

Enhancing Workflow Efficiency on Sequential Implementation of an AI Application in Clinical Routine Across Four Hospitals in Norway

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Nothing to disclose

BACKGROUND / OBJECTIVE

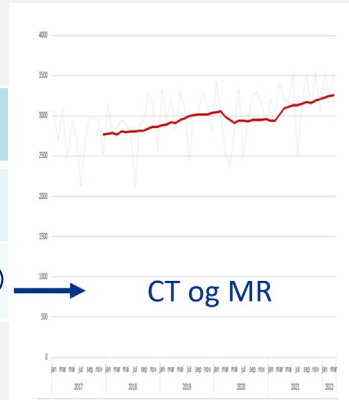
As the population increases, so does the prevalence of diseases (see Fig.1).

Each year, the volume of radiological investigations grows by approximately 15%, a rate that surpasses the availability of reporting radiologists.

This situation can be mitigated with the help of implementing AI solutions in radiology department.

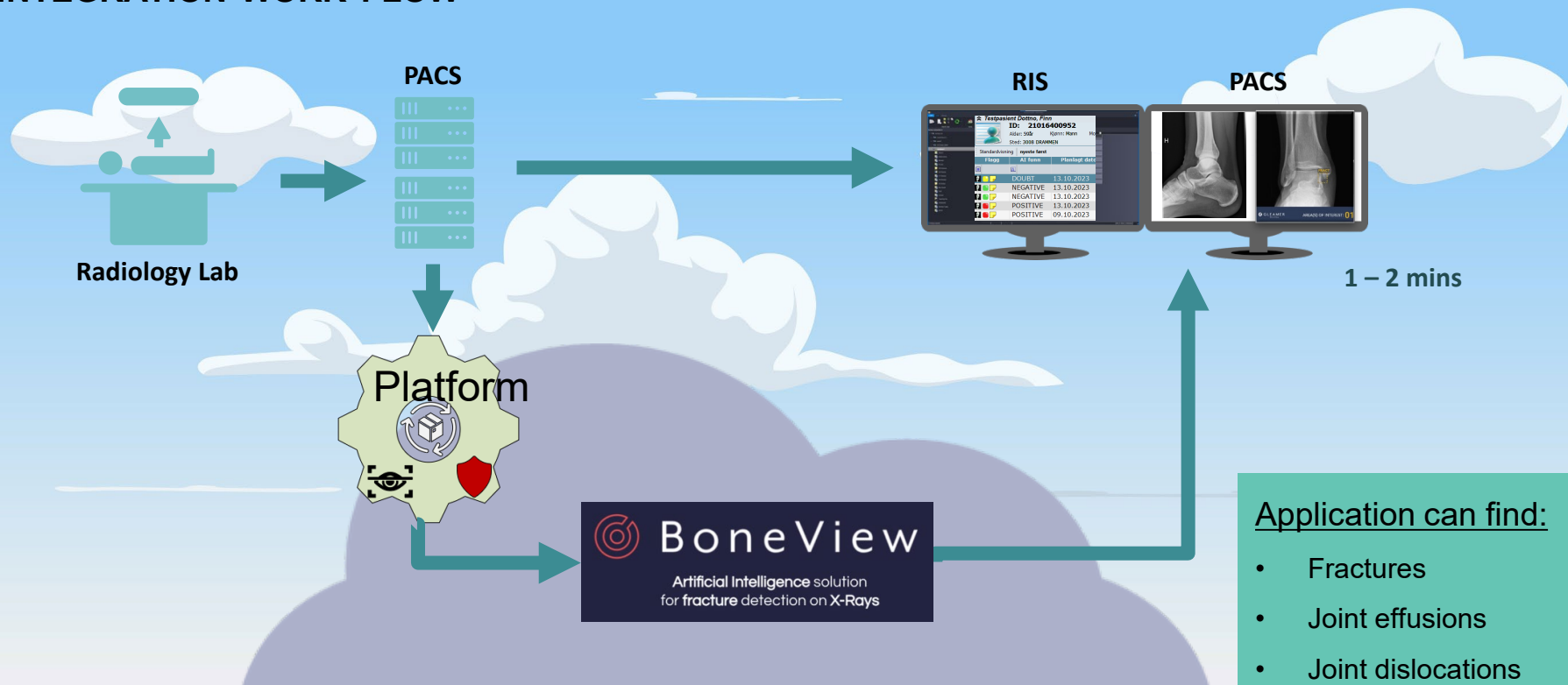
Cancer	2012	2022	%
Incidence	30,099	38,265	27.1
Prevalence	224,315	327,101	45.6

<https://www.krefregisteret.no/en/>



BACKGROUND/OBJECTIVE

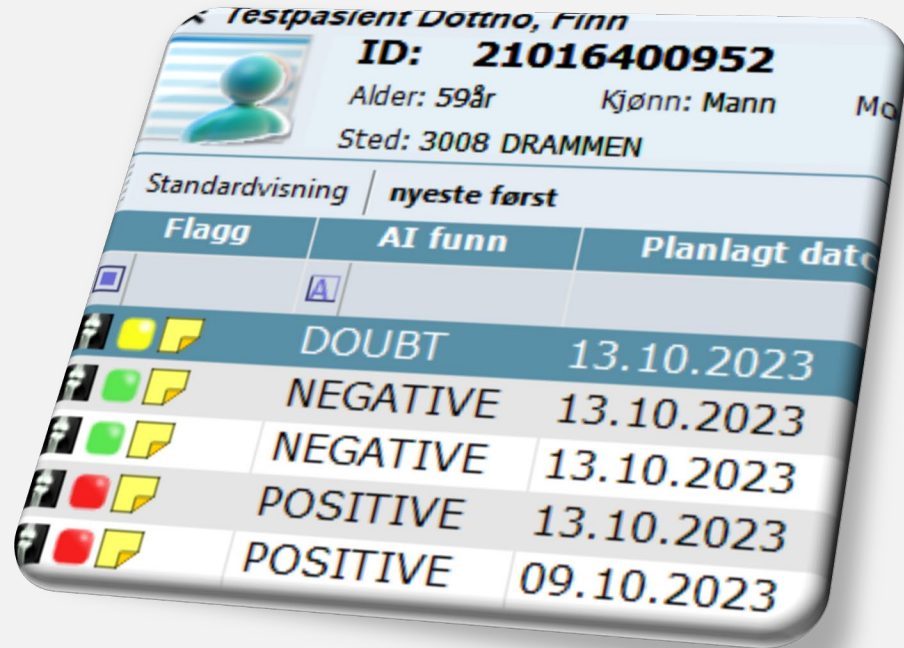
AI INTEGRATION WORK-FLOW



Application can find:

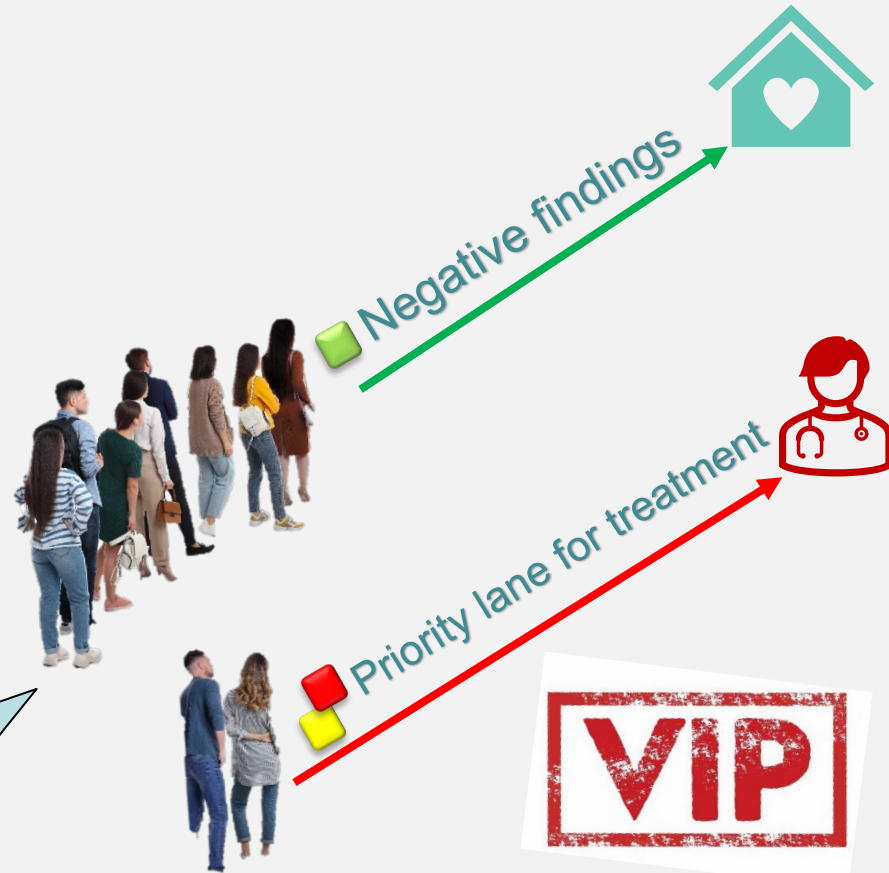
- Fractures
- Joint effusions
- Joint dislocations
- Bone lesions

METHODS: RIS INTEGRATION

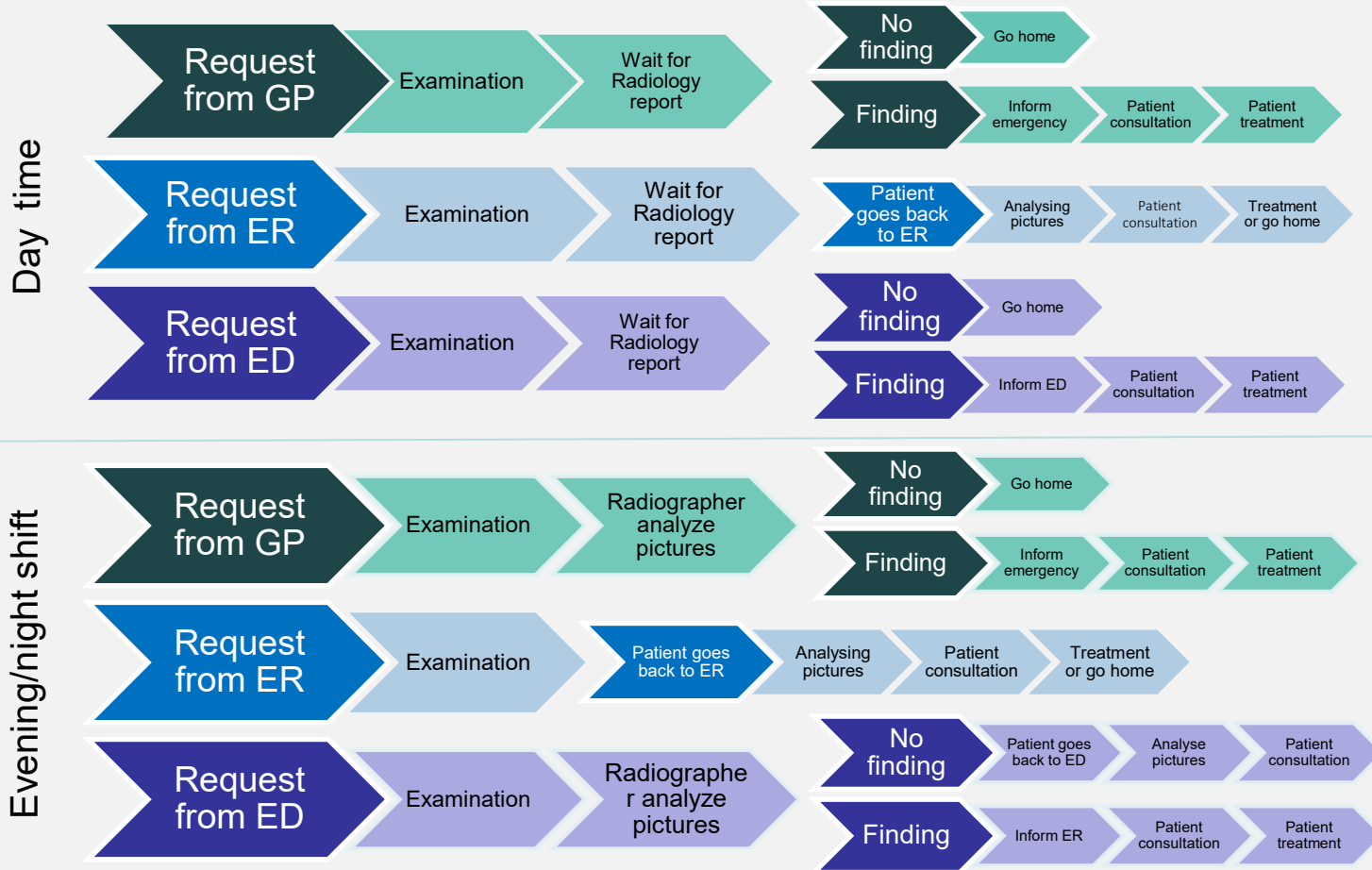


Standardvisning	nyeste først	
Flagg	AI funn	Planlagt dato
<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	DOUBT	13.10.2023
<input checked="" type="checkbox"/>	NEGATIVE	13.10.2023
<input checked="" type="checkbox"/>	NEGATIVE	13.10.2023
<input checked="" type="checkbox"/>	POSITIVE	13.10.2023
<input checked="" type="checkbox"/>	POSITIVE	09.10.2023

The AI results were **integrated into the RIS system** through a flagging mechanism. This enabled radiographers to **prioritize** patient flow post-imaging after AI results and assisted radiologists in prioritizing their reporting tasks.



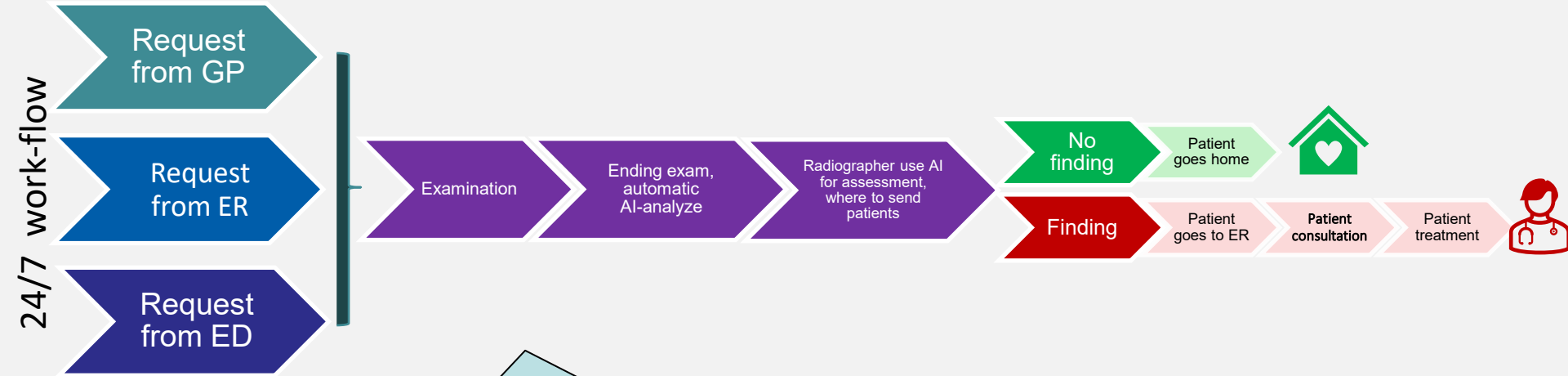
METHODS: WORKFLOW (PRE IMPLEMENTERING)



Patients were referred from **General Practitioners (GP)**, the hospital's **Emergency Room (ER)**, and the community's **Emergency Department (ED)**.

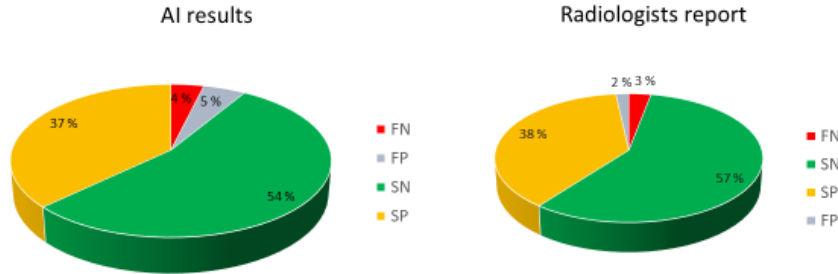
Consequently, patients were directed back to their referring physicians for treatment, with variations in the morning and duty routines.

METHODS: WORKFLOW (POST IMPLEMENTING)



- Negative AI-result: Patients goes home unless the referral physician asks for an extra consultation at ED
- Radiologists report all cases in normal workflow

RESULTS



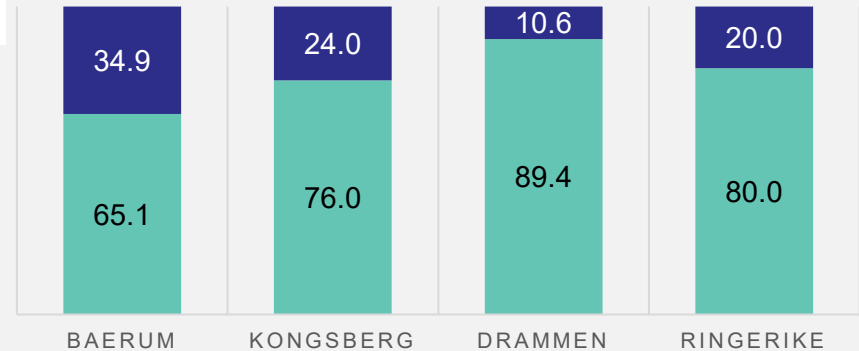
Accuracy	SN	SP	Total	ACC in %
AI results	344	235	634	91,3%
Radiologists	364	240	634	95,2%

FN – False Negative, FP – False Positive; SN – True Negative, SP – True Positive

External validation of the AI application demonstrated that its accuracy closely matched that of radiologist reports.

This chart illustrates the impact of the AI fracture detection algorithm on **consultation** needs across various hospitals at VV. The upper section represents the percentage of patients who did not require consultation (AI negative results) and were discharged, while the lower section indicates the percentage of patients who were referred back to their physicians for further treatment.

■ Need Consultation ■ No consultation



RESULTS / BENEFITS

Approx. 40,000 Investigations per year

Analysed by the use of AI

Approx. 10,000 patients per year

Avoids waiting time (Negative AI results)

Approx. 300 days of waiting time

avoided for patients per year

Approx. 6000 medical consultations annually

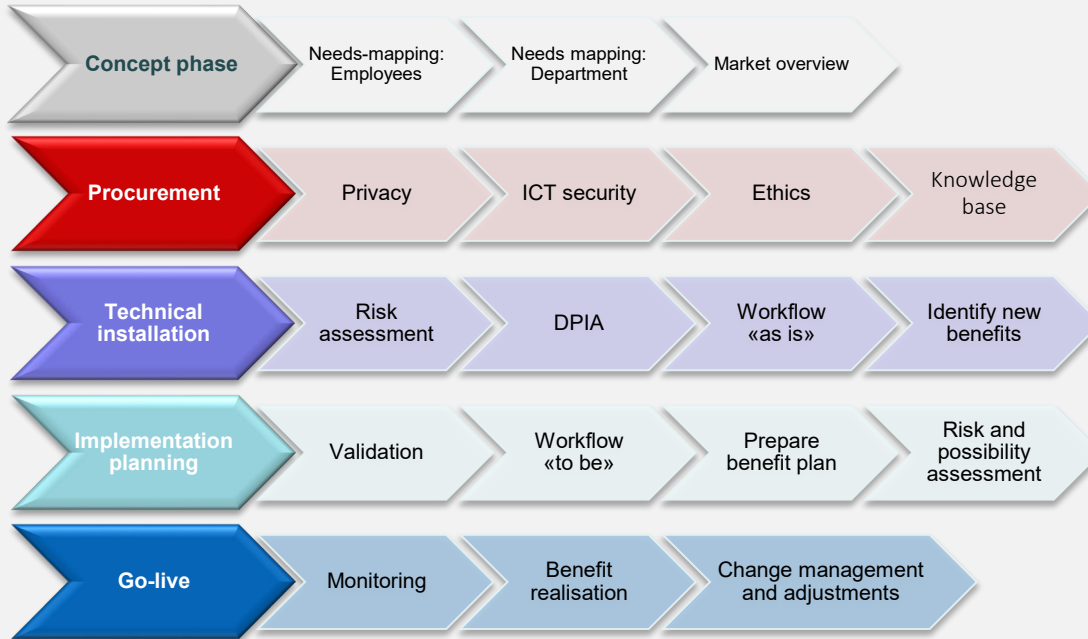
is made available to sick patients

- ✓ More time for the sick patients
- ✓ Reduces stress for employees
- ✓ Better patient safety



CONCLUSION

PHASES OF IMPLEMENTATION



The implementation of the AI application facilitated several improvements:

- Prioritized reporting for radiologists.
- Simplified the existing workflow into a single, streamlined process.
- Reduced waiting times for patients without positive findings.
- Expedited treatment for injured patients.

This streamlined workflow also supported the development of a structured five-phase implementation process.

Throughout the initial pilot phase, we gained significant insights by engaging and collaborating with all stakeholders involved in the adoption process. This experience helped us develop a phased implementation strategy, which in turn made it easier to implement at other sites.