Screening for Type 2 Diabetes is cost-effective. Evidence from a pilot screening study in Denmark

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Conflict of interests

Nothing to declare

Background & Aim

Increased screening of asymptomatic individuals

More people are screened at GP's: 40 - 65 pct. of adults aged 50-75 were tested each year in Denmark.

We estimate though that 100.000 people live with unknown T2D in Denmark.

Easy and cheaper screening methods have decreased the screening costs

HbA1c as a diagnostic criterion and novel methods to collect and store blood samples.

The quality of available national registers allowing for targeted screening.

Research question:

Is targeted screening for T2D using at-home self-samplingHbA1c tests reliable and cost-effective?

Step #1: Evaluating the reliability of HCCS for at-home self-sampling.

Step #2: Estimating the participation and detection rate using at-home self-sampling kits.

Step #3: Simulation of economic gains and treatment costs of early T2DM detection.

Step #1 Reliability of HCCS for at-home sampling

Hemoglobin Capillary Collection System (HCCS) is used to collect, prepare, and transport blood samples for HbA1c analysis.
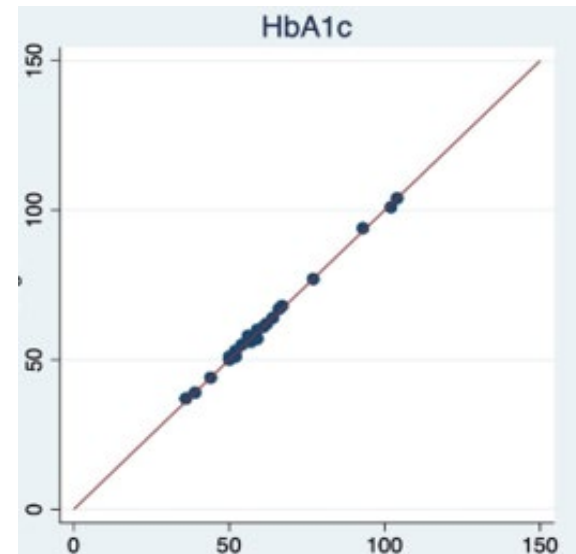
Study design: 21 individuals with known T2D tested using mailed HCCS and Standard capillary test

Results: HCCS performed like standard capillary test and was stable on storage and transport

HCCS vs standard test
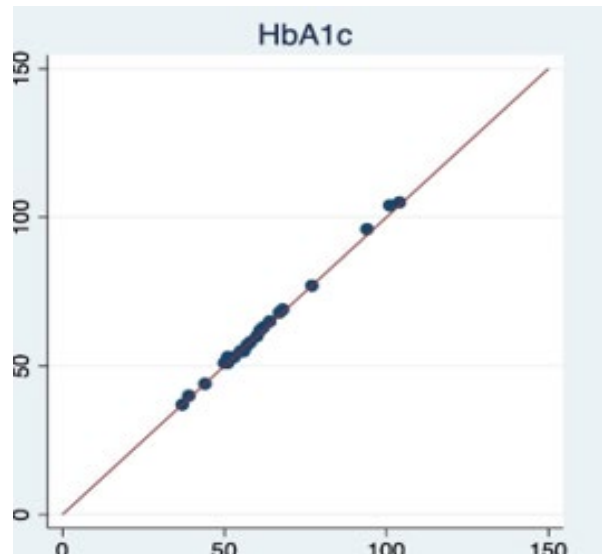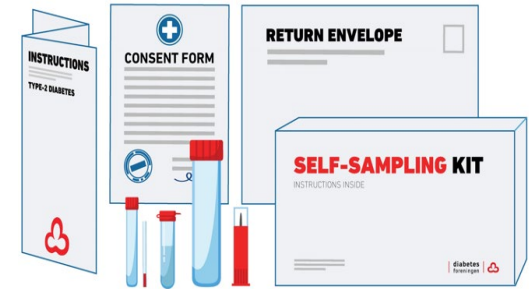

Same HCCS day 0 vs day 13

Step #2 At-Home self-sampling targeted screening

Study design

8,000 randomly selected individuals aged 50-75 years without a HbA1c-test the last 24 months, identified through Danish Adm. and Health registers.

HbA1c <48 mmol/mol → Digital result after 1-2 weeks on EHR

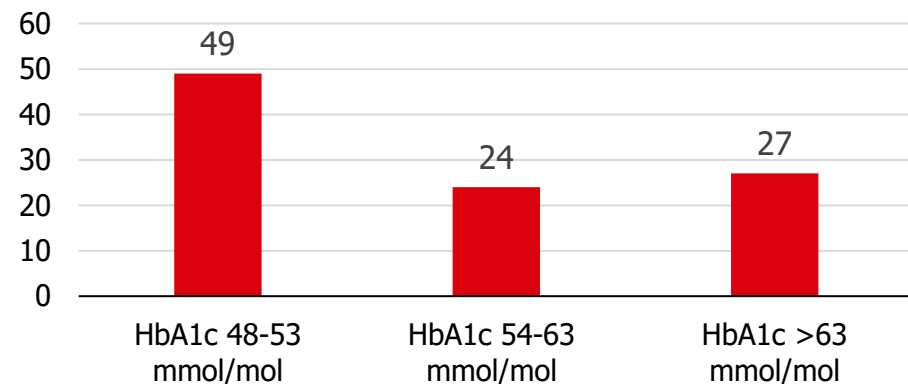HbA1c ≥48 mmol/mol → Phone call by a medical doctor & on EHR

Results

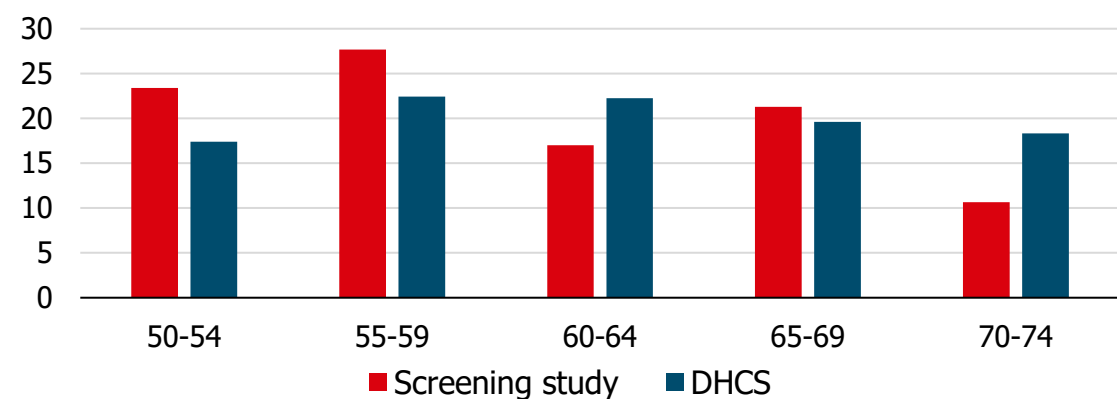**Participation rate:** 38%   **Detection rate:** HbA1c ≥48 mmol/mol: 1,7 %   HbA1c 42-47 mmol/mol: 11 %

Distribution of screen detected across HbA1c values

Age distribution among screen detected and detected through DHCS

■ Screening study   ■ DHCS

Step #3 Simulation of economic gains and treatment costs of early T2DM detection

Diabetes-related complications and their costs across HbA1c-levels (Lindvig et al. 2021)

The Swedish Institute for Health Economics' diabetes model to simulate complications.

Short-term health care cost of first micro- and macrovascular incident (Kjellberg et al. 2020).

Days absent from work due to T2D related complications (Sørensen & Ploug 2013).

Assumptions

Constant HbA1c levels in the absence of early detection.

Full treatment compliance from the time of diagnosis lowering HbA1c to 48 mmol/mol.

Constant progression factors such as syst. blood pressure, dyslipidemia, weight, and smoking.

Hence, the effect of early detection is solely attributed to the decrease in HbA1C levels.

Step #3 Simulation of economic gains and treatment costs of early T2DM detection

Gains and costs **pr. screen detected (€)**	1 year earlier diagnosis	3 year earlier diagnosis	5 year earlier diagnosis
Direct economic gains Lower T2D complications costs in the primary and secondary sector	263	**702**	1.098
Indirect economic gains Reduced sick leave	449	**1.219**	1.794
Direct and indirect costs pr. extra patient year G.P. chronic fee, costs to yearly tests, and self-paying for foot screening	-123,8	**-373**	-621
Total gains	588,2	**1.548**	2.271
Screening costs Costs related to screening	1.207	**1.207**	1.207
Net gains	-619	**341**	1.064
Return ratio on screening costs	0,49	**1,28**	1,88

Conclusions

Pecuniary effects and costs

Targeted screening for T2D using at-home self-sampling is reliable and cost-effective in DK among individuals between 50 and 75 years of age and without an HbA1cmeasurement the last 2 years

Non-pecuniary effects and costs

The potential increase in the quality of life for the patient and their relatives is not included.
Prior evidence suggest that non-pecuniary costs of screening are low or non-existing.

Harvesting effects

Due to risk for harvesting effects, a screening program should be carried out annually at five-year intervals - the years citizens are 50, 55, 60, 65, 70 and 75 years old. This may affect detection rates.

Acknowledgments

Thank you for your attention

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