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**Place of enrolment:** University of Copenhagen, Faculty of Health and Medical Sciences

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**Title of project:** Understanding the Diabetic Heart: A Deep Dive into the Prevalence and Prognostic Implications of Diabetes-related Cardiac Pathology

## **ABSTRACT**

Background and significance:

Cardiovascular disease is the leading cause of death in patients with type 2 diabetes (T2D) and is the largest contributor to the costs of T2D. Patients with T2D is at a much-increased risk of developing heart failure and the growing prevalence of T2D results in a growing number of patients worldwide developing cardiovascular complications due to T2D. This underlines the importance of being able to identify early diabetes-related changes to cardiac structure and function and to detect T2D sub-groups at increased risk of developing cardiovascular complications. Echocardiography is a sensitive tool for diagnosing subtle cardiac dysfunction in a multitude of conditions including T2D. Being able to identify early diabetes-related changes to cardiac structure and function may aid in earlier diagnosis of cardiovascular disease in patients with T2D and thus earlier intervention leading to improved prognosis.

Aims:

This PhD study is designed with the primary aims to **1)** determine the prevalence of sub-clinical cardiac pathology in asymptomatic patients with T2D using advanced echocardiography and hybrid Rb PET/CT, **2)** compare these findings to echocardiographic features of patients with T2D who has already developed heart failure, **3)** investigate the predictive value of diabetes-related echocardiographic features in relation to clinical outcomes, **4)** possibly identify the most robust risk markers capable of helping clinicians select the patients with increased risk of cardiovascular morbidity and mortality, and lastly, **5)** evaluate the effect of T2D on the heart over a 10-year period using unique temporal data from the Copenhagen City Heart Study's 4th and 5th round.

Study design and methods:

The aims of the study will be investigated using 4 studies, 3 prospective cohort studies; the DIAHEART study - deep phenotyping of the heart with advanced imaging modalities in type 2 diabetes – implications for pathophysiology and prognosis (DIA-HEART), the 4th and the 5th round of the large general population study – The Copenhagen City Heart Study, and 1 large randomized controlled trial (PARAGON-HF).