
CURATED STREAM

# Understanding the Role of AI in Healthcare

Transforming diagnostics, treatment and care with modern AI

# Agenda

*What we'll cover*

## Introduction

What AI in healthcare is, and why it matters now

## AI technologies in use

Machine learning, NLP, computer vision, robotics

## AI in diagnostics

Radiology, pathology, genomics, outbreak prediction

## Treatment & patient care

Personalised medicine, robotic surgery, monitoring

## Ethical & practical considerations

Privacy, bias, accountability, regulation

## Future trends

Foundation models, emerging tech, what's next

PART ONE

# Introduction to AI in Healthcare

Setting the scene — what AI does in clinical settings, and why now

# What is AI in healthcare?

*Software that learns from clinical data*

AI simulates human intelligence in machines to process data, recognise patterns and make informed decisions.

Modern clinical AI systems can ingest huge volumes of structured and unstructured data — imaging, lab results, electronic health records, sensor streams — and surface signals a human clinician would struggle to spot unaided.

## Key benefits

- **Improved accuracy**
- **Cost reduction**
- **Enhanced efficiency**

# Three big application areas

*Where AI is making the biggest difference today*

## Diagnostics

Improves accuracy of disease detection, reduces misdiagnosis, speeds up time-to-result.

## Treatment

Personalised treatment plans, drug discovery acceleration, response monitoring.

## Patient care

Better outcomes, lower readmission rates, improved patient experience.

*In each area, the AI augments clinicians — it does not replace clinical judgement.*

# Benefits of AI in healthcare

*Outcomes, cost and efficiency — reinforcing one another*

**Better patient outcomes** — more accurate diagnoses, personalised treatment plans, closer monitoring.

**Lower cost** — fewer unnecessary tests, fewer avoidable admissions, more efficient throughput.

**More efficient delivery** — automated routine tasks, reduced admin burden, more time for direct patient care.

**1,250+**
AI-enabled medical devices on the FDA authorised list by July 2025

**295**
FDA clearances in 2025 alone (>96% via the 510(k) pathway)

**~956**
Of the listed devices are radiology — by far the dominant specialty

# 2026 snapshot — the state of clinical AI

*Where the field is, in numbers*

**1,250+**

FDA-authorised AI medical devices

**142 days**

Median FDA clearance time

**Feb 2025**

First foundation-model clinical AI cleared (Aidoc CARE1™)

**2 Aug 2026**

EU AI Act fully applicable for high-risk medical AI

## AI medical devices by specialty (FDA list, July 2025)


*Counts are approximate, drawn from the FDA's AI/ML-enabled medical devices list (July 2025).*

PART TWO

# Types of AI Technologies

Machine learning, NLP, computer vision, robotics — the building blocks

# Machine learning and deep learning

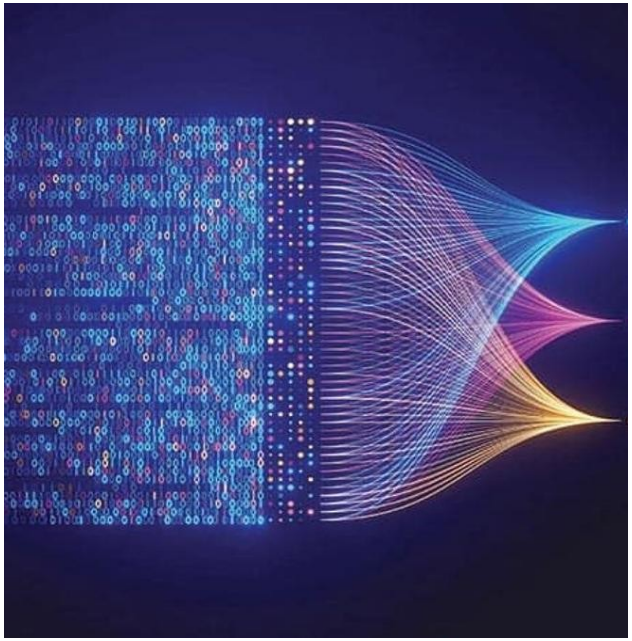
*How clinical AI actually learns from data*

## Machine learning

Algorithms learn patterns from data and make predictions or decisions. Used for fraud detection in claims, risk stratification, NLP triage, image classification.

## Deep learning

A subset of ML using multi-layer neural networks. Underpins speech recognition, modern medical image analysis, and the foundation models behind tools like Aidoc CARE1™.



*Data in → patterns out*

# Robotics and automation

*AI-supported devices that physically do clinical work*

## Surgical robotics

Robotic systems perform procedures with sub-millimetre precision — faster recovery, lower surgical risk.

## Medication dispensing

Automated pharmacies cut dispensing errors and free pharmacists for clinical work.

## Patient monitoring

Sensors and bedside devices stream vitals to AI models that flag deterioration early.

*AI doesn't operate the scalpel — it sharpens the surgeon's perception and steadies the system around them.*

# Image and pattern recognition in radiology

*The most mature application area for clinical AI*

*Ultrasound, X-ray, CT and MRI all benefit from AI overlays.*

## Why radiology first?

- Large, labelled image datasets (PACS archives, public benchmarks like CheXpert).
- Clear ground truth — biopsies, follow-up imaging, expert consensus.
- High-volume, repetitive task — strong ROI for triage and prioritisation.
- Well-understood regulatory pathway — ~96% of clearances go via 510(k).

**Result: ~956 of the 1,250 FDA-authorised AI devices are radiology.**

# Predictive analytics for disease outbreaks

*Spotting signals before they become crises*

AI systems analyse social-media chatter, news feeds, search trends and de-identified health records to flag potential outbreaks days or weeks earlier than traditional surveillance.

### 1. Ingest

Pull from open-source feeds, EHRs, lab networks

### 2. Detect

Models flag unusual patterns or geographic clusters

### 3. Alert

Public-health teams receive prioritised signals

### 4. Respond

Resources are pre-positioned; communication kicks in

*BlueDot famously identified COVID-19 signals from Wuhan reports in late 2019 — about 9 days ahead of the WHO alert.*

# AI in pathology and genomics

*From tissue slides and sequencing data to personalised insights*

## Pathology analysis

Models scan digitised whole-slide images to grade tumours, detect mitoses, and flag samples needing urgent review — reducing inter-observer variability.

## Genomics analysis

ML interprets variant data, predicts protein structure, and matches patients to targeted therapies — a foundation of precision oncology.

*DeepMind's AlphaFold opened up protein structure prediction; foundation models are now doing the same for cellular biology and variant interpretation.*

PART THREE

# AI in Treatment and Patient Care

From personalised medicine to robotic surgery to chronic-disease monitoring

# Personalised medicine and treatment plans

*Treatments tailored to the individual, not the average*

AI analyses a patient's medical history, genomics, lifestyle and prior response data to recommend treatment plans more likely to work for them specifically.

### Targeted therapies

Genomic profile matched to drugs likely to work — the core of precision oncology.

### Adaptive dosing

AI suggests doses based on real-time response, not population averages.

### Care-plan reasoning

LLM-assisted summaries help clinicians synthesise long, complex case histories.

# Robotic surgery and operative automation

*Precision tools that extend the surgeon's capability*

### Improved precision

Sub-millimetre tool control, tremor filtering, motion scaling.

### Lower complication risk

Smaller incisions, less blood loss, shorter hospital stays in many procedures.

### Less surgeon fatigue

Repetitive sub-tasks are automated, freeing focus for judgement calls.

*The surgeon still operates — the robot is a precision tool, not an autonomous agent.*

# AI in patient monitoring and support

*Continuous care for chronic conditions*

Wearables, bedside sensors and patient-facing apps now stream data to AI models that detect deterioration early and prompt timely intervention.

### Continuous monitoring

Heart rhythm, glucose, blood pressure — abnormalities flagged in real-time.

### Medication adherence

Reminders, refill prompts, smart pillboxes — improving compliance for chronic disease.

### Conversational support

Chatbots help triage symptoms, answer questions, and route patients appropriately.

# Spotlight: foundation models in clinical AI

*From narrow per-task tools to general clinical reasoning*

## Aidoc CARE1™ — February 2025

The first foundation-model-powered clinical AI cleared by the FDA. It reasons across multiple imaging modalities and conditions in a single model — a step-change from the narrow, per-task models that came before.

## What foundation models change for clinical AI

### One model, many tasks

Same backbone reads X-rays, CTs, MRIs and reports.

### Few-shot adaptation

Fine-tunes to a new pathology with far less labelled data.

### Multimodal reasoning

Combines images, structured EHR data and clinical notes.

### Faster regulatory iteration

Smaller incremental updates rather than rebuilding from scratch.

PART FOUR

# Ethical & Practical Considerations

Privacy, bias, accountability, regulation — the hard questions

# Privacy and data security

*Patient data is the fuel — and the risk*

- Clinical AI depends on huge volumes of sensitive patient data — images, genomes, lab results, longitudinal notes.
- Breaches damage patients, clinicians and the institution; HIPAA in the US and the NZ Privacy Act 2020 set the floor, not the ceiling.
- New attack surfaces in 2026 — prompt injection (#1 in OWASP Top 10 for LLM Applications 2025), data exfiltration via AI agents, third-party model leaks.

**97%** of breached organisations in 2025 lacked proper AI access controls (IBM Cost of a Data Breach 2025).

# Bias, accountability and regulation

*The hard questions — and how 2026 is starting to answer them*

## Bias

AI models trained on non-representative data can systematically under-treat or under-detect in some groups. A widely cited 2019 study found a US algorithm gave African-American patients lower priority for additional care than similarly ill white patients.

## Accountability

When an AI gets a diagnosis wrong, who's responsible — the vendor, the clinician, the institution? Liability law is still catching up. Most jurisdictions treat the clinician as the responsible decision-maker.

## Regulation

EU AI Act fully applicable 2 August 2026 — medical AI is high-risk under Annex III. FDA continues to clear via 510(k), with the July 2026 Omnibus update clarifying conformity assessments.

PART FIVE

# Future Trends & Developments

Where AI in healthcare is heading next

# Emerging directions

*What's on the near horizon for clinical AI*

### Foundation models for medicine

After Aidoc CARE1™, expect more multi-modal, multi-task clinical AI — reasoning across imaging, notes and labs.

### Generative drug discovery

Protein-structure models (AlphaFold etc.) plus generative chemistry are compressing discovery timelines.

### Virtual nursing & coding

LLM-based assistants that handle intake, education, and automated medical coding — freeing clinicians for direct care.

### Quantum & neuromorphic

Still research-phase, but offer the prospect of faster drug screening and brain-inspired efficient inference.

### Ambient clinical scribes

AI listens to the consult, drafts the note and flags follow-ups — already mainstream in many hospitals.

### Patient-facing chat

Health-tuned conversational AI for triage, education and chronic-disease coaching, with safety guardrails.

# Summary and next steps

*What to take away — and what to do with it*

## Key takeaways

- AI is now standard infrastructure in diagnostics — over 1,250 FDA-authorised devices, dominated by radiology.
- Treatment and care are next — personalised medicine, robotic surgery, continuous monitoring all maturing.
- Foundation models (e.g. Aidoc CARE1™, Feb 2025) shift clinical AI from per-task tools to general clinical reasoning.
- Ethical, legal and regulatory frameworks are arriving — EU AI Act fully applicable 2 Aug 2026.

## Next steps

1. Encourage interdisciplinary collaboration between clinicians, AI developers and policymakers.
2. Invest in AI education and training for healthcare professionals across all roles.
3. Stay current with advancements, best practice and emerging regulatory guidance.

**Join the discussion, explore partnerships, invest in responsible AI in healthcare.**