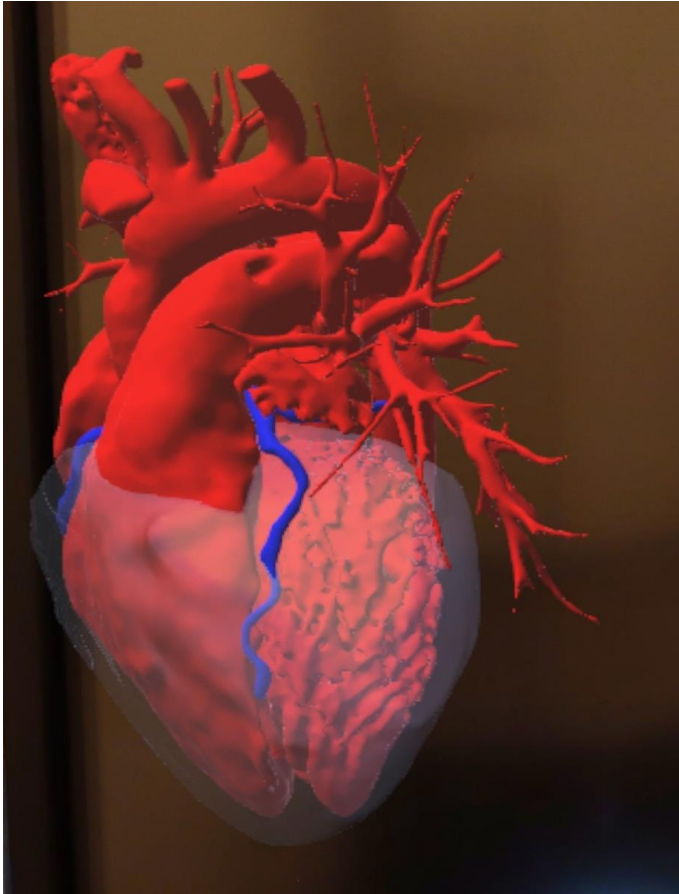


Mixed Reality Hologram ved Hjertekirurgi



Henrik Brun

Overlege, Barnekardiologisk avdeling

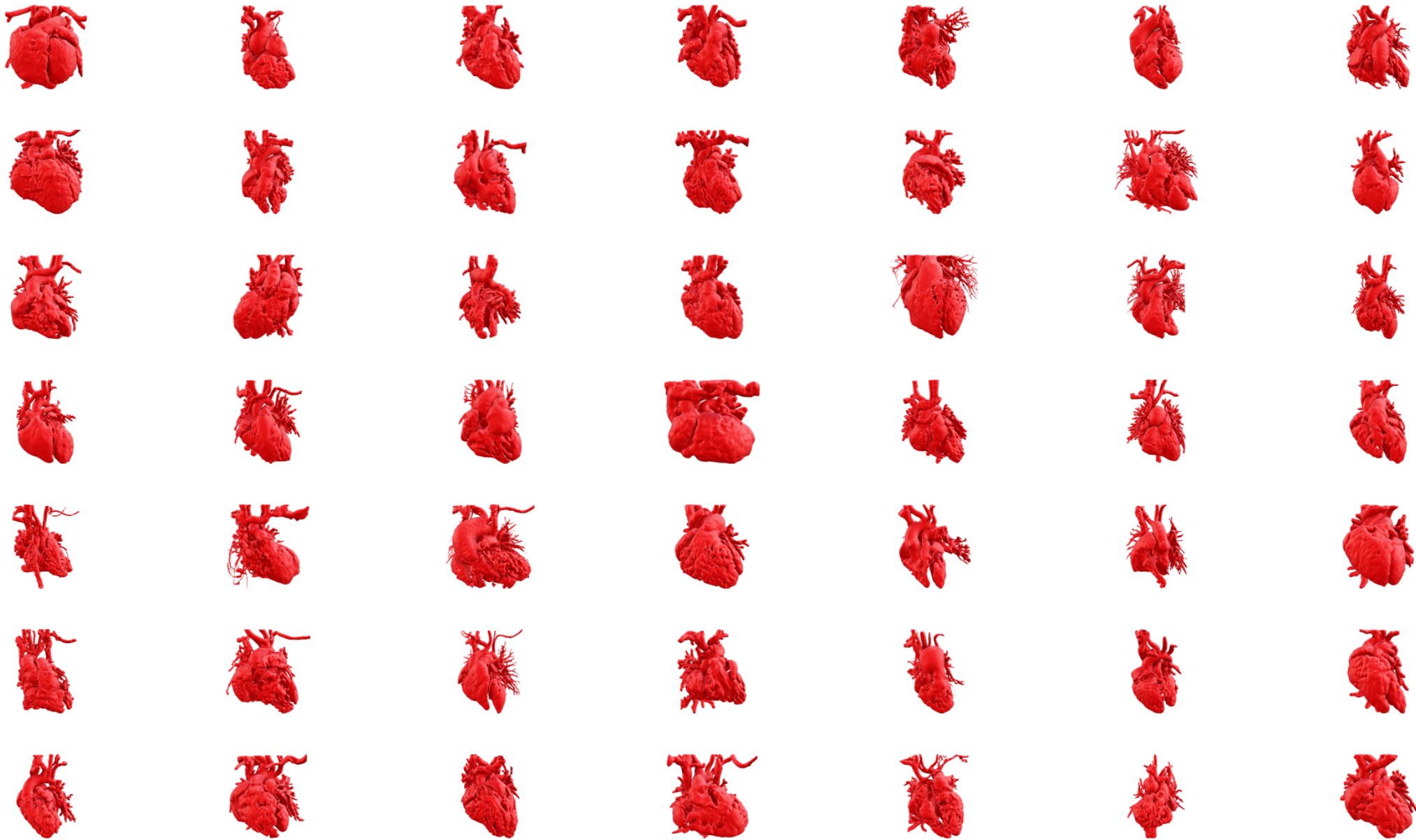
Forsker, Intervensjonscenteret

OUS Rikshospitalet

hbrun@ous-hf.no

Medfødt hjertefeil rammer

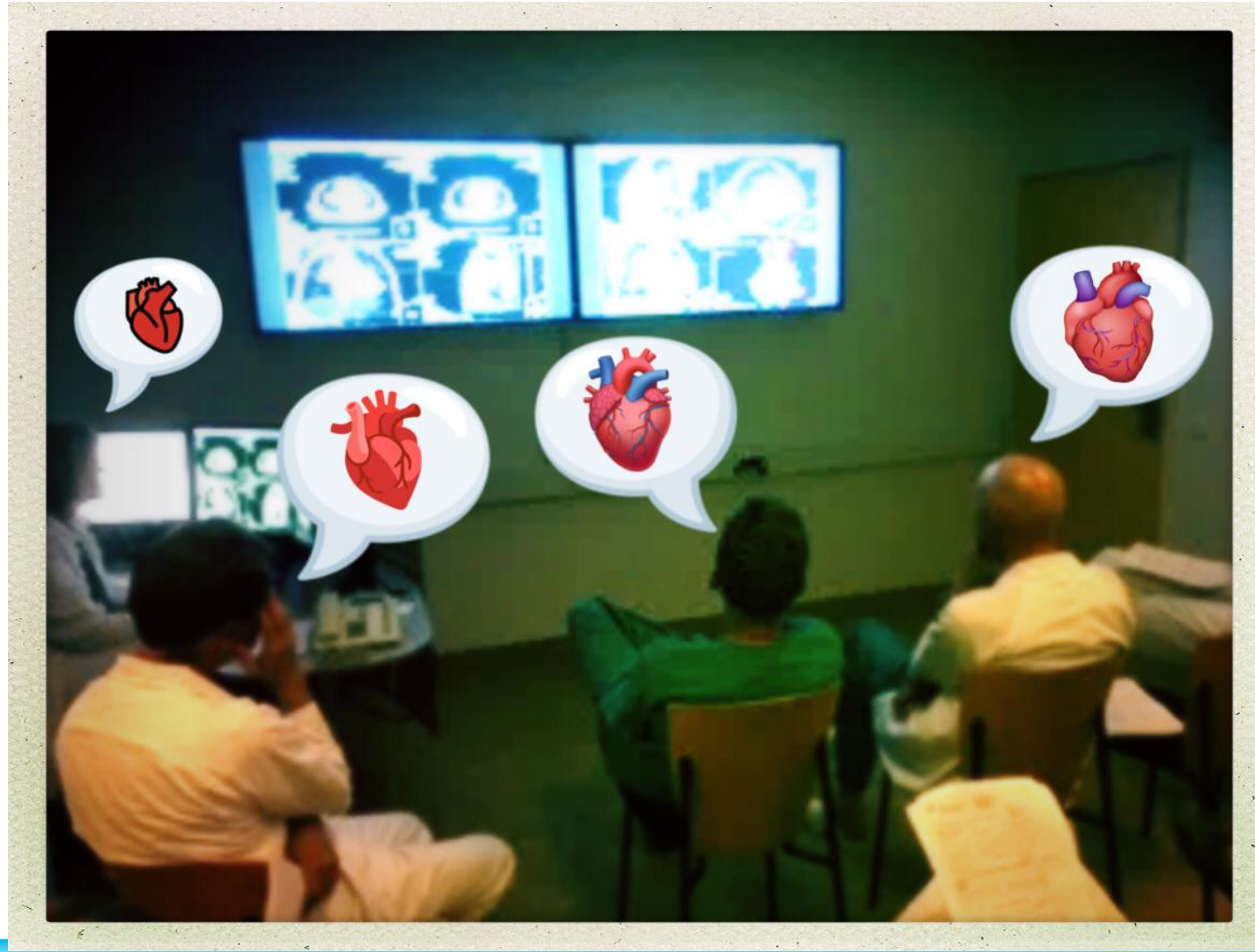
- 0,8 % av alle barn



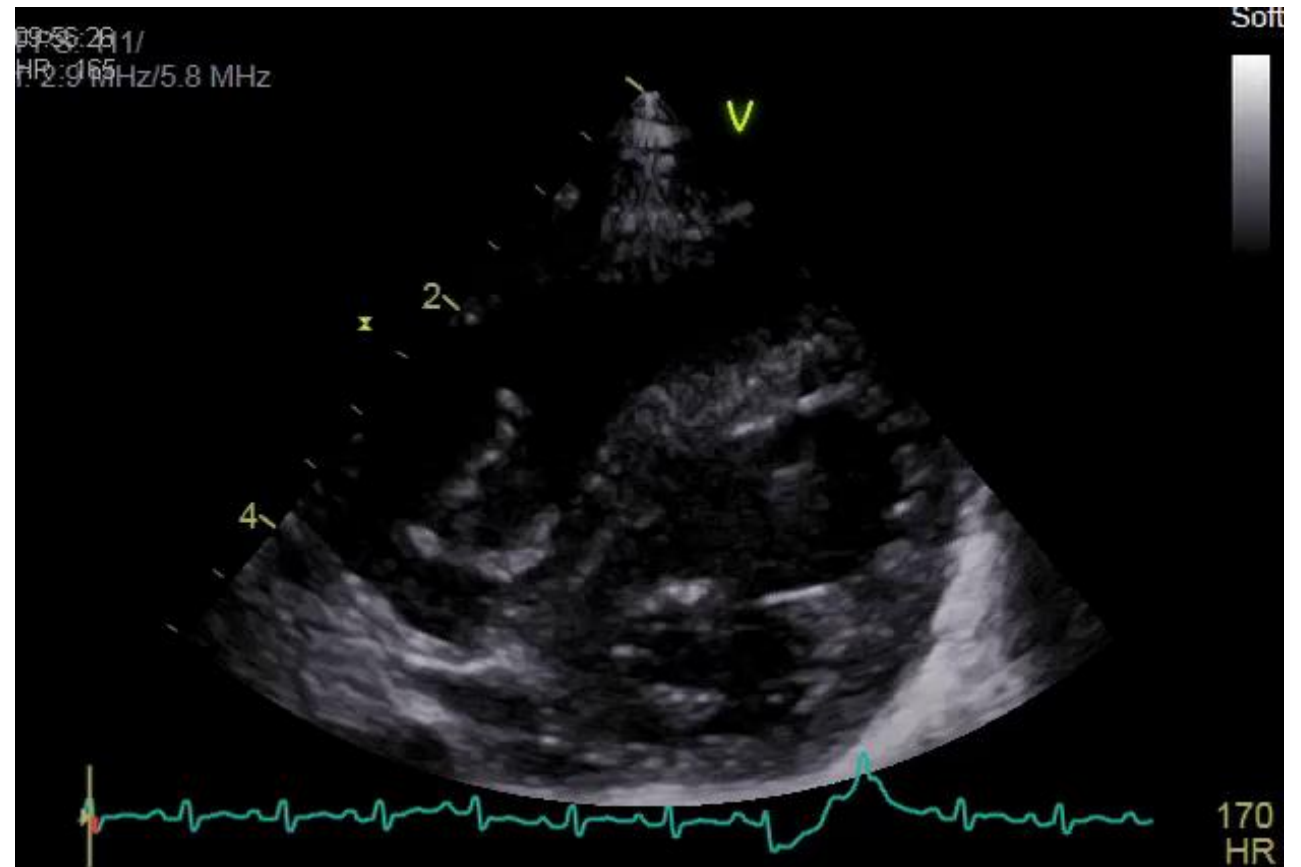
Nyfødthjerteoperasjon - Formel-1 kirurgi krever en perfekt plan

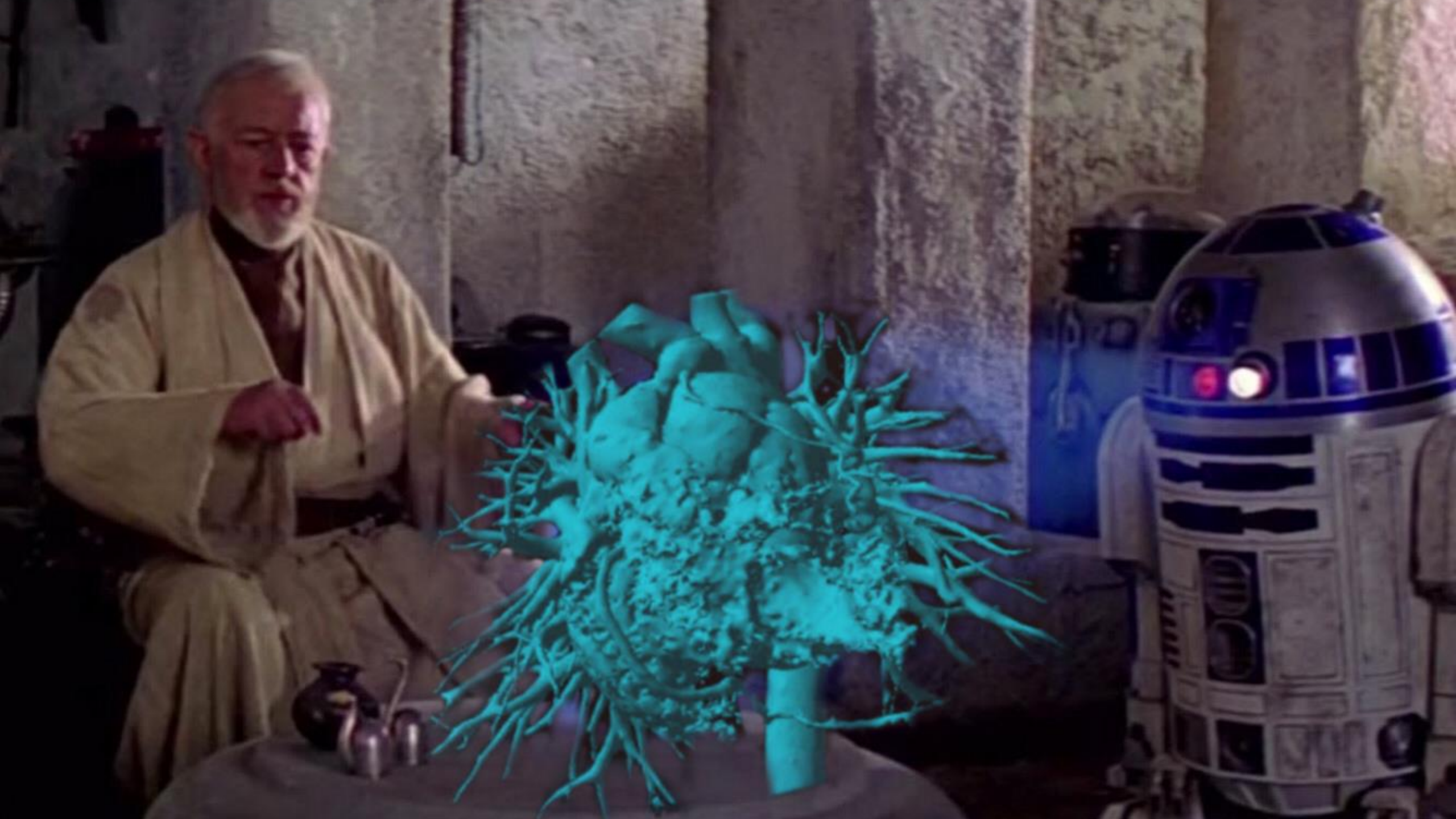


Tradisjonelt Multidisiplinært Hjertermøte



Standard Hjertekirurgisk Veikart



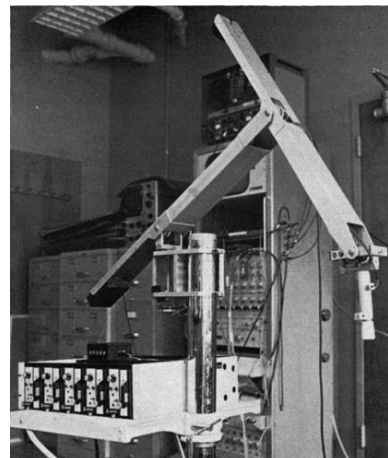


Utvikling av 3D hjertebilder

1974



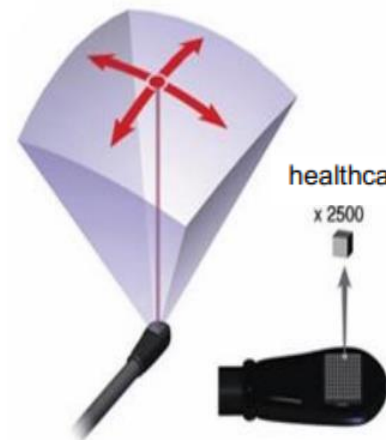
ungated 2D -
stitched 3D echo



2007



4D TEE



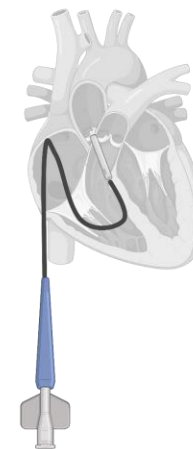
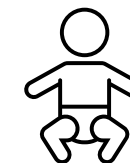
healthcare.philips.com

x 2500

2022



4D ICE
& Micro TEE

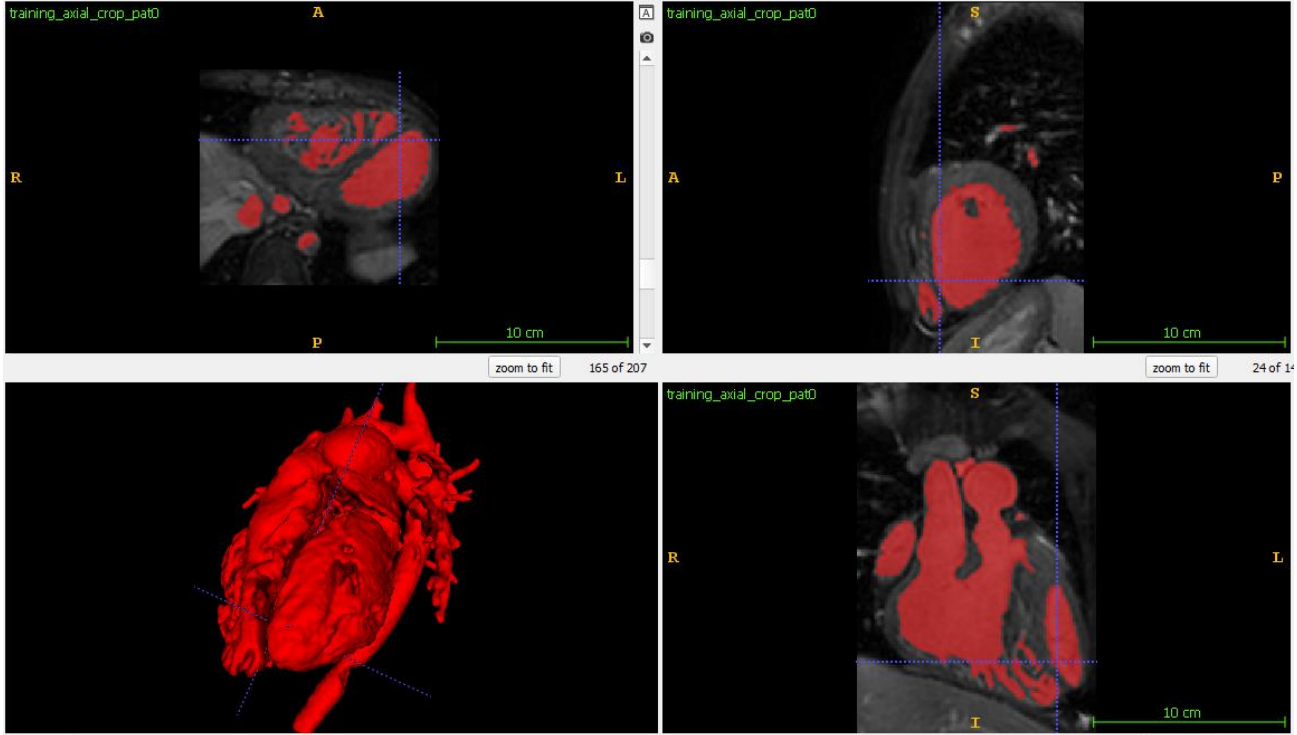


CT bilder →

Segmentering →

→

3D modell



2014-17 : 3D PRINT



2016



2019

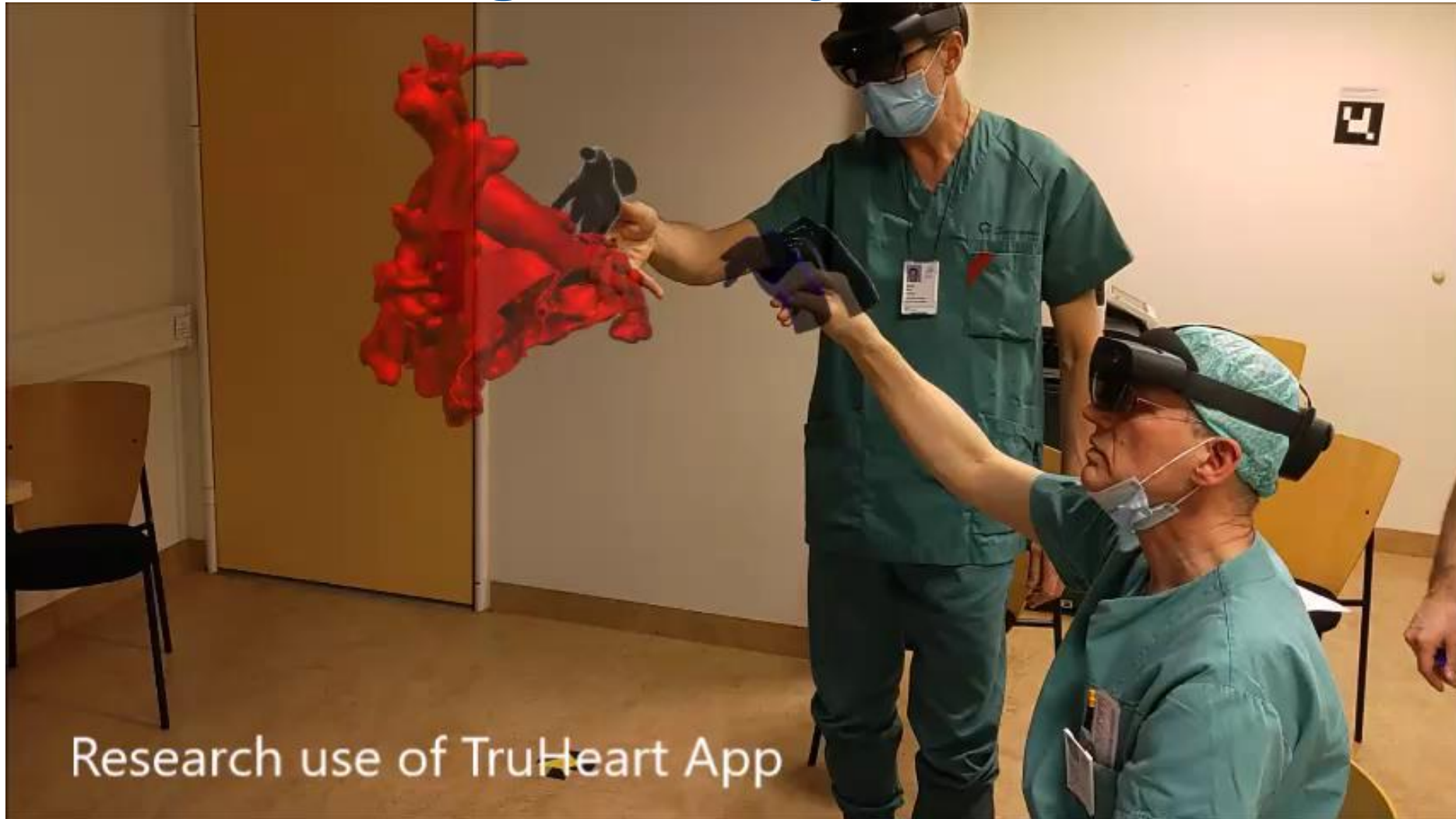


2017: From 3D Prints to Mixed Reality Holograms

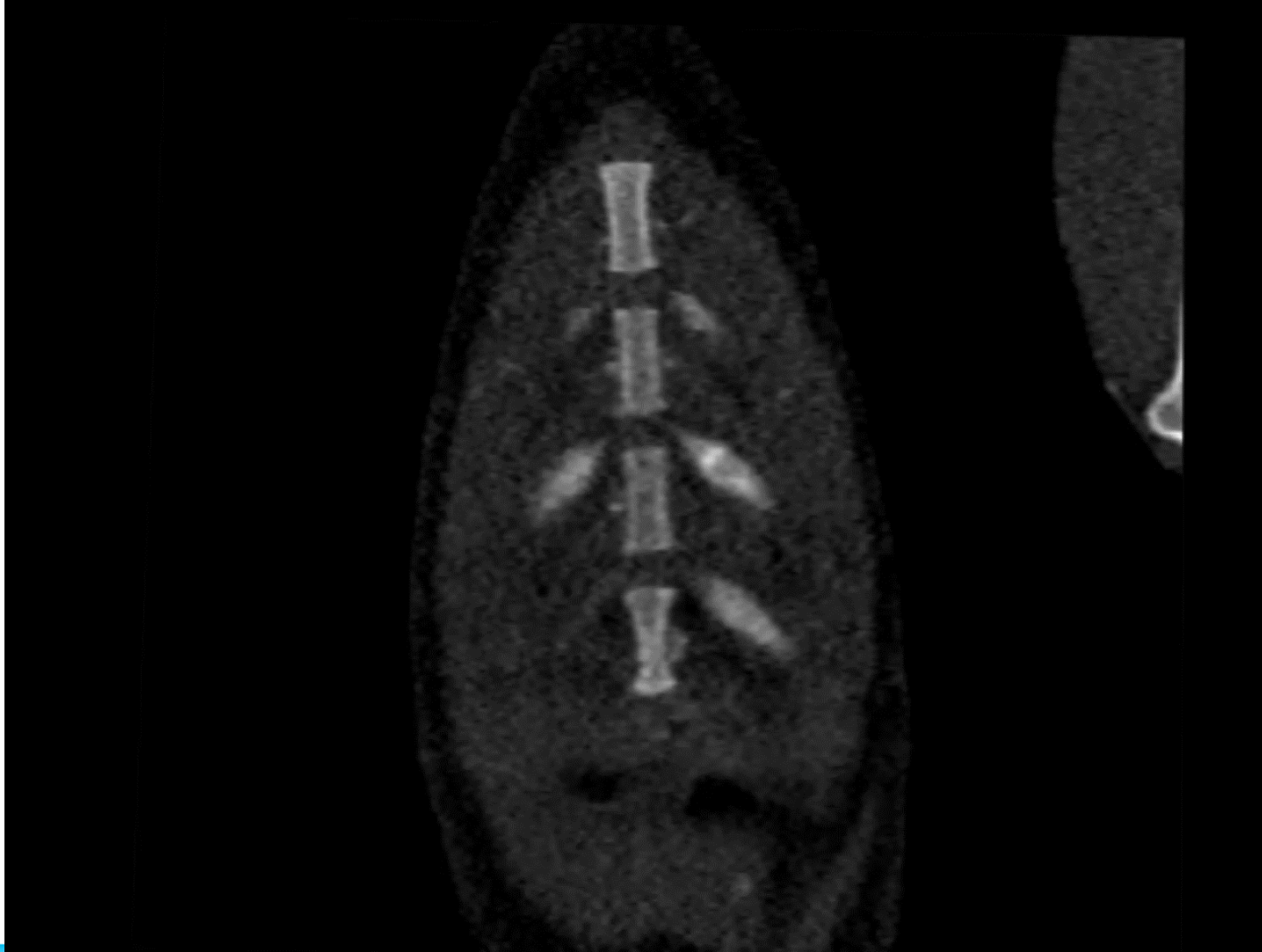


Brun H et al. *Eur. Heart J. Cardiovasc. Imaging* 2018

Holografisk Hjertermøte

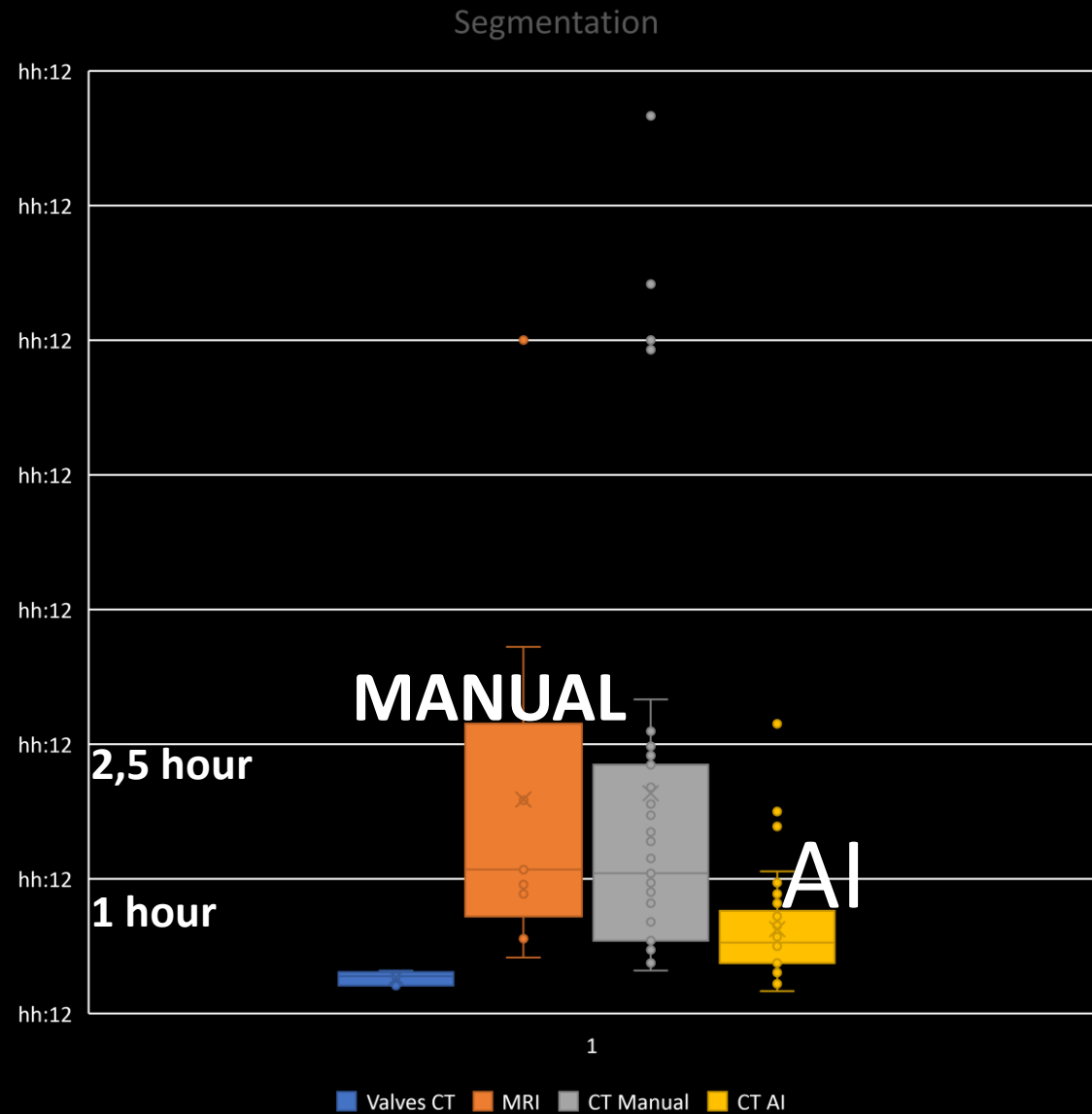


HoloCare Cloud : AI-basert segmentering

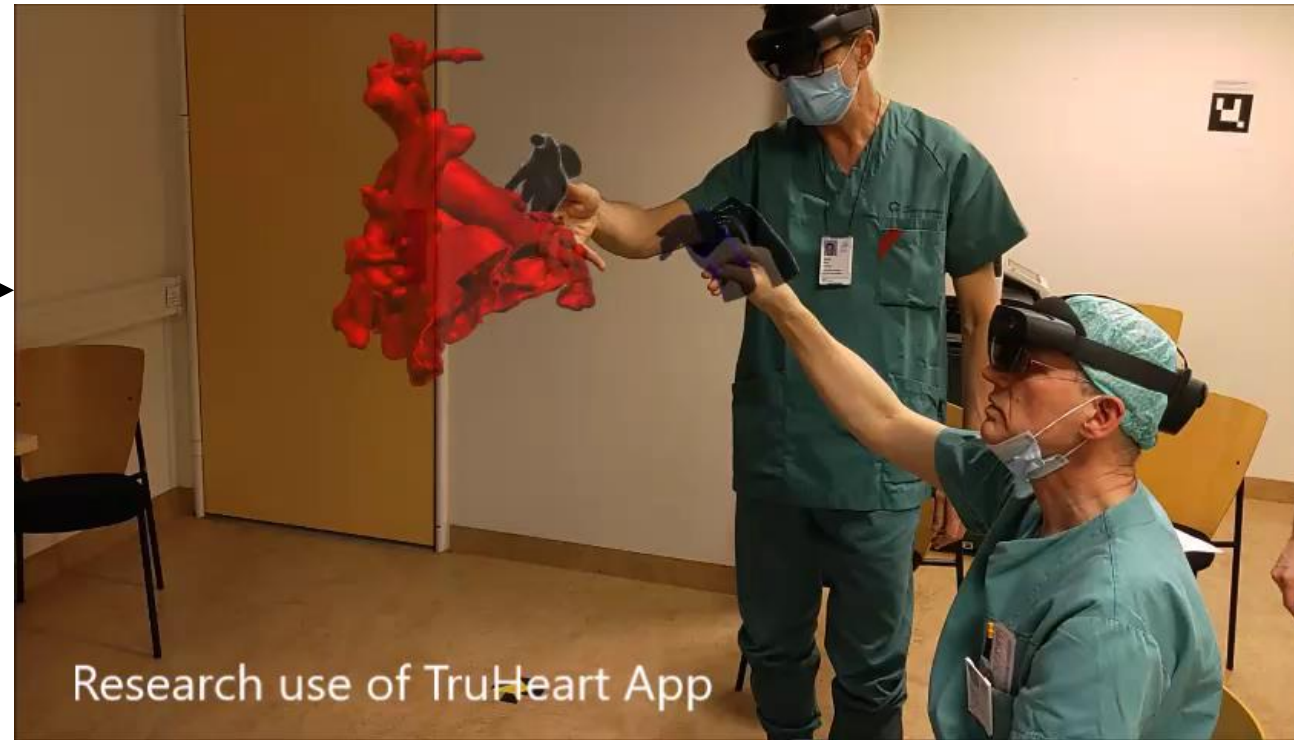
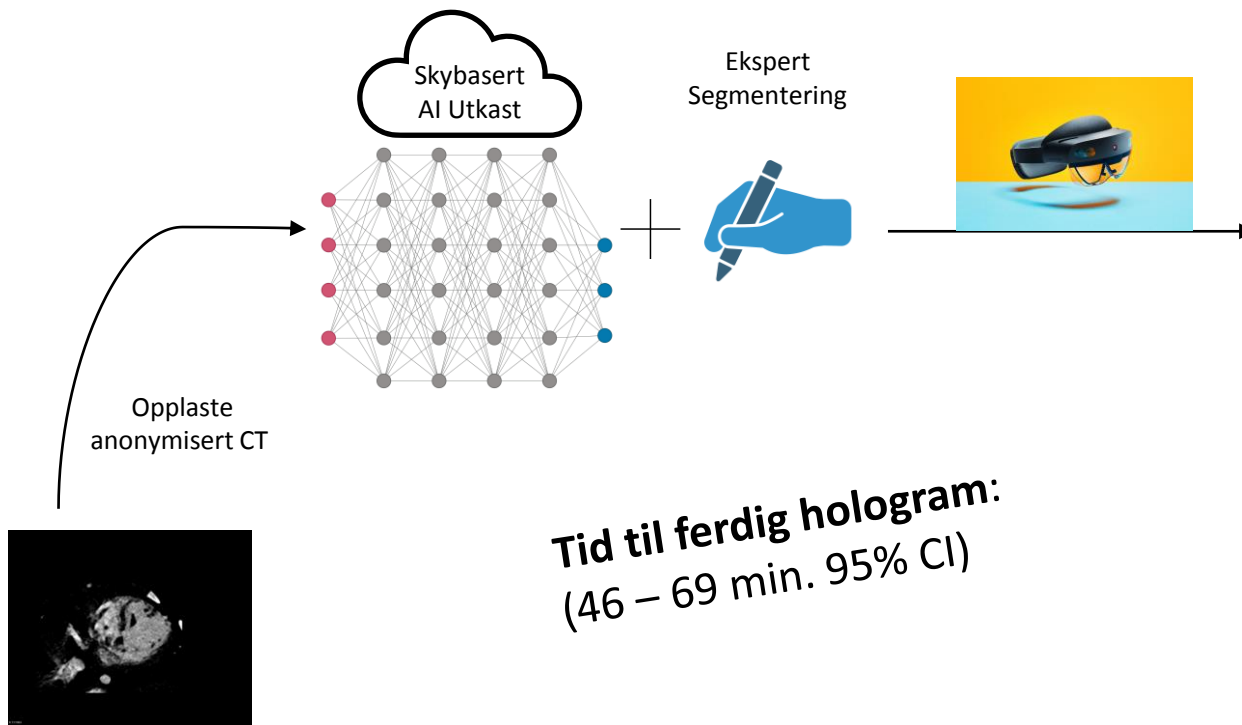


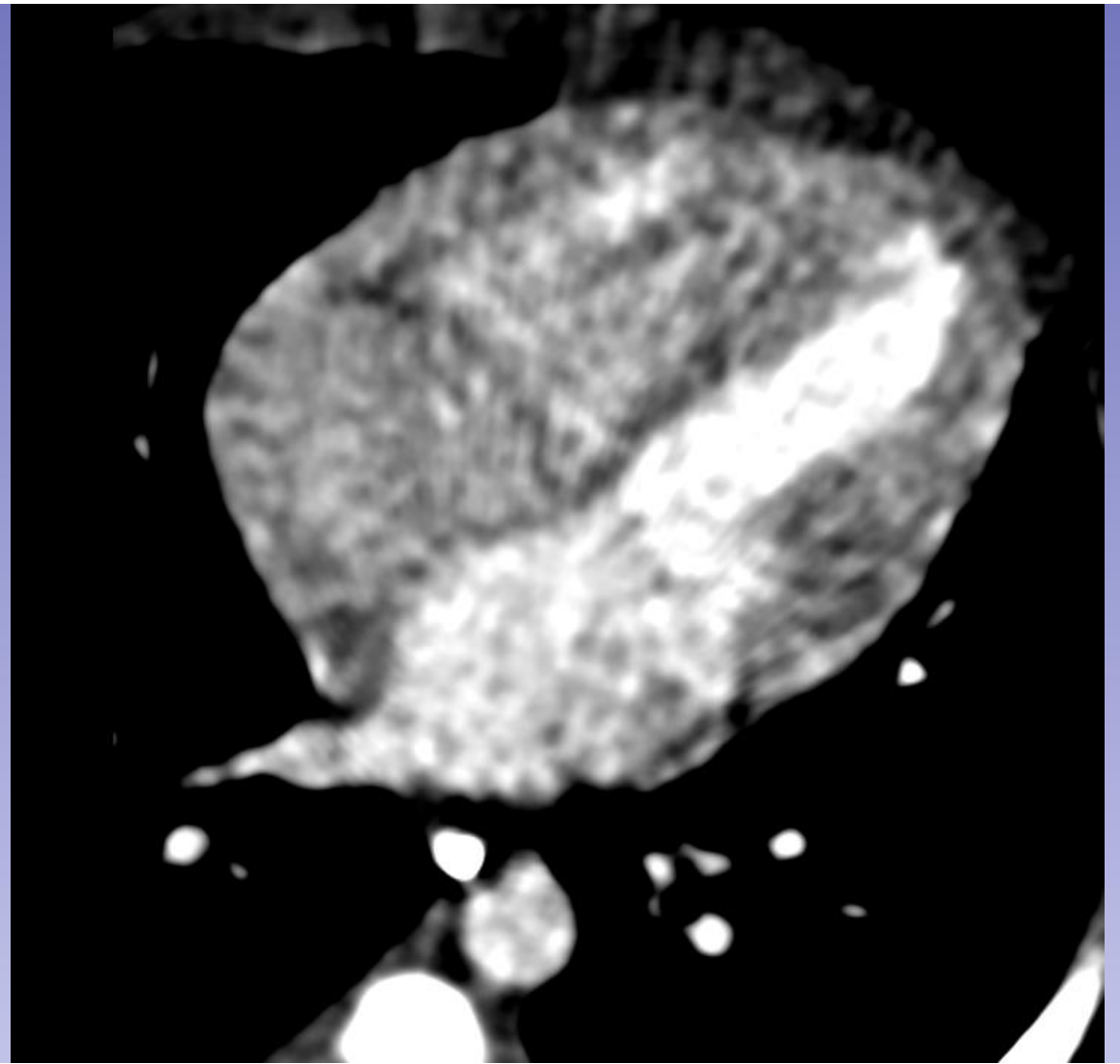
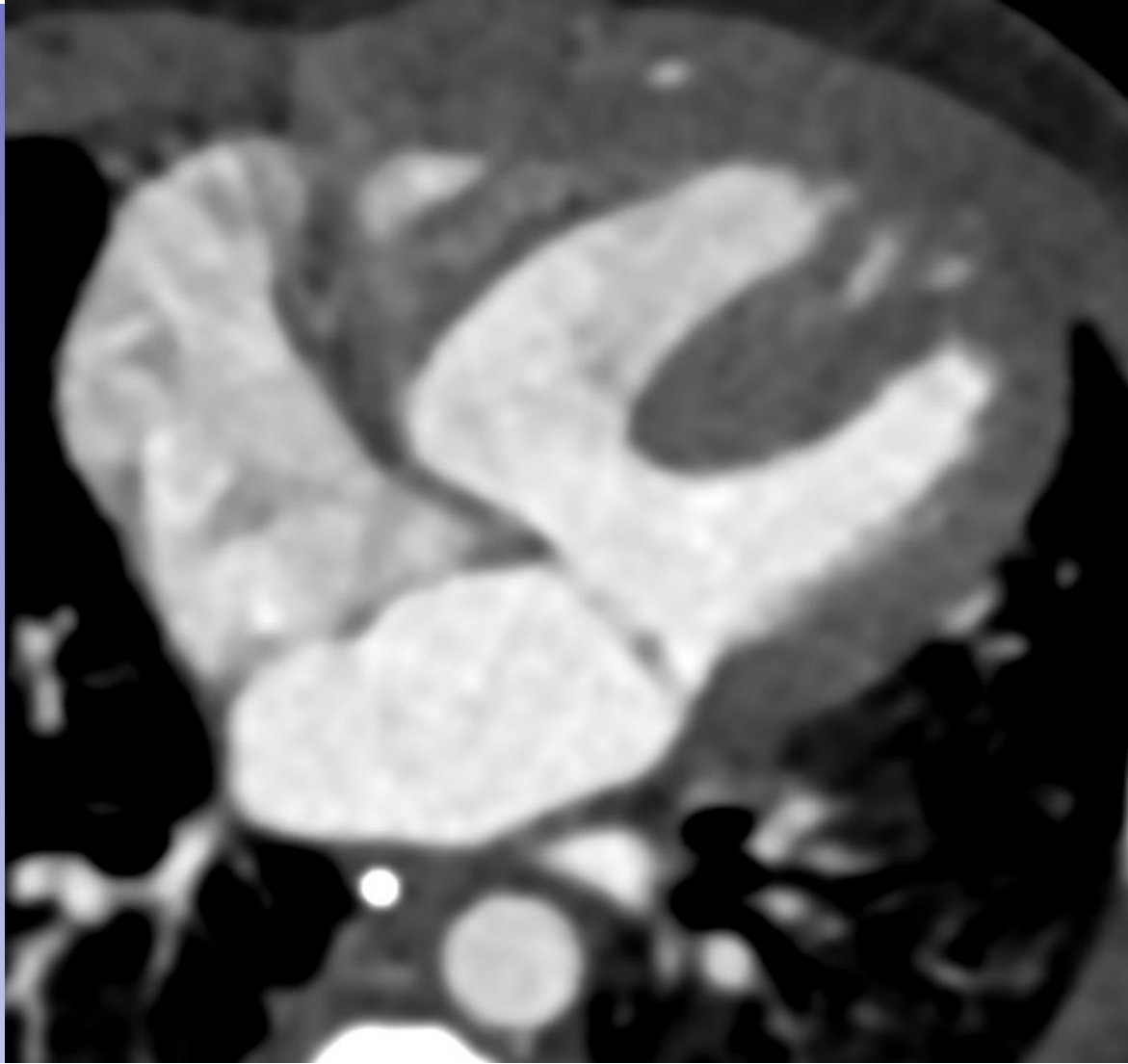
 The Research Council
of Norway

AI sparer tid: CT bilder → 3D modell



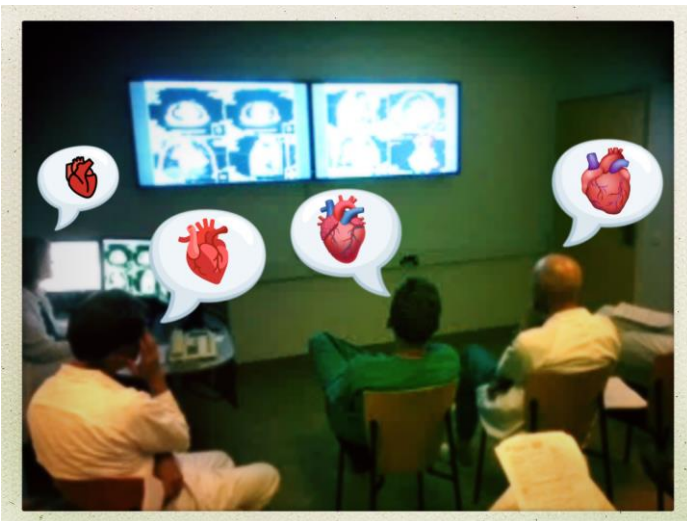
Workflow for mixed reality hologrammer





Studie design

50 barn til kompleks hjertekirurgi



Første beslutning



3D hjertemøte



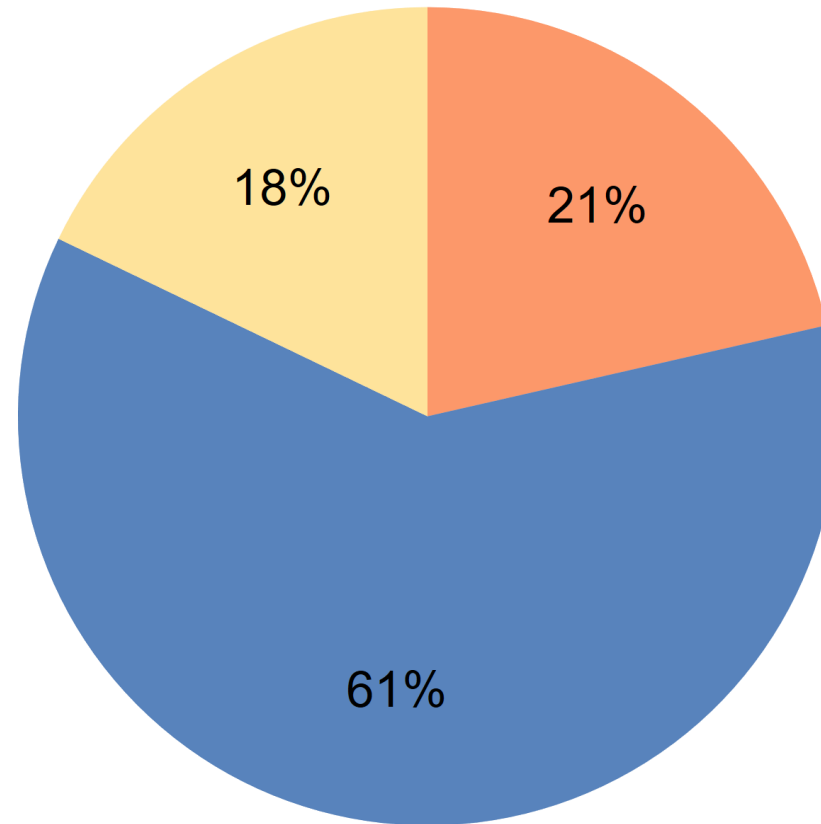
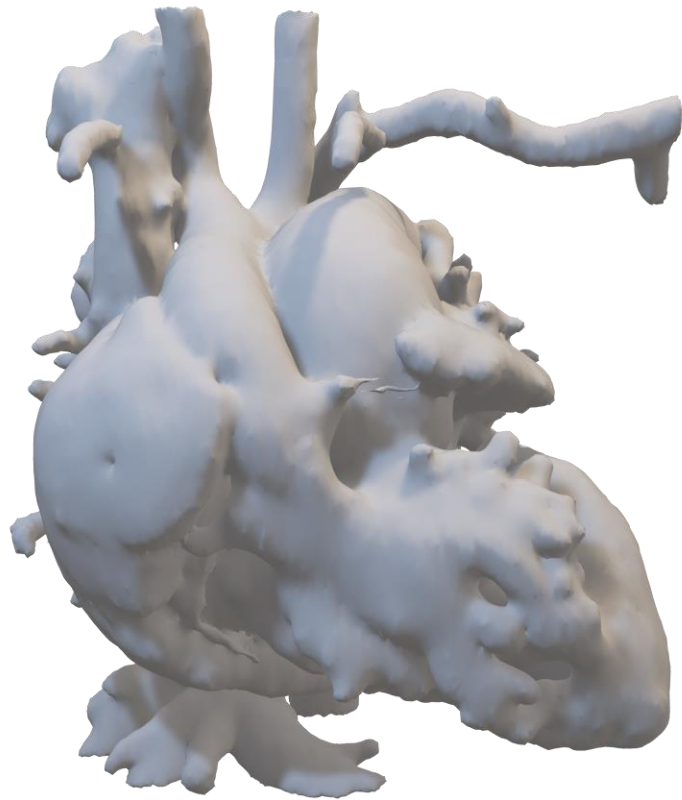
«3D» beslutning



Brukeropplevelse

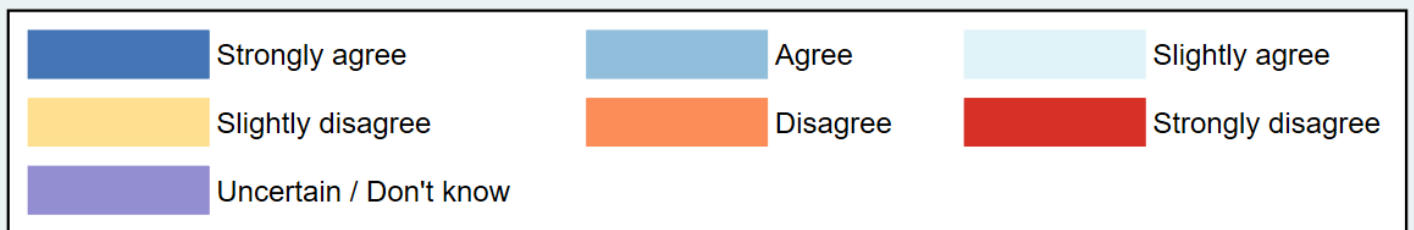
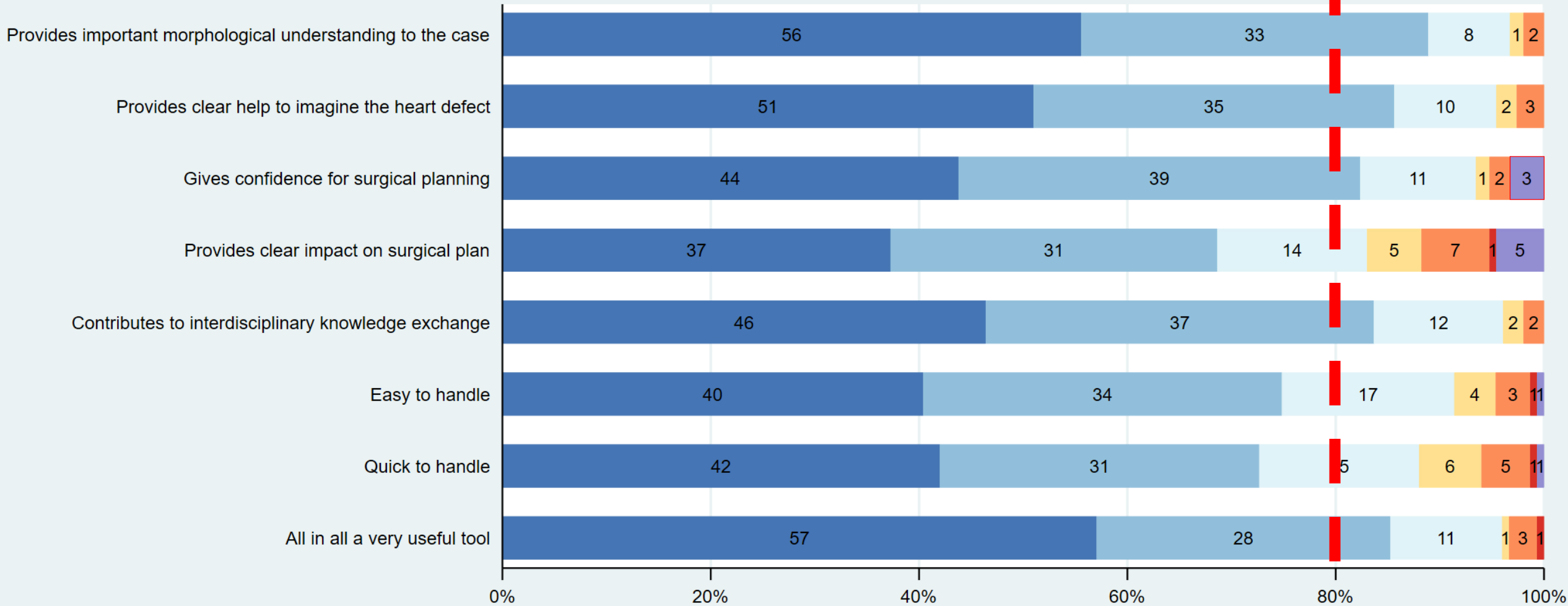
- Morfologi
- Hjelp for å framstille defekt
- Innflytelse på kirurgisk plan
- Trygghet
- Multidisiplinær utveksling
- App brukervennlighet

Hologram-effekter



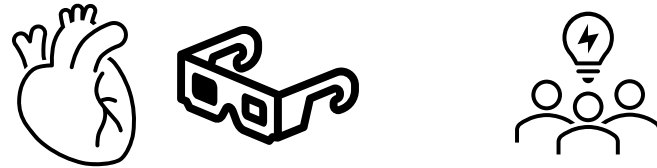
Change from access site Change of surgical method
Change from uni- to biventricular

To what extent do you agree or disagree in the following statements regarding 'the hologram'?

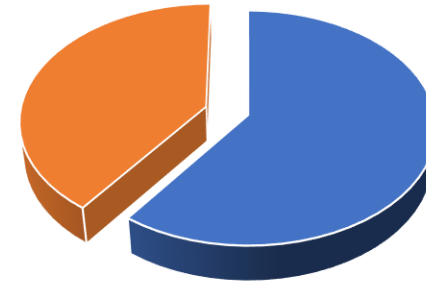


Reduserer Hologram Risiko ?

- Hologrammer forandrer måten man oppfatter morfologi



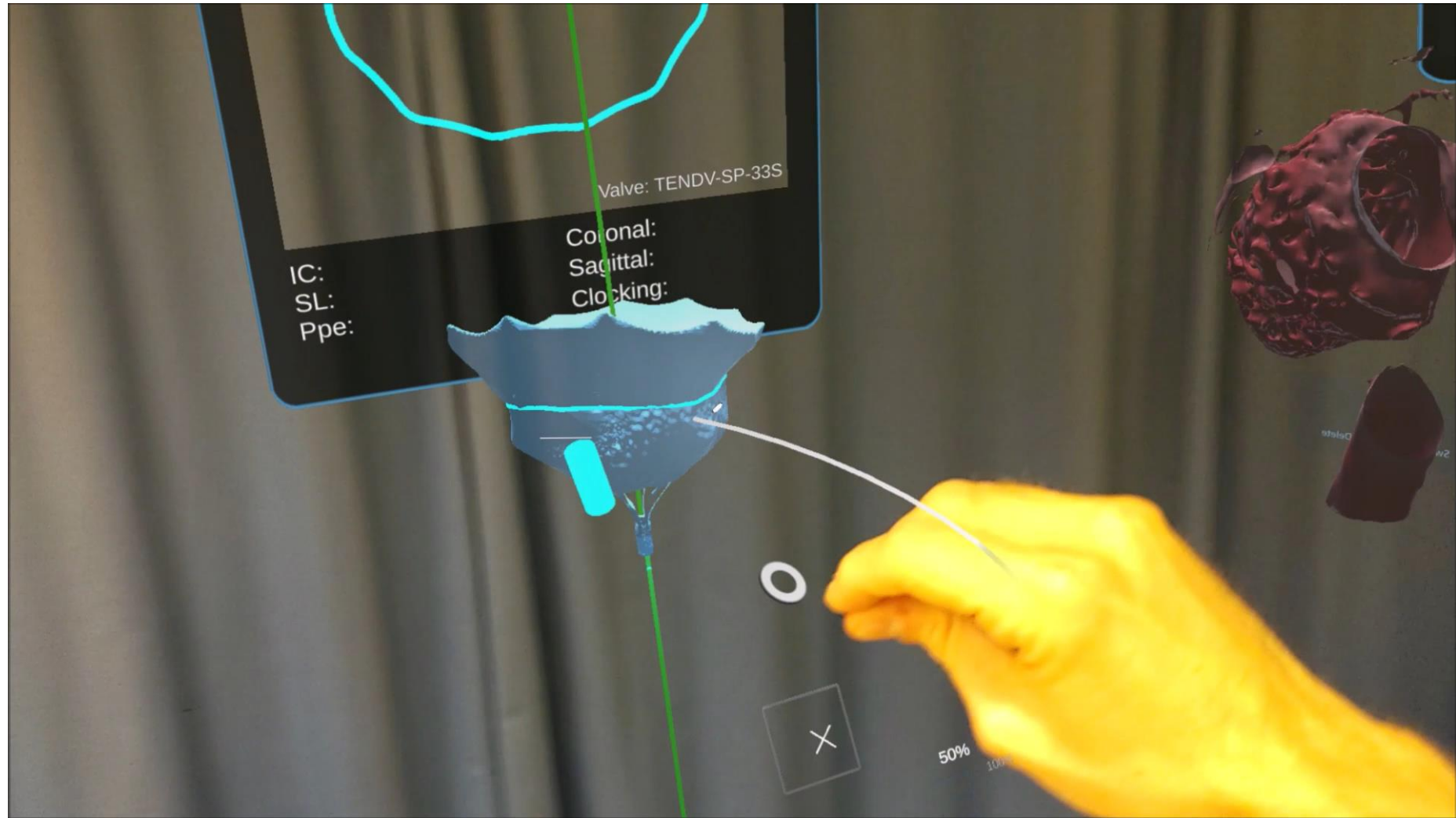
- Kirurgisk plan forandres i mer enn halvparten



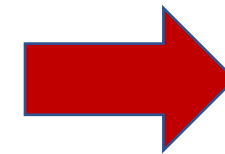
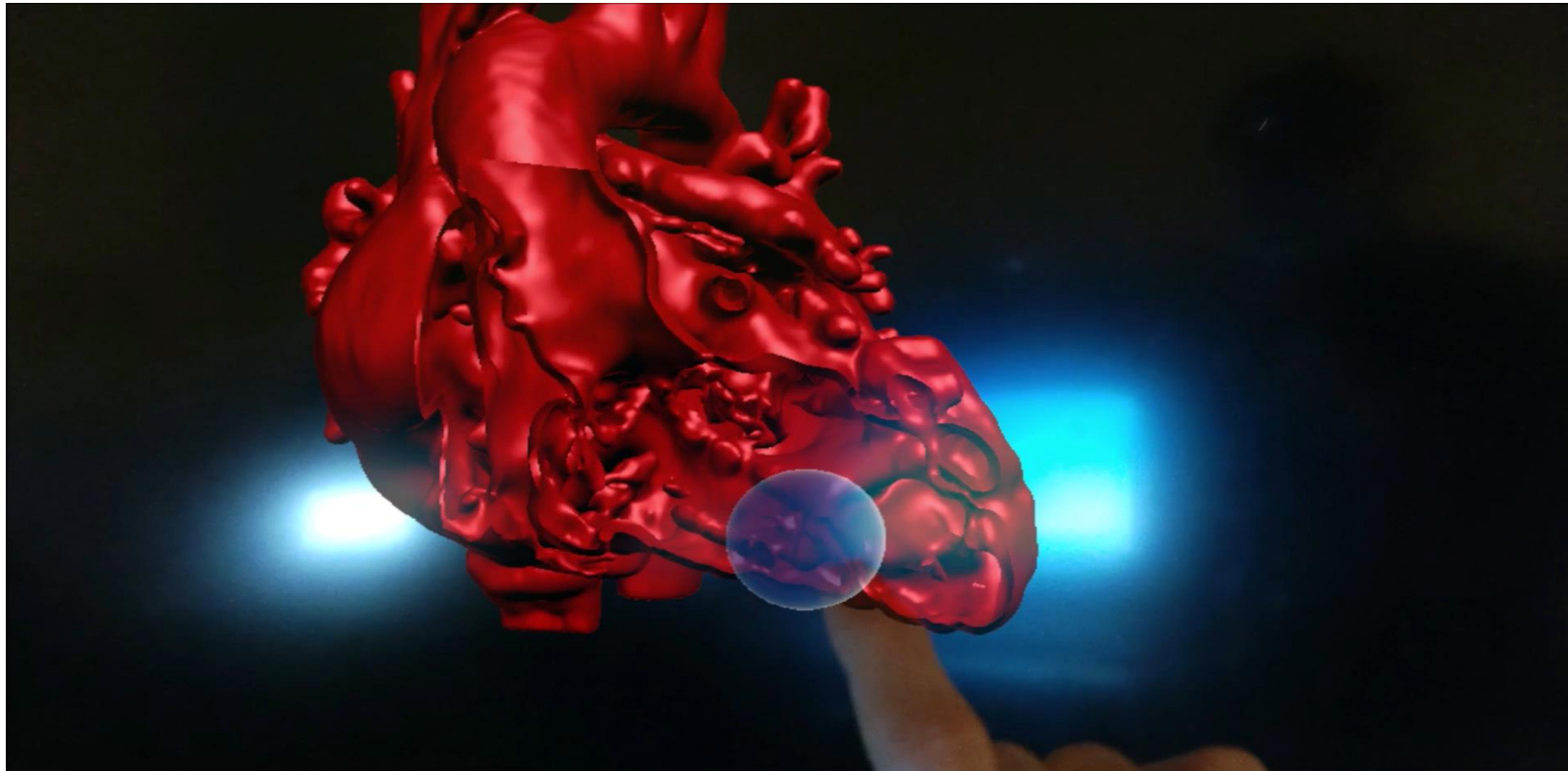
Complication rate relative risk	Univariate analysis		
Variable	OR	95% CI	p-value
Holographic strategy	0.44	0.09-2.15	0.31
Age	1.09	0.69-1.7	0.72
Weight	0.99	0.99-1.01	0.73
Complexity (Aristoteles Score)	1.29	0.88-1.9	0.19

Hva videre ?

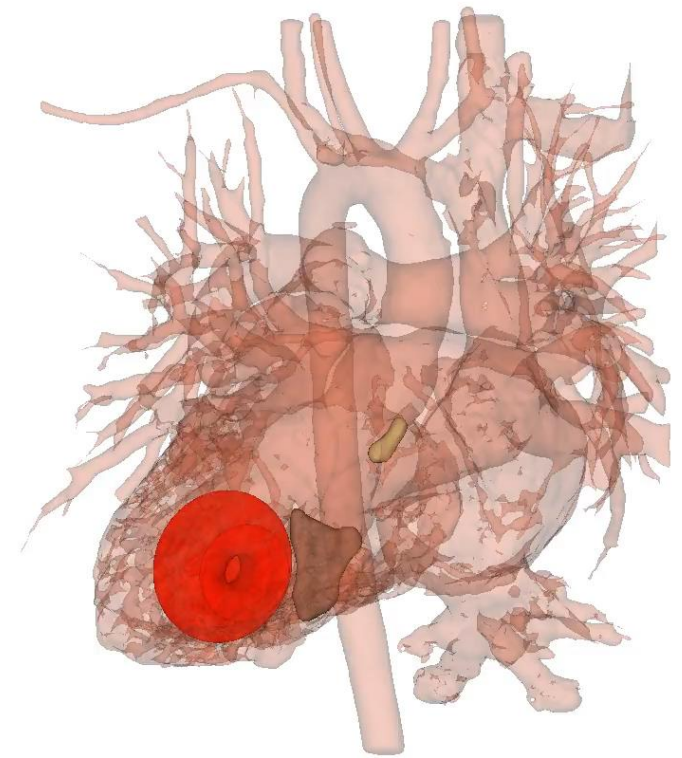
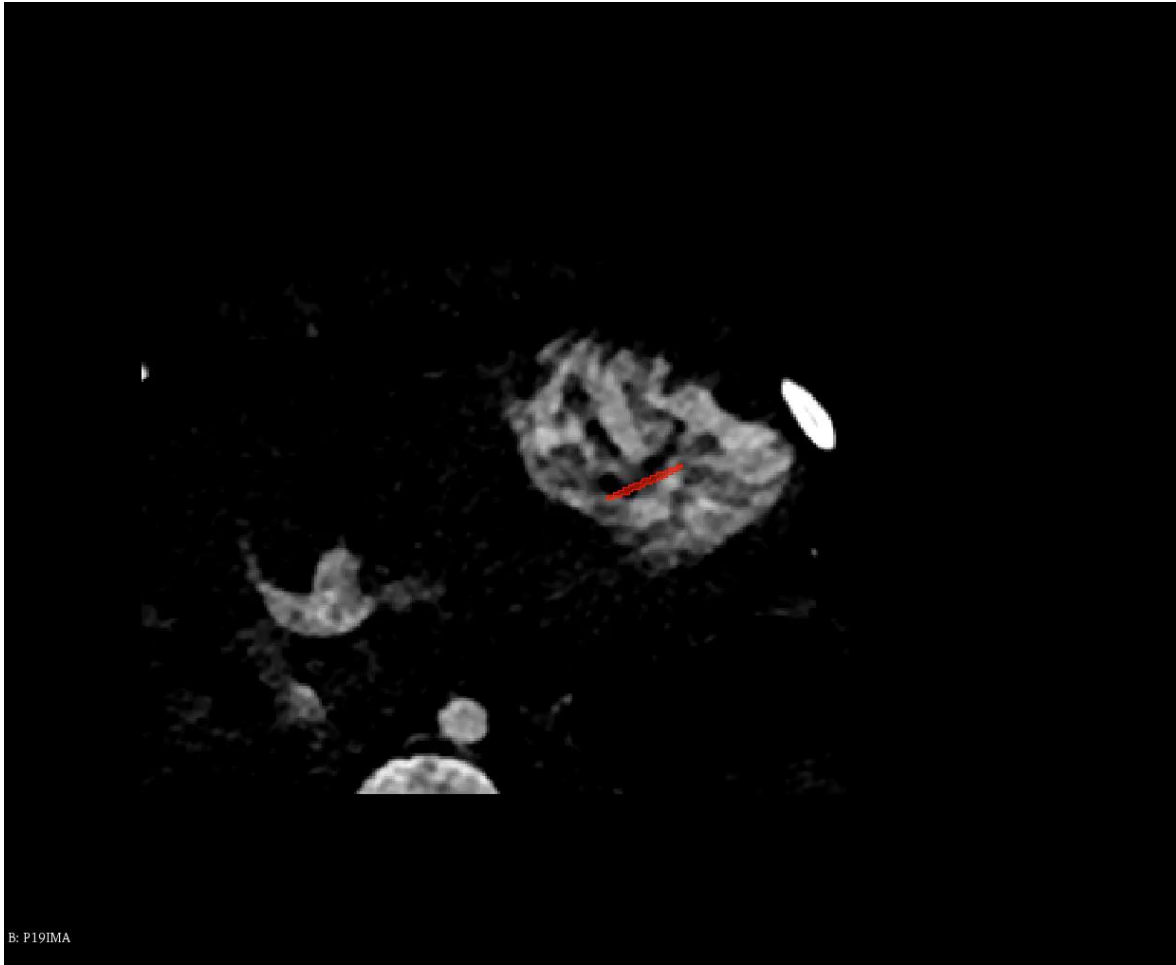
Mini-invasiv Mitralklaff



Holografisk Pasienttilpasset → 3DPrintet implantatmal



Pasientspesifikk virtuell device test

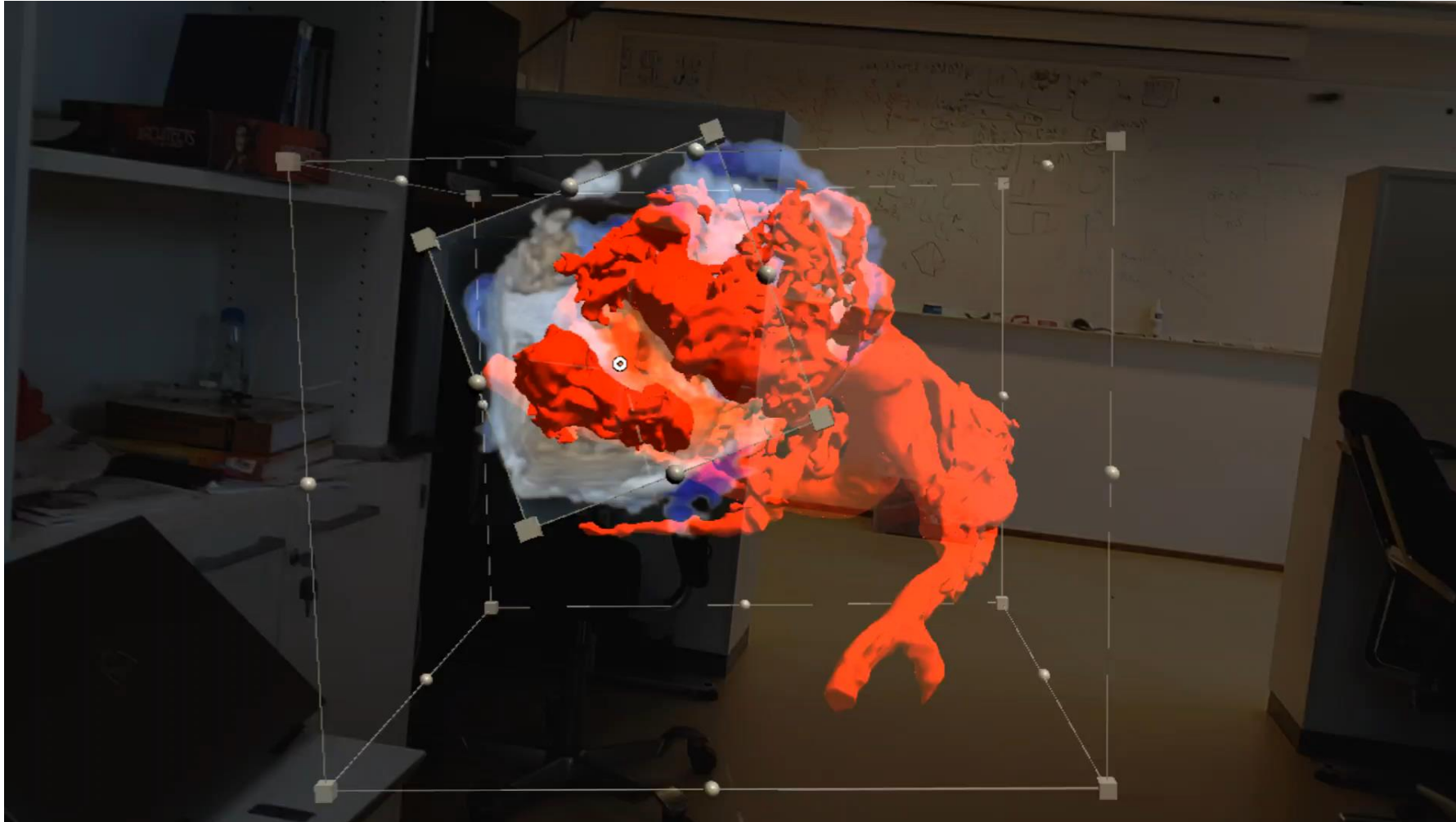


VSD-lukning

Mixed Reality 3D-Hjerteultralalyd

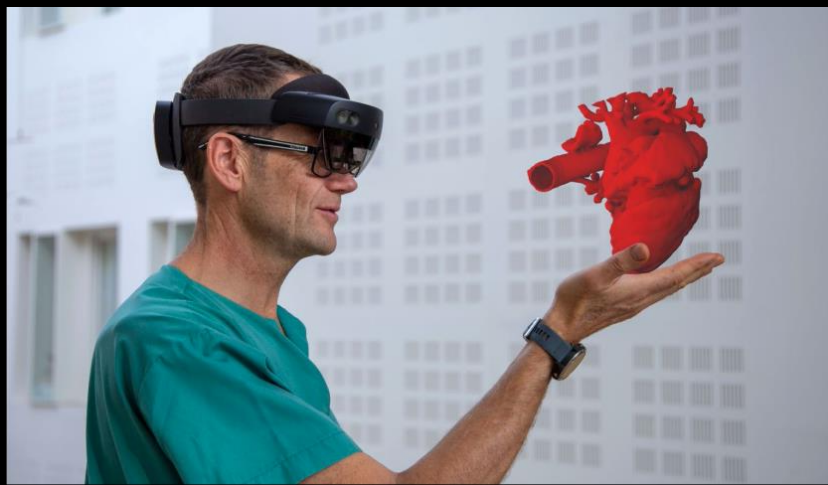


Mixed reality 3D ultralyd + CT-mesh fusjon

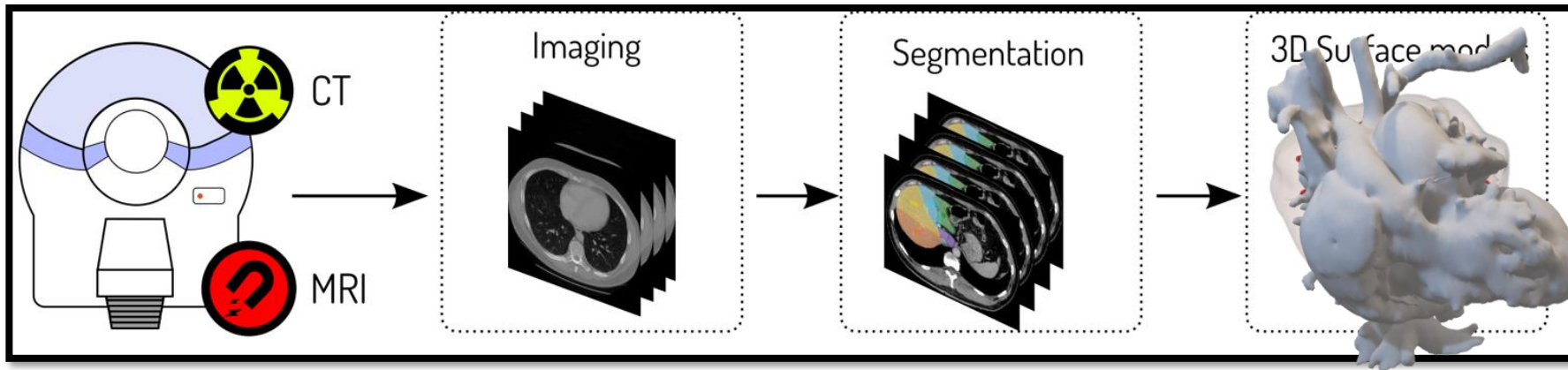


HOLOCARE

Est. 2019



Fra segmenterte CT bilder til 3D hjertemodell



Deteksjon

Målinger

Segmentering

Planlegging

Takk !



hbrun@ous-hf.no



Barnekardiologisk avd
OUS-Rikshospitalet



Thoraxkirurgisk avdeling



Barneradiologisk avdeling

