# Project description for DST application

## Autoriseret institution / Authorised institution

Steno Diabetes Center Aarhus (inst. nr. 574)  
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## Projekttitel / Project title

Transgenerational and life-course factors that influence risk for type 2 diabetes

## Projektbeskrivelse / Project description

The overall aim of this project is to identify the contributions of family network and life course factors on the development, management, and care of type 2 diabetes and its complications.

Type 2 diabetes is a complex, multi-factorial disease that is influenced throughout the life-course from individual as well as social factors. Behavioural risk factors and socioeconomic conditions cluster in families and their influence depends on the timing and accumulation of exposures. For instance, poor childhood socioeconomic status (SES) can impact final educational attainment, adult SES, and lifestyle and behavioural characteristics, which ultimately influences an individual’s metabolic capacity to regulate glucose and subsequent risk for diabetes.

This project will contribute to a broader and deeper understanding of the role that these factors play with the development and progression of diabetes. Using the findings from this project we hope to model several potential public health strategies that could impact the prevention and management of diabetes and diseases following diabetes.

A key feature to this project is the integration of external data sources, such as longitudinal cohort studies, with the register data. We aim to apply causal and predictive statistical methods to best use the data available from the integrated data sources.

## Population / Population

In order to identify familial relations through individuals’ life course trajectory, the population requested covers all individuals, alive or deceased, who live or lived in Denmark from 1 January 1970 to 31 December 2020 (~8.5 million people). Key requirements are:

* Data on parents of those born starting from 1970 as well as data throughout their early life and childhood.
* Minimum two and up to four-generation pedigree in which index individuals have linkage to their parents, siblings, half-siblings, and spouses. Index individuals are defined as those individuals that serve as a reference to identify family relations and which will be followed with regards to the outcome.

## Variabelindhold / Variables included

All variables can be de-identified (direct identification is not needed). List of requested variables is found in the tables at the end of the document.

Registers requested are:

* AKM: Arbejdsklassifikationsmodulet / The work classification module
* BEF: Befolkningen / The population
* BYSTRB: Bystørrelser bopæle / City sizes residences
* DOD: Døde i Danmark / Died in Denmark
* DODSAASG: Dødsårsagsregister / Cause of death register
* FAHU: Husstande / Households
* FAIK: Familieindkomster / Family income
* FAIN: Husstande og familier / Households and families
* FAM: TO UPDATE / TO UPDATE
* FTBARN: Fertilitet - børn / Fertility - children
* FTDB: Fertilitetsdatabasen børn / Fertility database children
* FTDK: Fertilitetsdatabasen paritetsfil kvinder / Fertility database parity file women
* FTDM: Fertilitetsdatabasen paritetsfil mænd / Fertility database parity file men
* FTFORAEL: Fertilitet - forælder / Fertility - parent
* FTNAEVN: Fertilitet - Nævner / Fertility - Mentions
* HUST: TO UPDATE / TO UPDATE
* IDA: TO UPDATE / TO UPDATE
* IEPE: Indvandrere og Efterkommere / Immigrants and Descendants
* IND: Indkomst / Income
* INDH: TO UPDATE / TO UPDATE
* INDK: TO UPDATE / TO UPDATE
* LABKA: TO UPDATE / TO UPDATE
* LMDB: Lægemiddeldatabasen / The drug database
* LPR\_ADM: Landspatientregistret - administrative oplysninger / National Patient Register - administrative information
* LPR\_BES: Landspatientregistret - ambulante besøgsdatoer / National Patient Register - outpatient visit dates
* LPR\_DIAG: Landspatientregistret - diagnoser / National Patient Register - diagnoses
* LPR\_OPR: Landspatientregistret - operationer efter ICD8 klassifikationen / National Patient Register - operations according to the ICD8 classification
* LPR\_PSYK: TO UPDATE / TO UPDATE
* LPR\_SKSOPR: Landspatientregistret - operationer / National Patient Register - operations
* LPR\_SKSUBE: Landspatientregistret - undersøgelser og behandlinger / National Patient Register - examinations and treatments
* LPRMFRDF: Dødfødte ud fra LPR / Stillbirths from LPR
* LPRMFRLF: Levendefødte ud fra LPR / Live births from LPR
* MFR: Levendefødte fra det medicinske fødselsregister / Live births from the Medical Birth Register
* PRIV\_ADM: Landspatientregistret private sygehuse - administrative oplysninger / National Patient Register private hospitals - administrative information
* PRIV\_DIAG: Landspatientregistret private sygehuse - diagnoser / National Patient Register of private hospitals - diagnoses
* PRIV\_SKSOPR: Landspatientregistret private sygehuse - operationer / National Patient Register of Private Hospitals - Operations
* PRIV\_SKSUBE: Landspatientregistret private sygehuse - undersøgelser og behandlinger / National Patient Register private hospitals - examinations and treatments
* PUOB: TO UPDATE / TO UPDATE
* RAS: Registerbaserede arbejdsstyrkestatistik / Register-based labor force statistics
* SER: Sessionsregister / Conscription Registry
* SHSS: Sammenhængende socialstatistik / Coherent social statistics
* SSNV: Sammenhængende socialstatistik nettovarigheder / Coherent social statistics net durations
* SSSY: Sygesikring (6-cifret) / Health insurance (6-digit)
* SYSI: Sygesikring (sikringsgruppe) / Health insurance group)
* SYST: Sygesikring (4-cifret) / Health insurance (4-digit)
* UAF\_ADM: Landspatientregistret uafsluttede kontakter - administrative oplysninger / National Patient Register unfinished contacts - administrative information
* UAF\_BES: Landspatientregistret uafsluttede kontakter - ambulante besøgsdatoer / National Patient Register unfinished contacts - outpatient visit dates
* UAF\_DIAG: Landspatientregistret uafsluttede kontakter - diagnoser / National Patient Register unfinished contacts - diagnoses
* UAF\_OPR: Landspatientregistret uafsluttede kontakter - operationer efter ICD8 klassifikationen / National Patient Register unfinished contacts - operations according to the ICD8 classification
* UAF\_SKSOPR: Landspatientregistret uafsluttede kontakter - operationer / National Patient Register unfinished contacts - operations
* UDDA: Uddannelser (BUE) / Education (BUE)
* VNDS: Historiske vandringer / Historical walks

## Data som ikke kommer fra Danmarks Statistik / Data that doesn’t come from DST

List cohorts:

* Diet, Cancer, and Health study. Next Generation Study
* ADDITION, ADDITION-PRO cohort studies
  + Some ideas: Family characteristics and diabetes control.
* Inter99
* CORE Trial (Check your health study. This is a household intervention)
* The Danish National Health survey (2010, 2013 and 2017)
  + See: <https://www.danishhealthdata.com/find-health-data/Danskernes-sundhed> Data administrator: National Institute of Public Health, SDU, application here: <http://www.danskernessundhed.dk/Spoergeskema>

Fra Sundhedsdatastyrelsen vil vi desuden søge om adgang til følgende register for data om diabetes samt relaterede sygdomme og risikofaktorer:

* Kroniske sygdomsdiagnoser:
* Det Nationale Diabetesregister? (RMPS, DADD, Diabase)
* Landspatientregistret
* Cancerregisteret
* IVF-registeret
* The laboratory data set/ Danish National Biobank?
* Dødsårsag: Dødsårsagsregisteret (DOD, DODSAARS, DODSAASG)
* Medicinering kronisk sygdom:
* Lægemiddelstatistikdatabasen
* Exposures and risk factors: Overvægt?
* Sessionsregisteret?
* drug addicts in treatment and alcohol treatment registers
* birth register
* children data base
* The laboratory data set

## Projekts slutdato / Project’s end date

Date of deletion of data: Access to data is requested until December 2030.

## Autoriserede forskere / Authorised scientists

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
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# List of registers and variables, with explanations

Requested variables from Arbejdsklassifikationsmodulet (AKM)

|  |  |
| --- | --- |
| Variables | Years |
| ALDER\_ULT\_INK | 1991–2018 |
| BESKST | 1976–2001 |
| BESKST02 | 2002–2013 |
| BESKST13 | 1991–2018 |
| BRCHL | 1976–1999 |
| DISCO08\_ALLE\_INDK | 2010–2013 |
| DISCO08\_ALLE\_INDK\_13 | 2010–2018 |
| DISCO08\_SEL\_INDK | 2010–2018 |
| DISCOALLE\_INDK | 1993–2009 |
| DISCOLOEN\_INDK | 1991–2009 |
| DISCOSEL\_INDK | 1991–2009 |
| DISCOTYP | 1991–2018 |
| DISCO\_ALLE\_INDK\_13 | 1991–2009 |
| FUNK\_TIMEANT | 2008–2018 |
| NACEA | 1992–2007 |
| NACEA\_DB07 | 2007–2018 |
| NACEI | 1993–2007 |
| NACEI\_DB07 | 2007–2018 |
| NACE\_13 | 1993–2007 |
| NACE\_DB07 | 2007–2013 |
| NACE\_DB07\_13 | 2007–2018 |
| NYSTGR | 1980–1999 |
| PNR | 1976–2018 |
| SOCIO | 1994–2001 |
| SOCIO02 | 2002–2013 |
| SOCIO13 | 1991–2018 |
| SOCIO\_GL | 1976–1990 |
| TYP | 1980–1999 |

Requested variables from Befolkningen (BEF)

|  |  |
| --- | --- |
| Variables | Years |
| AEGTE\_ID | 1985–2020 |
| ALDER | 1985–2020 |
| ANTBOERNF | 1985–2020 |
| ANTBOERNH | 1985–2020 |
| ANTEFAM | 1985–2020 |
| ANTPERSF | 1985–2020 |
| ANTPERSH | 1985–2020 |
| BOP\_VFRA | 1985–2020 |
| CIVST | 1985–2020 |
| CIV\_VFRA | 1985–2020 |
| E\_FAELLE\_ID | 1985–2020 |
| FAMILIE\_ID | 1985–2020 |
| FAMILIE\_TYPE | 1985–2020 |
| FAM\_KOEN | 1985–2020 |
| FAR\_ID | 1985–2020 |
| FM\_MARK | 1985–2020 |
| FOEDREG\_KODE | 1985–2020 |
| FOED\_DAG | 1985–2020 |
| FOERSTE\_INDVANDRING | 2004–2020 |
| HUSTYPE | 1985–2020 |
| IE\_TYPE | 1985–2020 |
| KOEN | 1985–2020 |
| KOM | 1985–2020 |
| MOR\_ID | 1985–2020 |
| OPHOLDMD\_DK | 1985–2020 |
| OPR\_LAND | 1985–2020 |
| PLADS | 1985–2020 |
| PNR | 1985–2020 |
| REFERENCETID | 1985–2020 |
| REG | 1985–2020 |
| SENESTE\_INDVANDRING | 2004–2020 |
| STATSB | 1985–2020 |
| VAN\_VTIL | 1985–2003 |

Requested variables from Bystørrelser bopæle (BYSTRB)

|  |  |
| --- | --- |
| Variables | Years |
| DSTKODE | 2006–2020 |
| DSTNAVN | 2006–2020 |
| FOLKETAL | 2006–2020 |
| HUSSTANDE | 2007–2020 |
| KOM | 2006–2020 |
| OPGIKOM | 2006–2020 |
| STORHED | 2006–2020 |
| OPGIKOM | 2006–2020 |

Requested variables from Døde i Danmark (DOD)

|  |  |
| --- | --- |
| Variables | Years |
| ALDER\_HAEND | 2019–2019 |
| DODDATO | 2019–2019 |
| PNR | 2019–2019 |

Requested variables from Dødfødte ud fra LPR (LPRMFRDF)

|  |  |
| --- | --- |
| Variables | Years |
| B\_AMBULANT | 1996–1996 |
| B\_FLERFOLD | 1996–1996 |
| B\_NORMAL | 1996–1996 |
| B\_PARTUS | 1996–1996 |
| B\_RISIKO | 1996–1996 |
| B\_RYGER | 1996–1996 |
| B\_SAMADR | 1996–1996 |
| B\_SECTIOF | 1996–1996 |
| C\_CIVSTD | 1996–1996 |
| C\_PLAC | 1996–1996 |
| D\_FODDTO | 1996–1996 |
| V\_ANTAL | 1996–1996 |
| V\_FALDER | 1996–1996 |
| V\_FCPR | 1996–1996 |
| V\_GRAV | 1996–1996 |
| V\_MALDER | 1996–1996 |
| V\_MCPR | 1996–1996 |
| V\_PABORT | 1996–1996 |
| V\_SABORT | 1996–1996 |
| V\_TIDLDOD | 1996–1996 |
| V\_TIDLLEV | 1996–1996 |

Requested variables from Dødsårsagsregister (DODSAASG)

|  |  |
| --- | --- |
| Variables | Years |
| C\_BOPKOM | 2018–2018 |
| C\_DODSMAADE | 2018–2018 |
| C\_DODSSTED | 2018–2018 |
| C\_DOD\_1A | 2018–2018 |
| C\_DOD\_1B | 2018–2018 |
| C\_DOD\_1C | 2018–2018 |
| C\_DOD\_1D | 2018–2018 |
| C\_DOD\_21 | 2018–2018 |
| C\_DOD\_22 | 2018–2018 |
| C\_DOD\_23 | 2018–2018 |
| C\_DOD\_24 | 2018–2018 |
| C\_DOD\_25 | 2018–2018 |
| C\_DOD\_26 | 2018–2018 |
| C\_DOD\_27 | 2018–2018 |
| C\_DOD\_28 | 2018–2018 |
| C\_LISTE14 | 2018–2018 |
| C\_LISTE49 | 2018–2018 |
| C\_LISTEA | 2018–2018 |
| C\_LISTEB | 2018–2018 |
| D\_DODSDATO | 2018–2018 |
| PNR | 2018–2018 |

Requested variables from Familieindkomster (FAIK)

|  |  |
| --- | --- |
| Variables | Years |
| FAMAEKVIVADISP | 1990–2009 |
| FAMAEKVIVADISP\_13 | 1987–2018 |
| FAMAEKVIVAINDKNETTO | 1990–2009 |
| FAMBOLIGFORM | 2000–2018 |
| FAMBOLIGTYPE | 2000–2018 |
| FAMBRUTTOINDK | 1990–2009 |
| FAMDISPONIBEL | 1990–2009 |
| FAMDISPONIBEL\_13 | 1987–2018 |
| FAMHOEJSTUDDA | 2000–2018 |
| FAMILIE\_ID | 1987–2018 |
| FAMINDKOMSTIALT | 1990–2009 |
| FAMINDKOMSTIALT\_13 | 1987–2018 |
| FAMLOENMV | 1990–2009 |
| FAMLOENMV\_13 | 1987–2018 |
| FAMSAMLETINDK | 1990–2009 |
| FAMSKATFRIYD | 1990–2009 |
| FAMSOCIOGRUP | 1994–2009 |
| FAMSOCIOGRUP\_13 | 1993–2018 |
| FAMTYPE | 1987–2018 |

Requested variables from Husstande (FAHU)

|  |  |
| --- | --- |
| Variables | Years |
| ANTBRNH | 1980–2007 |
| ANTCFAM | 1980–2007 |
| ANTPERH | 1980–2007 |
| ANTVOKSH | 1980–2007 |
| BOPIKOM | 1980–2007 |
| D\_ANT\_FAM | 1980–2007 |
| FHART | 2003–2006 |
| HUSTYPE | 1980–2007 |
| KOM | 1980–2007 |

Requested variables from Husstande og familier (FAIN)

|  |  |
| --- | --- |
| Variables | Years |
| ADRDATO | 1980–2007 |
| AEGTEFAELLE\_ID | 1980–2007 |
| ALDER | 1980–2007 |
| A\_FAMILIE\_ID | 1980–2007 |
| A\_STATUS | 1980–2007 |
| A\_TYPE | 1980–2007 |
| BOPIKOM | 1980–2007 |
| CIVDATO | 1980–2007 |
| CIVST | 1980–2007 |
| C\_FAELLE\_ID | 1980–2007 |
| C\_FAMILIE\_ID | 1980–2007 |
| C\_STATUS | 1980–2007 |
| C\_TYPE | 1980–2007 |
| D\_ANT\_FAM | 1980–2007 |
| D\_FAMILIE\_ID | 1980–2007 |
| D\_TYPE | 1980–2007 |
| FAR\_ID | 1980–2007 |
| FHART | 1980–2007 |
| FMMARK | 1980–2007 |
| FODREG | 1980–2007 |
| H\_TYPE | 1980–2007 |
| INDVDATO | 1980–2007 |
| KOEN | 1980–2007 |
| KOM | 1980–2007 |
| MOR\_ID | 1980–2007 |
| PNR | 1980–2007 |
| STATSB | 1980–2007 |

Requested variables from Indkomst (IND)

|  |  |
| --- | --- |
| Variables | Years |
| AEKVIVADISP\_13 | 1987–2018 |
| BESKST | 1980–2001 |
| BESKST02 | 2002–2013 |
| DISPON\_13 | 1980–2018 |
| LOENMV | 1980–2013 |
| LOENMV\_13 | 1980–2018 |
| PERINDKP | 1987–2018 |
| PERSONINDK | 1980–2018 |
| PNR | 1980–2018 |
| PRE\_SOCIO | 1980–2018 |

Requested variables from Indvandrere og Efterkommere (IEPE)

|  |  |
| --- | --- |
| Variables | Years |
| GENERATION | 2019–2019 |
| IE\_TYPE | 2019–2019 |
| OPR\_LAND | 2019–2019 |
| OPR\_LAND | 2019–2019 |
| OPR\_LAND | 2019–2019 |
| OPR\_LAND | 2019–2019 |

Requested variables from Lægemiddeldatabasen (LMDB)

|  |  |
| --- | --- |
| Variables | Years |
| ALDR | 1995–2019 |
| ATC | 1995–2019 |
| EKSD | 1995–2019 |
| PNR12 | 1995–2019 |
| VNR | 1995–2019 |

Requested variables from Landspatientregistret - administrative oplysninger (LPR\_ADM)

|  |  |
| --- | --- |
| Variables | Years |
| C\_ADIAG | 1977–2018 |
| C\_SEX | 1977–2018 |
| D\_INDDTO | 1977–2018 |
| PNR | 1977–2018 |
| RECNUM | 1977–2018 |

Requested variables from Landspatientregistret - ambulante besøgsdatoer (LPR\_BES)

|  |  |
| --- | --- |
| Variables | Years |
| D\_AMBDTO | 1994–2018 |
| RECNUM | 1994–2018 |

Requested variables from Landspatientregistret - diagnoser (LPR\_DIAG)

|  |  |
| --- | --- |
| Variables | Years |
| C\_DIAG | 1977–2018 |
| C\_DIAGMOD | 1977–1994 |
| C\_DIAGTYPE | 1977–2018 |
| C\_TILDIAG | 1995–2018 |
| RECNUM | 1977–2018 |

Requested variables from Landspatientregistret - operationer efter ICD8 klassifikationen (LPR\_OPR)

|  |  |
| --- | --- |
| Variables | Years |
| C\_OPR | 1977–2017 |
| RECNUM | 1977–2017 |

Requested variables from Landspatientregistret - undersøgelser og behandlinger (LPR\_SKSUBE)

|  |  |
| --- | --- |
| Variables | Years |
| D\_ODTO | 1999–2018 |
| RECNUM | 1999–2018 |

Requested variables from Levendefødte ud fra LPR (LPRMFRLF)

|  |  |
| --- | --- |
| Variables | Years |
| B\_AMBULANT | 1996–1996 |
| B\_FLERFOLD | 1996–1996 |

Requested variables from Sygesikring (6-cifret) (SSSY)

|  |  |
| --- | --- |
| Variables | Years |
| AFRPER | 2005–2019 |
| BARNMAK | 2005–2019 |
| BRUHON | 2005–2019 |
| HONUGE | 2005–2019 |
| KOENIMP | 2005–2019 |
| KONTAKT | 2005–2019 |
| PATGRP | 2005–2019 |
| PNR | 2005–2019 |
| SIKGRUP | 2005–2019 |
| SPECIALE | 2005–2019 |
| YDERNR | 2005–2019 |
| YDERSAMT | 2005–2019 |
| YDLANT | 2005–2019 |
| YDLTID | 2005–2019 |
| YDTYP | 2005–2019 |

Requested variables from Sygesikring (6-cifret) (SYSI)

|  |  |
| --- | --- |
| Variables | Years |
| AFRPER | 1990–2005 |
| BARNMAK | 1990–2005 |
| BRUHON | 1990–2005 |
| HONUGE | 1990–2005 |
| PATTYP | 1990–2005 |
| PNR | 1990–2005 |
| PRAKTYP | 1990–2005 |
| SIKGRUP | 1990–2005 |
| SIKREKOM | 1990–2005 |
| SPECIALE | 1990–2005 |
| YDERNR | 1990–2005 |
| YDERSAMT | 1990–2005 |
| YDLANT | 1990–2005 |
| YDLTID | 1990–2005 |
| YDTYP | 1990–2005 |

Requested variables from Uddannelser (BUE) (UDDA)

|  |  |
| --- | --- |
| Variables | Years |
| HFAUDD | 1980–2019 |
| PNR | 1980–2019 |
| UDD | 1980–2019 |