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Study on the prevalence and determinants of glucose intolerance in a Dutch caucasian population: the Hoorn Study

Submission date
16/12/2016

Recruitment status
No longer recruiting

Registration date
03/04/2017

Overall study status
Ongoing

Last Edited
26/08/2026

Condition category
Nutritional, Metabolic, Endocrine

[ ] Prospectively registered
[ ] Protocol
[ ] Statistical analysis plan
[ ] Results
[ ] Individual participant data
[X] Record updated in last year

Plain English summary of protocol

Background and study aims
Type 2 diabetes is a chronic (long-term) disorder where blood glucose (sugar) levels are too high. The prevalence of type 2 diabetes is increasing worldwide, bringing a high risk of complications of the eyes, kidneys and foot, and cardiovascular (heart) diseases. Many risk factors for diabetes have been identified. However, many factors are involved in type 2 diabetes and questions remain on interactions between risk factors. The aim of this study is to assess the prevalence and risk factors of impaired glucose metabolism (a pre-diabetic state) and diabetes in the general population.

Who can participate?
Men and women aged 50–75 randomly selected from the municipal registry in the year 1989

What does the study involve?
The participants visit the centre six times over 25 years to provide blood and urine samples, to be tested for diabetes, to be measured, and to complete questionnaires. Participants are followed up using the municipality register to check for the occurrence of chronic diseases.

What are the possible benefits and risks of participating?
There is minimal risk of participating, except for some bruising from blood drawn.

Where is the study run from?
Diabetes Zorgsysteem locatie Hoorn (Netherlands)

When is the study starting and how long is it expected to run for?
January 1989 to January 2080

Who is funding the study?
1. VU University Medical Center of Amsterdam
2. Nederlandse Organisatie voor Wetenschappelijk Onderzoek
3. ZonMw

4. European Union
5. Novartis Pharma
6. Diabetes Fonds
7. Netherlands Heart Foundation

Who is the main contact?
1. Prof Dr Joline Beulens
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Study information

Scientific Title
Prospective observational study on the prevalence and determinants of glucose intolerance in a Dutch caucasian population: the Hoorn Study

Acronym

Hoorn study

Study objectives
The Hoorn study was initiated to study the prevalence and risk factors of impaired glucose metabolism and diabetes in an elderly Caucasian population. This initially cross-sectional study has been extended to a prospective cohort over the past decades, to study the risk factors for disturbances in glucose metabolism and complications associated with disturbances in glucose metabolism.

Ethics approval required
Ethics approval required

Ethics approval(s)
Approved 27/06/1989, Ethics Review Committee of the VU University Medical Center Amsterdam (-, -, -, Netherlands; no telephone number provided; no email provided), ref: 89/092

Primary study design
Observational

Study design
Prospective observational study with five follow-up visits during a 25-year period, and ongoing registry of morbidity and mortality

Study type(s)
Other

Health condition(s) or problem(s) studied
Impaired glucose metabolism and type 2 diabetes

Interventions
Between the years 1989 and 1992, a population-based survey of glucose tolerance was performed in the Dutch city of Hoorn in the West-Friesland region of the Netherlands. During this baseline measurement, information was obtained on, among others, glucose metabolism, diabetes-related risk factor levels and complaints, lifestyle, dietary intake, and demographic variables.

Physical re-examinations, repeating the measurements at baseline with additional extensive measurement to assess diabetes complications, were conducted in 1990-1991, 1996-1998, 2000-2001, 2005-2007, and 2007-2009.

All visits have corresponding measurements, including glucose metabolism determined by fasting plasma glucose, 75-g Oral Glucose Tolerance Test and HbA1c; anthropometrics; blood plasma lipid levels; albumin/creatinine ratio; blood pressure; family history of diabetes, self-reported medication use, disease history, diabetes-related complaints, lifestyle determinants and socio-economic status.

Finally, in addition to physical follow-up visits, all participants are still actively followed up for vital status by linkage with the municipality register and for occurrence of cardiovascular disease, cancer and cause-specific mortality, by checking their medical records.

In subsamples of the cohort, extensive physical diabetes complications have been measured, such as a retinopathy screening, autonomic function tests, peripheral neuropathy, ankle-arm pressure-ratio, echo-doppler scanning van de carotis and electrocardiography. In all visits additional measurements have been conducted, which vary from visit to visit.

Intervention Type
Other

Primary outcome(s)
Disturbances in glucose metabolism, measured by fasting plasma glucose, 75-g Oral Glucose Tolerance Test and HbA1c at baseline and at the two follow-up measurements in 2010-2011 and 2013-2015

Key secondary outcome(s)
1. Depressive symptoms, measured using CES-D questionnaire at baseline and 7 year follow up
2. Quality of life, measured using questionnaires at baseline and 7 year follow up
3. Cardiovascular complications of diabetes, measured by a check of the medical records of the participants every 3 years

Completion date
01/01/2080

Eligibility

Key inclusion criteria
1. Men and women
2. Aged 50–75 years
3. Randomly selected from the municipal registry

Participant type(s)
All

Healthy volunteers allowed
No

Age group
Senior

Sex
All

Total final enrolment
2484

Key exclusion criteria
Participants with a non-Caucasian background

Date of first enrolment
01/01/1989

Date of final enrolment
12/12/1992

Locations

Countries of recruitment
Netherlands

Study participating centre
Diabetes Zorgsysteem locatie Hoorn
Maelsonstraat 7
Hoorn
Netherlands
1624 NP

Sponsor information

Organisation
VU University Medical Center of Amsterdam

ROR
https://ror.org/00q6h8f30

Funder(s)

Funder type
Hospital/treatment centre

Funder Name
Amsterdam University Medical Centers

Alternative Name(s)
Amsterdam UMC, Amsterdam University Medical Centres, AUMC

Funding Body Type
Government organisation

Funding Body Subtype
Universities (academic only)

Location

Netherlands

Funder Name
Nederlandse Organisatie voor Wetenschappelijk Onderzoek

Alternative Name(s)
Netherlands Organisation for Scientific Research, Dutch National Scientific Foundation, Dutch National Science Foundation, Dutch Research Council (Nederlandse Organisatie voor Wetenschappelijk Onderzoek), NWO:Nederlandse Organisatie voor Wetenschappelijk Onderzoek, Nederlandse Organisatie voor Wetenschappelijk Onderzoek (NWO), Dutch Research Council, The Dutch Research Council (NWO), Dutch Research Council, Netherlands, NWO

Funding Body Type
Government organisation

Funding Body Subtype
National government

Location
Netherlands

Funder Name
ZonMw

Alternative Name(s)
Netherlands Organisation for Health Research and Development

Funding Body Type
Private sector organisation

Funding Body Subtype
Other non-profit organizations

Location
Netherlands

Funder Name
European Union

Funder Name
Novartis Pharma

Alternative Name(s)
Novartis Deutschland GmbH, Novartis Pharma GmbH, Novartis Deutschland

Funding Body Type
Private sector organisation

Funding Body Subtype
For-profit companies (industry)

Location
Germany

Funder Name
Diabetes Fonds

Alternative Name(s)
Dutch Diabetes Research Foundation

Funding Body Type
Private sector organisation

Funding Body Subtype
Trusts, charities, foundations (both public and private)

Location
Netherlands

Funder Name
Netherlands Heart Foundation

Results and Publications

Individual participant data (IPD) sharing plan
The datasets generated during and/or analysed during the current study are/will be available upon request from Prof Joline Beulens (J.beulens@amsterdamumc.nl)

IPD sharing plan summary
Available on request