

AI - the point of no return from pathology to precision medicine

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Holiday Inn Brussels Airport

bmuc.be/bmuc-2026



**13th Belgian Multidisciplinary
Meeting on Urological Cancers**

Conflicts of interest

- I have no conflict of interest to report





Let's start with the good news

AI in pathology is already there...



HT Médica, Spain – Network Model



NEW CARE MODELS

Networked Workflow & Sub-specialization

▲ CURRENT CHALLENGE

Global shortage of pathologists + Constant increase in sample volume.



Delocalization

Pathologists working in a network from any location, breaking the physical barriers of the traditional lab.



Sub-specialization

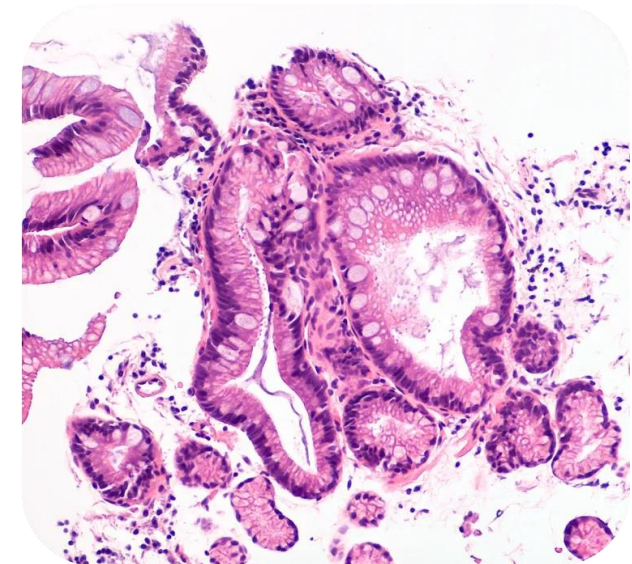
Intelligent case assignment ensuring each sample is diagnosed by the most suitable expert in that pathology.



AI-Driven Workflows

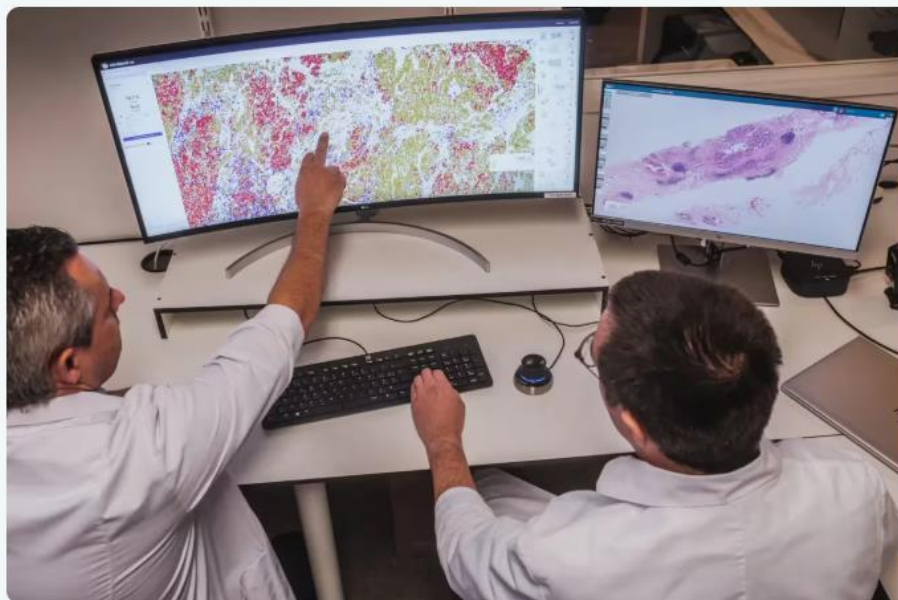
Visualization powered by precision and efficiency algorithms to optimize triage and diagnosis.

**AI Algorithm for Gastrointestinal
Solutions: Accurate Detection of
Intestinal Metaplasia, Helicobacter
pylori, Esophageal Eosinophils, and
Colon Polyps, Enhancing Diagnostic
Accuracy**



AI for high-volume repetitive tasks
Focus: maximizing efficiency

ZAS, Antwerp – AI expertise center



ZAS opent expertisecentrum voor artificiële intelligentie

Met het expertisecentrum voor artificiële intelligentie (AI) wil het lab voor Pathologische Anatomie (= weefselonderzoek) kennis en ervaring bundelen over de nieuwe technologie.

24 jan 2024

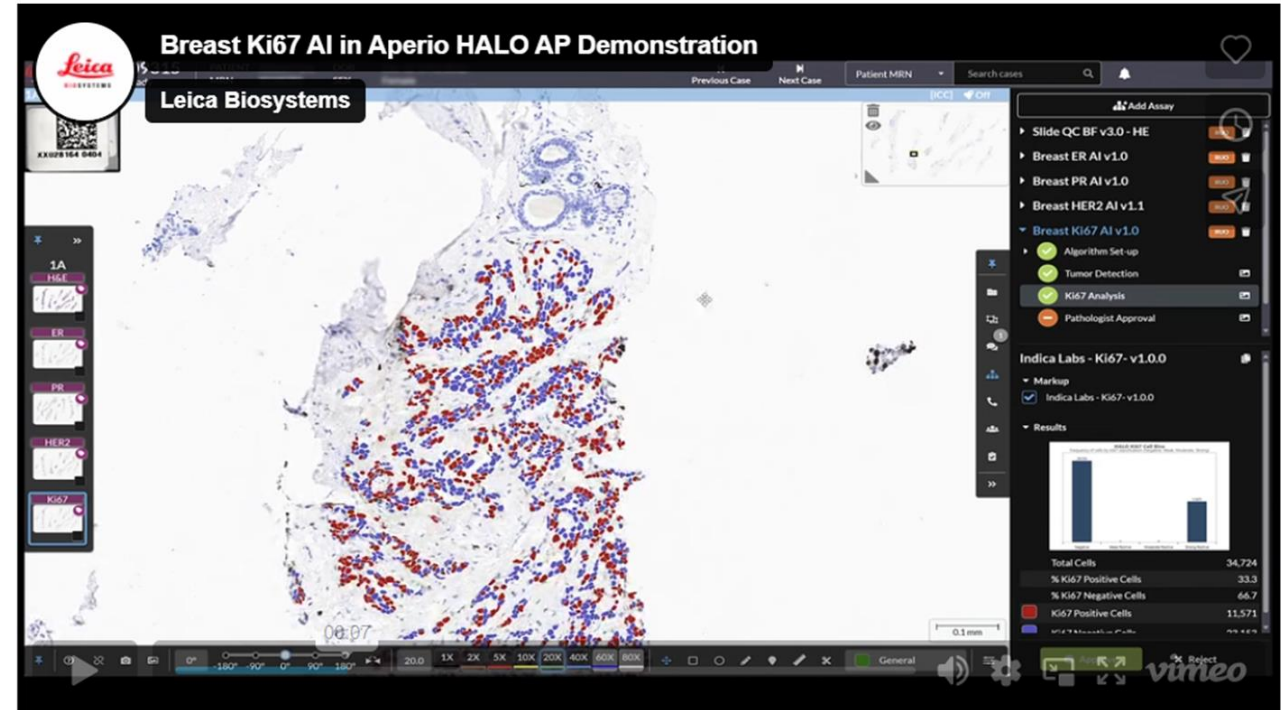


Dr. Frederik Deman



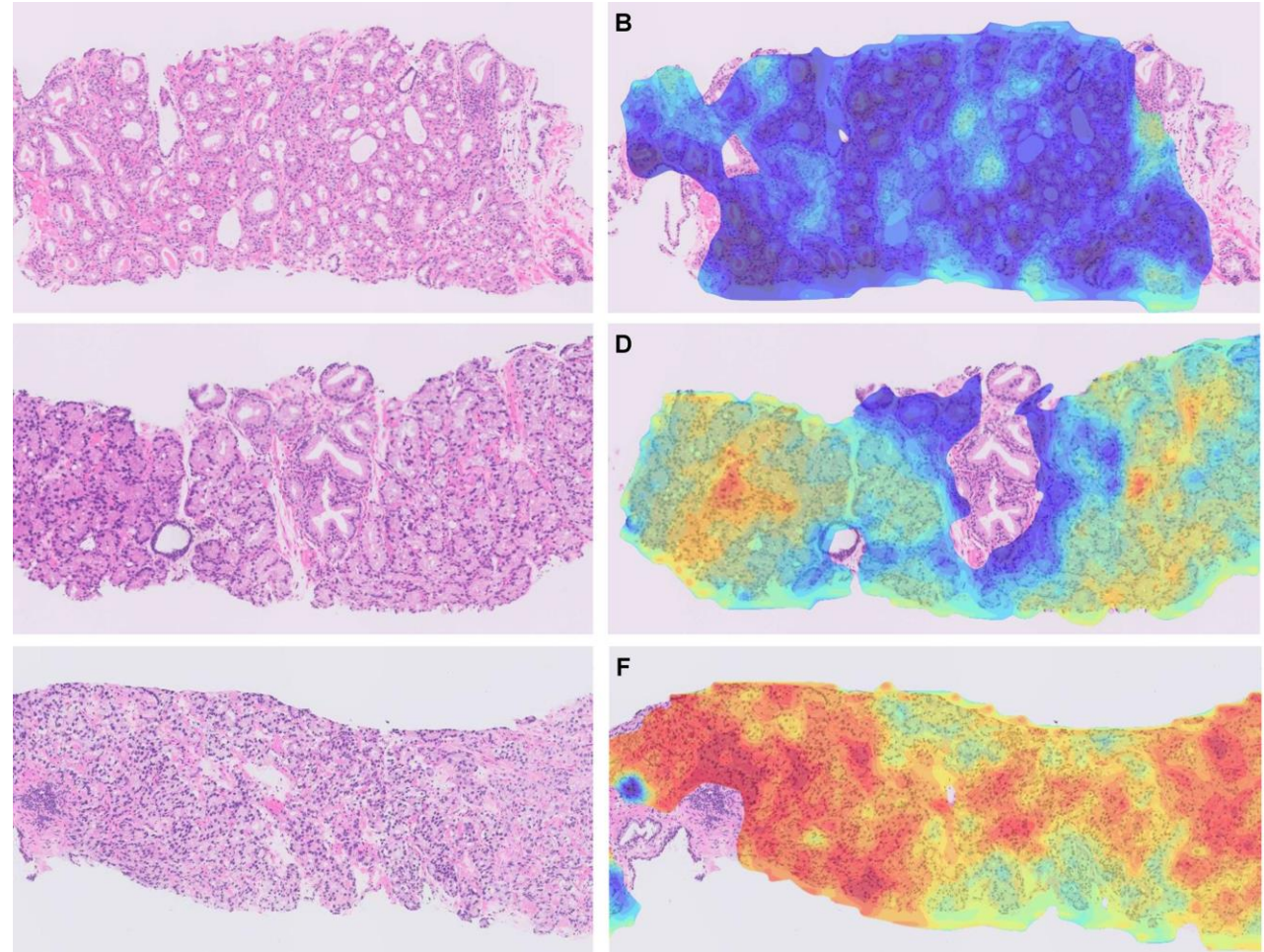
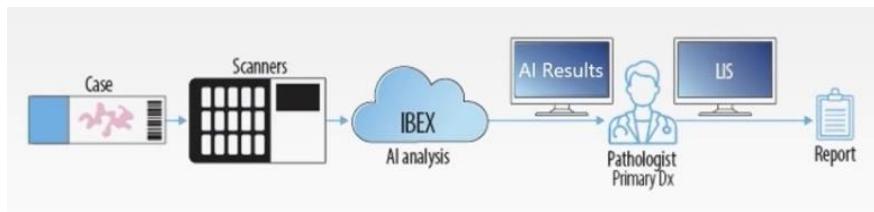
AI in Breast carcinoma

- Diagnosis
- More accurate quantification of different markers:
 - Ki67 (cutoff 14%)
 - ER & PR (cutoff 10%)
 - HER2 (score 1+, 2+ and 3+)
- Fully automated reporting

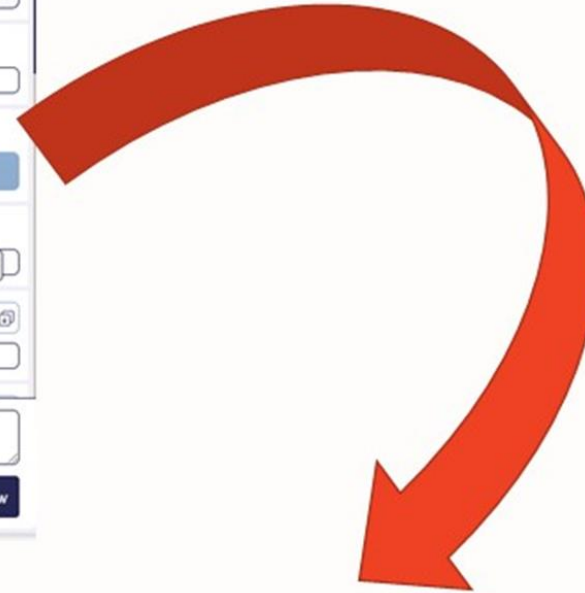


IBEX prostate AI

1. Efficiency: reduction in TAT (25%; 1 day)
2. 30% reduction in IHC
3. Less interobserver variability - more consistency in grading /Gleason score
4. Fully automated reporting of all essential data ~ structured reporting



Active Heatmap: Gleason Gleason 3  Gleason 5



Localisatie:

Fragmenten n: Tot. lengte (mm): Tumor:

Gleason +_ ISUP Grade groep (2014): Tumorfragmenten: % Tumor: Tot. tumorlengte (mm): HG PIN: LVI: Pn: Extra prostatiche tumoruitbreiding:

Update cilinder

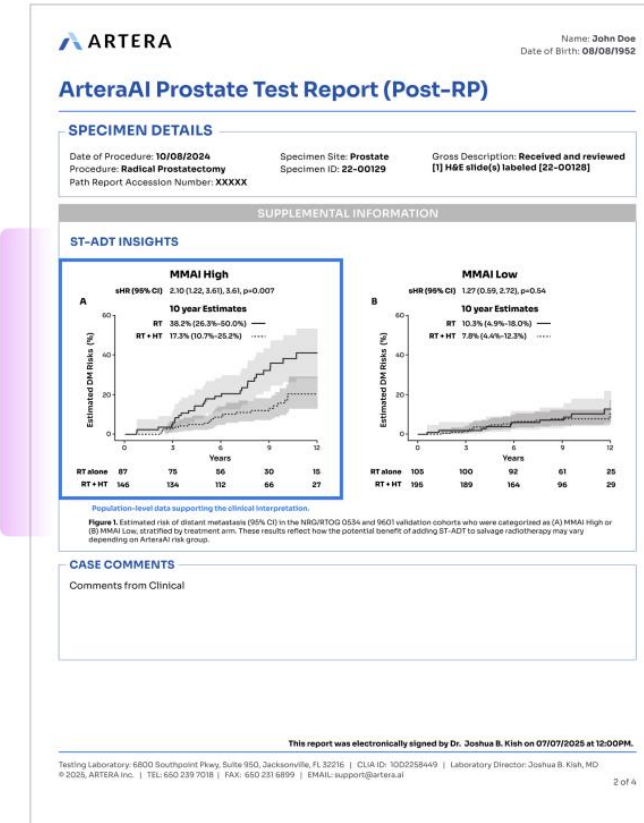
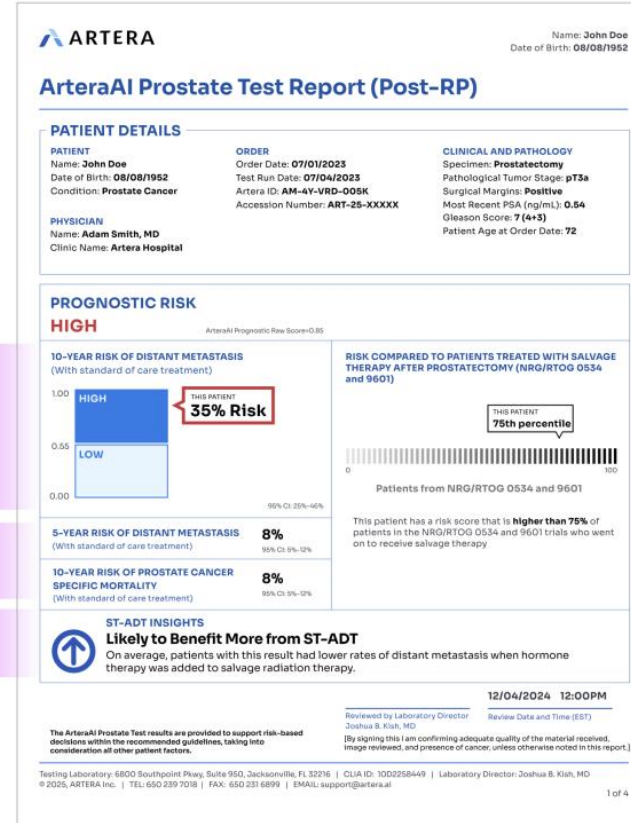
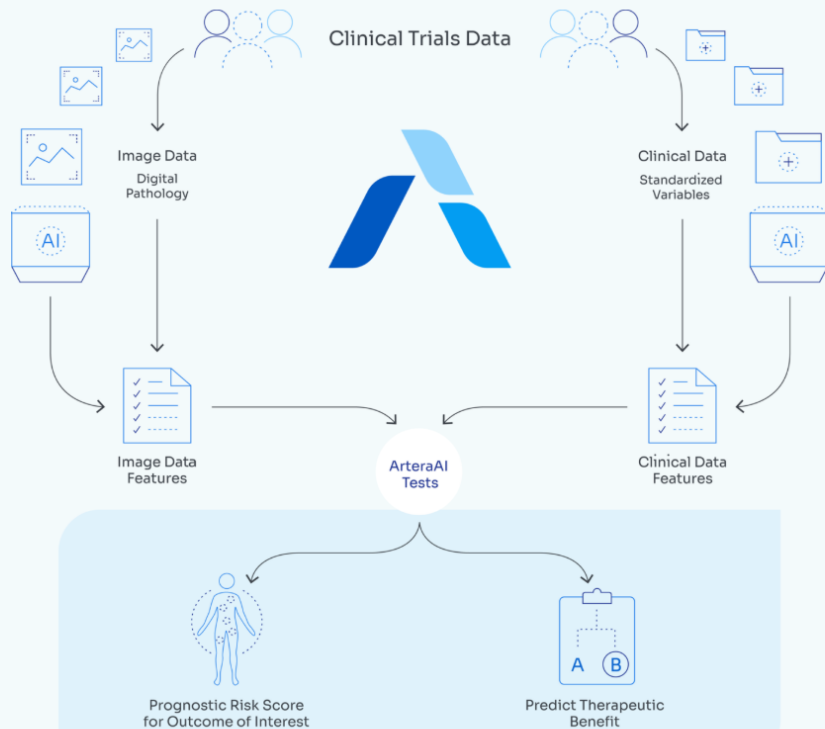
Normaal

	Nr	Localisatie	Fragm. n=	Tot. lengte (mm)	Tumortype	Gleason +_	ISUP Grade Groep (2014)	Tumorfragm. n=	% Tumor	Tot. lengte tumor (mm)	HG PIN	LVI	Pn	Extra-prostatiche tumoruitbreiding	
Edit	1	blauw	5	42	acinaïr adenoca.	4+5	5	2	15	5,6			Nee	Nee	Nee
Edit	2	roos	5	34	acinaïr adenoca.	3+4	2	4	50	15			Nee	Nee	Nee

AI & Clinical decision making

Artera predicts therapeutic benefit for patients

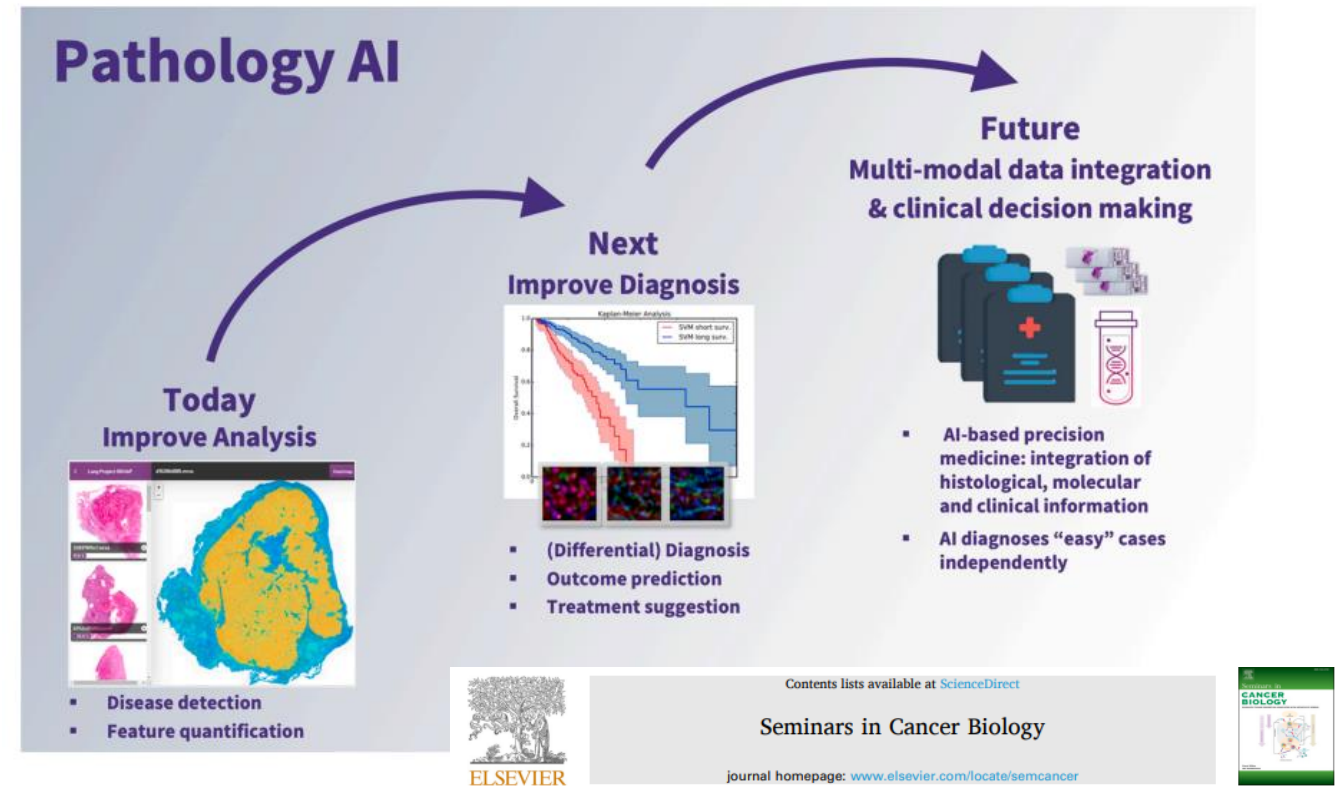
Using a large volume and a wide variety of clinical data and digital pathology images, our AI-enabled test accomplishes things that conventional techniques and computers cannot do alone.



AI – Today/Future

Advantages of AI:

- Accurate diagnosis
- Grading & classification
- Measurements (Breslow thickness – melanoma)
- Workflow efficiency
- Triage
- Knowledge support
- Standardization
- Structured reporting (SNOMED coding)
- Cost control (avoiding additional IHC)
- Quality control



2022

Artificial intelligence and pathology: From principles to practice and future applications in histomorphology and molecular profiling

Albrecht Stenzinger^{a,b,c,*}, Maximilian Alber^{d,e}, Michael Allgäuer^a, Philipp Jurmeister^{d,f}, Michael Bockmayr^{d,g,h}, Jan Budczies^{a,b}, Jochen Lennerzⁱ, Johannes Eschrich^j, Daniel Kazdal^{a,c}, Peter Schirmacher^{a,b}, Alex H. Wagner^{k,l}, Frank Tacke^j, David Capper^{f,m}, Klaus-Robert Müller^{n,o,p,q,*}, Frederick Klauschen^{d,i,r,*}

Pitfalls / disadvantages of AI

- Overreliance “lazy & insecure pathologist”
- Bias in data
- Black box
- Validation & EU regulation (IVDR)
- Cost (no reimbursement) and model
- De-skilling (AI & trainee/residents)
- Need for specialized support within departments
- GPUs (graphic processing units)
- IT integration

Is this the solution to my problem?



So...

What are we waiting for?

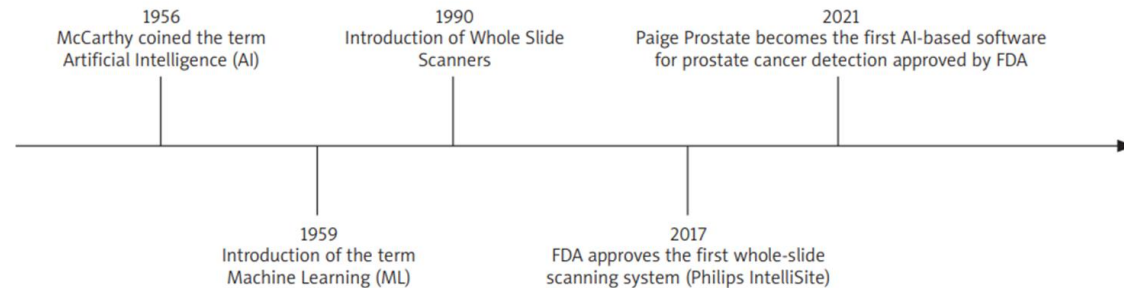
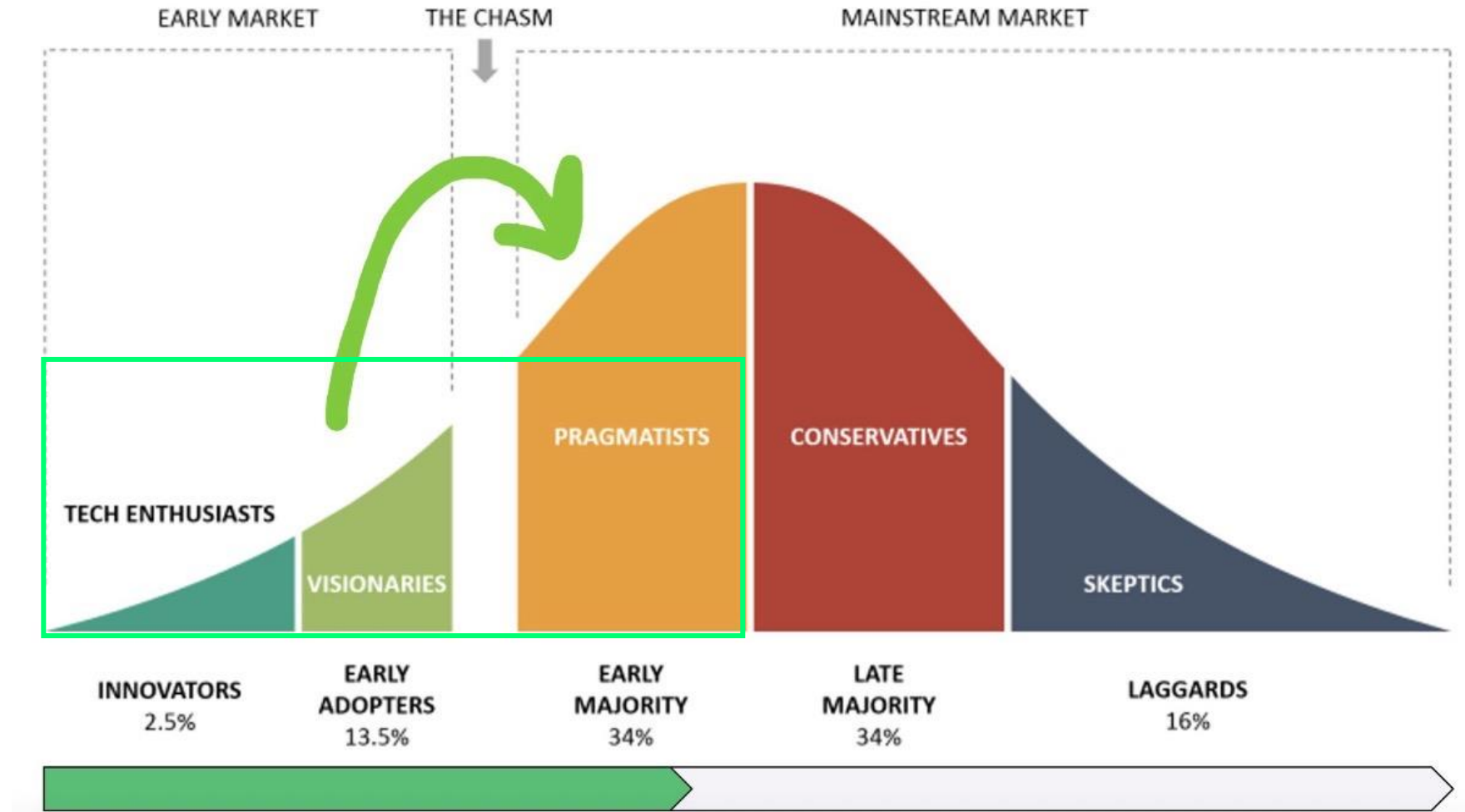
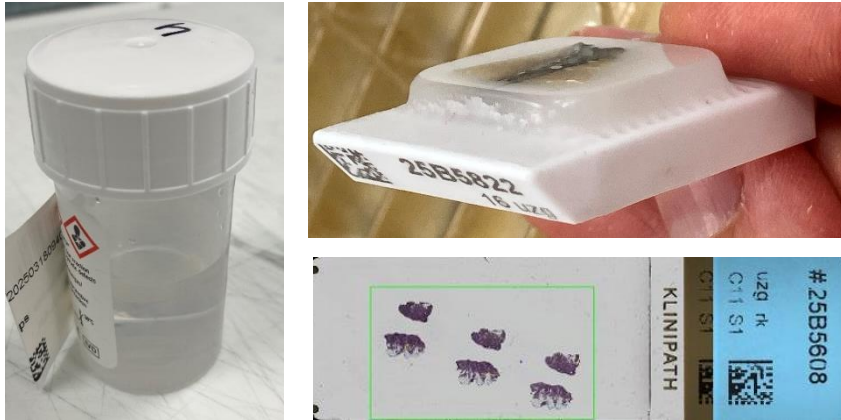


Figure 1. Milestones of digital pathology

What do you need to implement AI?



2. Workflow adaptation - digital pathology



2-3 high-throughput
scanners

Image Management
System (IMS)

Storage (1 slide ~1,5 GB)

Hardware (4K screens,
spacemouse...)

Total cost ~ 1.000.000 €



3. AI & defining clinical need

What problem do you need / want to solve?

- AI as supportive tool for operational efficiency
- Diagnostic precision & accuracy
- Specific biomarker quantification
- ...
- Optimal treatment selection



4. AI cost & implentation

- Majority hybrid costmodel:
 - annual software license ~ **50.000 – 250.000 €**
 - cost per case ~ **5 – 30 €**
 - implementation costs (integration, validation & training) ~ **10.000 – 100.000 €**
- What determines the price:
 - Number of cases per year
 - Integration with digital pathology
 - Level of automation (triage, reporting, ...)
 - Contract duration
 - Country / negotiation position



AI transforming the laboratory landscape

Conventional Pathologist



Digital & AI Pathologist



- Individual cost of digital pathology and AI is too high
 - Collaboration
 - Central scanning hubs
 - Subspecialisation
 - Standardisation (workflow & reporting)
- Challenges:
 - Logistics
 - TAT
 - Governance & data ownership
 - Acceptance of pathologist

Future perspectives

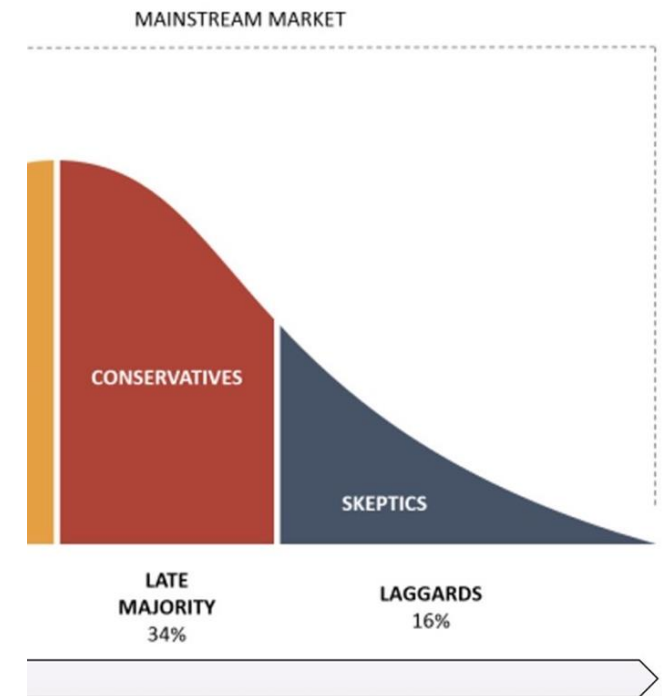
- Integration of pathology, radiology & genomics
- Dynamic risk models instead of static classifications
- AI as a “clinical co-pilot”
- More precision, less overtreatment



In conclusion

- AI is not a replacement, but an amplifier of clinical expertise
- Already applicable in areas such as prostate and breast cancer
- Great potential for personalized oncology care

- BUT...



Special thanks to The Belgian Digital Pathology / Structured Reporting working group:



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ZAS, Antwerp



Prof. dr. Amélie Dendooven
UZ Gent

Voting questions

- Please take your phone to cast your vote

