

**BEAT DKD**



Biomarker Enterprise to Attack DKD

**Imaging study**

**(Workpackage 4)**

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# Biomarkers

- Biomarkers are measures that indicates a normal or abnormal process taking place in your body.
- Examples include blood tests and blood pressure measurements.
- For diabetes kidney disease:
  - Kidney function: creatinine levels in the blood (estimated glomerular filtration rate, eGFR)
  - Kidney damage: amount of protein in the urine

# Imaging biomarkers

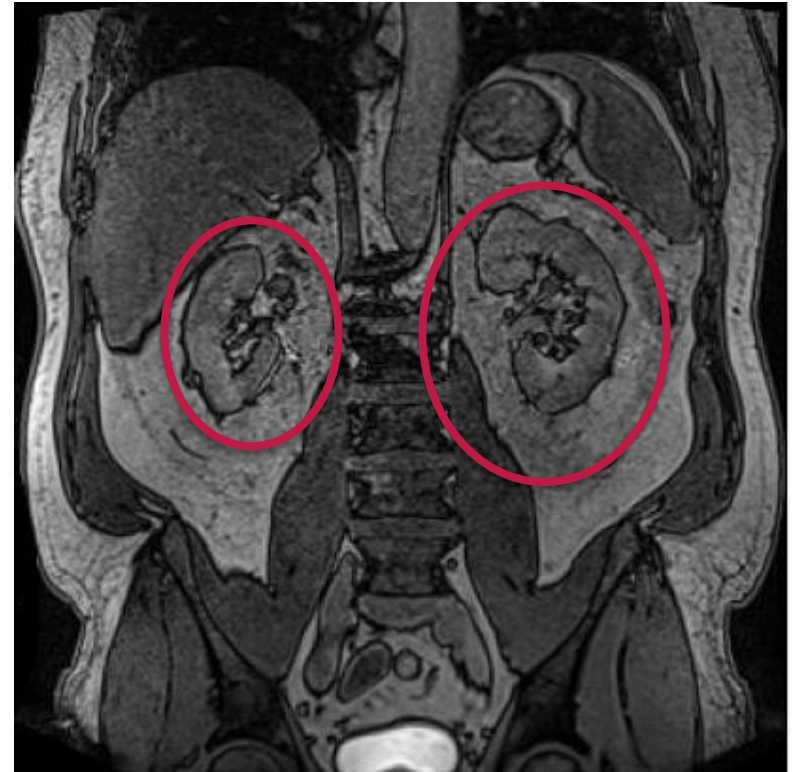
- Diabetic kidney disease does not develop or progress at the same rate or in the same way in people
- Increasing interest in imaging biomarkers, particularly with the kidneys.
- For example, total kidney volume is a clinically accepted biomarker for rapid progression of Autosomal Dominant Polycystic Kidney Disease
- Lack of data on diabetic kidney disease, particularly the early stages.

# Our core research questions

- Can renal imaging provide insight into the how it develops and why / how it varies between individuals?
- Can imaging biomarkers predict how kidney health / function will change over time in individuals with diabetes?
  - Can imaging biomarkers provide us with more information than our standard clinical tests?
  - Can we use imaging biomarkers to identify individuals at higher risk of diabetic kidney disease?

# How are we imaging the kidneys?

Magnetic Resonance Imaging (MRI)



# Imaging of the kidneys with MRI

Will examine

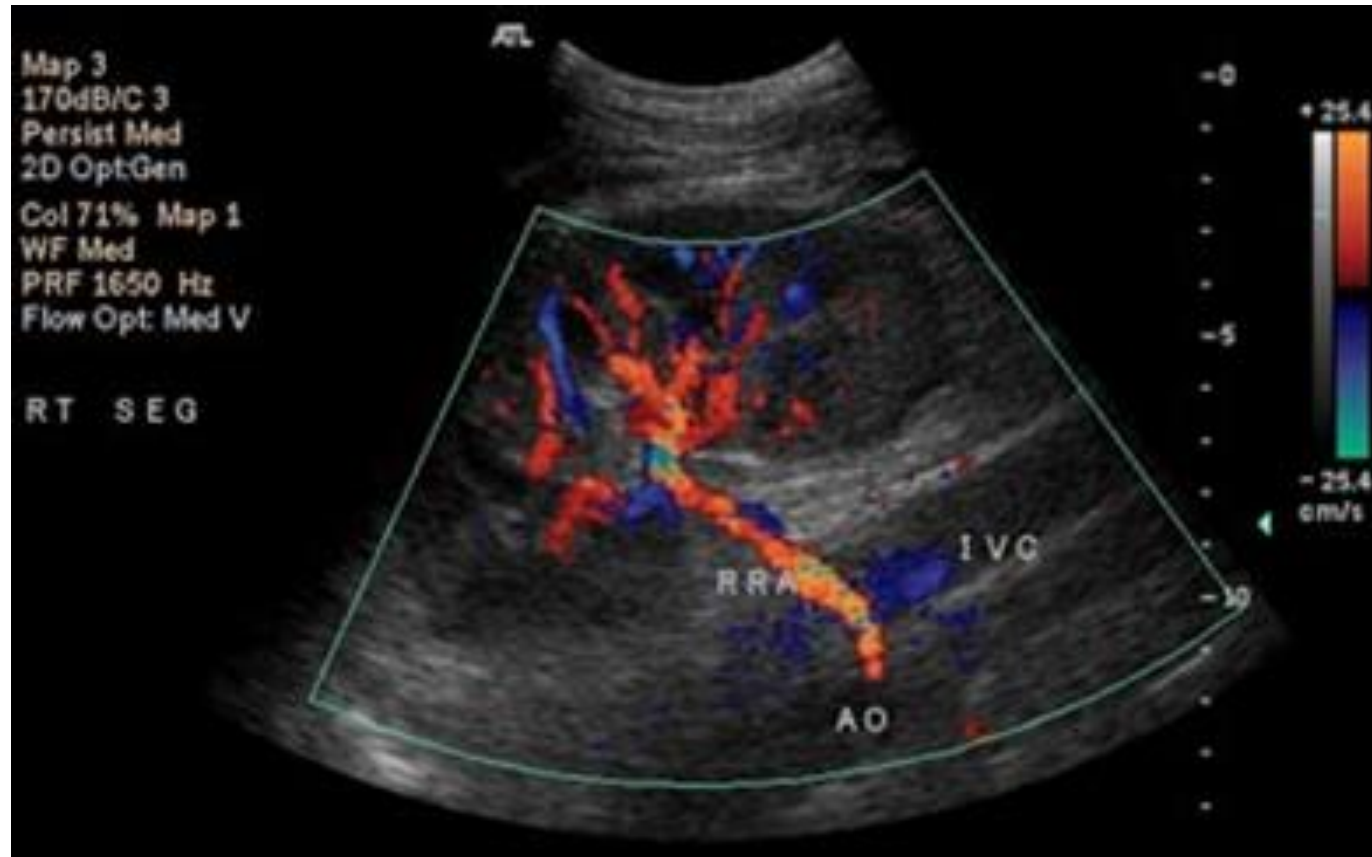
- Kidney size and shape
- Kidney function
- Blood flow
- Oxygen levels
- Fibrosis (scarring)
- Inflammation
- Body composition



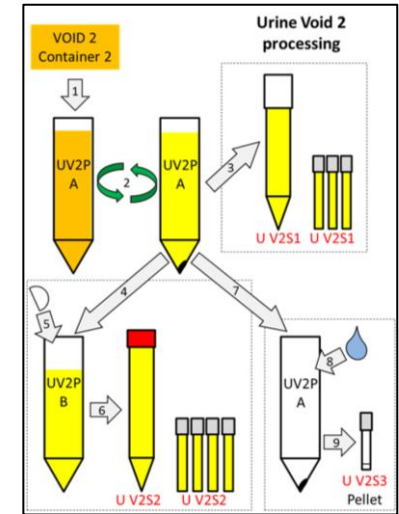
# Renal ultrasound



## Renal blood flow (renal resistive index)



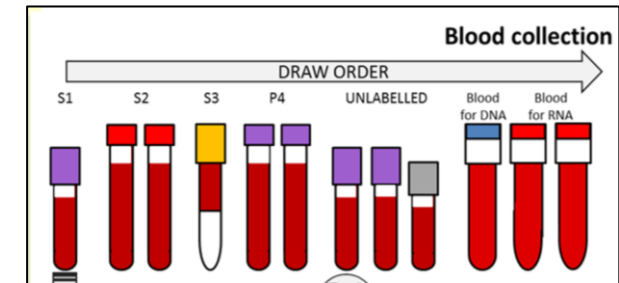
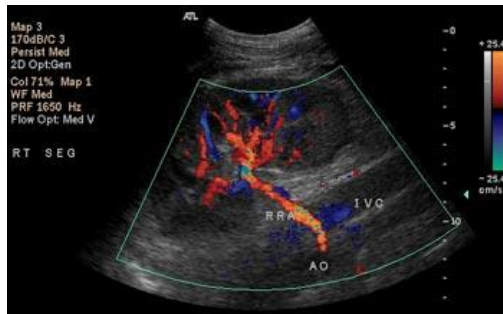
# Central iBEAT study overview



500 Participants with type 2 diabetes and either no or early signs of kidney changes

Repeat annually for 3 years

- Clinical exam and medical history
- Biofluid collection



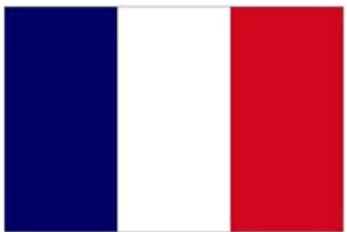


# Recruiting centres



**UK**

Exeter  
Leeds  
Sheffield



**France**

Bordeaux



**Finland**

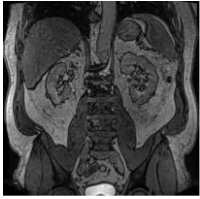
Turku



**Italy**

Bari

# Infrastructure support

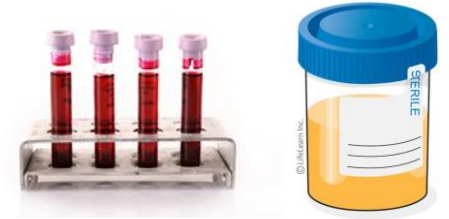


**UK**  
Sheffield

**Sweden**  
Antaros Medical



**Switzerland**  
Swiss Institute of  
Bioinformatic



**Sweden**  
Lund /Malmö



**UK**  
Sheffield  
Exeter

**Sweden**  
Lund / Malmö

**America**  
University of Michigan  
Novo Nordisk

# Standardising across centres

Need to ensure that we are doing the same things across all centres – ↓ variability

- Performing the imaging and clinical assessments the same way across all centres
  - Same guidelines for ultrasound, clinical assessments and biofluid collection
  - Across the centres we have different MRI vendors – have to ensure that the protocol for both capturing and analysing the images are the same across the vendors

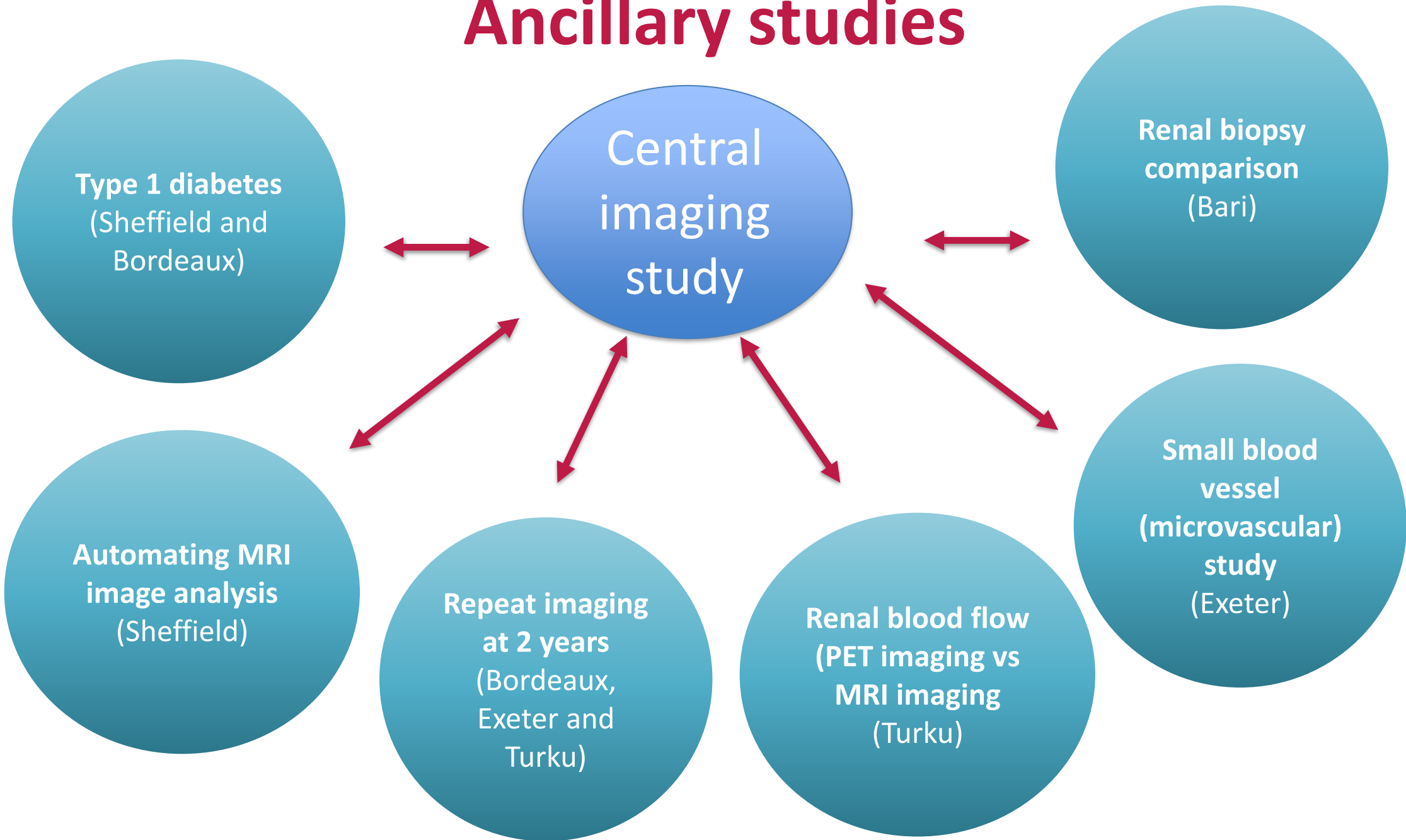
# Standardising across centres

- Standardising the conditions for the visits
  - All performed in the morning following an overnight fast
  - All participants given toast, butter and water



**Do all the participants in different centres do the same things?**

# Ancillary studies



# iBEAt Team



## Prognostic Imaging Biomarkers for Diabetic Kidney Disease (iBEAt): a BEAt-DKD study

Steven Sourbron<sup>1</sup>; Kim Gooding<sup>2</sup>; Chrysta Lienczewski<sup>3</sup>; Massimo Papale<sup>4</sup>; Niina Koivuviita<sup>5</sup>; Anna Zetterqvist<sup>11</sup>; Anna-Maria Dutius-Andersson<sup>11</sup>; Kanishka Sharma<sup>1</sup>; Alberto-Garcia Hernandez<sup>6</sup>; Dmitry Kuznetsov<sup>9</sup>; Julie Bailey<sup>1</sup>; Kay Tobin<sup>1</sup>; Virva Saunavaara<sup>5</sup>; Fotios Tagkalakis<sup>1</sup>; Francesco Pesce<sup>4</sup>; David Shelley<sup>1</sup>; Irvin Teh<sup>1</sup>; Claire Ball<sup>2</sup>; Roberto De Blasi<sup>4</sup>; Sapna Puppala<sup>1</sup>; Kaj Metsärinne<sup>5</sup>; Christian Combe<sup>7</sup>; Mark Ibberson<sup>9</sup>; Harry Holthofer<sup>14</sup>; Kai Simons<sup>12</sup>; Anil Karihaloo<sup>15</sup>; Lisa Hazelwood<sup>8</sup>; Wenjun Ju<sup>3</sup>; Richard Urquhart<sup>13</sup>; Vincent Rigalleau<sup>7</sup>; Rosamonde Banks<sup>1</sup>; Peter Gilmour<sup>6</sup>; Michael Mansfield<sup>1</sup>; Mark Gilchrist<sup>2</sup>; Dick de Zeeuw<sup>10</sup>; Hiddo Lambers-Heerspink<sup>10</sup>; Pirjo Nuutila<sup>5</sup>; Matthias Kretzler<sup>3</sup>; Matthew Wellberry-Smith<sup>1</sup>; Loreto Gesualdo<sup>4</sup>; Dennis Andress<sup>8</sup>; Nicolas Grenier<sup>7</sup>; Angela Shore<sup>2</sup>; Maria F. Gomez<sup>11</sup>

