- ☐ Disclosure is proportionate to the role AI is playing
- ☐ The privacy notice has been updated to reflect AI tool use before deployment
- ☐ The disclosure approach is accessible to patients with lower health literacy, communication needs, or whose first language is not English
- ☐ Consultation records document patient disclosure and agreement
- ☐ Where the tool makes decisions with significant effect on patients, UK GDPR Article 22 requirements have been assessed

Section E: Data Protection and Information Governance

- ☐ A Data Protection Impact Assessment has been completed for this tool
- ☐ The lawful basis for each category of personal data processed has been identified and documented
- ☐ The pharmacy's NHS DSPT submission reflects AI tool use where applicable
- ☐ Patient data rights can be met in relation to data processed by this tool
- ☐ The DPIA has been reviewed following any change in the tool's data processing arrangements

Section F: Monitoring and Review

- ☐ Performance monitoring arrangements are in place — not solely reactive to incidents
- ☐ Override rates are tracked and reviewed periodically
- ☐ User feedback from clinical staff is actively sought and documented
- ☐ The vendor contract specifies notification obligations for material updates to the tool
- ☐ External horizon scanning is part of routine governance

☐ The AI governance log is maintained and up to date

A pharmacy that can answer yes to all items in this checklist has met the minimum standard for responsible AI deployment set out in this framework. Where gaps exist, they should be addressed before deployment — or, where a tool is already in use, as a matter of priority.

Appendix B — Glossary

Algorithm: A set of rules or instructions followed by a computer system to perform a calculation or solve a problem. Understanding an algorithm does not require understanding its underlying mathematics it requires understanding what it does, what it was designed to do, and what its limitations are.

Algorithmic bias: Systematic error in an AI tool's outputs that arises from flawed assumptions or unrepresentative data in the tool's design or training. Bias can result in a tool performing less accurately for certain patient groups — particularly those underrepresented in training data — without this being apparent from aggregate performance metrics.

Algorithmic transparency: The degree to which an AI tool's reasoning can be understood and explained. A transparent tool can provide an explicable basis for its outputs. A black-box tool cannot. Transparency is a governance requirement, not a technical preference.

Automation bias: The documented tendency of human operators to defer to automated system outputs even when their own judgement suggests the output may be incorrect. Automation bias is a significant patient safety risk in clinical AI deployment and is addressed through training, governance culture and override mechanisms.

Clinical decision support: AI tools designed to assist clinicians in making clinical judgements. In community pharmacy, this includes triage tools, drug interaction checkers, treatment pathway guidance and medicines optimisation tools. Clinical decision support AI is the highest-risk category in the taxonomy set out in this framework.

Data Protection Impact Assessment (DPIA): A structured assessment required under UK GDPR for processing activities that are likely to result in high risk to individuals. A DPIA identifies the risks associated with a data processing activity and the measures taken to mitigate them. It is required before deploying AI tools that process patient personal data.

Generative AI: AI systems capable of generating text, images, or other outputs in response to prompts. In pharmacy, most commonly used for administrative tasks. Its outputs require critical review; it is capable of producing plausible but clinically inaccurate content.

Hallucination: A term used to describe instances in which a generative AI system produces output that is factually incorrect, fabricated, or internally inconsistent, presented with apparent confidence. Hallucination is an intrinsic characteristic of current large language model technology, not a malfunction.

Information governance: The framework of policies, procedures and accountability structures through which an organisation manages its information assets — including patient data — in compliance with legal, regulatory and professional requirements.

Intended purpose: The use for which an AI tool or software product is designed and marketed by its manufacturer. Intended purpose is the primary determinant of whether a

software product meets the MHRA definition of a medical device. A tool's intended purpose is established by the manufacturer's claims, instructions and marketing — not by how an individual user chooses to deploy it.

Large language model (LLM): A type of AI system trained on large volumes of text data, capable of generating, summarising and analysing text. LLMs are the underlying technology of most generative AI tools currently in widespread use, including those being marketed for pharmacy administrative functions.

Medical device: Under MHRA regulations, any instrument, apparatus, appliance, software, implant, reagent, material or other article intended to be used for a medical purpose. Software — including AI tools — that is intended to aid in diagnosis, prevention, monitoring, prediction, prognosis, treatment or alleviation of disease may meet this definition regardless of whether it produces a formal diagnosis.

NHS Data Security and Protection Toolkit (DSPT): A self-assessment framework used by organisations that access NHS patient data, requiring them to demonstrate compliance with data security and information governance standards. Community pharmacies handling NHS patient data are required to complete the DSPT annually.

Override: The act of a clinician exercising professional judgement that differs from or modifies an AI tool's recommendation. Override is not a failure of the AI tool or the clinician it is the intended function of a human-in-the-loop governance structure. Override rates are a governance monitoring metric.

Superintendent pharmacist: The pharmacist who is personally responsible for the safe and effective running of a registered pharmacy business. Under GPhC standards, the superintendent pharmacist carries accountability for ensuring that standards are met in their pharmacy, including in relation to the governance of AI tools in use.

UK GDPR: The United Kingdom General Data Protection Regulation — the primary data protection legislation governing the processing of personal data in the UK. UK GDPR applies to the processing of patient personal data by AI tools in pharmacy settings.

Validation: The process of testing an AI tool's performance against a defined standard, in a defined population, for a defined purpose. Validation evidence is a core element of AI tool due diligence. Validation in one setting does not constitute validation for community pharmacy use.

Appendix C — Regulatory Landscape Map

The following summarises the key regulatory bodies and frameworks relevant to AI implementation in community pharmacy. It reflects the position as of June 2026 and should be reviewed periodically as the landscape evolves.

General Pharmaceutical Council (GPhC)

Role in relation to AI: Sets and enforces professional standards for pharmacists, pharmacy technicians and registered pharmacies. Does not regulate AI tools or products directly.
Relevant outputs: Position statement on AI in pharmacy (April 2026); advice on AI in education, training and revalidation (April 2026); Standards for Pharmacy Professionals; Standards for Registered Pharmacies.
Inspection relevance: GPhC inspectors may assess whether pharmacy owners and superintendent pharmacists have met their governance obligations in relation to AI tools in use. The AI governance log, SOPs and staff training records are relevant evidence.
Website: pharmacyregulation.org

Royal College of Pharmacy

Role in relation to AI: Professional leadership body. Sets professional development expectations and provides policy guidance. Does not have regulatory enforcement powers.
Relevant outputs: AI in Pharmacy policy (January 2025); professional guidance on medicines optimisation, prescribing and clinical practice.
Website: rpharms.com

Medicines and Healthcare products Regulatory Agency (MHRA)

Role in relation to AI: Regulates medical devices, including AI software that meets the medical device definition. Responsible for assessing clinical safety and technical performance of medical device AI tools.
Relevant outputs: Software and AI as a Medical Device guidance; national commission on AI regulation in healthcare (recommendations expected 2026); Yellow Card scheme for adverse incident reporting.
Key point for pharmacy owners: If an AI tool used in your pharmacy meets the MHRA medical device definition, it must be registered with the MHRA and hold appropriate conformity marking. Pharmacy owners are not expected to make this assessment alone — but they are expected to ask the question and verify the answer.
Website: gov.uk/mhra

Information Commissioner's Office (ICO)

Role in relation to AI: Regulates data protection in the UK, including the processing of patient personal data by AI tools. Enforces UK GDPR and the Data Protection Act 2018.
Relevant outputs: Guidance on AI and data protection; guidance on automated decision-making; DPIA templates and guidance.

Key point for pharmacy owners: The ICO has published specific guidance on the use of AI in ways that involve personal data. DPIAs for AI tools processing patient data should be completed with reference to this guidance.
Website: ico.org.uk

NHS England

Role in relation to AI: System commissioner and strategic planner. Sets requirements for ICBs in relation to AI adoption. Does not directly regulate community pharmacy AI use but shapes the commissioning environment within which community pharmacy operates.
Relevant outputs: Medium-term planning framework (2025); AI knowledge repository; Pharmacy First service specification.
Key point for pharmacy owners: NHS England's planning framework requires ICBs to support AI adoption in primary care. Pharmacy owners experiencing a governance support deficit from their ICB should reference this framework in making the case for greater support.
Website: england.nhs.uk

NHS England Digital

Role in relation to AI: Provides technical standards, the NHS DSPT framework, and guidance on data and AI implementation across the NHS.
Relevant outputs: NHS DSPT; data security standards; AI in practice resource repository.
Key point for pharmacy owners: The NHS DSPT is an annual compliance requirement for pharmacies handling NHS patient data. AI tools that process NHS patient data must be reflected in your DSPT submission.
Website: digital.nhs.uk

This regulatory landscape is subject to change. The MHRA's national commission recommendations, expected in 2026, may substantially alter the framework for AI regulation in healthcare. Pharmacy owners should monitor updates from each of the bodies above and review their governance arrangements in response to significant regulatory developments.

About the Author

Asif Mukhtar MRPharmS is a Consultant Pharmacist, and the Founder and CEO of PharmBot AI Limited. He has ten years of clinical experience across community pharmacy settings and has been building clinical AI infrastructure for community pharmacy since 2022.

PharmBot AI was named a HealthInvestor Health Tech Provider of the Year finalist in both 2025 and 2026, and was shortlisted for the HSJ Partnership Awards 2026 for Best Pharmaceutical Partnership with the NHS from a field of over 240 entries. Asif submitted written evidence to the House of Lords Science and Technology Committee inquiry into AI in the UK - one of over 120 submissions accepted, and the only voice from community pharmacy, alongside Genomics England, Russell Group universities, and royal colleges. His evidence is published on the UK Parliament website as PMA0005.

He is the author of AI Isn't Failing In Healthcare It's: ***Built in the Wrong Place*** *(2026), available on Amazon.*

About PharmBot AI

PharmBot AI Limited is a UK clinical AI company building AIVAe -- an AI-enabled clinical infrastructure platform designed specifically for NHS community pharmacy workflows including Pharmacy First. PharmBot AI is the only community pharmacy-native AI company with a seat at the national policy table.

PharmBot AI has been independently cited in peer-reviewed academic literature as an example of AI infrastructure being developed for regulated pharmacy environments. Kahwaji et al. (2026), published in DIGITAL HEALTH (SAGE Publications, Impact Factor 3.3), reference PharmBot AI alongside regulatory frameworks from the MHRA and FDA in their examination of AI governance in pharmacy practice.

Website: www.pharmbot.ai.com

A Note on Use

This framework is published freely. You may share it, reference it and build on it -- with attribution to PharmBot AI Limited. If you would like to discuss its application in your organisation, commission a bespoke implementation review, or explore how AIVAe supports the governance standards described here, get in touch.

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