

Unravelling Heterogeneity in Ovarian Cancer through Image-Directed Interventions

from Ultrasound-Guided Biopsies to 3D-Moulds

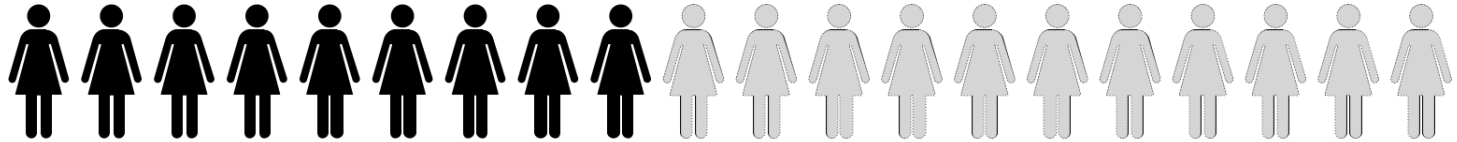
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26 July 2022 | Cambridge Mathematics of Information in Healthcare Hub (CMIH)

Motivation

Ovarian Cancer



5th

cause of cancer-related female deaths

**Five-year survival rate
steady since 1980**

Motivation

Ovarian Cancer

~70% of diagnoses
High Grade Serous Ovarian Cancer

- Most common
- Most lethal

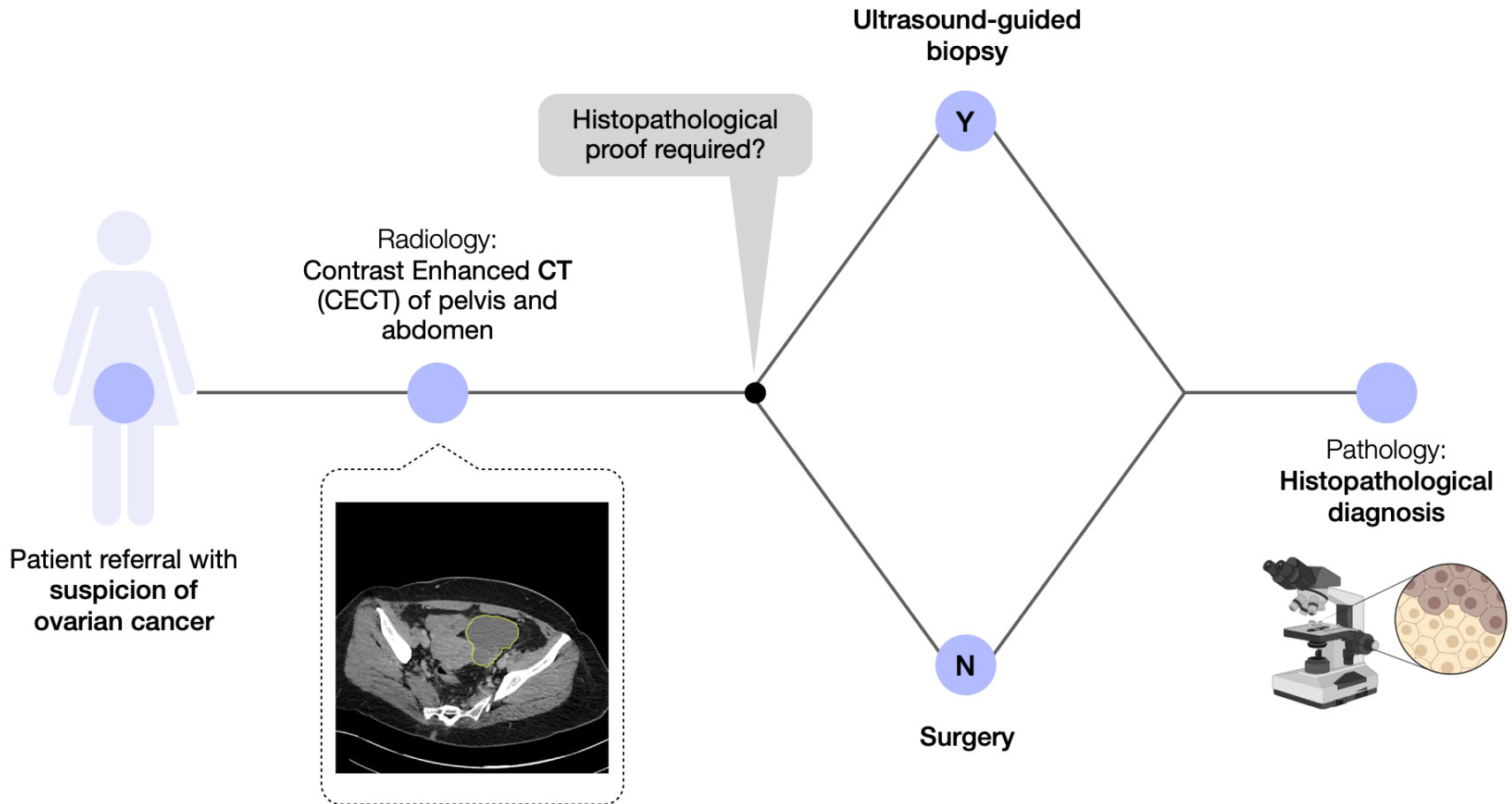
Poor prognosis in HGOSC correlates with
genomic intratumour heterogeneity

No systematic approach exists in the standard of care to identify intratumour heterogeneity

How can we understand and
identify genomic
intratumour heterogeneity
in the standard of care?

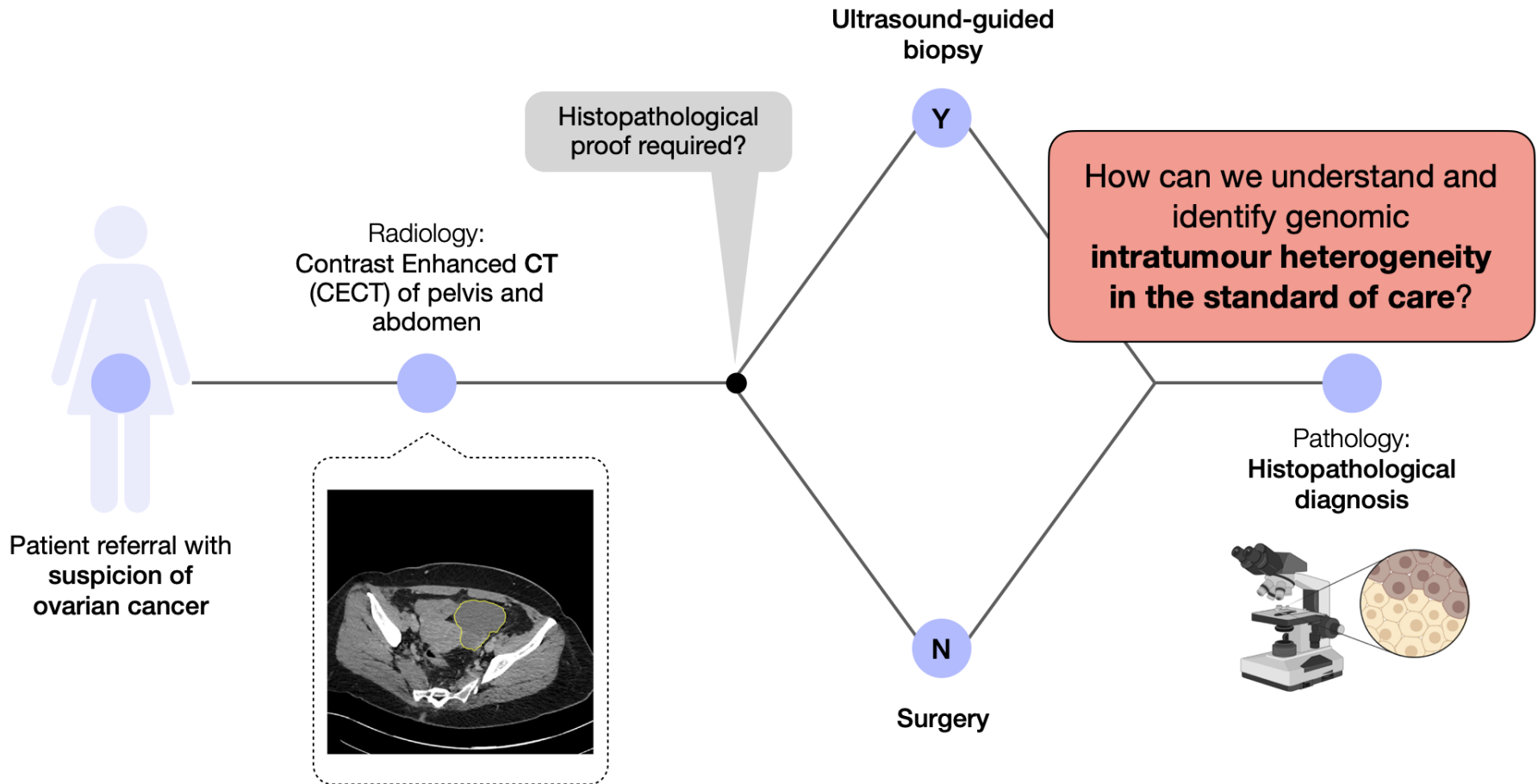
Motivation

Ovarian Cancer: the Diagnostic Standard of Care



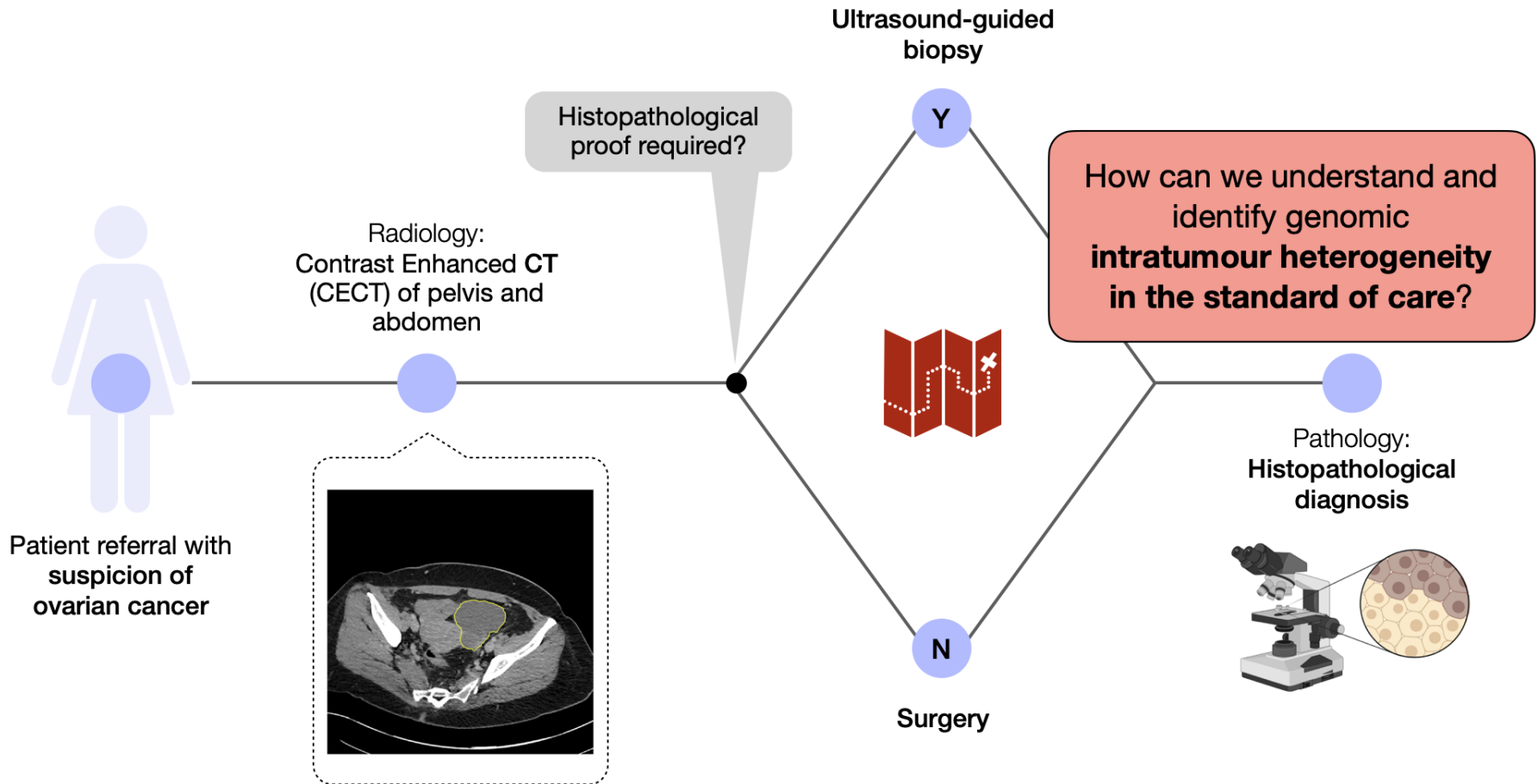
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Ovarian Cancer: the Diagnostic Standard of Care



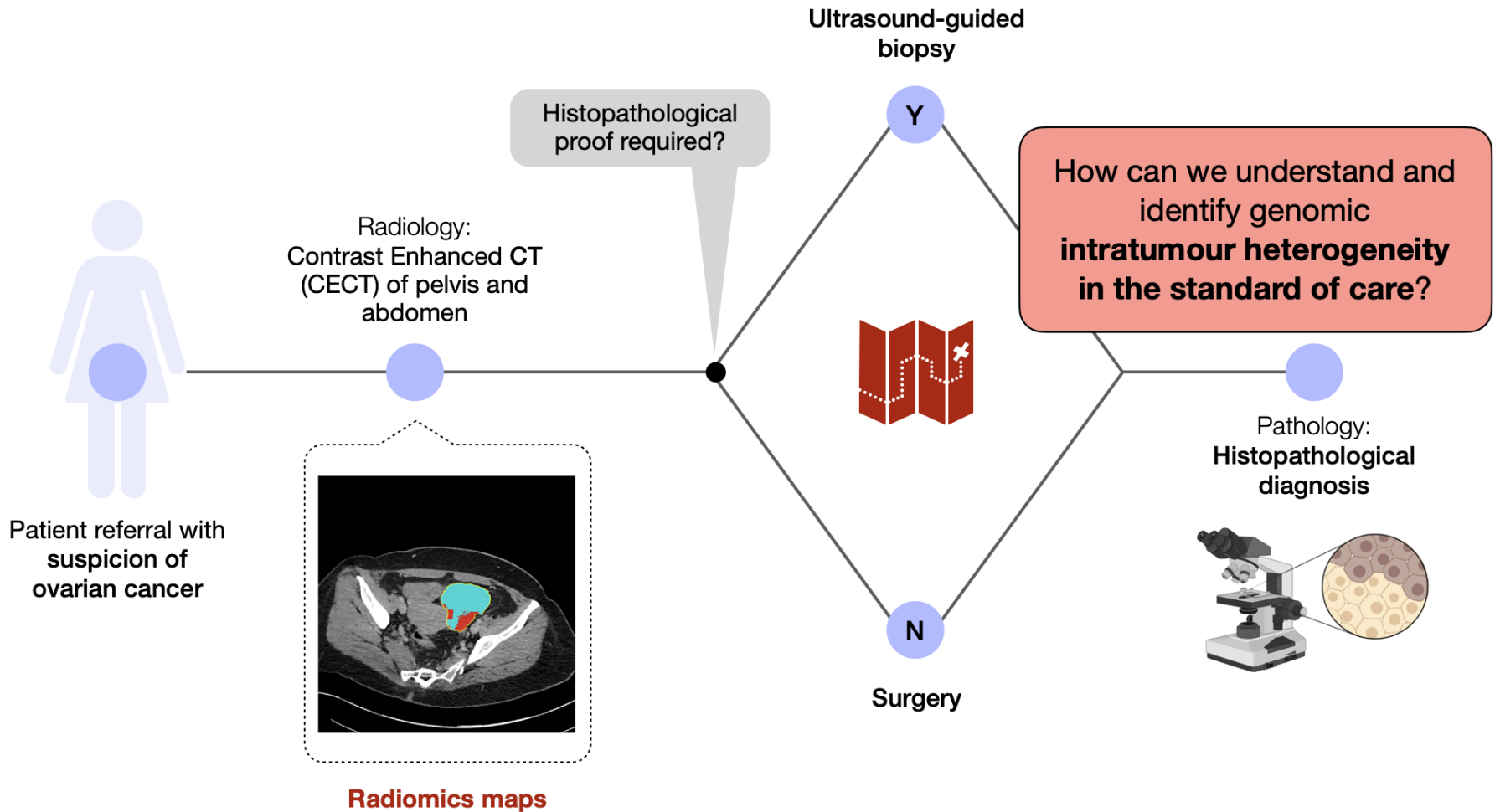
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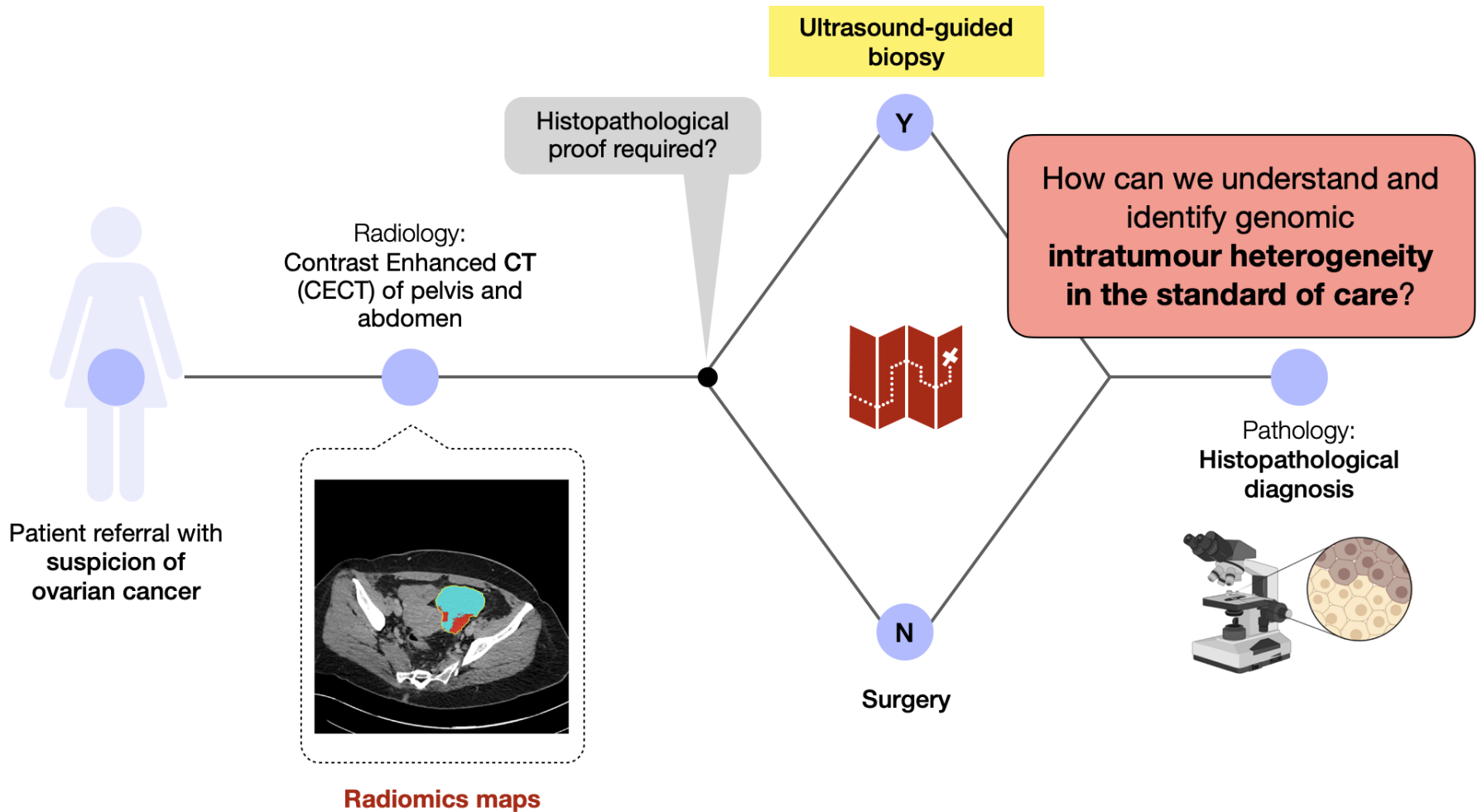
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Ovarian Cancer: the Diagnostic Standard of Care



Motivation

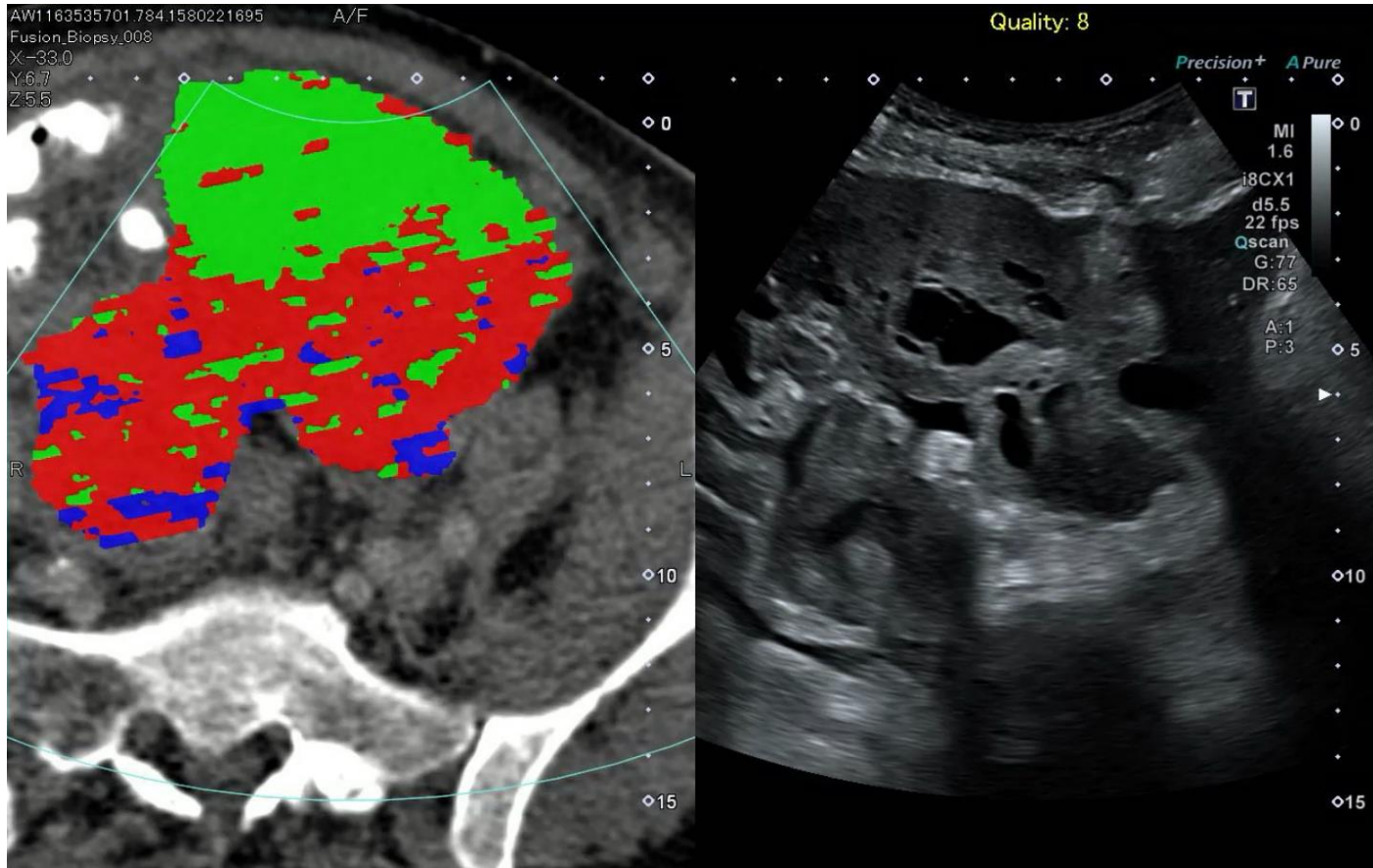
Ovarian Cancer: the Diagnostic Standard of Care



Ultrasound-guided biopsies

Fuse CT-derived radiomics maps to real-time ultrasound

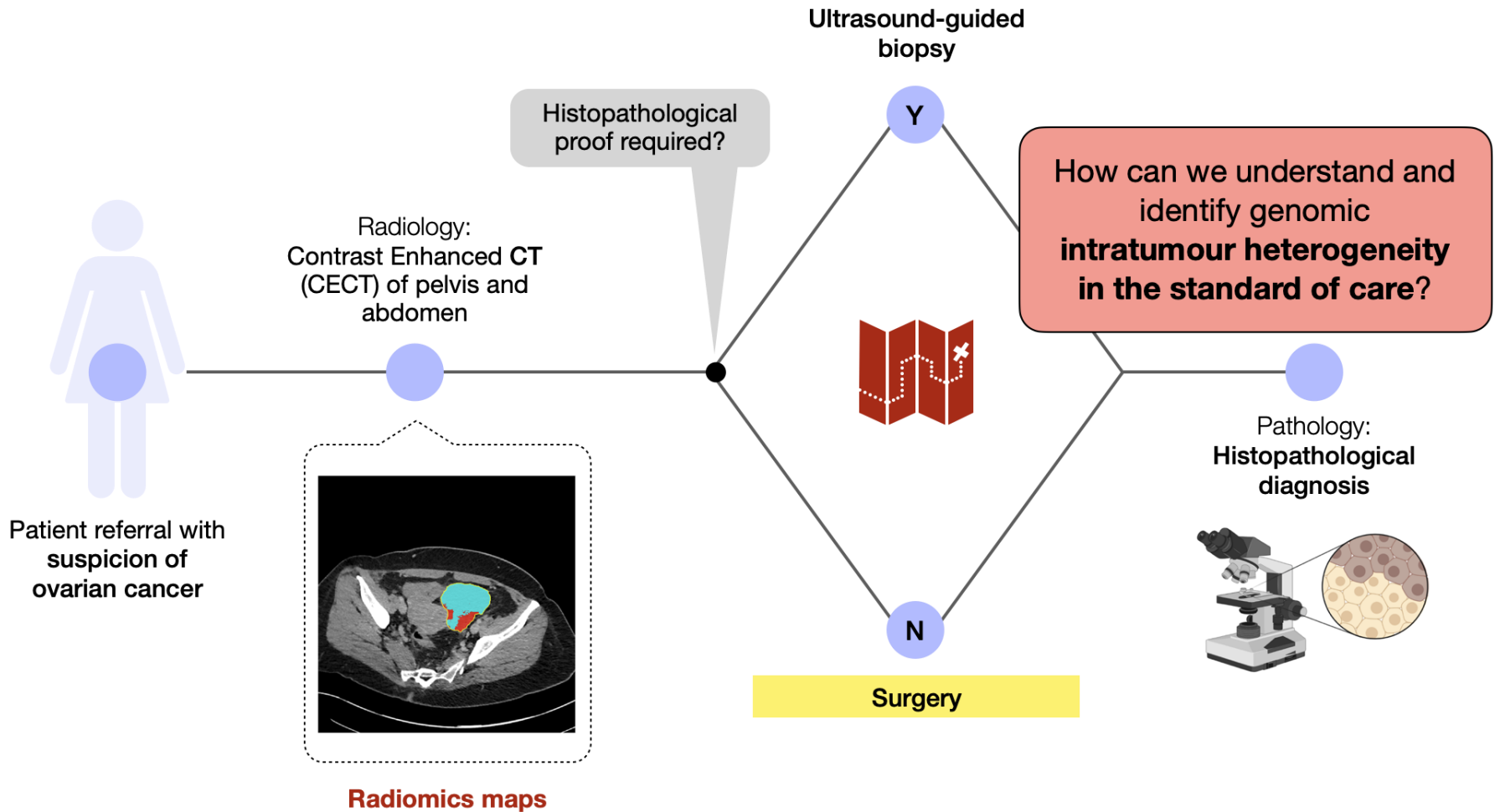
Canon
CANON MEDICAL



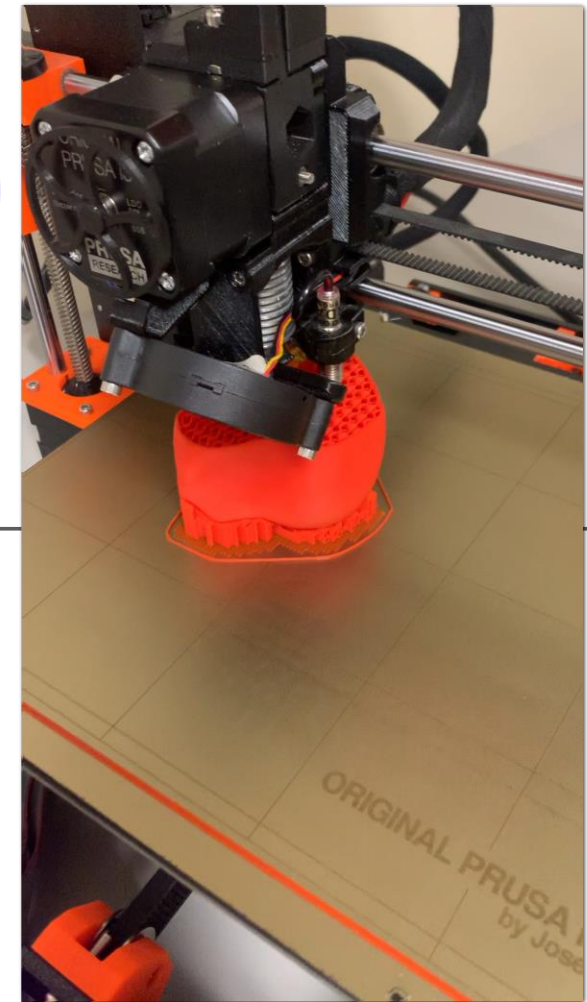
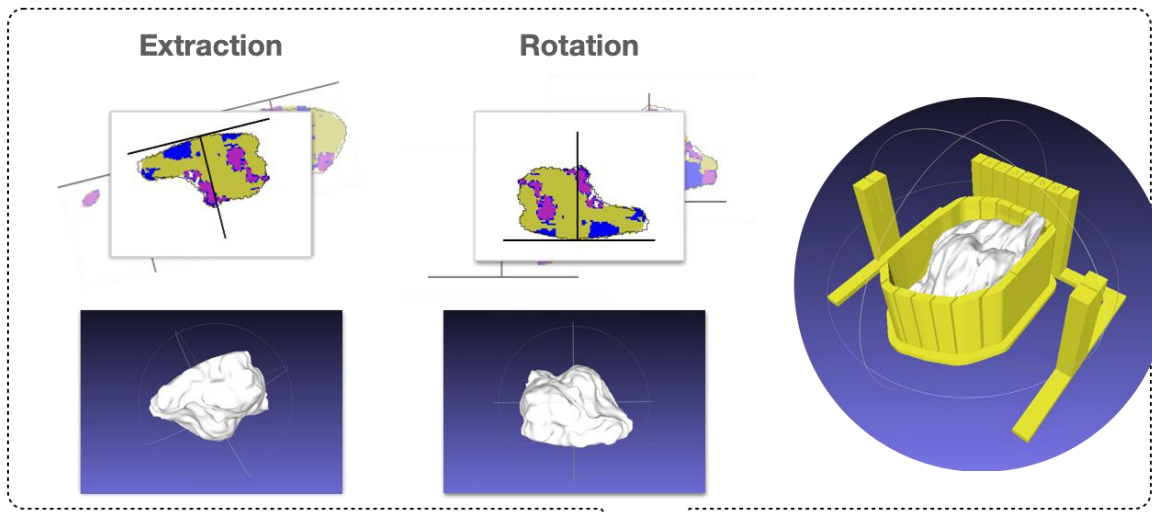
Beer, L., Martin-Gonzalez, P., Delgado-Ortet, M., Reinius, M., Rundo, L., Woitek, R., ... & Sala, E. (2021). Ultrasound-guided targeted biopsies of CT-based radiomic tumour habitats: technical development and initial experience in metastatic ovarian cancer. *European Radiology*, 31(6), 3765-3772.

Motivation

Ovarian Cancer: the Diagnostic Standard of Care

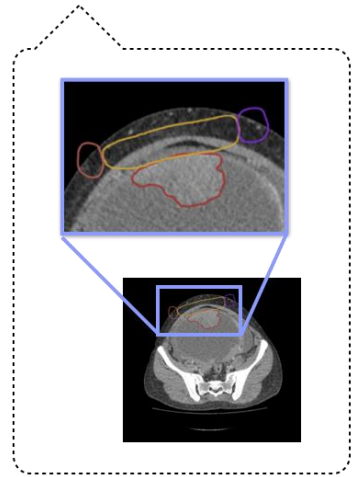


Lesion-specific 3D-printed moulds

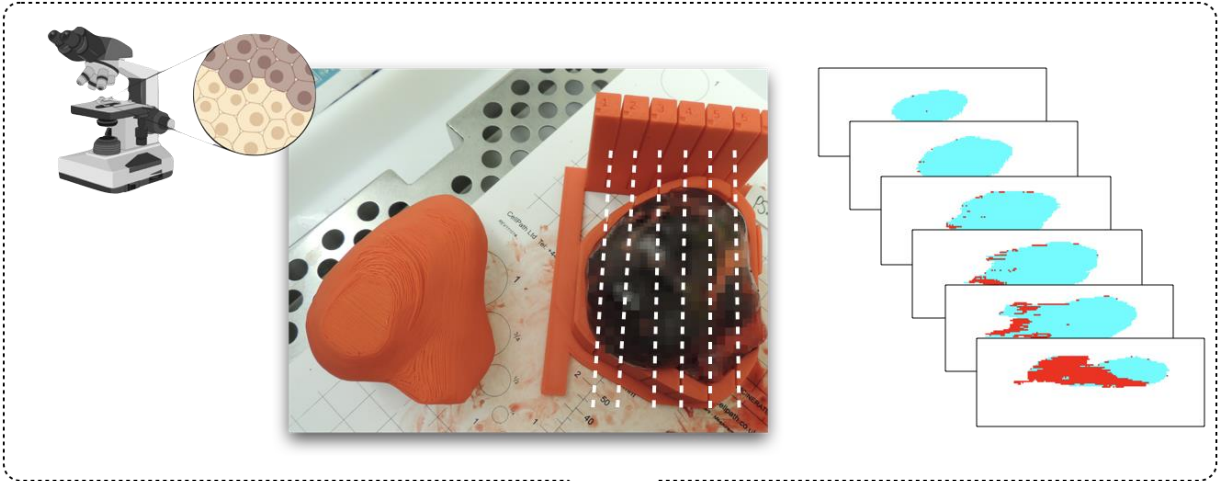


Radiology

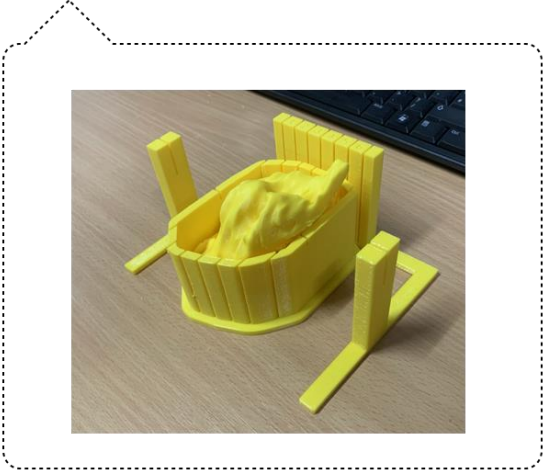
Computational



Lesion-specific 3D-printed moulds



Surgery



Pathology



Take-home messages

- We've developed **pipelines for precision tissue sampling techniques** that can be **integrated with the clinical routine** for patients with newly diagnosed HGSOC to unravel intratumour heterogeneity.
 - 3D-printed moulds had already been devised for other organs (kidney) but not for ovary and the unique challenges it poses.
 - US-fusion biopsies will potentially be used for other organs.
- External **collaborations with the industry** have arisen → US-guided biopsies have been an external collaboration with Canon Medical Research Europe.
- Future steps involve the spatial correlation of imaging and tissue-derived data (**radiogenomics**), but more patients need to be recruited.
 - Decreased patient recruitment these last months due to COVID-19 pandemic.

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thank you!

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