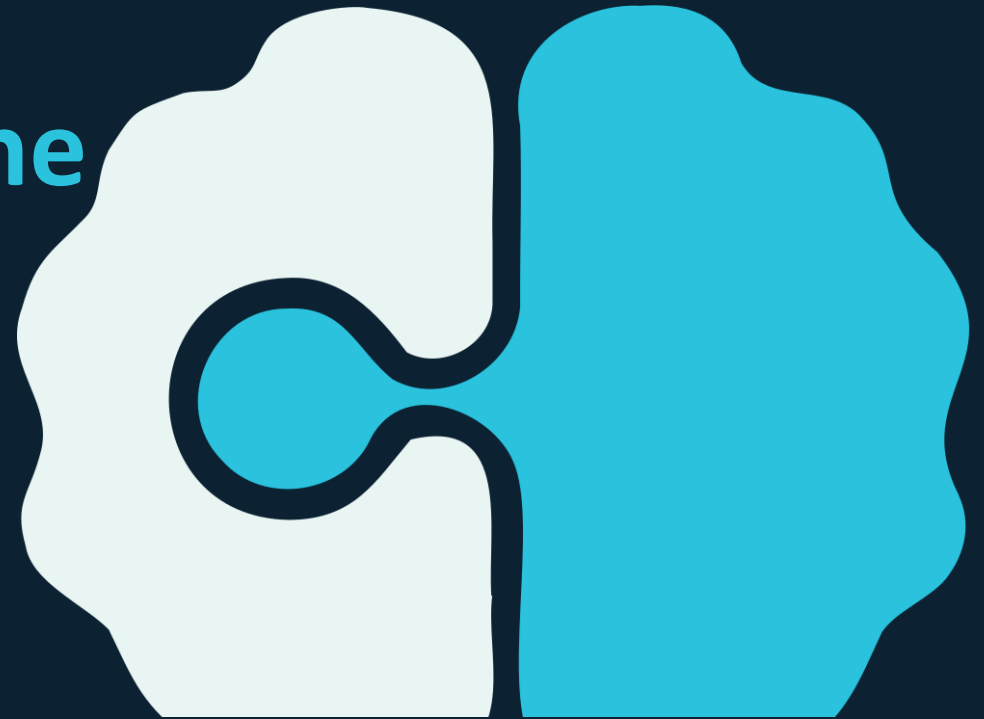




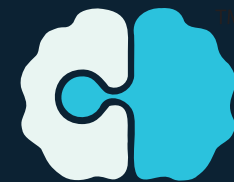
AI in Healthcare: What does this mean for **the** **doctor?**



What AI really changes in the clinic?

ChatMED GA 101159214

Assoc. Prof. Monika Simjanoska Misheva – ChatMED Coordinator
Faculty of Computer Science & Engineering · Ss. Cyril and Methodius University, Skopje



AI walked in through the front door with two false stories



THE ENGINEER'S PITCH

"AI will replace the doctor."

Fear sold as innovation. A headline, not a plan.



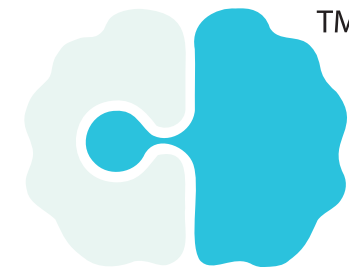
THE DOCTOR'S FEAR

"A smarter rival has arrived."

A threat imagined where a tool was offered.

✘ Both miss the point. *AI is neither saviour nor rival! Treating it as either gets the next decade wrong.*

Four questions. One honest answer.



Funded by
the European Union



01

What changes in daily clinical work?



02

What should/shouldn't we expect from today's AI / LLMs?



03

How do we work with AI as a clinical collaborator?



04

What does an AI-augmented clinical report look like?

STARTING POINT

None of this is new



Our most critical, most sensitive system

Healthcare is where the smallest error costs the most.



The doctor is always the first to be blamed

When the system fails, the person at the bedside takes the hit.



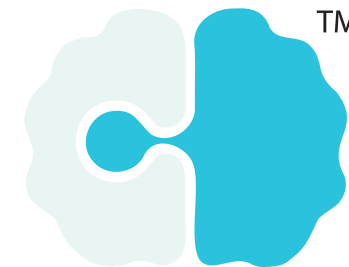
It has always carried imperfection

Variable notes, missing context, lost information — for decades.



Reform has been “in focus” for years

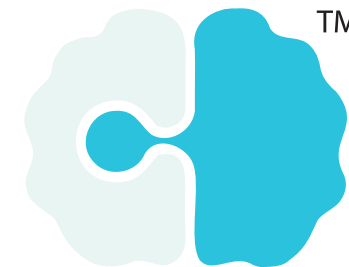
Standardisation and better care: promised, rarely finished.



“

**The system already
needed to change.
Long before AI.**

*AI didn't create these
problems! It just stopped
letting us ignore them!*



AI doesn't change the destination, it changes the speed



AI only accelerates a change that was already overdue.

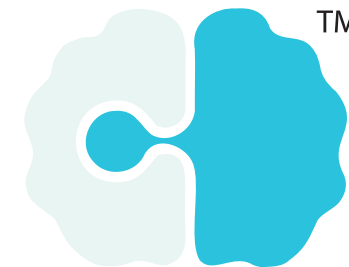
The same goals healthcare set for itself years ago — just on a deadline it can no longer postpone.

WITHOUT THE PUSH

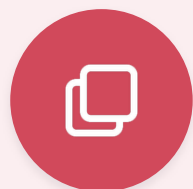
- Reform stays “a priority”
- Standards drift between wards
- Paperwork keeps eating the visit

WITH AI AS THE FORCING FUNCTION

- Terminology gets standardised — fast
- Reports become structured & comparable
- Tech drafts; the clinician decides



Why? Because AI refuses to work in a mess



What AI can't use

- Free-text chaos, no structure
- Ad-hoc abbreviations & local slang
- Missing context, missing units
- Reports nobody can compare



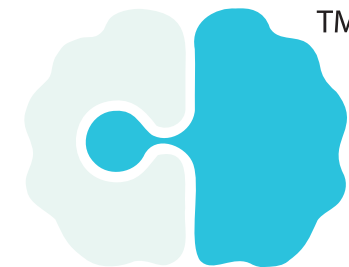
What AI needs

- Structured, coded fields
- Standard terminology (SNOMED, LOINC)
- Context: who, when, why, units
- Reports that compare across borders



It's like someone finally making you keep your room tidy!

Annoying at first, then you can actually find things, and so can everyone else!



What actually changes in your day



Standardise terminology

One name for one thing — every time.



Standardise report structure

Same sections, same order, every patient.



Write clearer notes

Because someone (and something) will read them.



Faster discharge reports

Drafted in seconds, not after the shift.



Type less

Let the tool draft; you correct and sign.



Confirm the patient understood

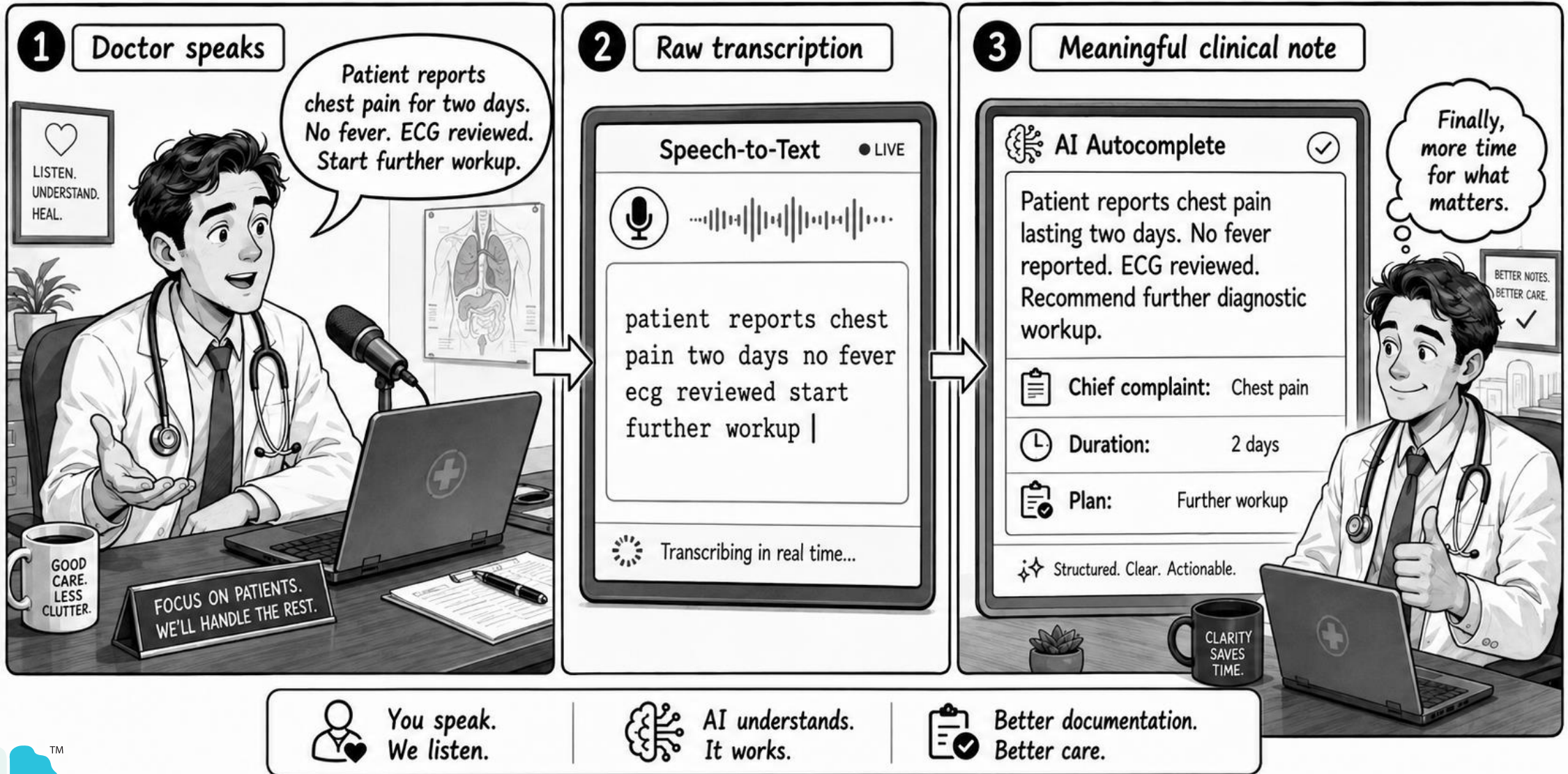
Diagnosis explained, not just delivered.

And the quiet one: **listen to the patient more.** *When the typing slows down, the listening speeds up.*

⇒ Two generations, one frustration ⇒



≡ From dictation to documentation. ≡



THE OLD WAY

I have so many interesting cases... These could make great case studies. But where do I even start?

I need data on patients with this specific condition from 2020 to 2025. Can you help me?

Sure, I'll need to check the database and build a custom query. It might take some time.

IT DEPARTMENT



DAYS... SOMETIMES WEEKS LATER

- Back and forth clarifications
- Data extraction
- Cleaning and formatting
- Finally... the data



THE NEW WAY

Find me all the patients with this specific condition from 2020 until 2025.

AI ASSISTANT - HIS

✓ Query understood

Results

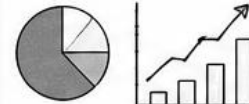
1,248 patients found
(2020 - 2025)

- ✓ Data extracted
- ✓ Data anonymized
- ✓ Ready for analysis

VIEW / EXPORT DATA

AI also suggests:

- Patient demographics
- Common treatments
- Outcomes summary
- Trends over time



Perfect! Now I can focus on what really matters: insights and better patient care.

JOURNAL OF CLINICAL CASE STUDIES
Case Series: 2020-2025



Same meaning. Different words. Broken data.

1. The problem

I know the patients are there... why can't the system find them all?

Ward notes
Pt had a heart attack.
Hx of T2DM.
A1c elevated.

Discharge summary
Myocardial infarction
Type 2 diabetes
HbA1c 8.1%

Lab system
HbA1c (NGSP)
Result: 8.1 %
Collected: 2023-11-02

Old EHR
MI in 2019
DM2
A1c: 8.1

Radiology
No evidence of acute MI.

Heart attack
MI
Myocardial infarction
AMI
Type 2 diabetes
T2DM
DM2
Glycated hemoglobin
HbA1c
A1c

Find patients...
Searching...

2. Why this breaks care and research

Find all patients with myocardial infarction and HbA1c results from 2020–2025

Query results ⚠ Incomplete results

Patients found **1,248**
(likely incomplete)

Missed matches (examples)

- "Heart attack" not matched
- "MI" not matched
- "T2DM" not matched
- "A1c" not matched
- ...and many more

Different names MI Myocardial infarction AMI Heart attack ...

Different codes I21.9 I22.9 410.x I21.3 ...

Missed patients

Messy statistics

Hard to share data

Case studies, audits, and research become much harder.

3. Standardized vocabularies help

Now the data speaks the same language.

AI / HIS TERMINOLOGY LAYER

Heart attack → SNOMED CT Myocardial infarction (22298006)

MI → SNOMED CT Myocardial infarction (22298006)

Myocardial infarction → SNOMED CT Myocardial infarction (22298006)

AMI → SNOMED CT Myocardial infarction (22298006)

Type 2 diabetes → SNOMED CT Type 2 diabetes mellitus (44054006)

T2DM → SNOMED CT Type 2 diabetes mellitus (44054006)

DM2 → SNOMED CT Type 2 diabetes mellitus (44054006)

Glycated hemoglobin → LOINC Hemoglobin A1c (4548-4)

HbA1c → LOINC Hemoglobin A1c (4548-4)

A1c → LOINC Hemoglobin A1c (4548-4)

Find all patients with myocardial infarction and HbA1c results from 2020–2025

Unified results

2,876
Complete cohort found

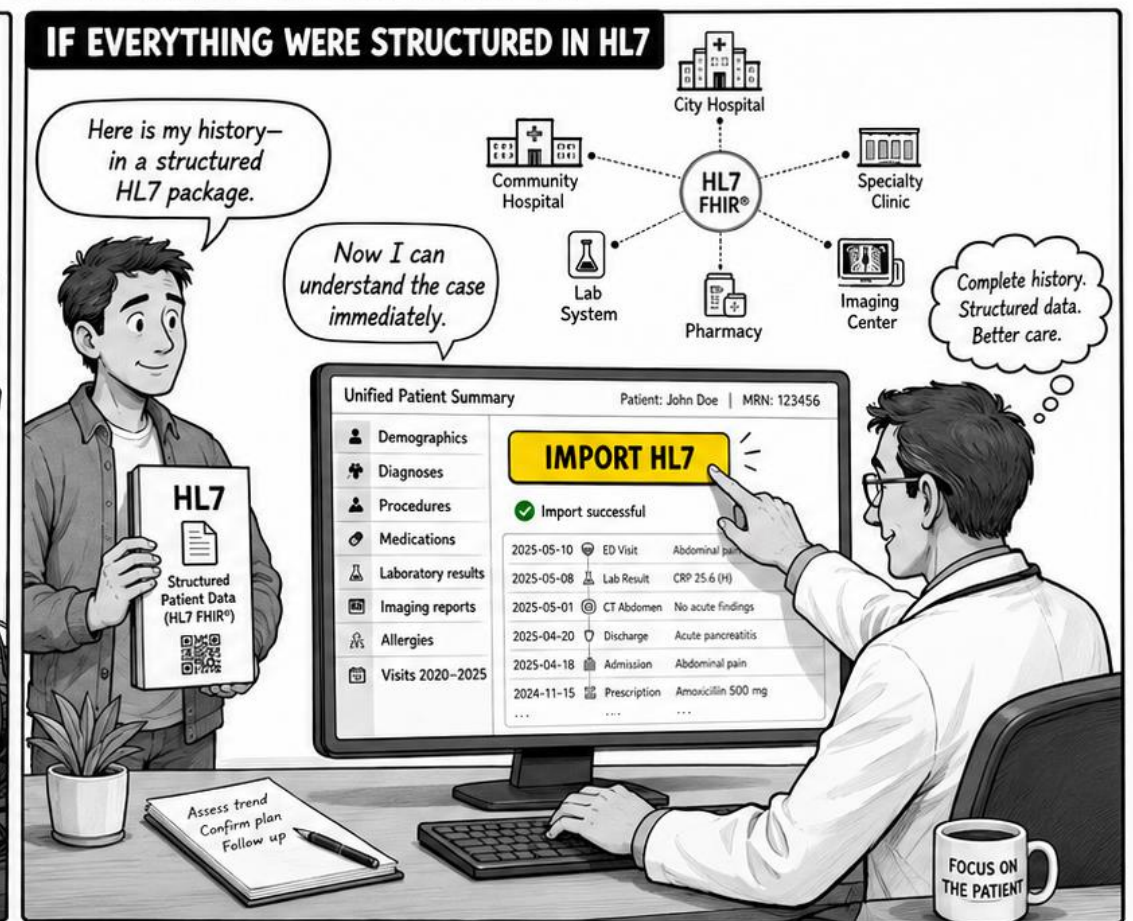
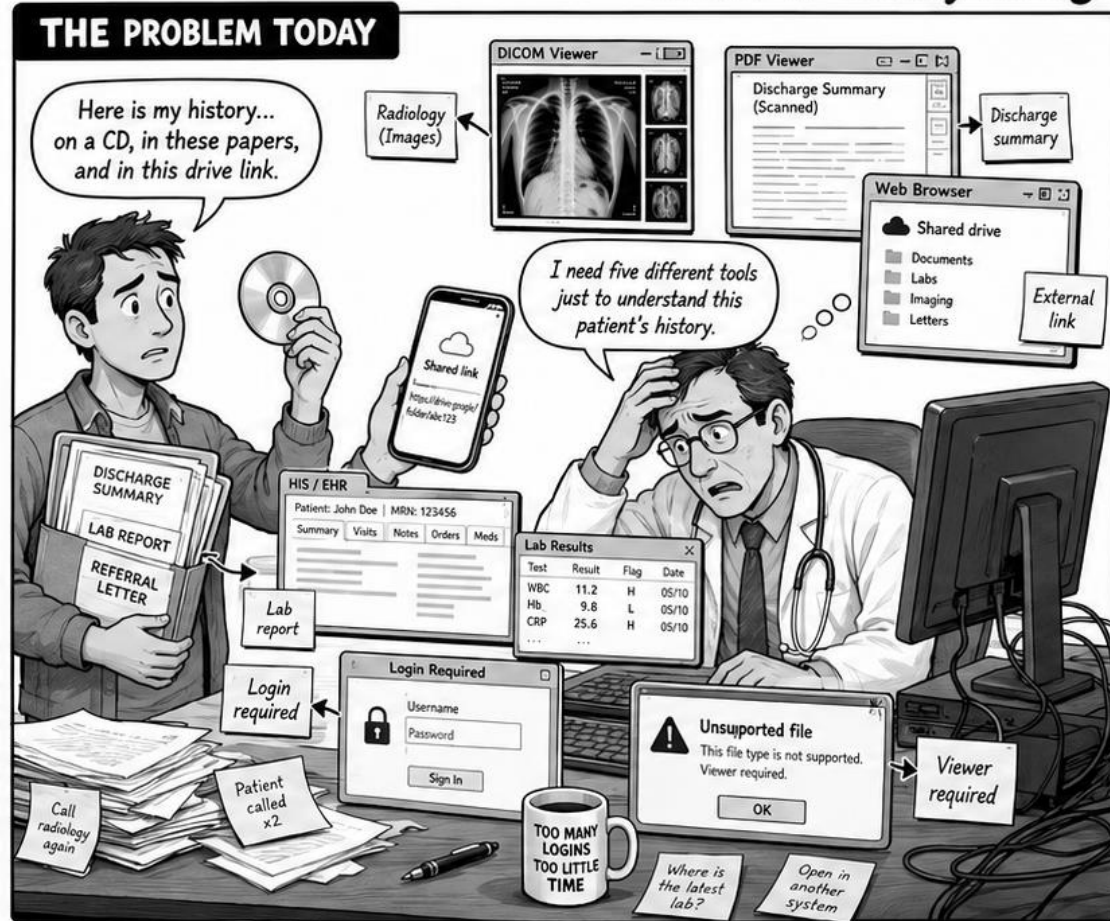
- ✓ Complete cohort found
- ✓ Consistent lab results
- ✓ Ready for analysis
- ✓ Better interoperability

Better retrieval | **Better interoperability** | **Better research and care**



One patient. Many files. No interoperability.

What if everything were structured in HL7?



LESS HUNTING FOR FILES. MORE UNDERSTANDING OF THE PATIENT.

HL7-structured data enables faster retrieval, cleaner exchange, and true interoperability.



Same-day discharge. One-month report?

What if AI could summarize everything in seconds?

THE PROBLEM TODAY

GYNECOLOGY OUTPATIENT
HYSTEROSCOPY TODAY
SAME-DAY DISCHARGE

EXIT

But how will anyone know what was done until then?

You can go home today. The discharge report will be ready in one month.

FRAGMENTED INFORMATION

- procedure note
- findings
- therapy
- follow-up
- images
- pathology pending

TOO MUCH TO DO

PROCEDURE NOTE

HYSTEROSCOPY IMAGES

FINDINGS

THERAPY

FOLLOW-UP

PATHOLOGY PENDING

Awaiting report

PENDING DISCHARGE REPORTS

Important history exists – but it is trapped in scattered notes and delayed documentation.

IF AI HELPED IMMEDIATELY

GYNECOLOGY OUTPATIENT
HYSTEROSCOPY TODAY
SAME-DAY DISCHARGE

EXIT

You can go home today – your discharge report is ready now.

HIS Patient Encounters Documents Reports

AI Discharge Assistant

Powered by AI

Procedure: hysteroscopy

Findings

- Endometrial polyp (anterior wall); otherwise normal cavity.

Therapy / recommendation

- Polypectomy performed. Send for histopathology.

Follow-up

- Review pathology report.
- Clinic follow-up in 2 weeks.

Discharge instructions

- Expect light spotting for a few days.
- Avoid tampons, douching, intercourse for 1 week.
- Report heavy bleeding, fever, severe pain.

Summary generated in seconds.

Summary Quality

- Complete Structured Ready

AI CONSOLIDATES MULTIPLE INPUTS

- DOCTOR DICTATION: Procedure narrative (voice-to-text)
- PROCEDURE IMAGES
- LAB / PATHOLOGY: Pathology request, Lab results
- CLINICAL NOTES: History, Medications, Allergies

Structured. Searchable. Ready for continuity of care.

DISCHARGE REPORT



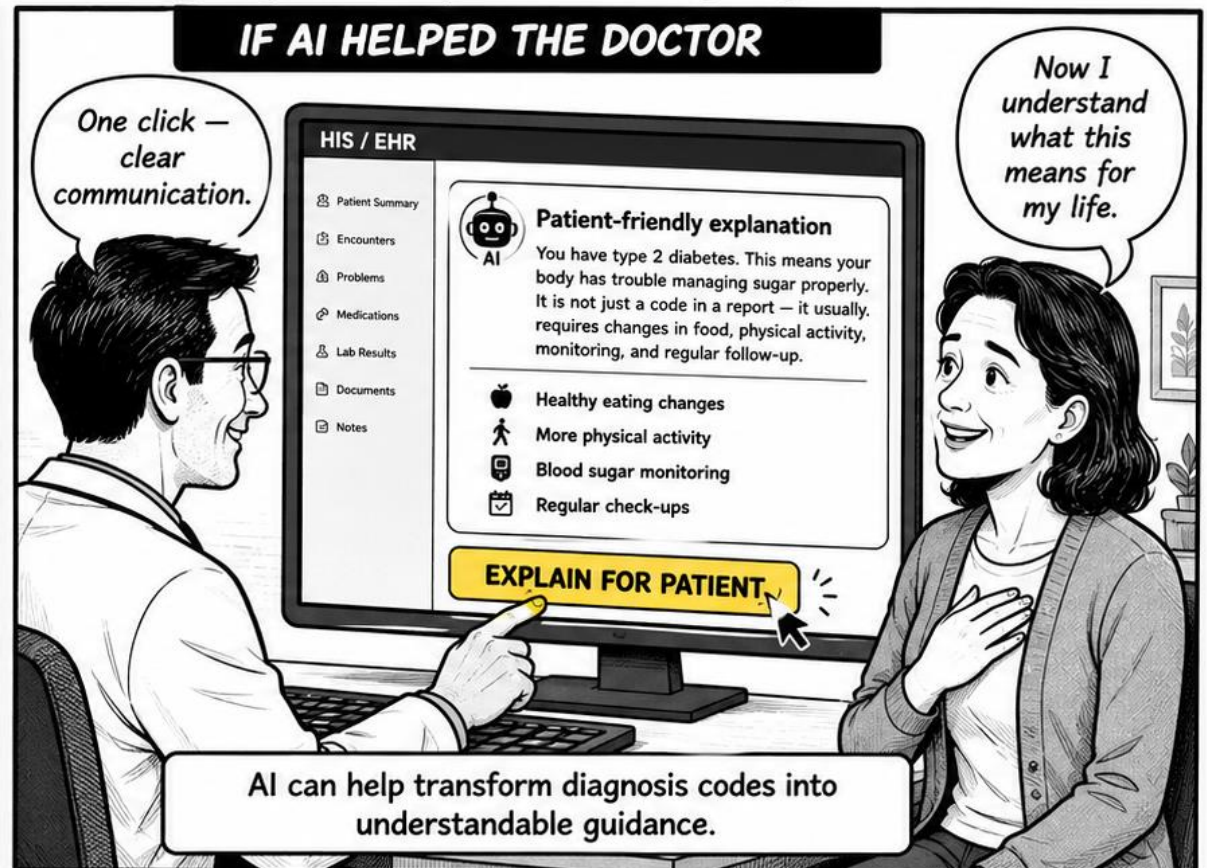
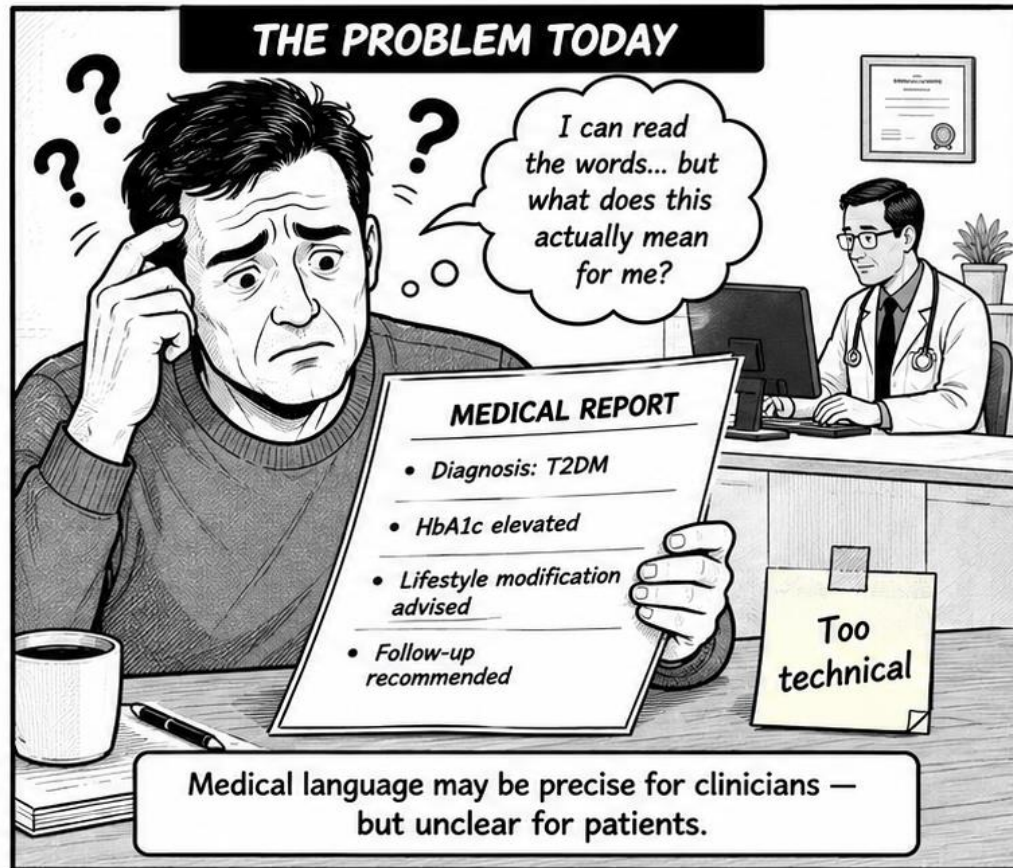
Less waiting for paperwork. More continuity of care.

AI-assisted summarization can turn same-day procedures into same-day documentation.



A report was written. But was it understood?

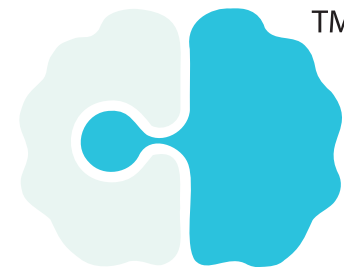
What if AI could turn clinical language into patient language?



BETTER UNDERSTANDING. BETTER ADHERENCE. BETTER CARE.

From T2DM to meaningful explanation — AI can help doctors communicate what really matters.



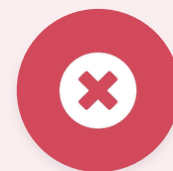


What to expect, and what not to



DO expect

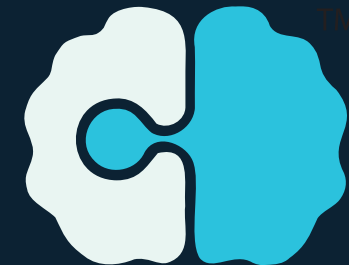
- ✓ **It sharpens a good expert**
and makes them usefully more doubtful.
- ✓ **It educates your patients**
so they arrive knowing what to ask.
- ✓ **It drafts, structures, cross-checks**
the repetitive work, at speed.



DON'T expect

- ✗ **It won't make you an expert**
you aren't already.
- ✗ **It won't turn a layperson into a doctor**
no shortcut around training.
- ✗ **It won't carry the responsibility**
the signature is still human.

AI raises the ceiling for experts. It does not build a floor under the unqualified.



Your collaborator living inside your system



It belongs inside your HIS

Not one more browser tab or external portal



The decision stays yours

AI proposes, you dispose. Every clinical call remains a human call.

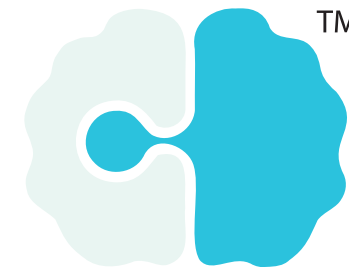


The Hippocratic Oath matters more, not less

More automation raises, never lowers, the weight of the clinician's judgement.



You are the doctor.
AI is only the open book
read aloud when you want
a second look!



Three things every AI-touched record must prove



Transparency

Say it plainly when AI helped.
No hidden hands in the note.



Provenance

Which model, which version,
who reviewed it, and when.

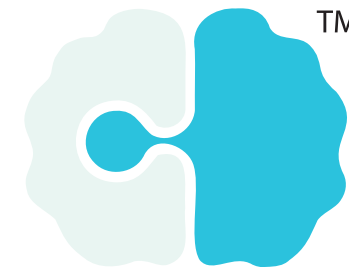


Robustness

Validated, secure, and audit-
logged. Safe to rely on.

ChatMED's design rule: *AI involvement is recorded as lightweight, optional fields in HL7 CDA / FHIR, visible to AI-aware viewers, invisible (and harmless) to everyone else.*

Basis: Simjanoska Misheva et al., "AI Act Compliance Within the MyHealth@EU Framework", J Med Internet Res 2025;27:e81184.



The same report — with one extra panel



DISCHARGE SUMMARY · International Patient Summary

Patient

Diagnosis

Medications

Plan & follow-up

Schema-valid. Renders normally in any legacy system.



AI COMPLIANCE
Only appears in AI-aware viewers

Contribution status AI-assisted

Human-in-the-loop Reviewed & signed by clinician

Risk classification High-risk (EU AI Act)

Explainability rationale “Drafted by validated LLM v2.3”

Annex IV technical file hospital.eu/annexIV/...

AI author metadata model · software · version

THE PLOT TWIST

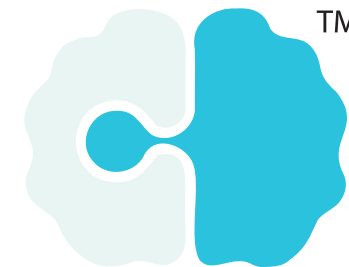
Wait — who should **actually** be worried?

*The fear was handed to the doctor.
It's worth checking the return address.*







WHO CARRIES THE LOAD





The hard part is the vendor's job, not yours



THE VENDOR MUST

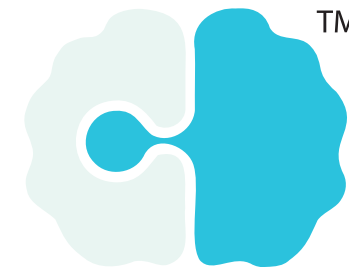
-  Build & validate the models
-  Compile the Annex IV technical file
-  Pass conformity assessment & carry liability
-  Run post-market monitoring

YOU SIMPLY

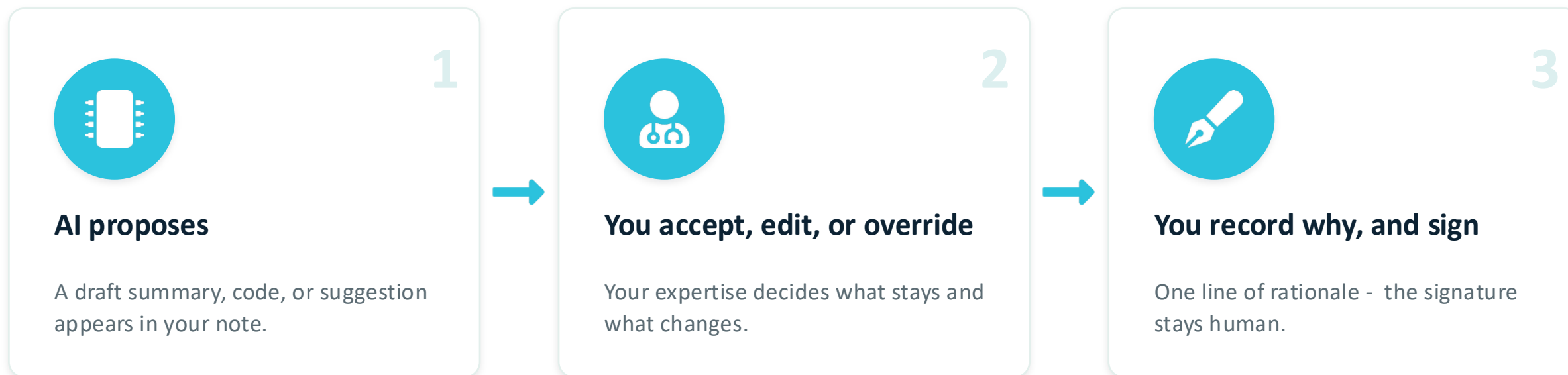
-  Switch it on. It comes to you
-  Use it, and judge it
-  Accept or override the suggestion
-  Sign, the call stays yours

You were sold the fear.

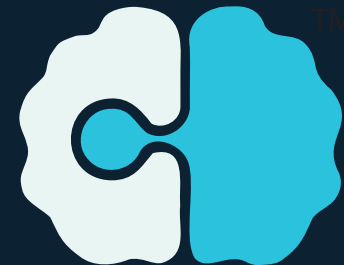
They carry the homework, and the EU AI Act puts it on them, the providers, not on you.



Accept, reject... but now you say why



The only genuinely new work is that sentence of justification — *and it is exactly what turns an AI draft into a record you can stand behind.*



The one real cost: sloppy reports won't survive



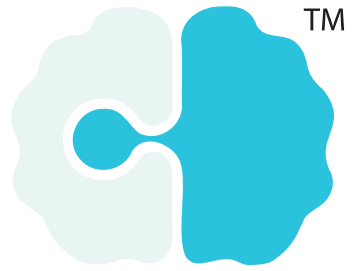
A “bad report” used to cost only the next reader's time. Now it is the fuel for the very system meant to help you — so garbage in shows up instantly, in your own results.

THEN

Tolerated, forgotten by the next morning. The cost was diffuse and easy to ignore.

NOW

It quietly degrades the tool you depend on. Accountability stops being optional, and that is the point.



A tidier hospital within and between departments



Clear AI processes, defined once

Who runs which model, when, and under whose review — written down, not improvised.



Standard handoffs between departments

Radiology → ward → discharge speak the same structured language.



Less lost-in-translation

Shared, coded data instead of re-typing the same facts three times.

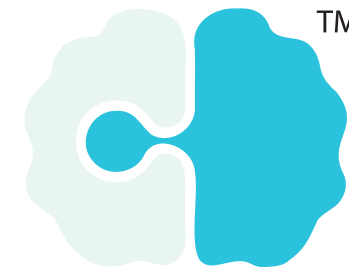


Bottlenecks become visible

Structured logs show exactly where care stalls — so it can be fixed.

THE EUROPEAN PAYOFF

It pulls you toward EHDS — faster



Funded by
the European Union

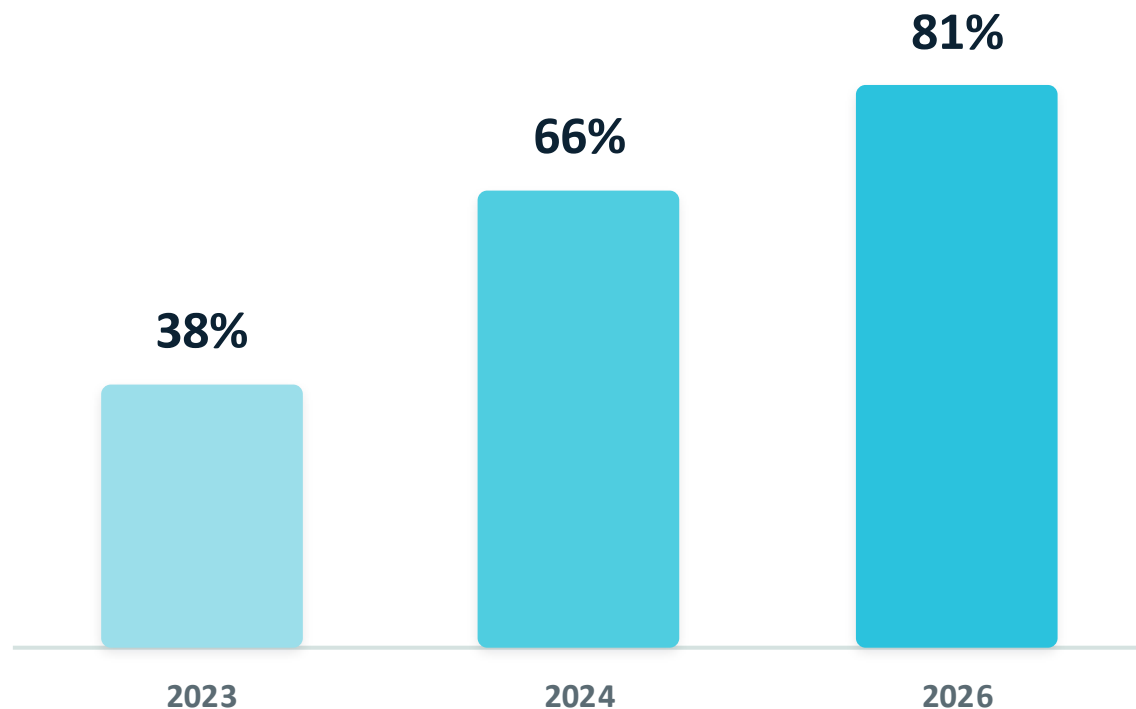


- ✓ Structured, AI-ready data is exactly what EHDS and MyHealth@EU demand.
- ✓ Doing the AI groundwork now means you are EHDS-ready early — not scrambling later.
- ✓ ChatMED's CDA / FHIR compliance fields already speak that cross-border language.

MyHealth@EU framing per Simjanoska Misheva et al., J Med Internet Res 2025;27:e81184.

THE EVIDENCE

This isn't a forecast. It's already happening.



Share of physicians using AI in practice

+78%

jump in physician AI use from 2023 to 2024 alone

1.1 → 2.3

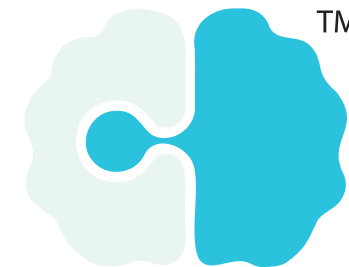
average AI use-cases per physician (2023 → 2026)

76%

say AI improves their ability to care for patients (up from 65%)

Source: American Medical Association, *Physician Survey on Augmented Intelligence* — 2023 (n=1,081), 2024 (n=1,183) and 2026 (n=1,692) waves. AMA Center for Digital Health & AI.

AI in Healthcare · ChatMED's perspective



Documentation first, and doctors set the terms

WHERE IT LANDS FIRST

68%

report increased AI use for clinical documentation — ambient scribes & transcription

75%

of AI-using physicians say it cut admin load and improved job satisfaction

WHAT DOCTORS REQUIRE

85%

want a say in how AI is adopted in their practice

92%

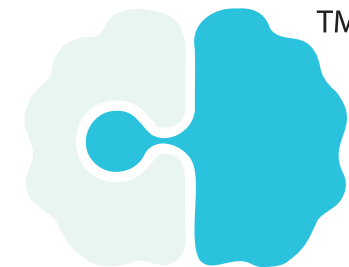
want proper training on the tools

84%

want it integrated into the EHR / HIS

AI is learnable: *Attitudes improve the more clinicians actually work with it.*

Sources: 68% — athenahealth 2025 Physician Sentiment Survey (Harris Poll, n=1,001);
75% — Doximity 2026 State of AI in Medicine (n=3,151);
85/92/84% — AMA Physician Survey on Augmented Intelligence (2024–2026);
familiarity effect — J Med Internet Res 2025;27:e74187 and Front Digit Health 2025; doi:10.3389/fdgth.2025.1556921.



What you give up vs. what you get



What you give up

- Tolerance for sloppy reports
- A sentence of justification per AI-assisted note
- A short learning curve at the start

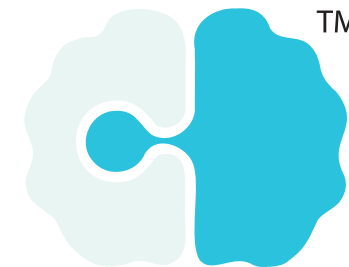


What you get

- ✓ Less typing, faster discharge reports
- ✓ A tidier hospital — within and between departments
- ✓ EHDS-readiness, ahead of the deadline
- ✓ A sharper second opinion on tap
- ✓ And the decision stays yours

The ledger isn't balanced, and that's the point.

Starting Monday



1 Insist it lives inside your HIS

Not one more login. If it isn't where you work, it won't get used.



2 Ask the vendor for the Annex IV file

It's their legal duty to have it, not your job to build it.



3 Treat every AI output as a draft

Accept, edit, or override. Then say why, and sign.



4 Write for the next human and the next machine

Clear, structured notes serve both, and the patient most of all.

The doctor doesn't disappear in this story. The doctor gets the mess cleared away.

ChatMED's perspective

AI won't replace the doctor. It just refuses to let the mess stay.



The decision is still yours, but now better informed, better documented, and better understood by the patient in front of you.

Tidy data, by force

Experts sharpened, not replaced

Every AI touch, on the record

ChatMED GA 101159214

Faculty of Computer Science & Engineering · Ss. Cyril and Methodius University, Skopje



Funded by
the European Union