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AI in healthcare

The AI landscape: traditional, generative, and agentic AI

Traditional artificial intelligence (AI) refers to machine learning and statistical models that operate on structured data to automate, predict, and optimise decision-making processes. These systems are designed to identify patterns and improve outcomes in areas such as quality, clinical efficiency, patient safety, and person-centred care.

Generative AI (GenAI) extends these capabilities by using large language models (LLMs) and other generative architectures that are built to handle general inputs and outputs. GenAI can analyse and create content from unstructured data such as large documents, clinical imagery, or audio from patient interactions, enabling more interactive and context-aware use of information. An assistant (sometimes used interchangeably with agent) is an LLM configured to perform a specific task through prompt engineering and data access.

Agentic AI systems equip LLMs with autonomy and access to a predefined toolbox, enabling them to complete multi-step clinical and operational tasks, such as drafting discharge summaries, querying EHRs, and coordinating referrals.

> "Data, artificial intelligence, and new technologies offer fantastic opportunities to bind the healthcare system more closely together [...] How do we create a humane healthcare system founded on care, trust, and security, where every citizen, no matter where they live, has access to the highly specialised treatment they need?"
>
> Rasmus Møgelvang, Hospital Director, Rigshospitalet

Source: Sundhedspolitisk Tidsskrift (2022)

State of AI

The healthcare sector faces sustained cost pressure on already high public expenditure, alongside a demographic squeeze in which rising demand meets a shrinking workforce. That combination forces a structural change to reduce the workforce-intensity in care delivery.

Clinicians often work on several tasks in parallel, and the complexity of that everyday reality leaves little room to absorb new tools efficiently, which slows in-situ adoption. To continue delivering quality, patient-centred services, there is a need to adopt novel technologies responsibly and create real impact for patients and HCPs in their everyday tasks.

To understand the current level of AI adoption within the healthcare sector, it is worth distinguishing between two types of use cases:

- clinical use cases built on complex patient data
- office/administrative tasks which resemble use cases in other sectors

Most documented AI implementations reside in the former category, specifically within diagnostics. Medical image analysis is the most mature use case, radiology AI is running in selected regional hospitals, and audio-based triage analysis is partially deployed.

The latter category of use cases like predictive prevention, capacity optimisation, cross-entity knowledge sharing, etc., sits in small pilots and shadow initiatives that are not being scaled efficiently. Leveraging knowledge across healthcare and from other sectors, there seem to be substantial opportunities to capture within these impact areas.

The lack of broadscale AI implementation and adoption in healthcare does not seem to be held back by an absence of strategy in Denmark. On the contrary, strategic ambition exists at several levels; nationally, regionally, locally, and increasingly at European level. The challenge is that these efforts are not always connected into a clear implementation pathway, resulting in many pilots and initiatives that struggle to scale into everyday clinical and administrative practice.

The structural obstacles on the clinical side are concrete: records are fragmented, unstructured, and biased across systems and formats; staff have little room in the average workday to take on new tools; and the systems lack the legal and commercial competencies to scale AI built in-house. AI today acts mainly as an efficiency lever to ease workforce pressure rather than as mission critical infrastructure.

Trust transfer is non-trivial in a profession built on strong professionalism, and the question of who is responsible for the patient when AI is in the loop remains unresolved. Crucially, this liability cannot sit with individual doctors and nurses on top of an already busy day; it is a leadership responsibility to remove that risk from clinicians and to establish clear ownership of accountability before an AI ever makes an error. Workforce concern about redundancy meets a real risk of widening digital inequality between resourceful and less resourceful citizens, while AI-prepared patients arrive with self-generated diagnoses, treatment plans, and follow-up questions that time-pressured clinicians struggle to absorb.

AI is improving at a remarkable pace, and the potential to assist within a healthcare system under increasing pressure calls for efforts to bring the boardroom strategies into the everyday work of HCPs. Realising this at scale requires the benefits to be made tangible: leadership will only invest once the concrete gains of a given AI application are clearly demonstrated.

Healthcare's AI ambition is real, but fragmented data, thin capacity, and an overstretched workforce keep adoption from scaling

Healthcare AI is framed as an efficiency tool, mature in isolated pockets but not yet system-wide

Barriers to scaling are capacity, data governance, ethical Considerations, and fragmented infrastructure

Regulation is tightening faster than organisations can build the governance to match

Current state of AI in the health care industry...

AI adoption in Danish healthcare rests on a strong foundation: high digital maturity, a deep health data asset base, sustained political attention, funding for pilots, and active collaboration across national, regional, and clinical actors. Strategy and ambition sit at multiple levels, both centrally and locally.

Adoption is therefore happening, but unevenly. Diagnostic imaging is the most advanced area, already in production at scale in Danish radiology, and AI-based triage support on the 1813 and 112 emergency lines is partially deployed. Speech to text scribes, predictive readmission models, and capacity optimisation tools are advancing through pilots. Most other activity still sits in small-scale experimentation rather than scaled rollout, with initiatives coming both from national and cross-regional flagship projects and from bottom-up clinical teams.

The data, governance structures, and talent within the workforce are largely in place to build and scale responsible AI in Denmark.

... but what is hindering adoption?

Although ambition and strategy exist at several levels, a gap to scaled implementation persists. Activity is spread from European to local levels, with unclear ownership and few pathways from pilot to production; pilots are rarely shut down but scaling them afterwards is where efforts stall.

The barrier profile differs sharply by use case. Administrative and logistics-oriented AI can move quickly with limited clinical risk and is consistently underused. Clinical support tools require workflow fit and trust before they scale. Diagnostic and treatment decision support carries the heaviest evidence, governance, and regulatory load, and moves slowest. A large part of the challenge is capacity: implementation power at department level is thin, IT functions are focused elsewhere, and the gains at scale are not yet visible enough to pull investment and attention.

Denmark's health data foundation is genuinely strong, built on shared national infrastructure and high citizen trust, but fragmentation across systems and ownership structures makes operationalising it for AI harder than the headline position suggests. Clinical scepticism is professional, not reflexive: imaging or screening AI that flags more cases is only useful if the system can absorb the follow-up, and high false-positive rates can swamp downstream capacity.

Regulation adds a further layer. GDPR, the EU AI Act, and the incoming EHDS raise the compliance bar, governance practice is still catching up, and informed consent is hard to maintain when patients have no working model of how AI reaches its outputs.

Future outlook of AI across the healthcare value chain

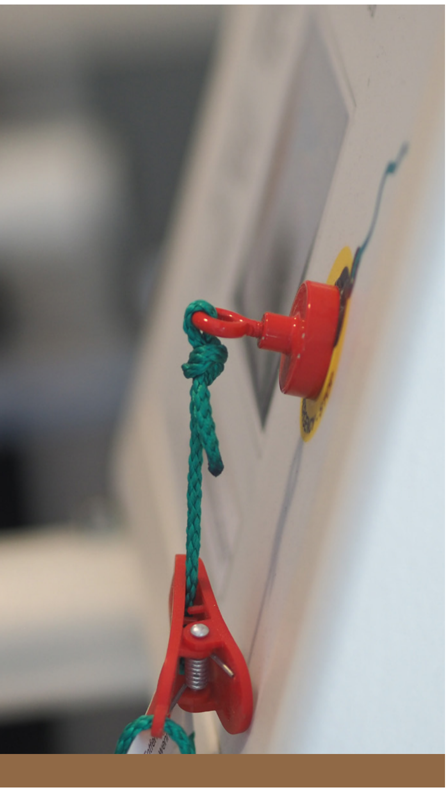
We see AI reshaping healthcare across the value chain, starting with operational and documentation efficiency and moving towards de-hospitalised care, predictive prevention, and AI-augmented clinical decision-making.

			INDUSTRY ADOPTION			
	Use case	**Description**	**Emerging**	**Low**	**Medium**	**High**
01. Prevention and health promotion	Preventive treatment with patient data and AI	Combine EHR, wearables, and social-determinant data with predictive analytics to identify high-risk individuals, personalise prevention, and detect likely readmissions before symptoms escalate. Denmark holds a structural advantage given the breadth of data available across the system.	●	○	○	○
	Increase patient accessibility to knowledge and help with AI	GenAI as a personal patient navigator clarifying what to expect from whom across fragmented care pathways, especially for less digitally capable users. Will strengthen e-health literacy and patient empowerment.	○	●	○	○
	AI tool to analyse patient prescriptions before prescribing new medicine	AI checks existing prescriptions against any new prescription to flag dangerous interactions and contraindications, supporting safer polypharmacy in patients. The need is sharpened by an ageing population and rising multimorbidity, and by the shift from one-size-fits-all care towards personalised medicine tailored to individual circumstances.	○	●	○	○
02. Access, triage, and primary care	AI-assisted pre-patient interaction (pre-visit summarisation and actionable)	Push actionables from existing patient data to clinicians and home-care staff before each interaction. This would be checklists, early-sign flags (e.g., dehydration), uneven-education support.	●	○	○	○
	Patient screening at emergency department and 1813/112	AI-assisted triage on Danish emergency lines and at EDs, including Corti-style audio analysis for cardiac-arrest detection and 112 app with shared location.	○	○	●	○
	Scheduled coordination based on patient needs	AI-supported care coordination using risk stratification to align scheduling with need and support GPs' population responsibility. Imaging AI, AI-prepared notes, and outcome simulation for complex cases. The most mature pocket in production today, especially radiology.	○	●	○	○
03. Diagnostics, assessment, treatment, and transitions	AI for diagnostics (images, text, tabular)	Imaging AI, AI-prepared notes, and outcome simulation for complex cases. The most mature pocket in production today, especially radiology.	○	○	○	●
	Utilise AI to allow patients home treatment	AI enables hospital-at-home: remote monitoring, voice-based follow-ups, medication-timing reminders. Identified as a transformational shift.	○	○	●	○
	AI for medical decision support (incl. multidisciplinary AI team)	Decision support for cancer and complex care, including an agentic "multidisciplinary AI team" that listens across specialty meetings, provides role-specific clinical guidance, and flags signs of deterioration.	○	●	○	○
04. Operations, ministrations, and logistics	Capacity and logistics optimisation	AI-driven optimisation of bed management, OR scheduling, staff rostering, patient flow, and inter-hospital logistics. Low patient-sensitivity adoption win.	○	●	○	○
	AI summaries of a patient's process through the system	GenAI summarises a patient's journey for reporting and continuity, including doctor–patient transcription and medical-to-patient-friendly translation.	●	○	○	○
	Cross-entity knowledge sharing and management	GenAI surfaces information across hospitals, GPs, specialists, and municipalities, addressing the cross-institutional information gap as EHDS evolves.	○	●	○	○

Highlighted future AI use cases in healthcare

The next wave of AI in healthcare carries the dual promise of releasing clinical capacity and reaching patients the system currently underserves.

01. Preventive treatment with patient data and AI	**Why:**	The Danish system is built for the general population, leaving outliers underserved. Wearables and phone-connected services now generate the continuous data needed for predictive prevention at scale, addressing late identification of deteriorating patients, avoidable readmissions, and inequitable access for citizens not actively seeking care.
	Examples:	Johns Hopkins-style predictive analytics combines EHR and wearable data to flag potential readmission within 30 days. Denmark's earlier 2% Act implementation hired nurses to follow up on algorithm-flagged risks, but evaluation showed the resources were poorly spent, and the algorithm itself was fixed and non-tunable. The lesson points to design and operating-model choices, not a failure of the underlying concept.
	Impact:	Earliest-possible identification of high-risk patients, enabling preventive rather than reactive intervention. This has the potential to reduce inequality if designed to find people not seeking care themselves.
02. AI-assisted pre-patient interaction	**Why:**	Healthcare staff, especially less-educated home nurses, frequently arrive at patient interactions unprepared, with no help to navigate large journals beforehand. The pre-visit data already exists in the EHR; the bottleneck is analysis and pushing the right context to the right person at the right time. The use case sits adjacent to AI medical scribe functionality, an area with prior demonstration projects, and addresses a clear and continuous pain point: uneven preparation, missed early signs, and inconsistent quality across staff seniority and education levels.
	Examples:	A home nurse opens the day with an AI-prepared briefing for each upcoming visit. The assistant has read the patient's journal overnight, summarised what has changed, flagged early signs to look for such as dehydration or medication side effects, and prepared a short checklist tailored to the visit. The nurse arrives prepared and confident, and the senior physician gets the same support before ward rounds.
	Impact:	Higher quality and personalisation of patient interactions. It also becomes particularly useful where staff education is uneven.
03. Utilise AI to allow patients home treatment	**Why:**	Western healthcare systems face a structural transition towards de-hospitalisation, with AI as a key enabler. The blocker is cultural, not technical. Danish HCPs are reluctant to work remotely from the patient, and reliable remote monitoring, structured follow-up, and timely escalation can relieve that fear, provided the tools are designed not to amplify health anxiety in family members who are already anxious.
	Examples:	Voice-based AI follow-ups with patients at home (Kaigo Health-style) and AI as a home-treatment assistant providing medication reminders at the right time, with remote monitoring data feeding back to the clinical team. This combines a voice-based GenAI UI, particularly important for ageing or limited-mobility users, with continuous data flow to clinicians.
	Impact:	This is a shift involving a high degree of change, approaching transformational in scope. It frees hospital capacity and supports continuity of care across the hospital-to-home transition.
04. Capacity and logistics optimisation	**Why:**	Identified as low-hanging fruit since it is not patient-relation sensitive, which makes it materially easier to adopt than clinical-facing AI. Many projects are already underway across healthcare systems on AI for workforce planning, although the landscape is fragmented across small vendors. Strong analogues from other capacity-constrained industries reduce the technical risk and accelerate vendor selection. The pain points are well-known: bed bottlenecks, suboptimal staff rostering, and inefficient patient flow within and between hospitals. The use case extends naturally into healthcare IoT: RFID tagging of beds, equipment, staff badges, and patient wristbands generates real-time location and movement data at a volume only AI can practically process, opening the door to live capacity optimisation rather than retrospective scheduling.
	Examples:	AI handles the optimisation work behind bed management, operating room scheduling, staff rostering, and patient flow within and between hospitals. The result is fewer bottlenecks, better-utilised operating rooms, and a smoother experience for both patients and staff.
	Impact:	High ROI early AI use cases in healthcare operations. The efficiency gains land in the near term and the trust barriers that slow patient-facing AI do not apply. Live, IoT-enabled capacity optimisation moves the operating model from retrospective planning to real-time orchestration – particularly valuable for high-turnover assets such as beds, operating rooms, and infusion equipment.



Implement reference cases

The two cases illustrate how Implement Consulting Group has embedded AI into core healthcare and public sector processes with clients, delivering tangible results and meaningful business impact

Strengthening ward-round documentation with AI for a Danish public hospital

A cardiology department in a Danish public hospital struggled with a disproportionate documentation load on doctors, nurses, and medical secretaries, and wanted a path towards digital, AI-supported documentation of ward rounds and patient consultations.

Working through a multidisciplinary working group, Implement ran ward-round observations and workshops to clarify viable technical solutions, assess their fit to the documentation task, and surface the legal frameworks each would require. The output was a prioritised, ready-to-execute implementation plan.

Impact

- Four viable solutions surfaced through observation and co-creation; two selected for deeper work
- Legal prerequisites mapped per solution, removing the most common clinical AI rollout blocker
- Concrete implementation plan delivered, enabling immediate pilot start

Clinical Documentation

Healthcare AI

Shared AI governance and a lighthouse pilot for a regional healthcare authority

One of the Danish regional healthcare authorities needed a shared direction, governance structure and framework for responsible use of AI within HR and education.

Over the engagement, Implement upskilled 300+ employees across eight units through seminars, workshops, and hands-on training; established an AI ambition, assessment framework, and a prioritised use case pipeline refined from 66 ideas down to five minimum viable product (MVP) candidates; and built and user-tested a lighthouse pilot, RAG-based holiday-guidance chatbot for HR Service, to validate the move from pilot to operations.

Impact

- Shared AI vocabulary and competency baseline built across eight units
- MVP cut email response time on standard HR queries by ~50%, with 80% of answers ready-to-send after iteration two
- Reusable governance toolkit handed over with decision gates and RACI roles

AI Governance

Generative AI

5 Mission-driven AI adoption starting from healthcare's fundamental challenges, not the technology – five strategic choices must be considered

The challenge	The strategic choice (FROM → TO)			Where ai plays a role
Clinicians struggling to stay afloat amid the workload Bed bottlenecks, OR under-use, fragmented logistics across sites	**01. OPERATING MODEL**	Retrospective planning	Live orchestration	**Capacity optimisation** Logistics optimisation, IoT, and RFID data fusion across assets
Operational strain Documentation load, interrupt-driven work	**02. VALUE CREATION**	Top-down	Clinician led adoptation	**Clinician-led adoption** Scribes, pre-visit prep, decision support, agentic MDT teams
Reforming healthcare: De-hospitalisation Care must move home; clinicians fear loss of patient proximity and change is hard	**03. STRATEGIC DIRECTION**	AI as efficiency tool	Mission critical enabler	**Bringing care home** AI for remote monitoring, voice-based follow-up, clinical escalation
Digital inequality Resourceful patients navigate; others fall through the gaps	**04. SCOPE AND AMBITION**	Scattered pilots with devotees	Structured scaling	**Equity-by-design rollouts** Patient facing AI with navigators, e-health literacy tools, voice-first accessibility
Regulatory load and complexity Vendor lock-in, MDR,GDPR, EU AI Act	**05. CAPBILITY STRATEGY**	Pure buy-and-partner	Build with governance	**Governed and responsible AI** Governance, MDR/GDPR/EU AI Act readiness, data foundations

Future outlook

The future of healthcare is impossible to predict. But what is certain is that AI can no longer be parked as a curiosity – the pressures on the system are now larger than the barriers that have held adoption back.

Across healthcare, organisations are moving in a common direction. Not because they share a destination, but because cost pressure, workforce strain, and the need for de-hospitalisation are too sharp to ignore. The early leaders are not those with the longest roadmaps, but those who confront the organisational, regulatory, and trust barriers head-on rather than treating AI as a purely technical question.

In the near term, progress starts with pragmatic use cases like capacity and logistics optimisation, AI-assisted pre-patient interaction, voice-based interfaces for less digitally capable patients that serve as entry points to build governance, scaling muscle and clinician trust. The harder work lies inside the organisation: closing the gap between top-down lighthouses and bottom-up clinician energy, resolving accountability when AI is in the loop and designing rollouts so they do not widen digital inequality.

At Implement, we see early movers investing not only in technology, but in data foundations across many sources, legal competencies for MDR, GDPR, and the EU AI Act, and most importantly, in workforce transformation that reframes AI as enabling new roles rather than threatening existing ones. Lasting impact will depend on organisations' ability to move AI from pocket-deep maturity to system-wide capability as a mission aimed at solving the fundamental challenges of healthcare – and not driven by tech savvy and curiosity.

Healthcare comes first – AI takes it further

AI strategic advisory
- Healthcare AI strategy, ambition, and roadmap
- Organisational readiness across clinical and non-clinical units
- AI operating model for regional and hospital structures
- Regulatory positioning: MDR, GDPR, EU AI Act, EHDS

AI use case discovery and piloting
- Use case identification across the value chain
- Feasibility assessment: clinical, legal, and data
- Proof-of-concept development with clinical teams

AI sourcing advisory
- Clinical AI tech stack and platform strategy
- Platform and system evaluation and contracting
- Implementation partner selection, with EHR/PACS awareness

AI strategy execution
- Building and running AI programme and project PMO, and agile release trains
- Driving PoCs, MVPs, and solution development
- Implementing the AI operating model
- Ensuring value creation and realisation

AI solution delivery
- Scaling pilots from department to system-wide
- Deploying scribes, decision support, and optimisation tools
- Integration with EHR, PACS, and scheduling systems

AI security and compliance advisory
- Clinical risk and patient-safety mitigation
- Data privacy, consent frameworks, and e-health literacy
- Compliance with MDR, GDPR, EU AI Act, and EHDS

AI learning journeys and adoption
- Clinician-facing AI training and copilots
- Change management across clinical and admin staff
- Culture and clinical leadership development

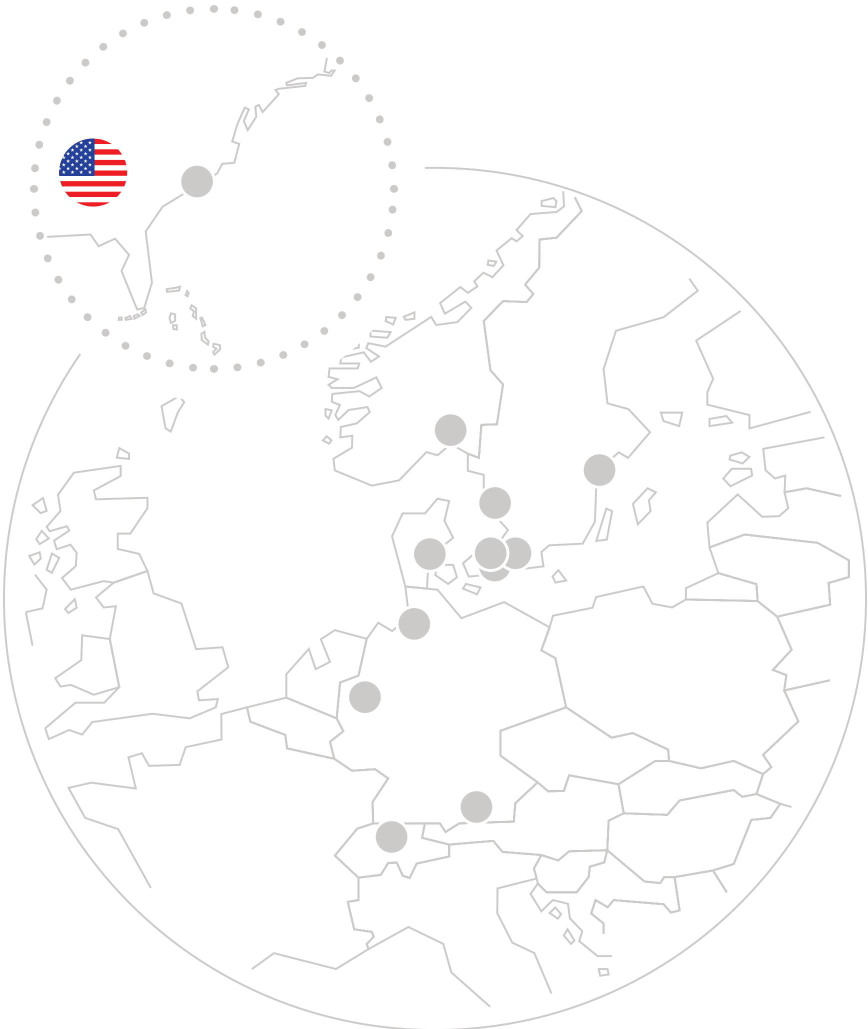
Local roots, global perspective

Founded in Denmark and built internationally, Implement combines Scandinavian roots with experience from complex transformation across Europe and the United States.

In defence and security, we help public authorities, defence organisations, and companies turn investment and ambition into capability that works in practice.

Our work spans programme leadership, organisational capability, data and technology, industrial collaboration, and implementation.

We help strengthen the links between procurement, people, industry, data, and operational use, so new capability can be brought into service, sustained, and improved over time.



- Founded in Denmark in 1996
- Partner and employee owned
- 12 offices in six countries
- Working across Europe and the United States

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