



Sammen skaper vi fremtidens helsetjenester

# Velkommen til H2B Open KI og pasientjournal

10. desember 2024 kl 12.30-16



Oslo

# En arena for åpen innovasjon



*«Health2B er der de riktige menneskene møter de riktige utfordringene og effektivt kommer frem til de riktige løsningene»*

# Health2B - sammen skaper vi fremtidens helsetjeneste



«Health2B er der de riktige menneskene møter de riktige utfordringene og effektivt kommer frem til de riktige løsningene»

# Health2Bs hovedmål



Etablere kultur og metodikk for offentlig-privat samhandling



Øke gjensidig forståelse for behov, infrastruktur, løsninger og kompetanse



Utvikle samstemte målbilder for definerte fokusområder



Bidra til raskere og mer målrettet utvikling og bruk av teknologi og tjenester

# Agenda KI og pasientjournal

Tid	Tittel	Hvem
12.30-12.35	Velkommen ved H2B	Elen Høeg
12.35-12.40	Kort intro til tema	Nis Johannsen, HSØ
12.40-13.00	Sørlandet Sykehus og Omilon	Sebastian Tangen, Sørlandet sykehus Jacques Svarverud, Omilon
13.00-13.20	Vestre Viken HF og DIPS AS	Stian Langli, Vestre Viken Helseforetak, Bjørn Fjukstad, DIPS
13.20-13.40	Diakonhjemmet Sykehus og Vidd	Torfinn Lødøen Gaarden, Diakonhjemmet Harald Bugge, Vidd
13.40-13.55	PAUSE	
13.55-14.15	Hvordan frigjøre tid til det som er viktig - og hvilke muligheter bør utforskes videre?	Johnny Advocaat, Oslo kommune Øystein Nygaard, Noteless

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14.20-14.25	Vil du kjøre eller fly med KI	Stefan Manov, Stenoly
14.25-14.30	Mulighetene i skjæringspunktet	Henrik Haaland Jahren, Braive
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 Health2B



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# Fra samtale til strukturert journalnotat

Sebastian Tangen Alfsen, Lege - Indremedisin, Sørlandet Sykehus  
Jacques Svarverud, Sales Director, Omilon AS

# Mål og visjon for KI

## Sørlandet sykehus

### Å sørge for at løsningen:

- Er moden
- Sparer tid i praksis
- Ikke senker kvaliteten
- Er kostnadseffektiv
- Er lovlig

### Hvordan sikre dette med *Ambient scribes*?

- Pilotprosjekt
- Metodisk utforskning

- **Effektivitet, nøyaktighet og kvalitet** på pasientbehandlingen som gis ved bærekraftig innføring og anvendelse av KI
- Anvendelse av kunstig intelligens i samsvar med overordnede verdier og mål, og i tråd med lovverk, **etiske prinsipper, menneskerettigheter og demokrati**
- For at sikre trygg anvendelse av KI vil vi ha primærfokus på **innføring av modne og validerte løsninger**
- Vi tror på at innføring av **KI-løsninger i tett samarbeid med helsepersonell** sine ønsker og behov gir de beste resultater
- Tett samarbeid med akademia, andre helsefortak og industri for å forske på og **utvikle, validere og implementere beste praksis KI løsninger**

2 timer spart daglig

15 % reduksjon i ventetiden

Kan vi oppnå de  
samme gevinstene i  
Norge?

# Hvorfor pilotprosjekt? Er ikke dette bare plug and play?

## 1. Journalen spiller en annen rolle i sykehus

- Skrives for andre
- Feil kan raskt ha store konsekvenser
- Feilaktig informasjon videreføres lett, ofte vanskelig å bli kvitt

## 2. Sykehuset representerer bredere spekter av bruk

- Noen er en perfekt match (poliklinikk), andre er vanskelige

## 3. Er teknologien faktisk moden?

- 2023-2024: Kun 4 studier, 3/4 er spørreundersøkelser – Alle er fornøyd og tid spares! Men...
- “Using ChatGPT-4 to Create Structured Medical Notes From Audio Recordings of Physician-Patient Encounters: Comparative Study” – Kernberg et al:
  - 23 feil/notat. Over tre forsøk kun 56 % av info korrekt rapportert
  - Manglende info: 86 %, ekstra informasjon: 10,5 %, ukorrekte fakta: 3,2 %.

Ny potensiell feilkilde, og  
feil i sykehus måles i menneskeliv



## *MED OMILON SOM SAMARBEIDSPARTNER*

- Integrasjon med journalsystem
- Sterk tale-til-tekst løsning
- Kjent og velbrukt løsning ved Sørlandet Sykehus
- Høy kompetanse inn mot helsesektoren
- ISO 27001-sertifisert



omilon

# Omilon Group

**30.000+** daglige brukere

**35+** EPJ integrasjoner

**65+** ansatte

Skandinavias ledende kompetansemiljø på  
talegjenkjenning



Nasjonal avtale med  
alle fire helseregioner i  
Norge



Avtaler med alle  
regioner i Danmark



Sterk posisjon med  
talegjenkjenning i  
regioner og kommuner



## Omilon Connect

### Talegjenkjenning

Lytter på samtalen og omsetter lyden til tekst.



### Store språkmodeller

Analyserer, sammenfatter og strukturerer samtalen.



### Pasientjournal

Journalnotatet godkjennes og lagres i EPJ.





# Ikke bare teknologi

## Journalens rolle

- Dokumentasjon, men også filtrering
- Tenketid – Syntese av informasjon
- Huskeliste
- Felles arbeidsverktøy - Skal være nyttig

## Hva er konsekvensen for journalen?

- Note bloat?
- Effekt på kvalitet?
- Ordforråd?

## Arbeidsrutiner

- Tradisjonell diktering/skriving - Ord for ord
- Ambient scribes – Korreksjon
- Mindre anledning til ettertanke og refleksjon?

## • Pasientopplevelsen

- Alle funn må sies høyt
- Problematisk i noen kontekster

# Sykehussettinger



## POLIKLINIKK

- Ingen større utfordringer



## AKUTTMOTTAK

- Bråkete
- Avbrytelser
- Varierende rom
- Flere samtaler



## VISITT

- Mye god info er på previsit
- Korte pasientsamtaler
- Mobilitet



## OPERASJON/ RADIOLOGI

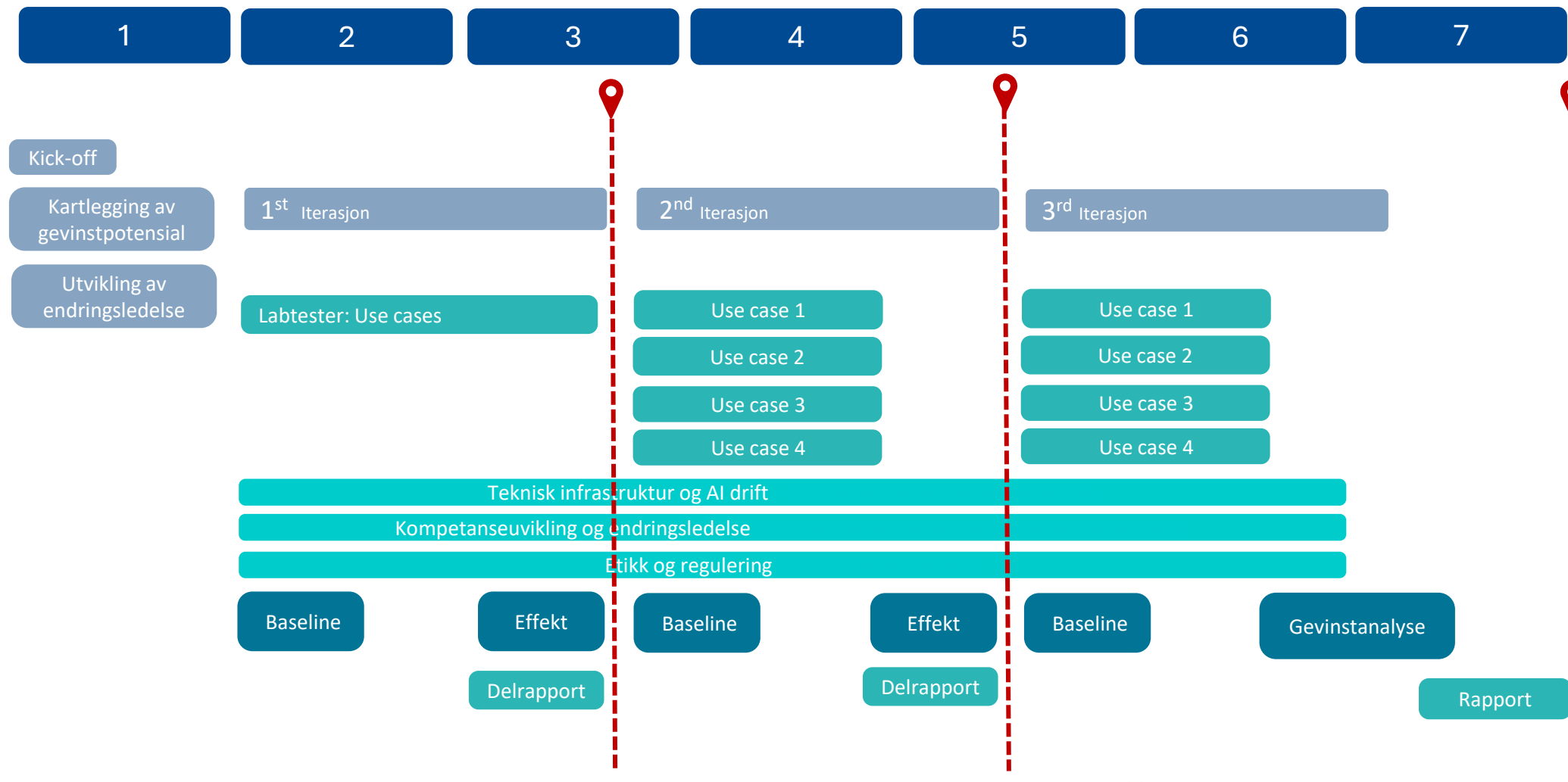
- Begrenset nytte under operasjon
- UL ved radiologi: problematisk å si funn høyt



## PSYKIATRI

- Stort potensiale
- Lavere risiko enn somatikken
- Stor fare for *note bloat*
- Svært lange samtaler
- Ukjent terreng
- Samtykkekompetanse!
- Visit/Poliklinikk/Akuttmottak

# Overordnet prosjektskisse



# Gevinstrealisering

## Kvantitative målinger

- Målinger i DIPS
- Konkrete målinger designes i forhold til den spesifikke use case

## Kvalitativ måling

- Intervjuer, observasjoner, spørreskjema
- Journal audits

## Vi ønsker mer enn bare å måle gevinster.

Vi fokuserer også på å forstå de underliggende faktorene som påvirker muligheten til å oppnå de ønskede resultatene.



Takk for oss!



Vestre Viken og DIPS  
-se egen pdf





# Diakonhjemmet Sykehus og Vidd

- se egen pdf



 Health2B

PAUSE





# Agenda KI og pasientjournal

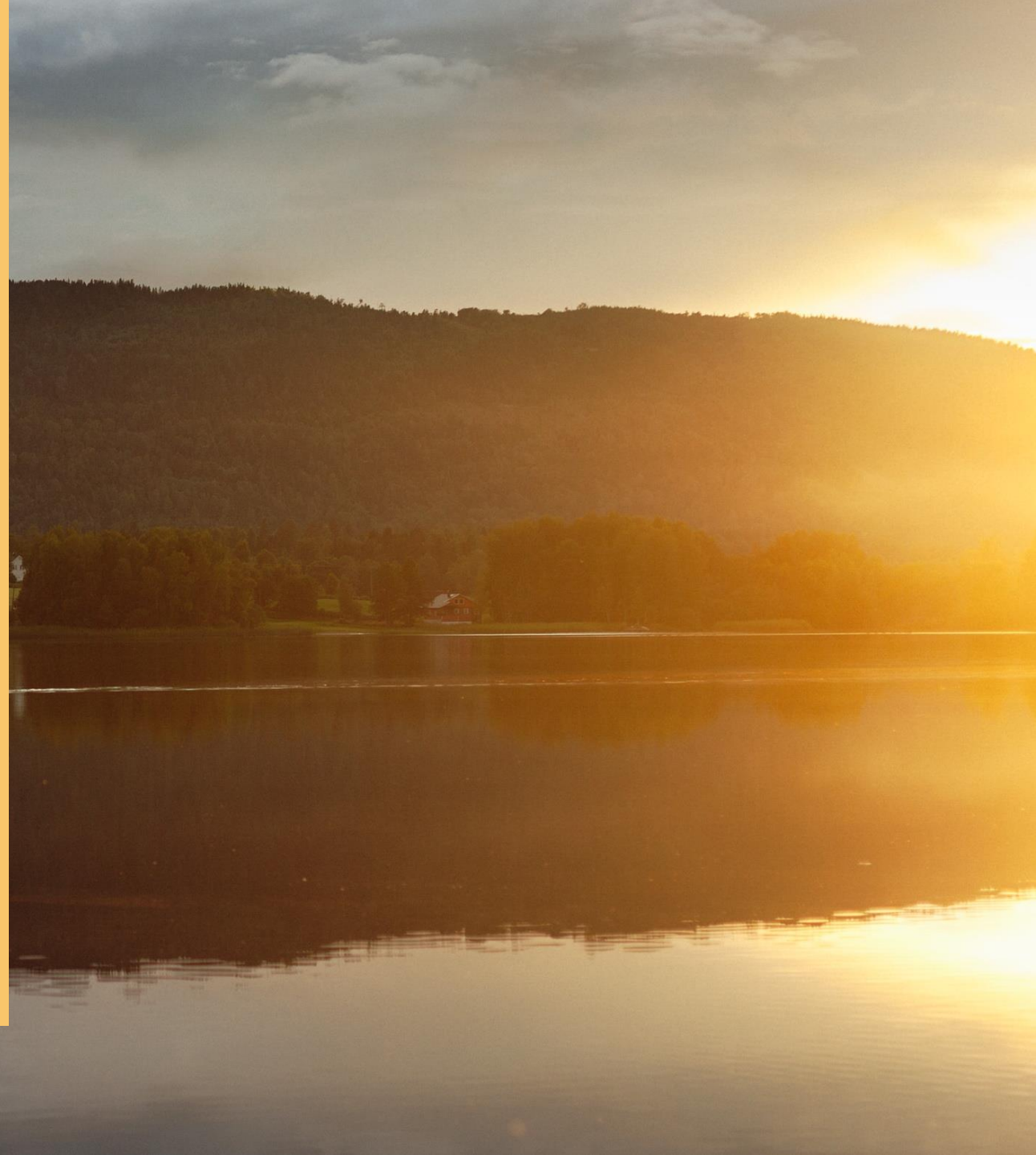
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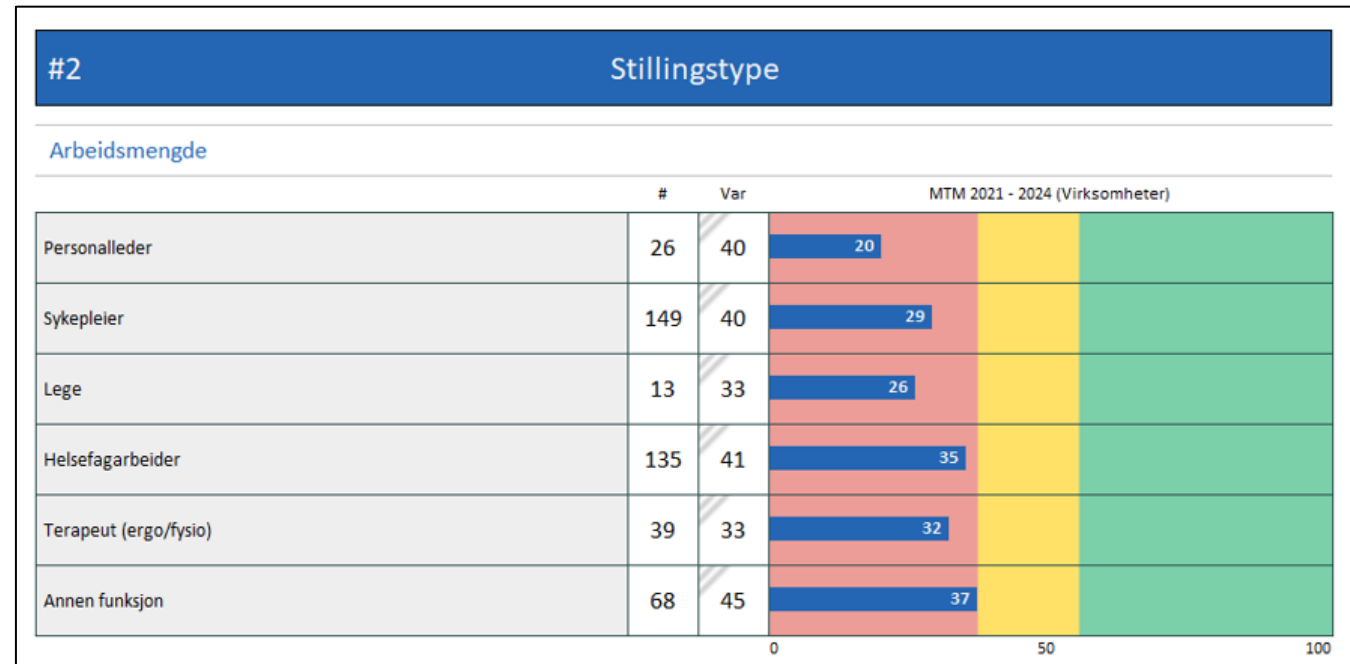
# Vår motivasjon for og erfaringer med å utforske *ambient scribe*

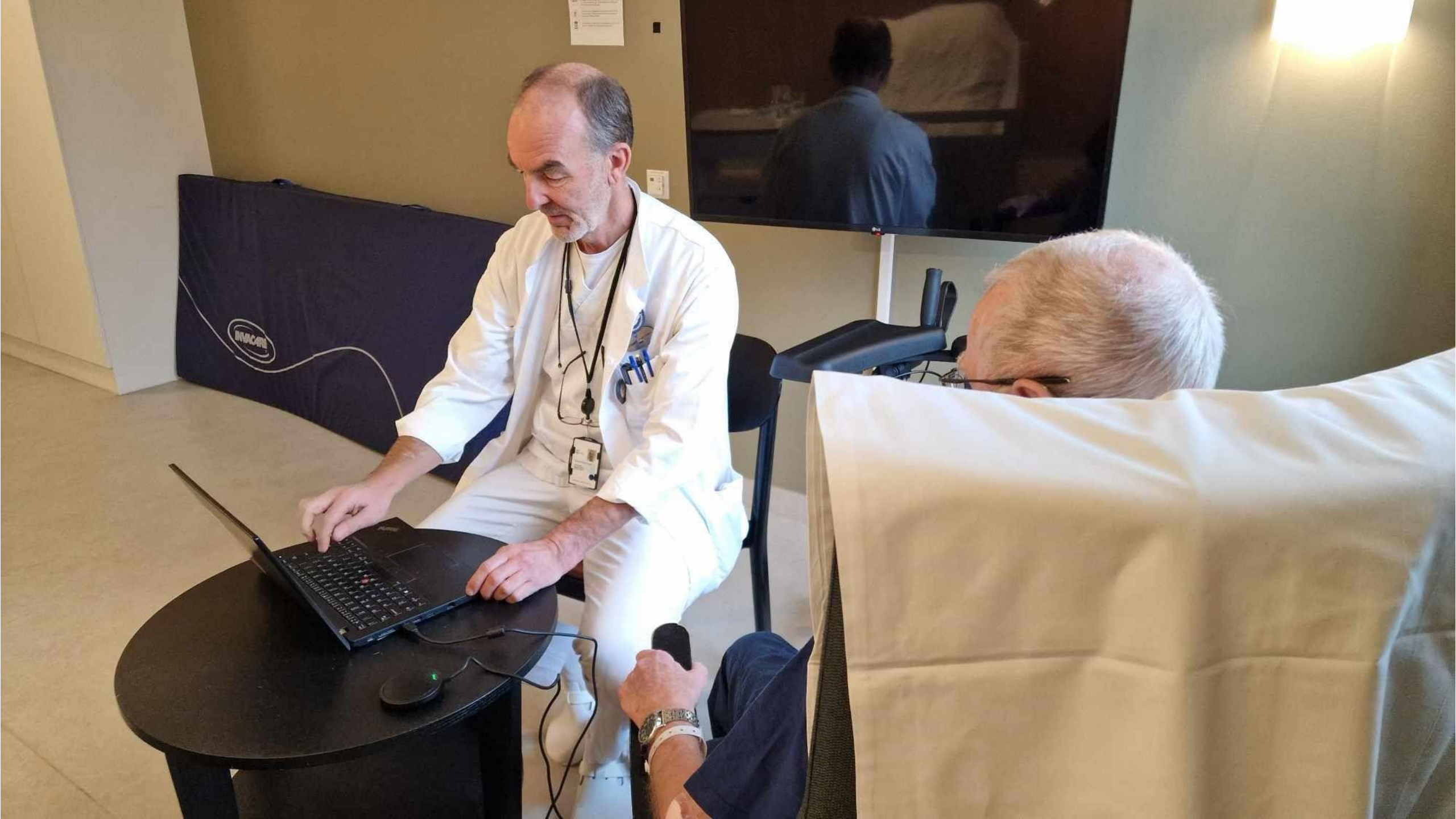
Johnny Advocaat  
direktør – innovasjon og digitalisering  
Sykehjemsetaten  
Oslo kommune



# Vår motivasjon for å teste denne type teknologi

1. spare tid (og øke kvalitet) på kort sikt
2. lære mer om teknologien før vi anskaffer ny EPJ



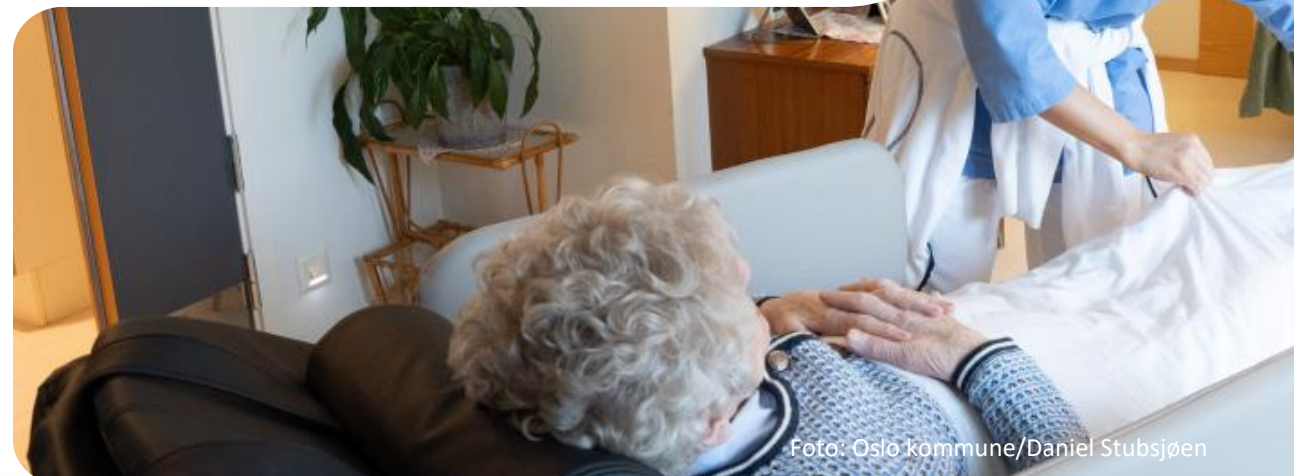
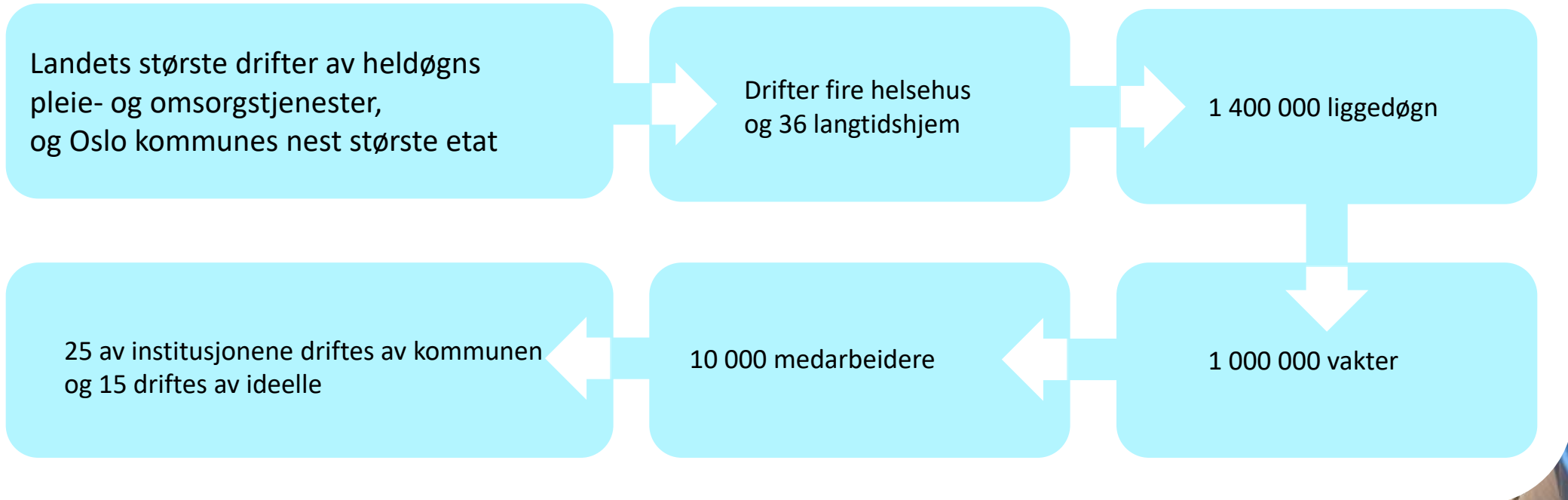




# Oversikt over langtids hjem og helsehus i Oslo

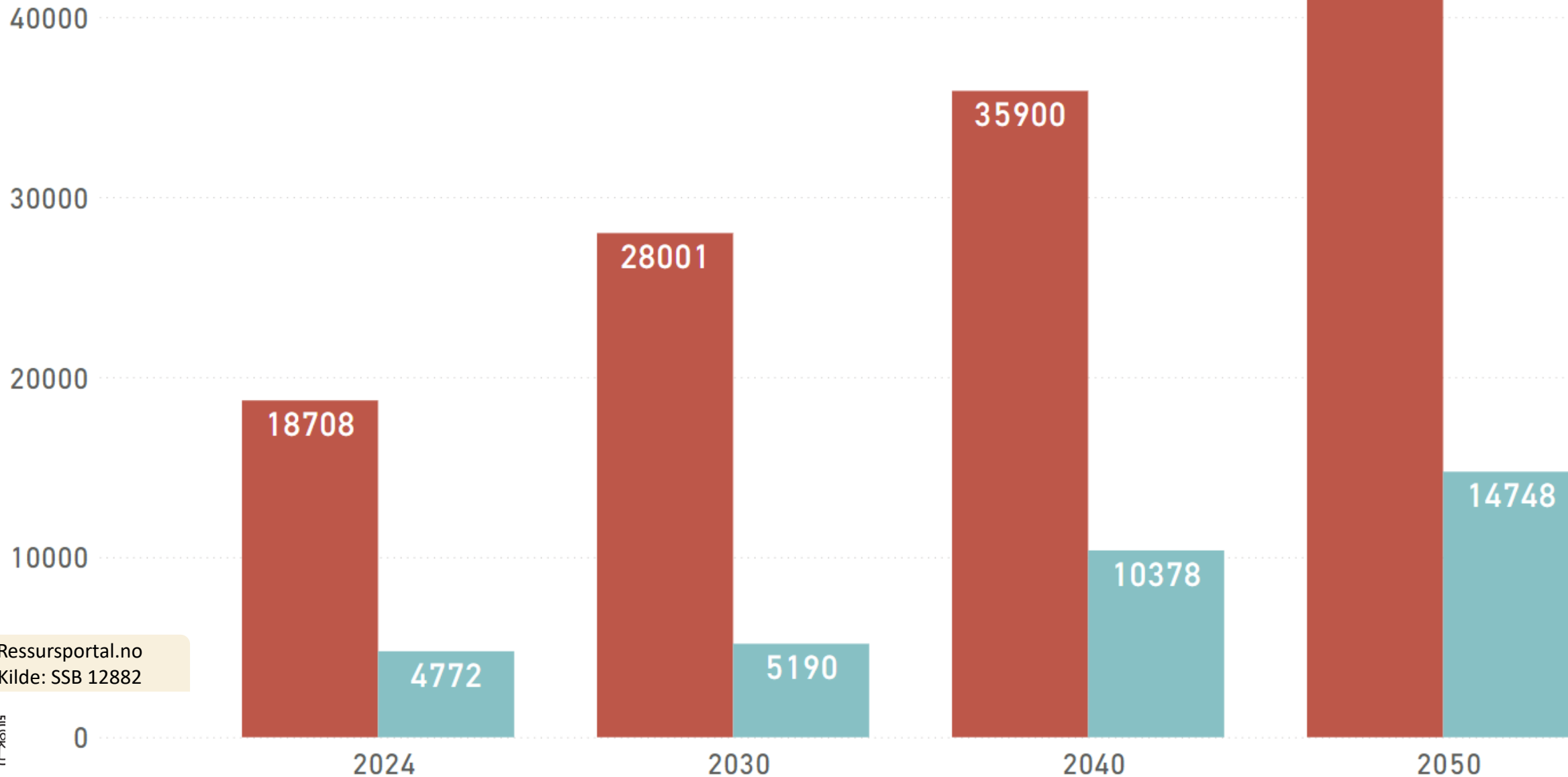


# Fakta Sykehjemsetaten



● 80-89 år ● 90 år +

## Antall eldre over 80 år øker kraftig i Oslo

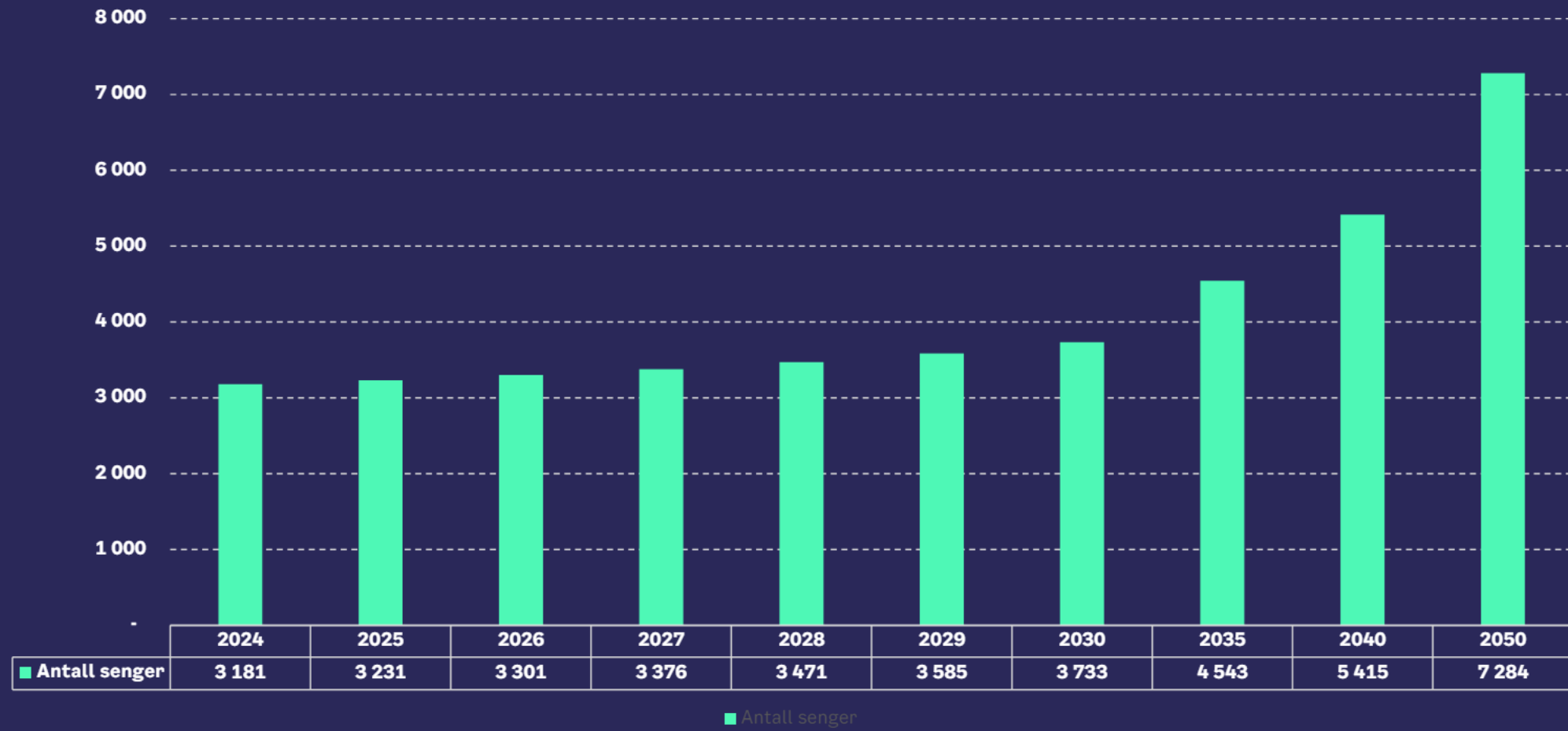


Ressursportal.no  
Kilde: SSB 12882



0

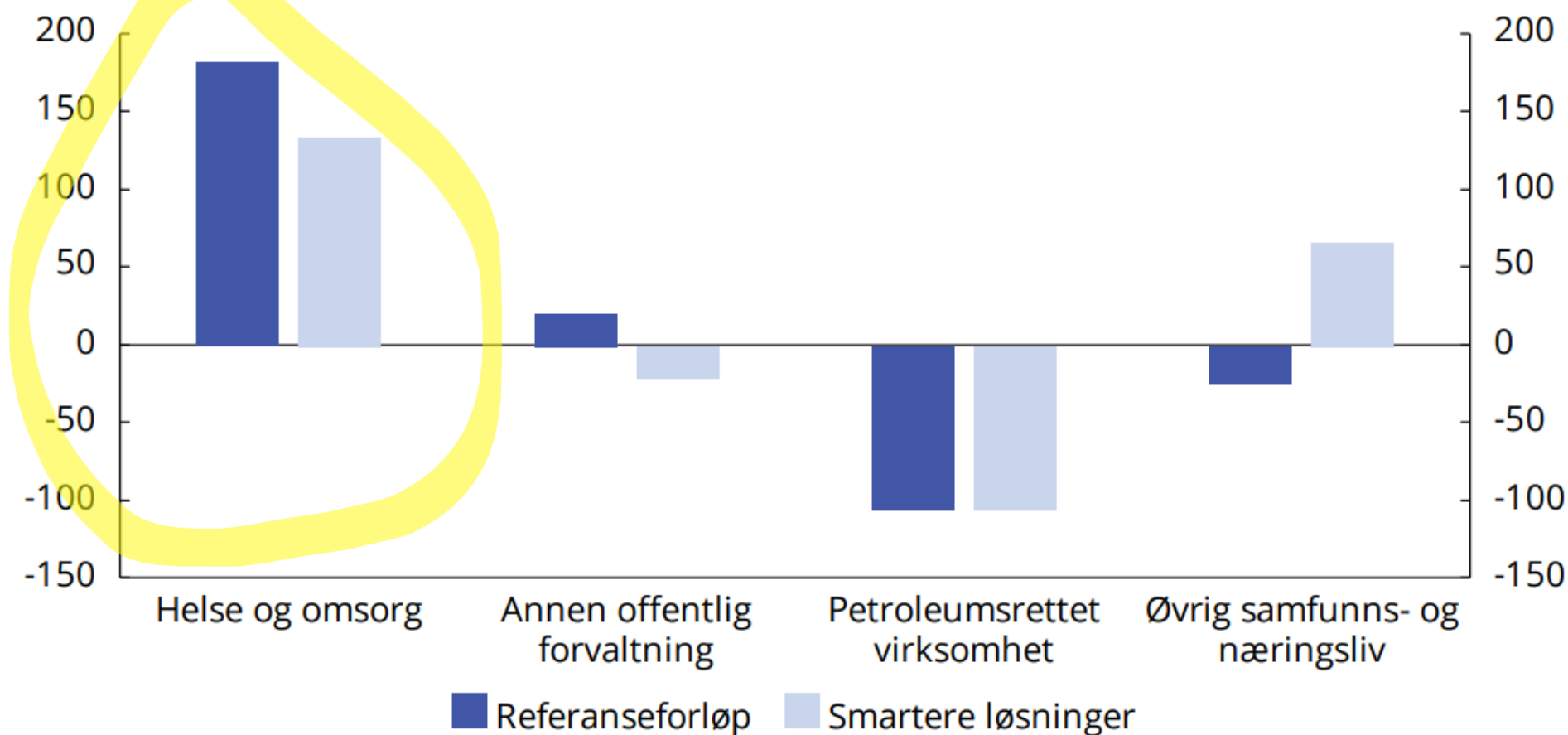
# Utvikling langtidsplasser fram mot 2050 med samme dekningsgrad som i 2024





# Klarer vi å jobbe smartere, kan det bli rom for økt sysselsetting også i andre sektorer

Illustrasjon av endringer i sysselsetting frem mot 2060. 1000 personer



# 20%

produktivitetsvekst?



# 50%

produktivitetsvekst?



# 100%

produktivitetsvekst?

Journalbilde

Info: [Patient Name] [Address] [Date]

Diagnoser: [List of diagnoses]

Journaltype	Tidspunkt	Start	Slutt
Sjåplejournal		1-8	03.01.2010
Sjåplejournal		1-8	04.01.2010
Sjåplejournal		1-8	04.01.2010
Prøvetekst	Prøvetekst	1-8	04.01.2010
Prøvetekst	Prøvetekst	1-8	05.01.2010

Prøvetekst [Content]

Info: [Patient Name] [Address] [Date]

Diagnoser: [List of diagnoses]

Behandling: [List of treatments]

Medisinske opplysninger: [List of medical information]

Prøvetekst: [List of test results]

Info: [Patient Name] [Address] [Date]

Journalbilde

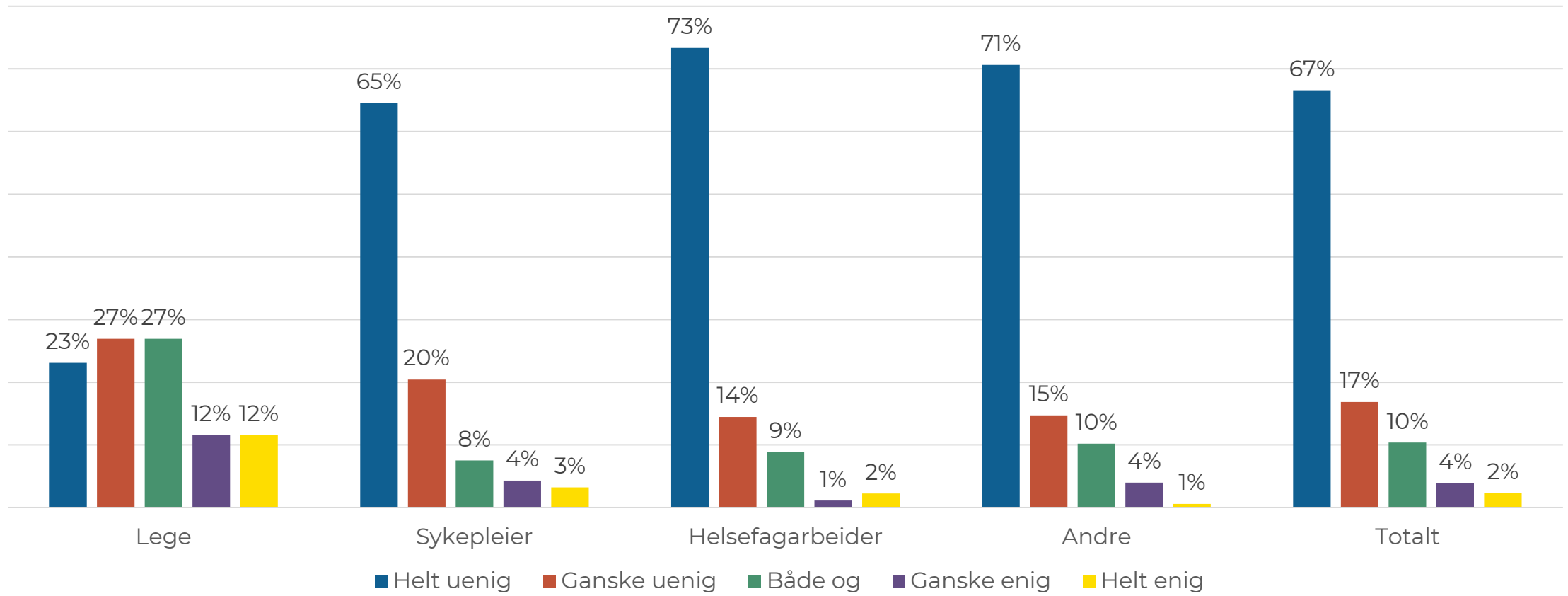
Medisinske opplysninger: [List of medical information]

Behandling: [List of treatments]

Prøvetekst: [List of test results]

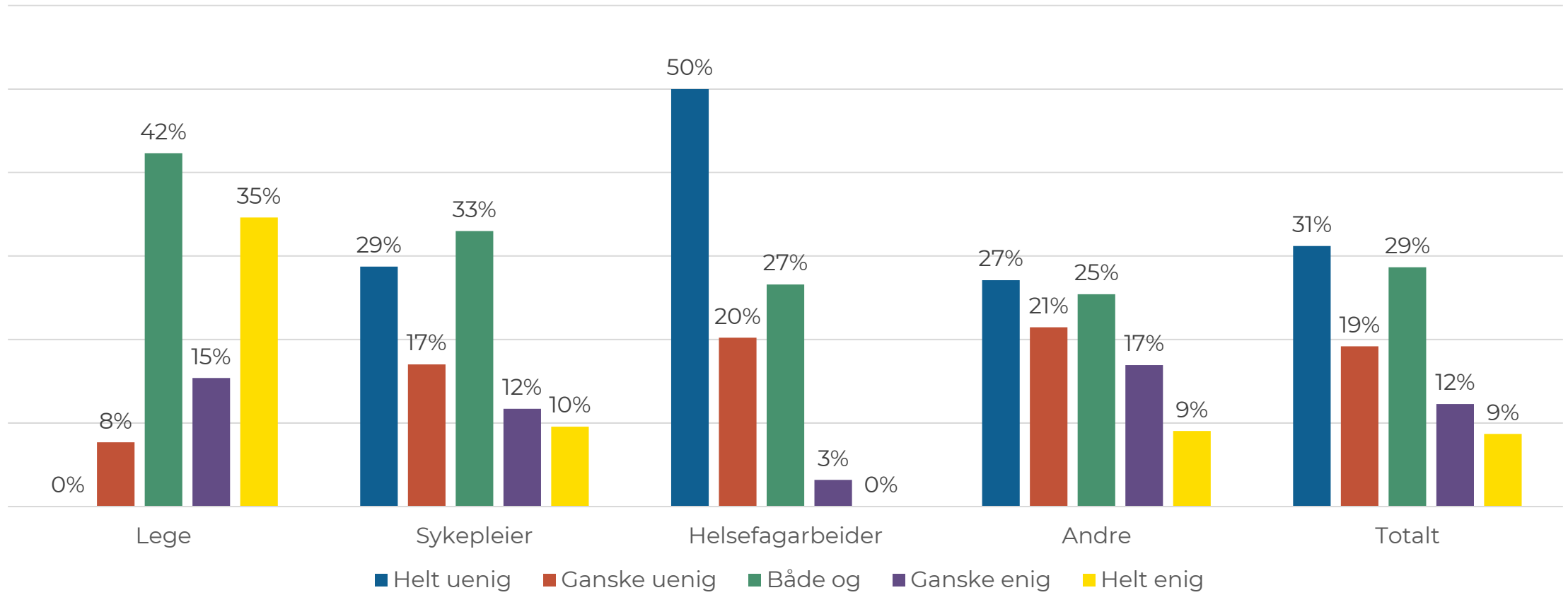
# Jeg har vurdert/vurderer å slutte i nåværende jobb på grunn av Gerica

Tallene er  
Ikke verifisert pt



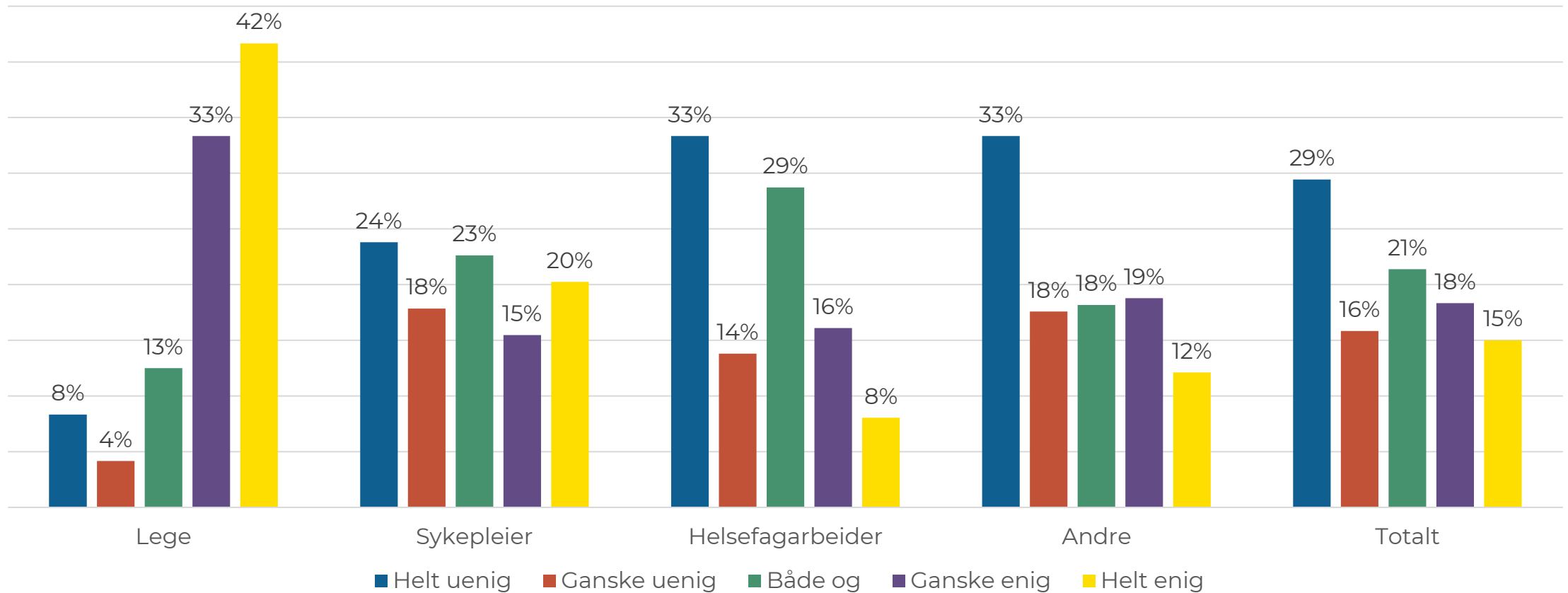
# Gerica påvirker min arbeidshverdag negativt

Tallene er  
Ikke verifisert pt



# Når jeg skal velge en ny arbeidsgiver, så vil et moderne pasientjournalssystem være av betydning for valget mitt

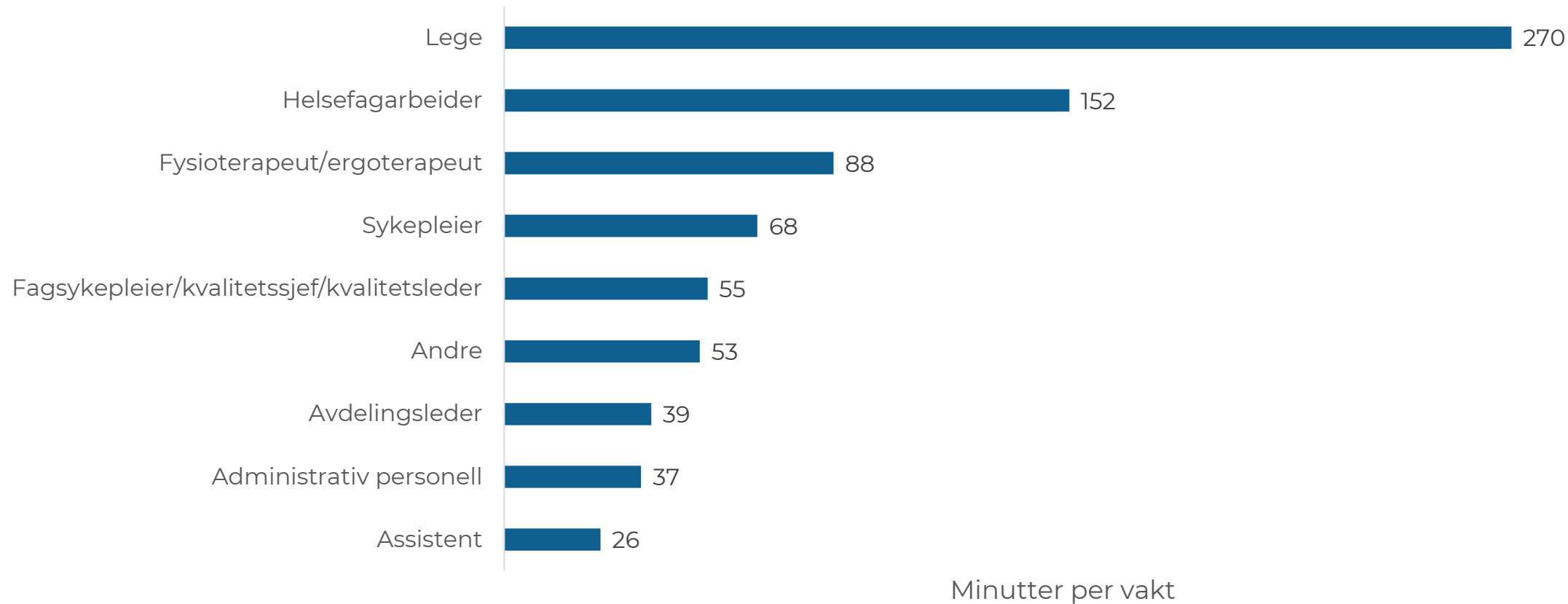
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Ikke verifisert pt





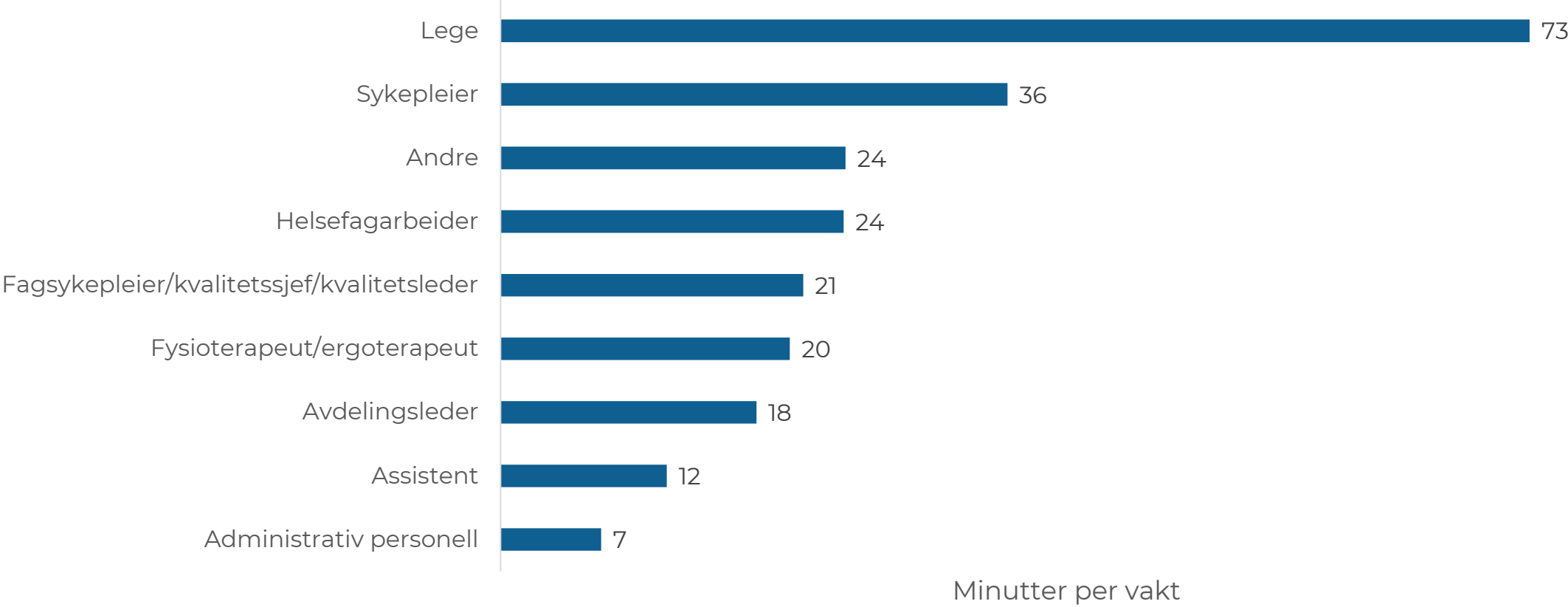
# Hvor mange minutter pr vakt bruker du i Gericca?

Tallene er  
Ikke verifisert pt

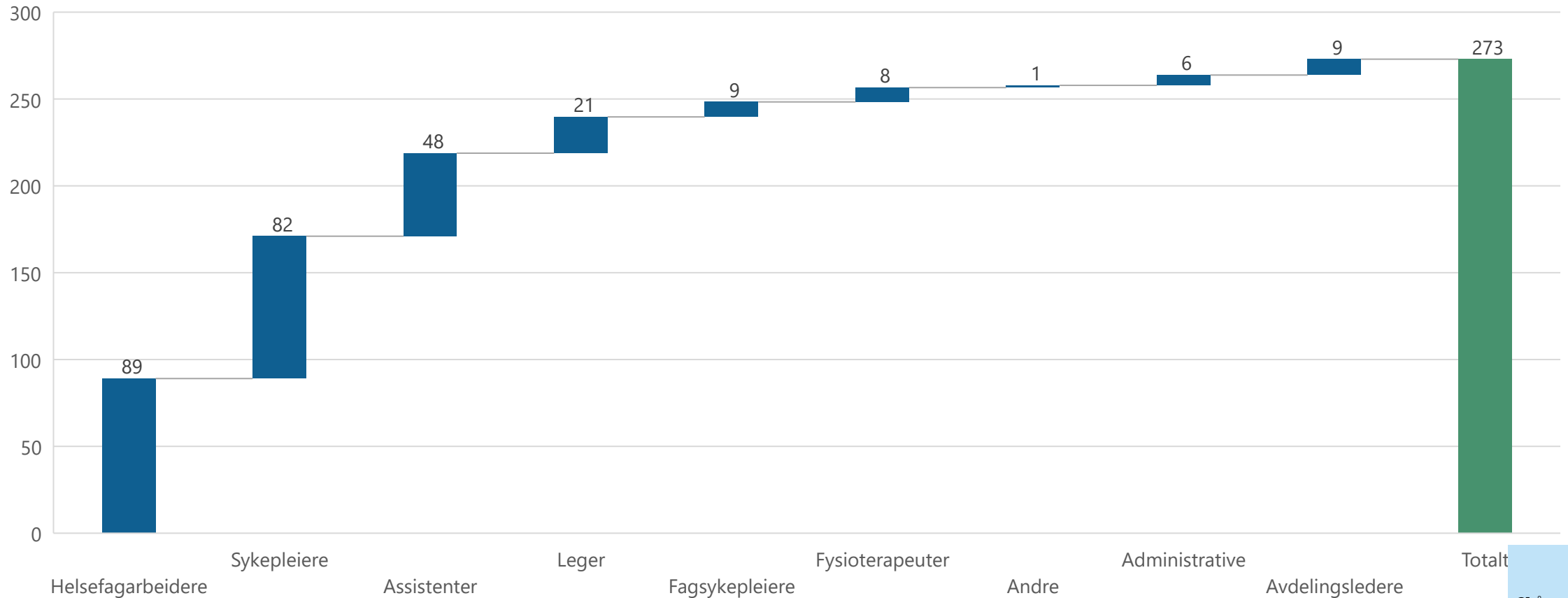


Tallene er  
Ikke verifisert pt

# Hvor mange minutter per vakt bruker du på å dobbeltføre informasjon i Gericca?

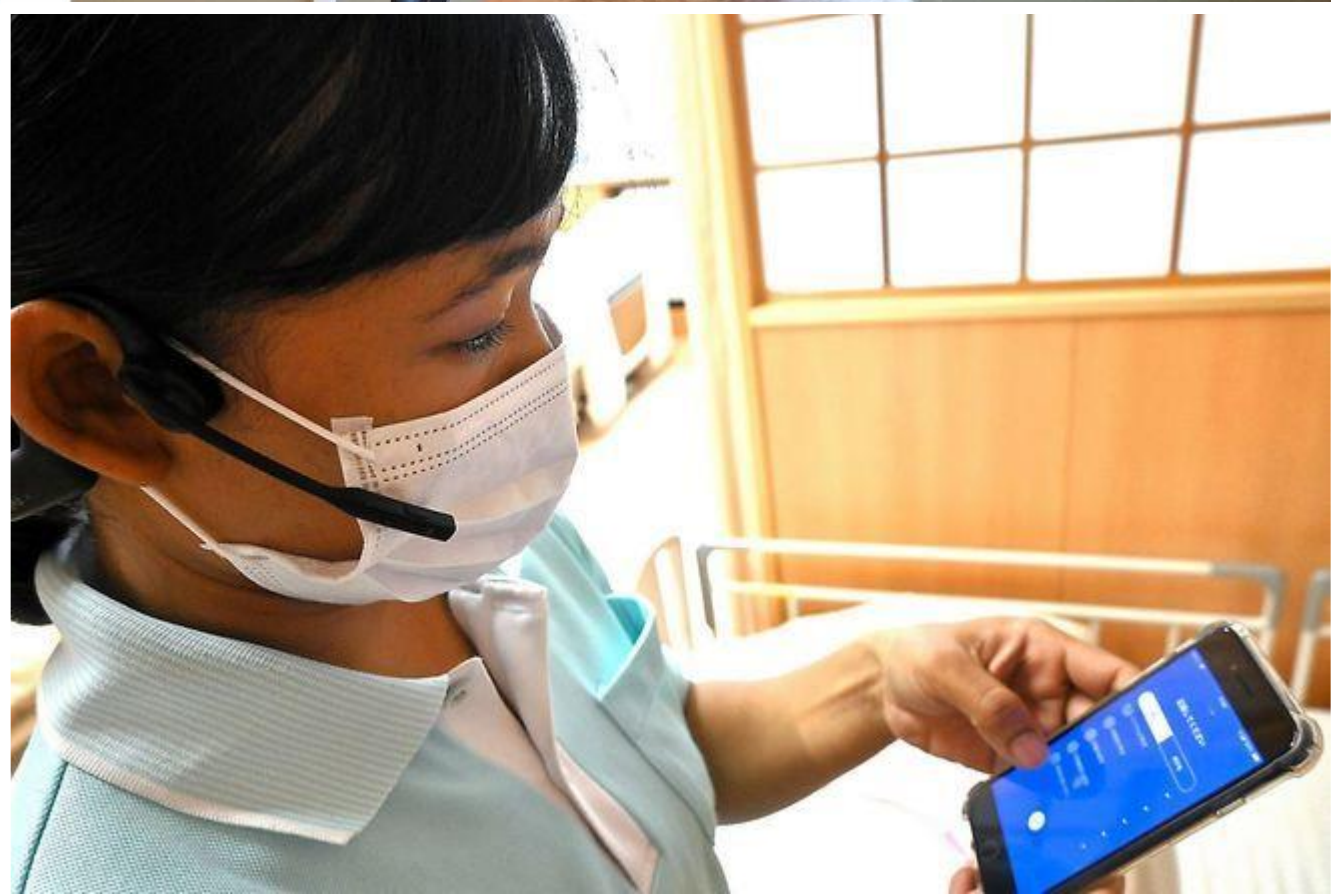
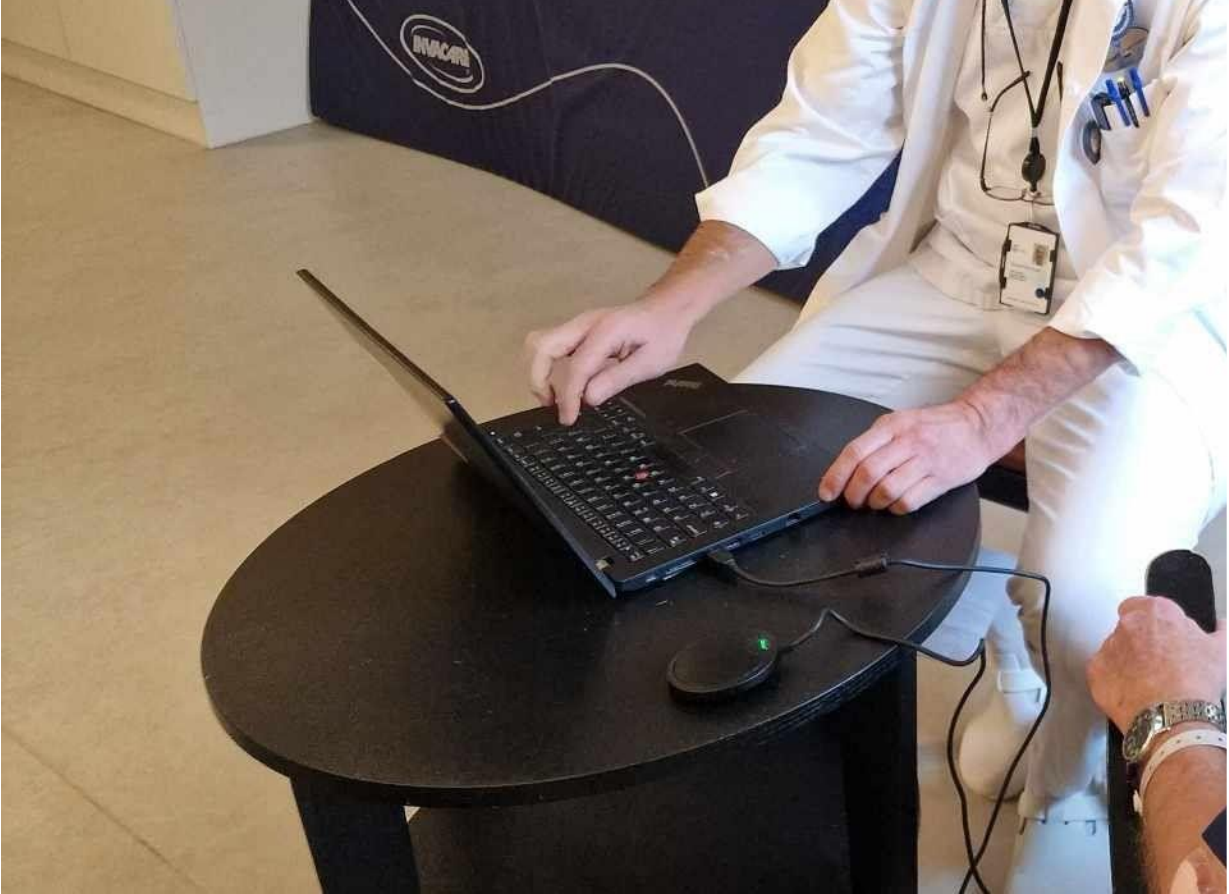


# Totalt antall årsverk besparelespotensial knyttet til journal i kommunalt drevne sykehjem



Tallene er  
Ikke verifisert pt

21 årsverk / 3000 be



# Spørsmål vi fremdeles er nysgjerrige på...

- ▶ Hvordan øke kontekst med input fra EPJ?
- ▶ Hvordan kan man samtidig generere pasient/pårørendetilpassede notater og tilgjengeliggjøre disse i sanntid?
- ▶ Hvordan fungerer teknologien med pasienter/beboere som har demens/kognitiv svikt?
- ▶ Hvordan fungerer teknologien i situasjoner hvor pårørende har en større rolle?
- ▶ Hvilke andre situasjoner er aktuelle – vil alle ansatte gå med opptaksutstyr fremover?
- ▶ Kan app/notatene også inkludere beslutningsstøtte – hvordan unngå feil- og overbehandling?
- ▶ Når er det nødvendig å få godkjenning som medisinsk teknisk utstyr?
- ▶ Hvordan lykkes med sømløs brukeropplevelse når man arbeider i EPJ?
- ▶ Hvordan kan man generere nye notater basert tidligere notater og annen dokumentasjon?

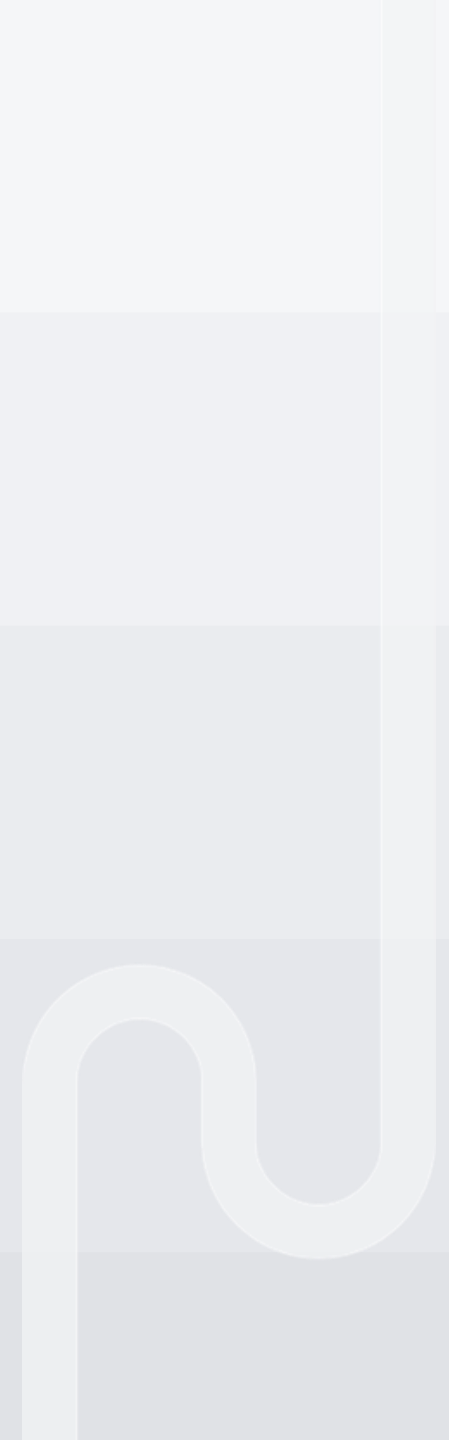
# noteless

Health2B Open

**Øystein Nygaard**

AI Lead

10. DECEMBER 2024





# Tilgjengelig på alle digitale enheter

- ✓ Onboarding < 1 minutt
- ✓ Tidsbesparelse fra dag 1
- ✓ Reduserer utbrenthet



Hvilket mulighetsrom ønsker vi oss?





En rik fauna

omilon

MEDBRIC

corti

Maia MD

Noteless

MediVox

stenoly

Vidd

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 Health2B

Medbric





**En plattform med  
AI-agenter for  
helsesektoren**





# MEDBRIC

- Utspring fra forskningssamarbeid mellom UiO og NTNU
- Pilotprosjekt med prototypeutvikling
- Over 400 fastleger har bistått med tilbakemeldinger

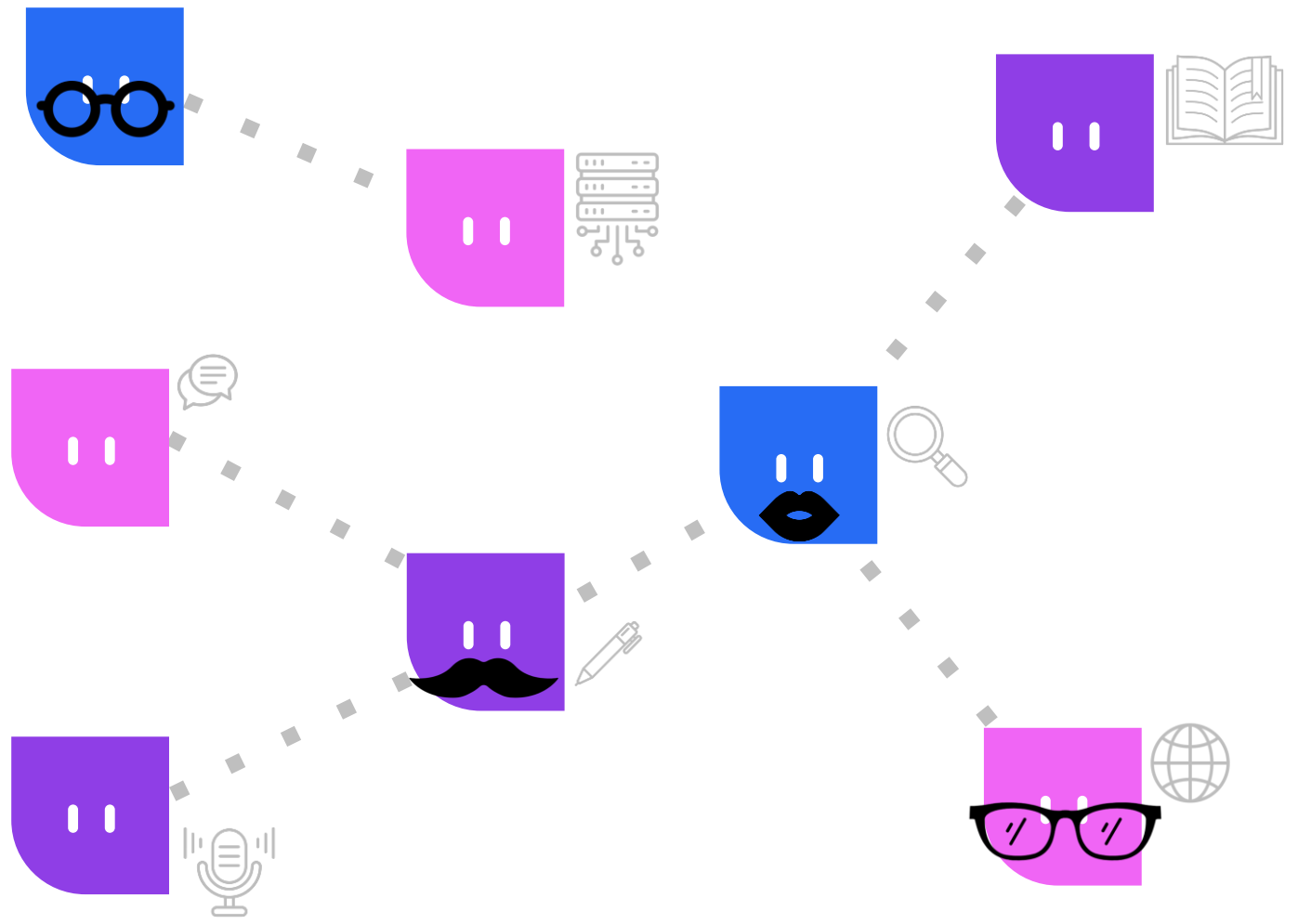
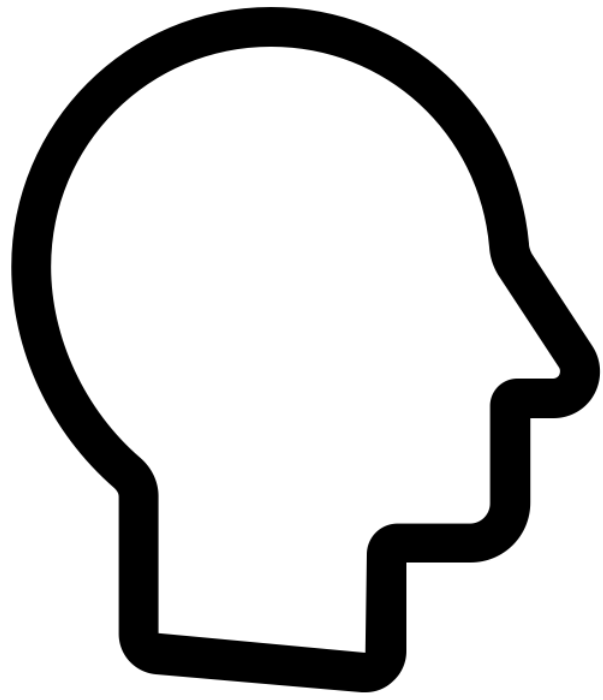


# AI agenter:

Dataprogram som bruker AI-modeller til å ta avgjørelser og utføre oppgaver på egen hånd.



MEDBRIC





# Våre AI-agenter



**AILA**

Transkriberer lydopptak fra medisinske konsultasjoner. Genererer presise notater med høy språklig kvalitet:

- Journalnotat
- Henvisninger
- Legeerklæringer
- Melding til pasienten



**AISA** Pilot

Kunnskapschatbot som oppgir tydelig kildereferanser i svarene. Henter svar fra eget bibliotek av verifiserte kunnskapskilder:

- Kliniske retningslinjer
- Medisinske håndbøker
- Forskningsrapporter
- Fagfellevurderte artikler



**AILO** Pilot

Oppsummerer kliniske dokumenter og lengre pasient historikk. Genererer presise sammendrag





[jorunn@medbric.com](mailto:jorunn@medbric.com)

[jonespen@medbric.com](mailto:jonespen@medbric.com)

- Basert på forskning, utvikles i et kontinuerlig samarbeid med norske fastleger
- Selvstendige AI-agenter
- Integrasjon med EPJ-leverandører
- Nye pilot- og forskningsprosjekter

 Health2B

Stenoly



Vil du **kjøre**  
eller **fly** med **KI**



 **stenoly**

 Health2B

Braive  
-se egen pdf







PAUSE



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corti



Human Bytes  
ARTIFICIAL INTELLIGENCE IN HEALTHCARE

# Corti is creating the leading Gen-AI platform for healthcare



## Trained in healthcare

Corti's AI is exclusively built and trained for healthcare — not a repurposed open-source model—ensuring specialized performance tailored to clinical environments and patient care needs



## Clinically-proven AI

Backed by 8 years of clinical research, Corti transcribes, documents, assures quality, codes, and provides real-time prompts so providers can make the most of their time with patients

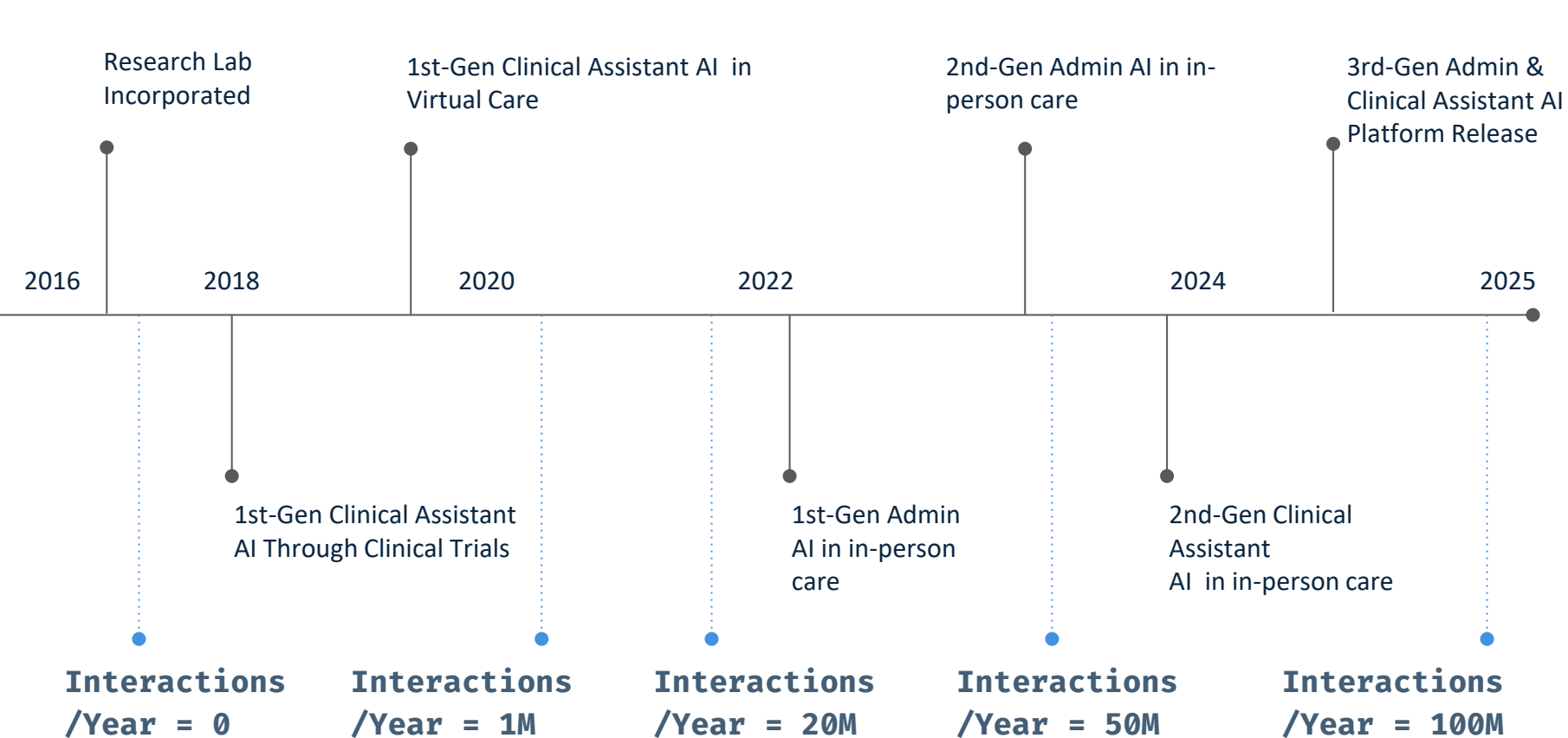


## Realtime guidance

Corti's AI delivers real-time, data-driven guidance to enhance care quality, expedite high-quality documentation, and drive revenue capture through optimized coding and billing accuracy

# We are the leading Healthcare AI R&D lab in Europe

With research at our core.



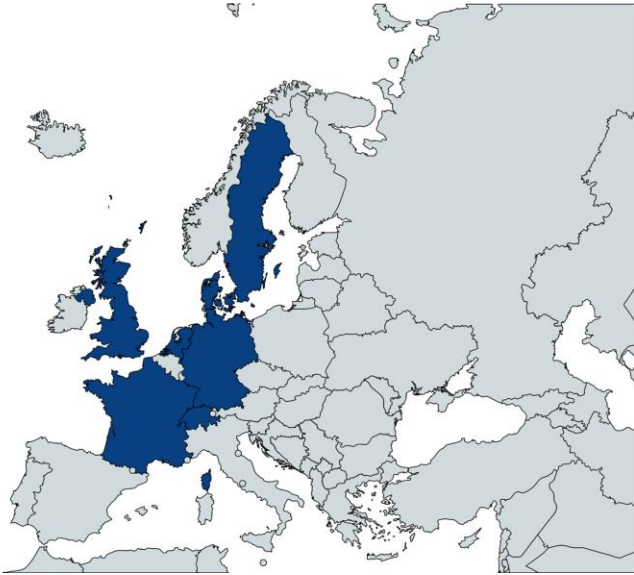
250,000 Citations  
In the R&D Team

25+ Publications  
Proving the Technology

92M Patient Interactions  
Supported Each Year

Corti is building accessible and trustworthy AI to make every interaction an opportunity to deliver higher quality care

### Corti in Europe



England



Del av Ramsay Santé



Region Hovedstaden



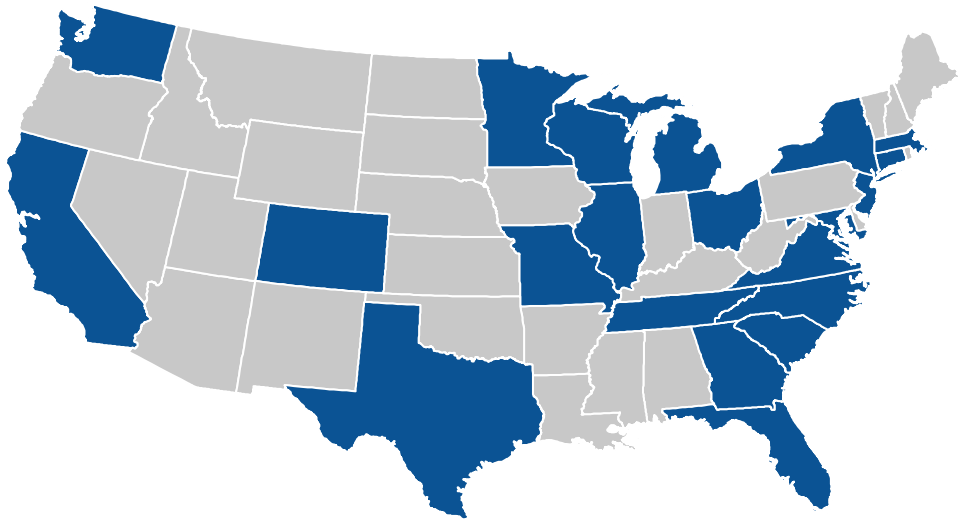
SOS Alarm



REGION SJÆLLAND

-vi er til for dig

### Corti in the US



# 1 API : 11+ Languages : 20+ Geo's

Available in more than  
20+ countries

- Dutch: Netherlands, Belgium
- German: Germany, Switzerland, Austria
- French: Belgium, France
- Spanish: Spain, LATAM
- Danish
- Norwegian
- Swedish
- English: US; UK; AUS, Singapore, NZ
- Italian
- Portuguese
- Arabic

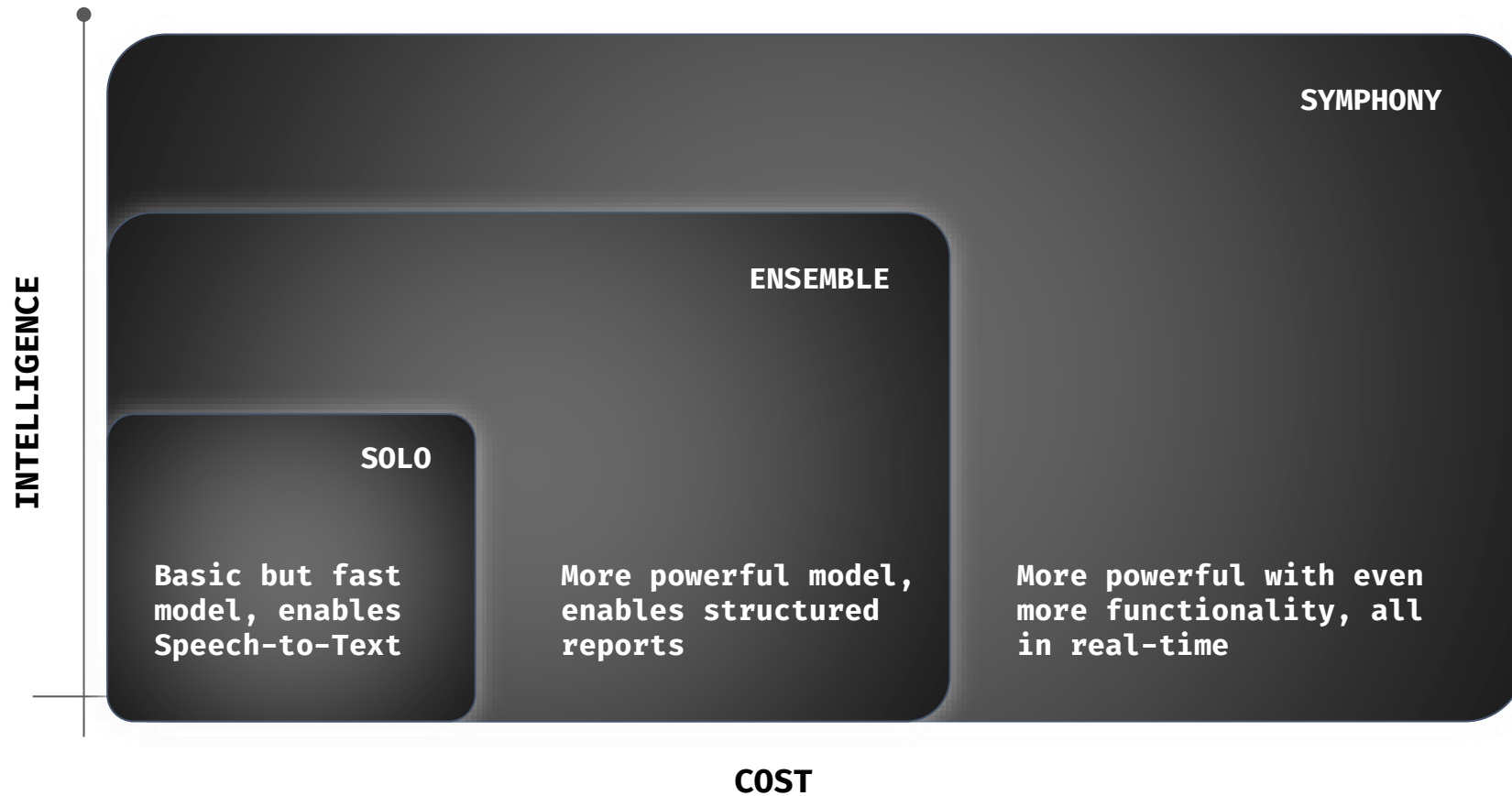
Support for 11+ languages in  
Speech and Text

The image displays a grid of 15 language examples, each with a flag icon, the language name, and a sample sentence. The examples are:

- Italiano: Hai allergie conosciute?
- Svenska: Min hals känns öm när jag sväljer.
- Norsk: Jeg skal foreskrive deg en antibiotika.
- Deutsch: Sie müssen sich ein paar Tage ausruhen.
- Nederlands: Rookt of drinkt u regelmatig alcohol?!
- American English: You should avoid heavy lifting for now.
- French: Prendre un échantillon de sang.
- Español: Tengo una tos persistente.
- Dansk: Jeg har haft smerterne i...
- Schweizerdeutsch: Es isch mir schwindlig, wenn ich uufstah.
- Português Europeu: Terá de marcar uma consulta de seguimento.
- British English: I've been feeling unusually tired lately.
- Deutsch: Ich fühle mich in letzter Zeit ungewöhnlich müde.
- Portuguese: Como hai questi sintomi?
- Español: He tenido fiebre durante los últimos dos días.
- American English: I'll refer you...
- Français: J'ai eu de la fièvre ces deux derniers jours.
- Svenska: Blir smärtan värre på natten?

# Corti offers three Foundation Models

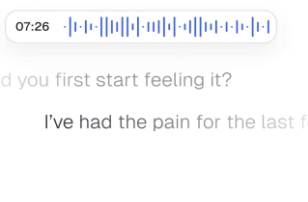
With functionality to power all healthcare use cases



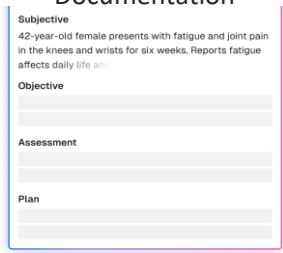
# Corti can power solutions for many healthcare use cases

## Corti AI Capabilities

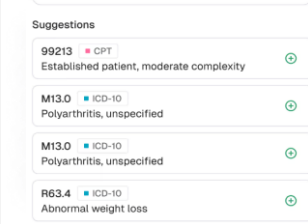
### Speech to Text & Dictation



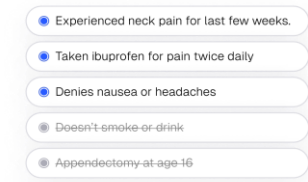
### Ambient Documentation



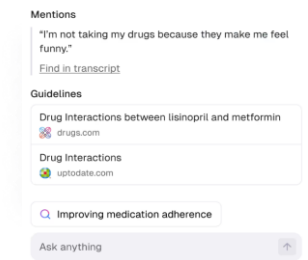
### Diagnosis & Procedure Coding




### Live Note-Taking



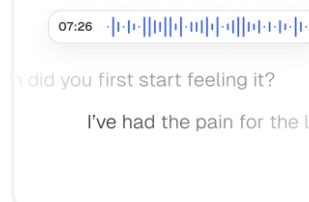
### Contextual Search & Knowledge Retrieval



### Evaluation & Alignment Models



### Real-time Natural Language Processing



## Use Cases

Realtime transcription of patient visits or dictation

Generation of concise and customized medical reports, notes

Automatic diagnostic and procedure coding (ICD, CPT)

Realtime extraction of key information from transcript

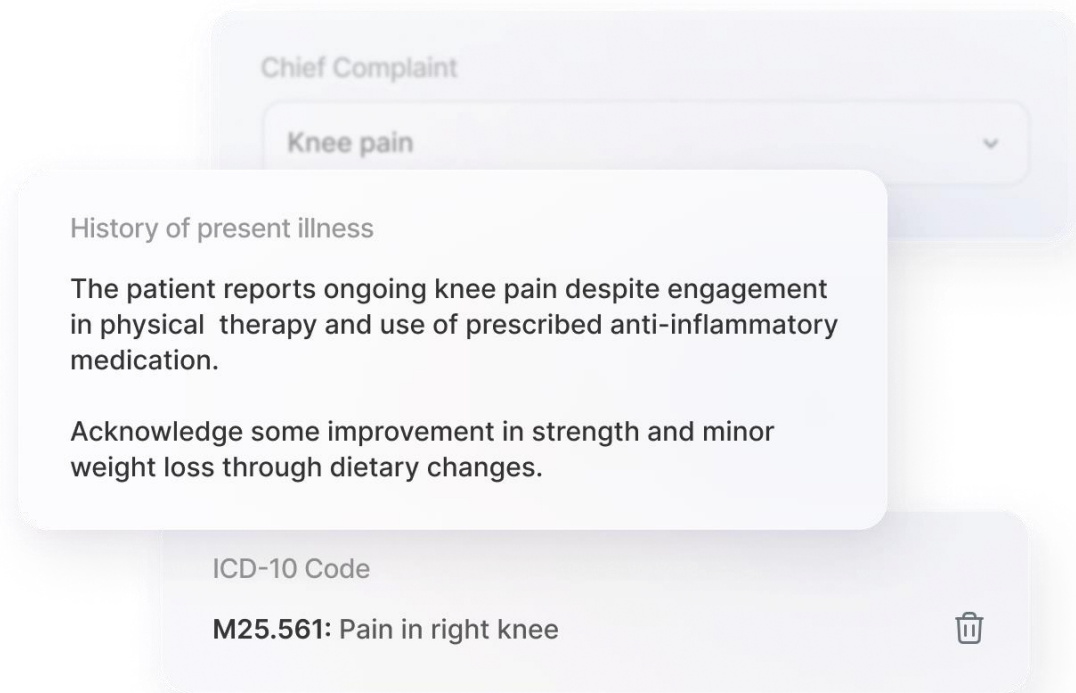
Realtime AI chat assistance with any complex query

Evaluates performance of output and areas for improvement

Advanced dictation use cases

# Introduction Corti

## Highly accurate AI



## Ambient Documentation

# Highest accuracy

Corti's proprietary LLM built solely for healthcare is 32x faster than GPT4.o, and is 20% more accurate.

- Captures every detail of consultations, supporting ambient, virtual and phone interactions.
- Generates real-time structured documentation according to specified templates and styles (e.g. SOAP).
- Offers customisable templates according to each specific customer and specialty requirements.
- Bespoke template creation based on provider standards or doctor preferences.
- Includes dictation (speech recognition) functionality for quick and simple correction
- Eliminates 90% of documentation time.



# Introduction Corti

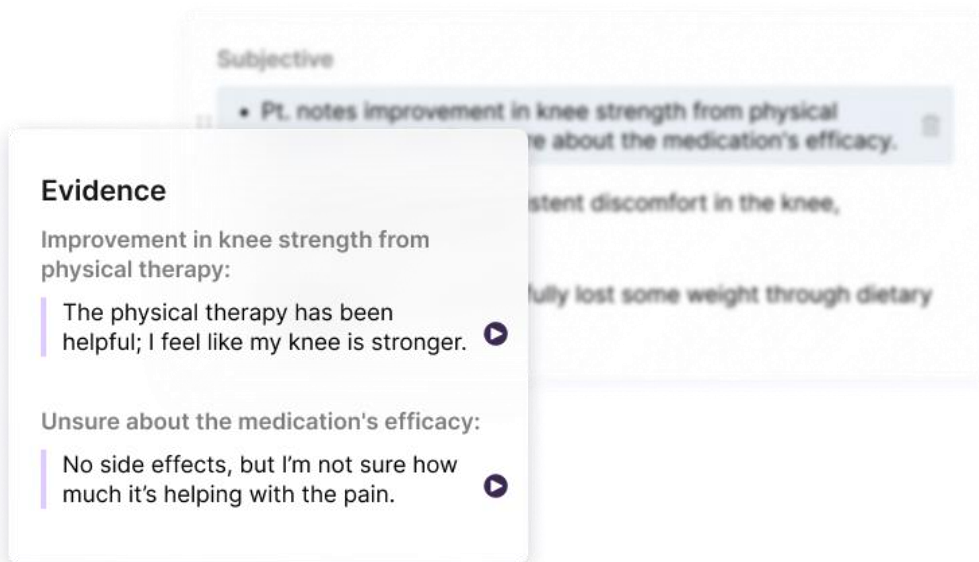
## Explainable and trustworthy AI

### Transparency & trust

## Best-in-class safety

Corti's AI explainability boosts transparency and trust by providing evidence for its insights, ensuring all of our users can confidently make use of AI support.

- Corti's fact-based AI is the leader in explainable documentation with +98% of its generated documentation being traceable.
- Corti has been found to produce documentation that is 38% more succinct which means radically fewer hallucinations.
- When A/B tested by providers, doctors chose Corti over their peers documentation 63% of the time.

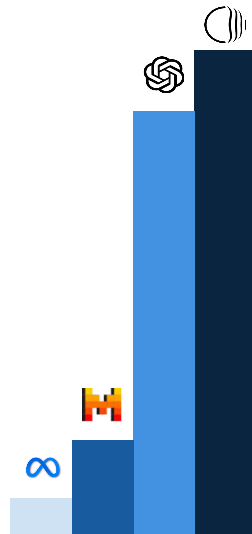




# More trustworthy Results that can be trusted

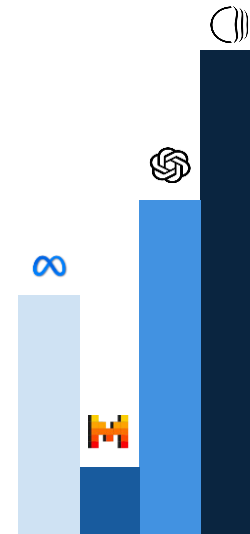
Corti's proprietary LLM, specifically trained in healthcare, outperforms foundational models used by competitor solutions, making us safer and more relevant for providers and patients

Corti makes **8%** fewer errors than GPT-4o



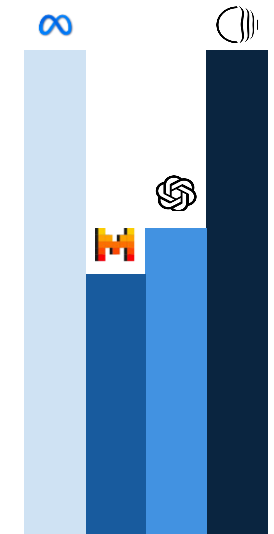
**Accuracy & Style**  
(bar indicates % documentation accuracy vs. transcript)

Corti generates **20% more detail** than GPT-4o



**Document Completeness**  
(bar indicates % of AI report that was accepted with no edits by provider)

Corti makes **38% fewer hallucinations** than GPT-4o



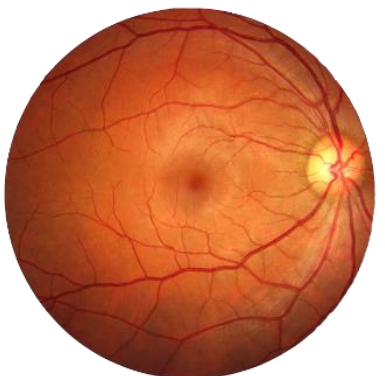
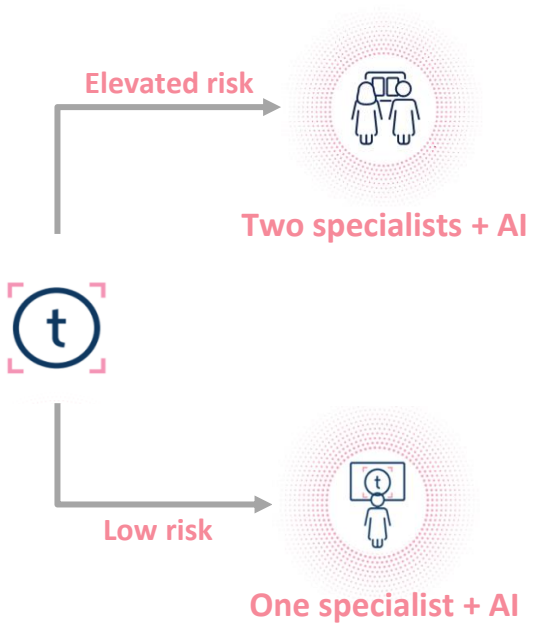
**Hallucinations**  
(bar indicates % of details in AI report that were kept in final version)



Most scribe companies uses a combination of Open AI, Mistral, or Meta LLMs; in this analysis we have compared Corti's LLM to highly optimized LLMs from these three incumbents



# Human Bytes – AI in healthcare



Cancer screening  
Replacing a radiologist

Eye screening  
Replacing an ophthalmologist

Cancer treatment planning  
Automating workflows





# LLM in Healthcare



Documented performance  
Intended use and purpose  
Risk management system (QMS)  
Human oversight and transparency



**You need control over the full value chain in development  
(as with medical devices)**



## Already included in Danish AI contracts: (Non-high-risk systems)

*“the methods and steps undertaken for the development of the AI system, including, where relevant, the use of pre-trained systems or tools provided by third parties, and how these have been applied, integrated, or modified by the provider, including a description of any licenses or other contractual arrangements related to such third-party inputs.”*



# AI Act: Denmark



## Already included in Danish AI contracts: (Non-high-risk systems)

*“data sheets describing the training methods and techniques used and the training datasets employed, including information about the origin of these datasets, their scope and key characteristics, how the data were collected and selected, labeling procedures (e.g., for supervised learning)”*

**AI Act demands control over full technology value chain**



# Cloud: Sweden



## Secure third country data transfers:



**DATA PRIVACY  
FRAMEWORK  
PROGRAM**



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[Self-Certify](#)

[Data Privacy Framework List](#)

[Audiences](#)

[About](#)



**FILTER RESULTS**

**CLEAR FILTERS**

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z 0 1 2 3 4 5 6 7 8 9 **ALL**

**ACTIVE PARTICIPANTS**

**INACTIVE PARTICIPANTS**

**EXPORT LIST DATA**

Query returned no results.

[Self-Certify](#)

[Data Privacy Framework List](#)

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- [Data Protection Authorities](#)

- [Program Overview](#)
- [Framework Text](#)
- [Inactive Participants](#)
- [News & Events](#)





# HSØ cloud tender demands



## AI Act already considered:

*“Describe the procedures that are established for **continual monitoring of integrity and quality** in the AI solution in use.”*

*“The Contractor **and potential Subcontractors** who is chosen to deliver the solution to the Customer, should be **compliant in accordance with EU AI Act.** Contractor's description is requested.”*



## AI Act already build into requirements:

*“The AI solution should demonstrate characteristics of trustworthiness: valid and reliable, safe, secure and resilient, accountable and transparent, explainable and interpretable, privacy-enhanced, and fair with harmful bias managed.*

*A statement/description of the AI product should be provided in relation to the EU Ethical Guidelines for Reliable and Credible Use of Artificial Intelligence, European Commission: Ethics Guidelines for Trustworthy AI (2019)”*

**Speech to text is no longer infrastructure only**



Thank you

Sebastian Slej - Corti - [ss@corti.ai](mailto:ss@corti.ai)

Frederik Baastrup - Human Bytes - [fba@humanbytes.ai](mailto:fba@humanbytes.ai)

# Agenda KI og pasientjournal

Tid	Tittel	Hvem
14.15-14.20	Medbric - en plattform med fremtidens AI-agenter for helsevesenet	Jorunn Thaulow, Jon Espen Ingvaldsen, Medbric
14.20-14.25	Vil du kjøre eller fly med KI	Stefan Manov, Stenoly
14.25-14.30	Mulighetene i skjæringspunktet	Henrik Haaland Jahren, Braive
14.30-14.50	PAUSE	
14.50-15.05	Internasjonal erfaring	Sebastian Slej, Corti Frederik Baastrup, Human Bytes
15.05 -15.25	<b>Refleksjonsinnlegg – betydninger av teknologi for tekstanalyse i medisinsk praksis</b>	Troels Mønsted, UiO
15.25-16.00	Panel samtale og dialog med salen – veien videre	
16.00	Takk for idag	

# AI and the medical record

## Reflections on the use of AI for clinical note taking

Troels Mønsted, Associate Professor, PhD

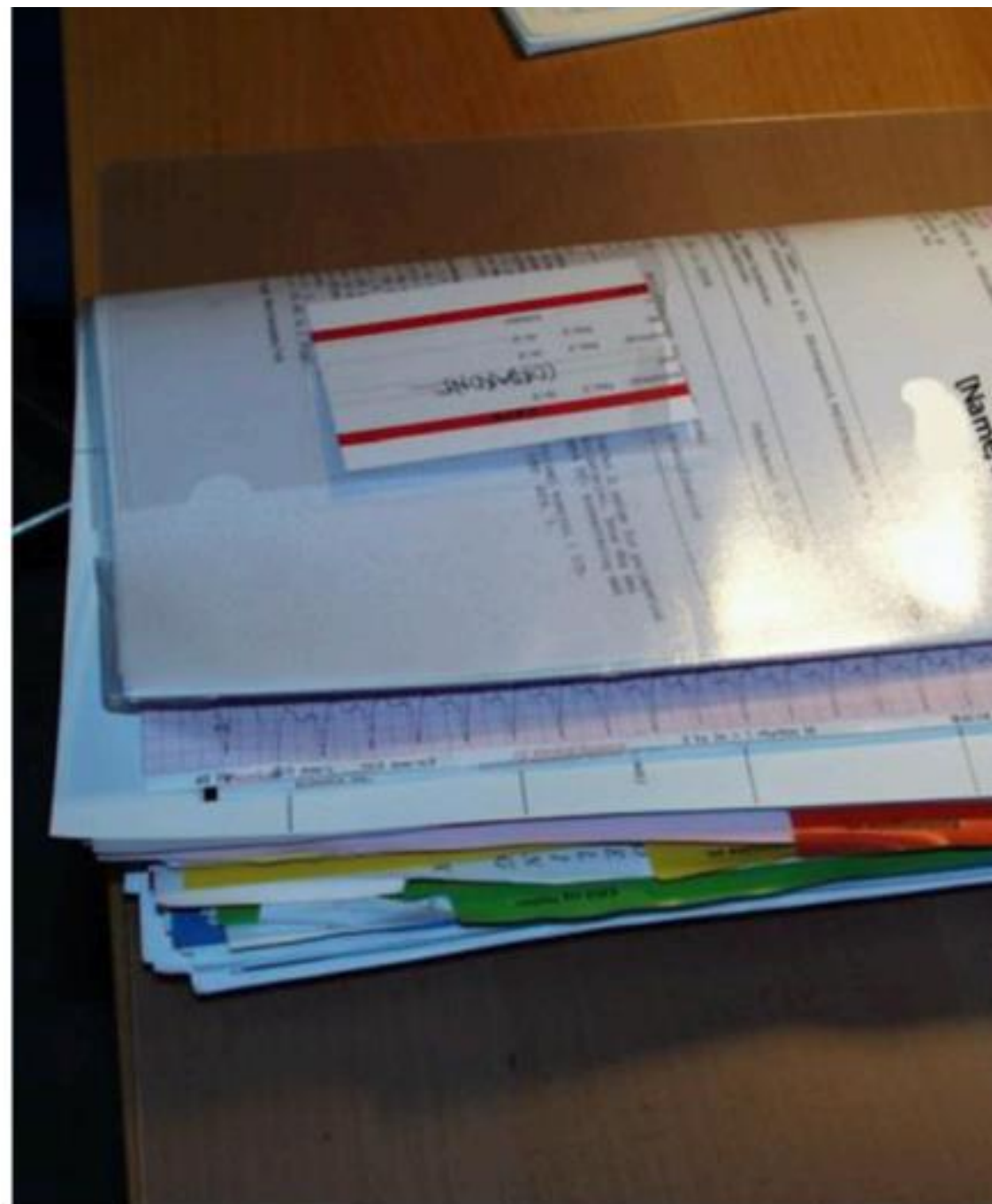
Department of Informatics, University of Oslo

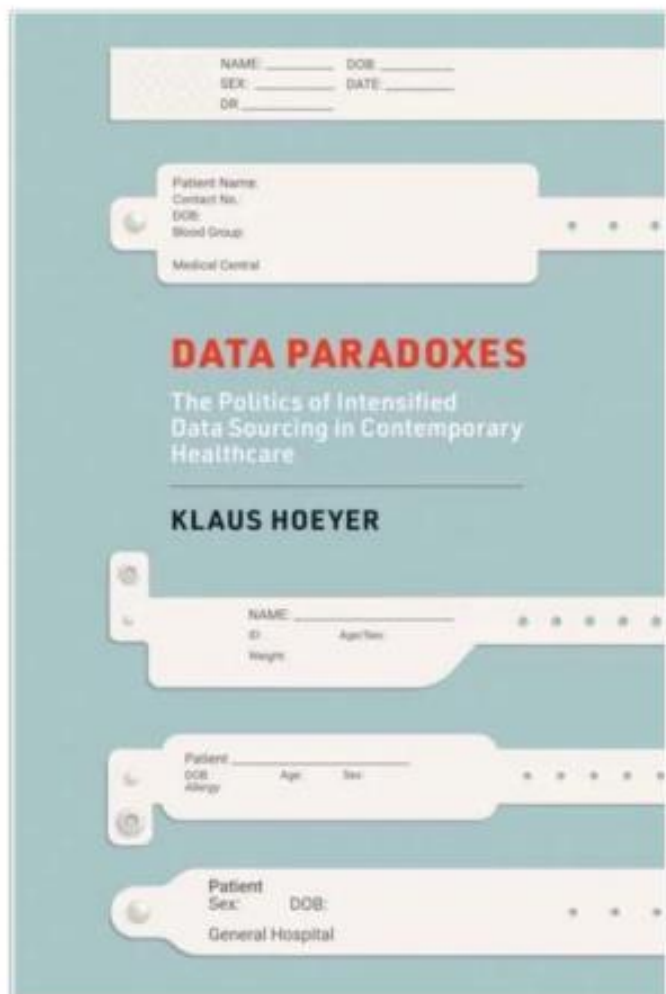
[monsted@ifi.uio.no](mailto:monsted@ifi.uio.no)

Health2B Open: KI og Pasientjournal



UNIVERSITY  
OF OSLO





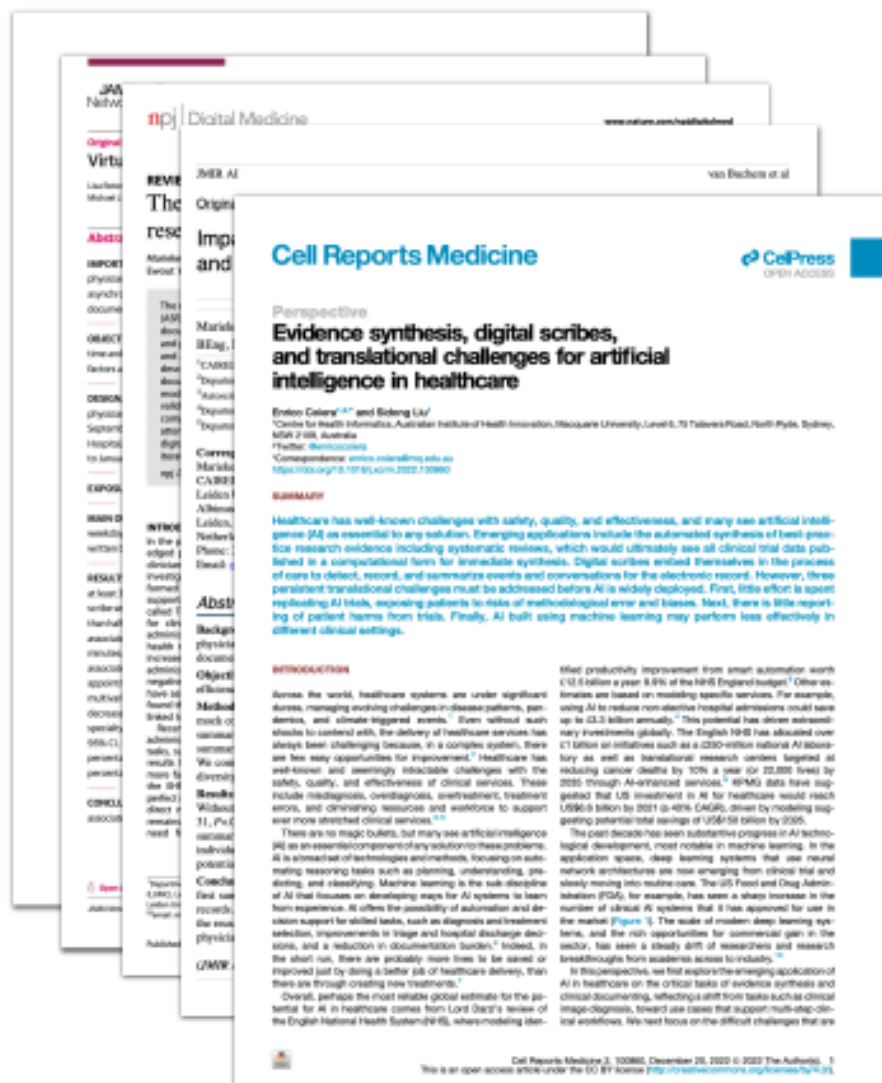
Hoeyer (2023)



# Digital scribes in healthcare

## General impressions from an emerging literature

- Reasons to be optimistic!
- Digital scribes reported as a relevant response to intensified data sourcing leading to pronounced burnout among health professionals.
- Moderate to good effect on task completion time of clinical note writing as well as satisfactory precision reported.
- Several challenges emerging during ‘the last mile’ of AI implementation and ‘in the wild’ reported.



# Challenges occurring during 'the last mile'

## Three translational challenges of implementation of digital scribes

- Lack of replication of AI trials.
- Lack of reporting of potential harm in AI trials.
- Limited understanding of the extend to which AI models perform as efficiently in other settings than those they originate from.



Coiera & Liu, 2022

# Challenges occurring 'in the wild'

## **What about the long-term impact on clinical work?**

- Lack of understanding of how the use of AI, including digital scribes, will affect practices and workflows in healthcare on the long-term.

## **Example: Types of challenge appearing 'in the wild' identified by Andersen et al (2023)**

- Alignment of AI with human values
- Design processes and AI
- Interaction and collaboration with AI
- **Sociotechnical aspects - the complex network of people, practices, and technologies.**
- Implementation processes.

Reference: Andersen, Nunes, Wilcox, Coiera, & Rogers (2023): Introduction to the Special Issue on Human-Centred AI in Healthcare: Challenges Appearing in the Wild. ACM Transactions on Computer-Human Interaction, 30(2).

Rationalizing Medical Work

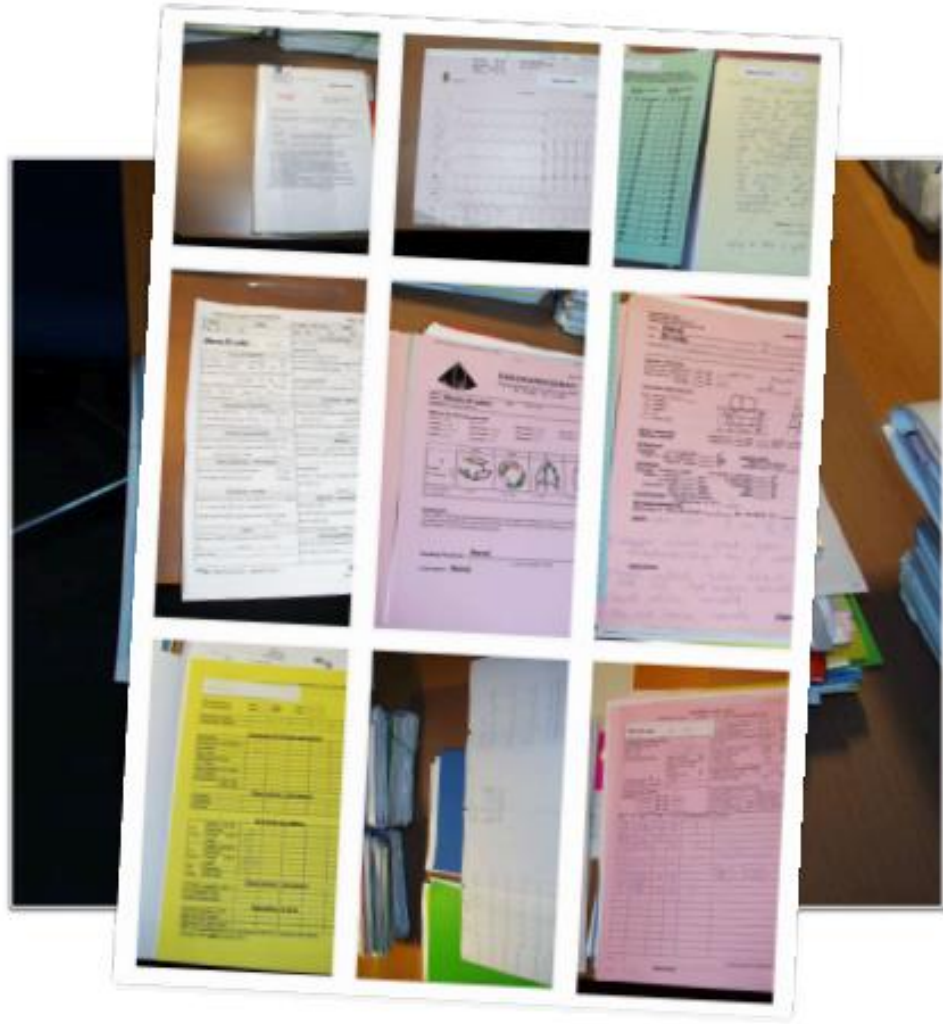
Decision-Support Techniques  
and Medical Practices

Marc Berg

Berg (1997)







27.05.2009 21:15 CHARD

**Admission**

64-year-old male admitted w.d. atrial fibrillation with rapid heart rate.

**Previous**

Known with paroxysmic atrial fibrillation, treated with ablation in fall 2006.

30.01.07 CAG done at GH without indication for revascularization. Ventriculography with normal LVEF.

Has reportedly mainly been treated at LOH, according to his son he has been hospitalized at LOH for most of 2006.

Furthermore had PCI.

**Present**

Is admitted with fast atrial fibrillation, comes in with wide complex tachycardia, as mentioned known with left bundle branch block, in acutely bad shape, respiratory and circulatory. Is awake and has communicated with the staff. Complains of nausea and would like a bag to throw up in. Due to fast, broad complex tachycardia there is given

rp. inj. Cordarone 300 mg as  
bolus IV

with good effect on the ventricular frequency, which falls to about 80. Still wide QRS complexes. Pt becomes pale and cold sweating, gets seizure like twitches in the face and the extremities. Pt becomes unconscious and his respiration fails, cardiac arrest is diagnosed and basic resuscitation 30/2 is commenced. Telenetri shows bradycardia down to 30. There is given

rp. inj. Atropine 3 mg IV

and after 4 min inj. Adrenalin 1 mg IV

Pt has an acceptable systolic BP between 110-140. Does not wake up at all and is intubated. He still has seizures with grimacing movements in the head-neck region, pt conferred with doctor HM, pt is transferred to ICU for cooling.

# A study of clinical notes

## About the study

- Investigation of clinical notes in one patient record sampled at a cardiology unit at a leading hospital in Denmark.
- Focus on notes taken during a 29-day admission where the patient suffered heart failure 3 times.
- Analysis of the structure, content and role of the clinical notes.

## Questions addressed in this paper:

- Why were clinical notes the core of the medical record?
- What roles did clinical notes fulfill beyond pure documentation?

### Cooperative Epistemic Work in Medical Practice: An Analysis of Physicians' Clinical Notes

Jørgen P. Bansler<sup>1</sup>, Erling C. Havn<sup>1</sup>, Kjeld Schmidt<sup>2,3</sup>, Troels Mønsted<sup>4</sup>,  
Helen Høgh Petersen<sup>5</sup> & Jesper Hastrup Svendsen<sup>5</sup>

<sup>1</sup>University of Copenhagen, Copenhagen, Denmark (E-mail: bansler@diis.dk); <sup>2</sup>Copenhagen Business School, Frederiksberg, Denmark; <sup>3</sup>University of Siegen, Siegen, Germany; <sup>4</sup>University of Oslo, Oslo, Norway; <sup>5</sup>Rigshospitalet, Copenhagen, Denmark

**Abstract.** We examine an important part of the medical record that has not been studied extensively: physicians' clinical notes. These notes constitute an explanatory medical narrative that documents the patient's illness trajectory by combining each physician's notes into a common text. Although several prior CSCW studies have addressed the role of the medical record in patient care, they have not dealt specifically with the role, structure, and content of these notes. In this article, we present a detailed analysis of a set of physicians' clinical notes recording the acute hospitalization and subsequent treatment of a patient with chronic heart disease. We show that clinical notes are highly structured and conventionalized texts that promote consciousness while at the same time allowing physicians to express themselves in a precise and nuanced way. Based on this analysis, we argue that physicians' clinical notes form the core of the medical record. They serve both as a 'tool for thinking' for the individual physician, enabling him or her to make sense of the patient's past history and current condition, and as a coordinative artifact used by physicians, nurses, and other health care professionals. We conclude by discussing the implications of this research for the design of Electronic Medical Record (EMR) systems.

**Keywords:** Clinical documentation practices, Organisational communication genre, Clinical notes, Progress notes, Admission notes, Narratives, Medical discourse, Medical reasoning, Sensemaking, Medical record, Electronic health record, Electronic medical record

#### 1. Introduction

The institution of the medical record is under increasing pressure from many different directions. Driven by advances in pharmaceutical, diagnostic, surgical, anesthetic, clinical, prosthetic, physiotherapeutic, and other technologies, the medical profession is undergoing a process of radical specialization<sup>1</sup>. At the same time, as a result of the very same advances in medical technologies people live longer and the percentage of patients with chronic diseases is consequently rising steadily (Strauss et al., 1983;

<sup>1</sup> Tentative and partial accounts of the research reported in this article have been published previously (e.g., Bansler et al., 2011, 2013b; Bansler et al., 2013c; Mønsted, 2015). The present article gives a significantly richer and more complete account of the case, and the analysis and discussion have been revised and extended.

Bansler, Havn, Schmidt, Mønsted,  
Petersen & Svendsen (2016)



# What *is* a clinical note?

**Genre:** The structural, linguistic, and substantive conventions that guide the composition of text (Yates & Orlikowski, 1992)

## Genre rules of clinical notes:

- Chronological order.
- References to other documents.
- Standardized layout, including identifiers of author, date, and place.
- Concise format.
- Variance of organization and style between clinical specialisms.

```
27.05.2009  21:15  CHARD
Admission
64-year-old male admitted w.d. atrial fibrillation with rapid
heart rate.

Previous
Known with paroxysmic atrial fibrillation, treated with ablation
in fall 2006.
30.01.07 CAG done at GH without indication for revascularization.
Ventriculography with normal LVEF.
Has reportedly mainly been treated at LOH, according to his son he
has been hospitalized at LOH for most of 2006.
Furthermore had PCI.

Present
Is admitted with fast atrial fibrillation, comes in with wide com-
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block, in acutely bad shape, respiratory and circulatory. Is
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                                rp.  inj. Cordarone 300 mg as
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Telemetri shows bradycardia down to 30. There is given
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and after 4 min                                inj. Adrenalin 1 mg IV
Pt has an acceptable systolic BP between 110-140. Does not wake up
at all and is intubated. He still has seizures with grimacing
movements in the head-neck region, pt conferred with doctor HM,
pt is transferred to ICU for cooling.
```

# What questions does this raise for current development and implementation of digital scribes? A few words from an AI

**Tool:** Perplexity Pro (based on Claude).

## **Prompt**

- I am preparing a discussion of the potential benefits and challenges we may face when introducing AI functionality in electronic medical records, for instance as a way to automate the writing of clinical notes. Based on Bansler2016, what would you suggest as the most important things to be aware of when introducing AI in the writing of clinical notes?

## **Discussion points suggested by Perplexity**

- Should the narrative structure of clinical notes be preserved?
- How can we ensure that the related cognitive tasks and workflows remain supported?
- How can both precision and subtle nuance be preserved?
- How can the dual role of clinical notes be preserved (sense making and coordination)?
- How can the notes adhere to structural and linguistic conventions?
- How can structure and flexibility be balanced?
- How will the notes integrate with existing workflows?

# Discussion points

- What changes in clinical documentation work can we anticipate with the introduction of digital scribes, positive or negative?
- Methodical implications: How can we learn about, evaluate, and document these changes pre- and post implementation?
- How can we account for these change in the development, implementation and use of digital scribes?

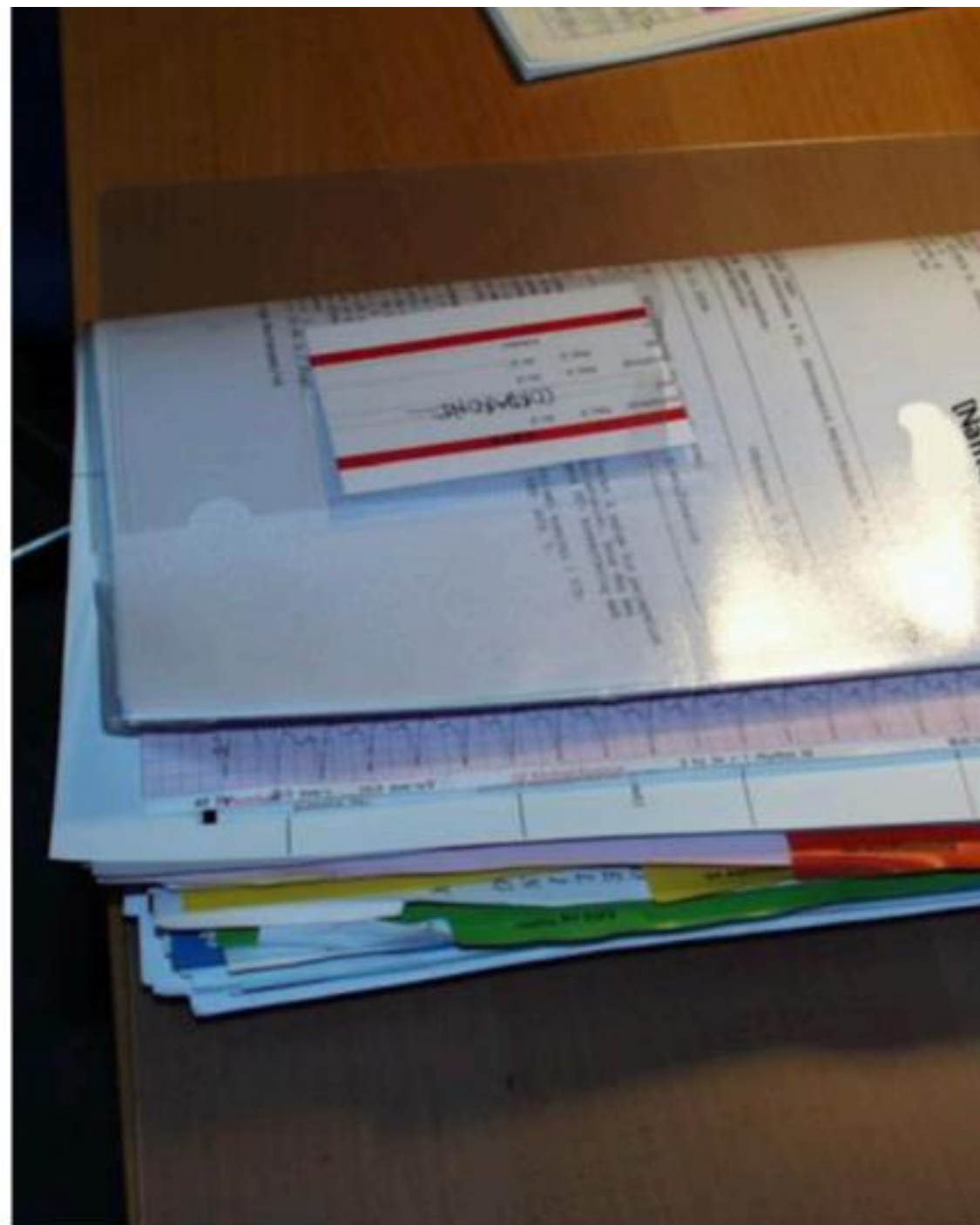
# Thank you!

Troels Mønsted, Associate Professor, PhD  
Department of Informatics, University of Oslo  
[monsted@ifi.uio.no](mailto:monsted@ifi.uio.no)

Health2B Open: KI og Pasientjournal



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OSLO SCIENCE PARK



Oslo



NOVARTIS



DNV Imatis

sopra  steria

Kernel



telenor

bouvet



Roche



HELSE SØR-ØST

 IQVIA



Visiba



tietoevry

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