

SUPPLEMENTARY DATA

Online Appendix

DIAGRAM Consortium Author list

Andrew P Morris^{1,135}, Ben F Voight^{2,3,135}, Tanya M Teslovich^{4,135}, Teresa Ferreira^{1,135}, Ayellet V Segrè^{2,5,6,135}, Valgerdur Steinthorsdottir⁷, Rona J Strawbridge^{8,9}, Hassan Khan¹⁰, Harald Grallert¹¹, Anubha Mahajan¹, Inga Prokopenko^{1,12}, Hyun Min Kang⁴, Christian Dina^{13,14,15}, Tonu Esko^{16,17}, Ross M Fraser¹⁸, Stavroula Kanoni¹⁹, Ashish Kumar¹, Vasiliki Lagou¹, Claudia Langenberg²⁰, Jian'an Luan²⁰, Cecilia M Lindgren¹, Martina Müller-Nurasyid^{21,22,23}, Sonali Pechlivanis²⁴, N William Rayner^{1,12}, Laura J Scott⁴, Steven Wiltshire¹, Loic Yengo^{25,26}, Leena Kinnunen²⁷, Elizabeth J Rossin^{2,5,28,29}, Soumya Raychaudhuri^{2,30,31}, Andrew D Johnson³², Antigone S Dimas^{1,33,34}, Ruth JF Loos^{20,35-37}, Sailaja Vedantam^{38,39}, Han Chen⁴⁰, Jose C Florez^{5,6,38,41}, Caroline Fox^{32,42}, Ching-Ti Liu⁴⁰, Denis Rybin⁴³, David J Couper⁴⁴, Wen Hong L Kao⁴⁵, Man Li⁴⁵, Marilyn C Cornelis⁴⁶, Peter Kraft^{46,47}, Qi Sun^{46,48}, Rob M van Dam^{46,49}, Heather M Stringham⁴, Peter S Chines⁵⁰, Krista Fischer¹⁶, Pierre Fontanillas², Oddgeir L Holmen⁵¹, Sarah E Hunt¹⁹, Anne U Jackson⁴, Augustine Kong⁷, Robert Lawrence⁵², Julia Meyer²², John RB Perry^{1,53}, Carl GP Platou^{51,54}, Simon Potter¹⁹, Emil Rehnberg⁵⁵, Neil Robertson^{1,12}, Suthesh Sivapalaratnam⁵⁶, Alena Stancakova⁵⁷, Kathleen Stirrups¹⁹, Gudmar Thorleifsson⁷, Emmi Tikkanen^{58,59}, Andrew R Wood⁵³, Peter Almgren⁶⁰, Mustafa Atalay⁶¹, Rafn Benediktsson^{62,63}, Lori L Bonnycastle⁵⁰, Noël Burtt², Jason Carey², Guillaume Charpentier⁶⁴, Andrew T Crenshaw², Alex SF Doney^{65,66}, Mozghan Dorkhan⁶⁰, Sarah Edkins¹⁹, Valur Emilsson⁶⁷, Elodie Eury²⁵, Tom Forsen^{68,69}, Karl Gertow^{8,9}, Bruna Gigante⁷⁰, George B Grant², Christopher J Groves¹², Candace Guiducci², Christian Herder⁷¹, Astradur B Hreidarsson⁶³, Jennie Hui^{72,73,74,75}, Alan James^{72,76,77}, Anna Jonsson⁶⁰, Wolfgang Rathmann⁷⁸, Norman Klopp¹¹, Jasmina Kravic⁶⁰, Kaarel Krjutškov¹⁶, Cordelia Langford¹⁹, Karin Leander⁷⁰, Eero Lindholm⁶⁰, Stéphane Lobbens²⁵, Satu Männistö⁵⁹, Ghazala Mirza¹, Thomas W Mühleisen^{79,80}, Bill Musk^{72,75,77,81}, Melissa Parkin², Loukianos Rallidis⁸², Jouko Saramies⁸³, Bengt Sennblad^{8,9}, Sonia Shah⁸⁴, Gunnar Sigurðsson^{63,67}, Angela Silveira^{8,9}, Gerald Steinbach⁸⁵, Barbara Thorand⁸⁶, Joseph Trakalo¹, Fabrizio Veglia⁸⁷, Roman Wennauer⁸⁵, Wendy Winckler², Delilah Zabaneh⁸⁸, Harry Campbell^{18,89}, Cornelia van Duijn^{90,91}, Andre G Uitterlinden^{90,91,92}, Albert Hofman⁹⁰, Eric Sijbrands⁹², Goncalo R Abecasis⁴, Katharine R Owen^{12,93}, Eleftheria Zeggini¹⁹, Mieke D Trip⁵⁶, Nita G Forouhi²⁰, Ann-Christine Syvänen⁹⁴, Johan G Eriksson^{59,68,95,96}, Leena Peltonen^{2,19,58,59,139}, Markus M Nöthen^{79,80}, Beverley Balkau^{97,98}, Colin NA Palmer^{65,66}, Valeriya Lyssenko⁶⁰, Tiinamaija Tuomi^{96,99}, Bo Isomaa^{96,100}, David J Hunter^{46,47,48}, Lu Qi^{46,48}, The Wellcome Trust Case Control Consortium¹⁴⁰, Alan R Shuldiner^{101,102}, Michael Roden^{71,103}, Ines Barroso^{19,104,105}, Tom Wilsgaard¹⁰⁶, John Beilby^{72,73,74}, Kees Hovingh⁵⁶, Jackie F Price¹⁸, James F Wilson^{18,89}, Rainer Rauramaa^{107,108}, Timo A Lakka^{61,107}, Lars Lind¹⁰⁹, George Dedoussis¹¹⁰, Inger Njølstad¹⁰⁶, Nancy L Pedersen⁵⁵, Kay-Tee Khaw¹⁰, Nicholas J Wareham²⁰, Sirkka M Keinänen-Kiukaanniemi^{111,112}, Timo E Saaristo^{113,114}, Eeva Korpi-Hyövälti¹¹⁵, Juha Saltevo¹¹⁶, Markku Laakso⁵⁷, Johanna Kuusisto⁵⁷, Andres Metspalu^{16,17}, Francis S Collins⁵⁰, Karen L Mohlke¹¹⁷, Richard N Bergman¹¹⁸, Jaakko Tuomilehto^{27,115,119,120}, Bernhard O Boehm¹²¹, Christian Gieger²², Kristian Hveem⁵¹, Stephane Cauchi²⁵, Philippe Froguel^{25,122}, Damiano Baldassarre^{87,123}, Elena Tremoli^{87,123}, Steve E Humphries⁸⁴, Danish Saleheen^{10,124}, John Danesh¹⁰, Erik Ingelsson⁵⁵, Samuli Ripatti^{19,58,59}, Veikko Salomaa⁵⁹, Raimund Erbel¹²⁵, Karl-Heinz Jöckel²⁴, Susanne Moebus²⁴, Annette Peters⁸⁶, Thomas Illig^{11,126}, Ulf de Faire⁷⁰, Anders Hamsten^{8,9}, Andrew D Morris^{65,66}, Peter J Donnelly^{1,127}, Timothy M Frayling⁵³, Andrew T Hattersley¹²⁸, Eric Boerwinkle^{129,130}, Olle Melander⁶⁰, Sekar Kathiresan^{2,5,131}, Peter M Nilsson⁶⁰, Panos Deloukas¹⁹, Unnur Thorsteinsdottir^{7,62}, Leif C Groop⁶⁰, Kari Stefansson^{7,62}, Frank Hu^{46,48}, James S Pankow¹³², Josée Dupuis^{32,40}, James B Meigs^{6,133}, David Altshuler^{2,5,6,134,135,136}, Michael Boehnke⁴, Mark I McCarthy^{1,12,93}.

DIAGRAM Consortium Affiliations

- 1 Wellcome Trust Centre for Human Genetics, University of Oxford, Oxford, OX3 7BN, UK
- 2 Broad Institute of Harvard and Massachusetts Institute of Technology (MIT), Cambridge, MA 02142, USA
- 3 University of Pennsylvania - Perelman School of Medicine, Department of Pharmacology, Philadelphia PA 19104, USA
- 4 Department of Biostatistics, University of Michigan, Ann Arbor, Michigan 48109-2029, USA
- 5 Center for Human Genetic Research, Massachusetts General Hospital, 185 Cambridge Street, Boston, MA 02114, USA
- 6 Department of Medicine, Harvard Medical School, Boston, MA 02115, USA
- 7 deCODE Genetics, 101 Reykjavik, Iceland
- 8 Atherosclerosis Research Unit, Department of Medicine Solna, Karolinska Institutet, Stockholm, Sweden
- 9 Center for Molecular Medicine, Karolinska University Hospital Solna, Stockholm, Sweden
- 10 Department of Public Health and Primary Care, University of Cambridge, Cambridge, CB1 8RN, UK
- 11 Research Unit of Molecular Epidemiology, Helmholtz Zentrum Muenchen, 85764 Neuherberg, Germany
- 12 Oxford Centre for Diabetes, Endocrinology and Metabolism, University of Oxford, OX3 7LJ, UK
- 13 Inserm UMR 1087, 44007 Nantes, France
- 14 CNRS UMR 6291, 44007 Nantes, France
- 15 Nantes University, 44007 Nantes, France
- 16 Estonian Genome Center, University of Tartu, Tartu, Estonia
- 17 Institute of Molecular and Cell Biology, University of Tartu, Tartu, Estonia
- 18 Centre for Population Health Sciences, University of Edinburgh, Teviot Place, Edinburgh, EH8 9AG, UK
- 19 Wellcome Trust Sanger Institute, Hinxton, Cambridge CB10 1SA, UK
- 20 MRC Epidemiology Unit, Institute of Metabolic Science, Addenbrooke's Hospital, Cambridge CB2 0QQ, UK
- 21 Institute of Medical Informatics, Biometry and Epidemiology, Ludwig-Maximilians-Universität, 81377 Munich, Germany
- 22 Institute of Genetic Epidemiology, Helmholtz Zentrum Muenchen, 85764 Neuherberg, Germany
- 23 Department of Medicine I, University Hospital Grosshadern, Ludwig-Maximilians-University, Munich, Germany
- 24 Institute for Medical Informatics, Biometry and Epidemiology, University Hospital of Essen, University Duisburg-Essen, 45122 Essen, Germany
- 25 CNRS-UMR-8199, Institute of Biology and Lille 2 University, Pasteur Institute, F-59019 Lille, France
- 26 University Lille 1, Laboratory of Mathematics, CNRS-UMR 8524, MODAL team, INRIA Lille Nord-Europe
- 27 Diabetes Prevention Unit, National Institute for Health and Welfare, 00271 Helsinki, Finland
- 28 Health Science and Technology MD Program, Harvard University and Massachusetts Institute of Technology, Boston, Massachusetts, USA
- 29 Harvard Biological and Biomedical Sciences Program, Harvard University, Boston, Massachusetts, USA

SUPPLEMENTARY DATA

30 Division of Rheumatology, Immunology and Allergy, Brigham and Women's Hospital, Harvard Medical School, Boston, MA 02115, USA
31 Partners Center for Personalized Genomic Medicine, Boston, MA 02115, USA
32 National Heart, Lung, and Blood Institute's Framingham Heart Study, Framingham, MA 01702, USA
33 Department of Genetic Medicine and Development, University of Geneva Medical School, Geneva 1211, Switzerland
34 Biomedical Sciences Research Center Al. Fleming, 16672 Vari, Greece
35 Charles R. Bronfman Institute for Personalized Medicine, Mount Sinai School of Medicine, New York, NY, USA
36 Child health and Development Institute, Mount Sinai School of Medicine, New York, NY 10029.
37 Department of Preventive Medicine, Mount Sinai School of Medicine, New York, NY 10029.
38 Program in Medical and Population Genetics, Broad Institute, Cambridge, Massachusetts, USA
39 Division of Genetics and Endocrinology, Children's Hospital, Boston, MA 02115, USA
40 Department of Biostatistics, Boston University School of Public Health, Boston, MA 02118, USA
41 Diabetes Research Center, Diabetes Unit, Massachusetts General Hospital, Boston, Massachusetts, USA
42 Division of Endocrinology and Metabolism, Brigham and Women's Hospital and Harvard Medical School, Boston, Massachusetts, USA
43 Boston University Data Coordinating Center, Boston, Massachusetts, USA
44 Collaborative Studies Coordinating Center, Department of Biostatistics, University of North Carolina at Chapel Hill, Chapel Hill, NC 27599, USA
45 Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD 21287, USA
46 Department of Nutrition and Epidemiology, Harvard School of Public Health, 665 Huntington Ave, Boston, MA 02115, USA
47 Program in Molecular and Genetic Epidemiology, Harvard School of Public Health, 665 Huntington Ave, Boston, MA 02115, USA
48 Channing Laboratory, Dept. of Medicine, Brigham and Women's Hospital and Harvard Medical School, 181 Longwood Ave, Boston, MA 02115, USA
49 Saw Swee Hock School of Public Health, National University of Singapore, 21 Lower Kent Ridge Road, Singapore 119077
50 National Human Genome Research Institute, National Institutes of Health, Bethesda, MD 20892, USA
51 HUNT Research Centre, Department of Public Health and General Practice, Norwegian University of Science and Technology, Levanger, Norway
52 Centre for Genetic Epidemiology and Biostatistics, The University of Western Australia, Nedlands, WA 6009, Australia
53 Genetics of Complex Traits, Institute of Biomedical and Clinical Science, Peninsula Medical School, University of Exeter, Magdalen Road, Exeter EX1 2LU, UK
54 Department of Internal Medicine, Levanger Hospital, Nord-Trøndelag Health Trust, B-7600 Levanger, Norway
55 Dept of Medical Epidemiology and Biostatistics, Karolinska Institutet, Box 281, SE-171 77 Stockholm, Sweden
56 Department of Vascular Medicine, Academic Medical Center, University of Amsterdam, PO-BOX 22660, 1100DD, Amsterdam, the Netherlands
57 Department of Medicine, University of Eastern Finland and Kuopio University Hospital, 70210 Kuopio, Finland
58 Institute for Molecular Medicine Finland (FIMM), Helsinki FIN-00014, Finland
59 Department of Chronic Disease Prevention, National Institute for Health and Welfare, Helsinki FIN-00271, Finland
60 Lund University Diabetes Centre, Department of Clinical Science Malmö, University Hospital Scania, Lund University, 20502 Malmö, Sweden
61 Institute of Biomedicine, Physiology, University of Eastern Finland, Kuopio Campus, Kuopio, Finland
62 Faculty of Medicine, University of Iceland, 101 Reykjavík, Iceland
63 Landspítali University Hospital, 101 Reykjavík, Iceland
64 Endocrinology-Diabetology Unit, Corbeil-Essonnes Hospital, F-91100 Corbeil-Essonnes, France
65 Diabetes Research Centre, Biomedical Research Institute, University of Dundee, Ninewells Hospital, Dundee DD1 9SY, UK
66 Pharmacogenomics Centre, Biomedical Research Institute, University of Dundee, Ninewells Hospital, Dundee DD1 9SY, UK
67 Icelandic Heart Association, 201 Kopavogur, Iceland
68 Department of General Practice and Primary Health Care, University of Helsinki, 00014 Helsinki, Finland
69 Vaasa Health Care Centre, 65100 Vaasa, Finland
70 Division of Cardiovascular Epidemiology, Institute of Environmental Medicine, Karolinska Institutet, Stockholm, Sweden
71 Institute for Clinical Diabetology, German Diabetes Center, Leibniz Center for Diabetes Research at Heinrich Heine University Düsseldorf, 40225 Düsseldorf, Germany
72 Busselton Population Medical Research Institute, Sir Charles Gairdner Hospital, Nedlands, WA 6009, Australia
73 PathWest Laboratory Medicine of Western Australia, QEII Medical Centre, Nedlands, WA 6009, Australia
74 School of Pathology and Laboratory Medicine, The University of Western Australia, Nedlands, WA 6009, Australia
75 School of Population Health, The University of Western Australia, Nedlands, WA 6009, Australia
76 Dept of Pulmonary Physiology and Sleep Medicine, West Australian Sleep Disorders Research Institute, Queen Elizabeth II Medical Centre, Hospital Avenue, Nedlands WA 6009, Australia
77 School of Medicine and Pharmacology, University of Western Australia, Nedlands WA 6009, Australia
78 Institute of Biometrics and Epidemiology, German Diabetes Center, Leibniz Center for Diabetes Research at Heinrich Heine University Düsseldorf, 40225 Düsseldorf, Germany
79 Institute of Human Genetics, University of Bonn, 53127 Bonn, Germany
80 Department of Genomics, Life & Brain Center, University of Bonn, 53127 Bonn, Germany
81 Respiratory Medicine, Sir Charles Gairdner Hospital, Nedlands, WA 6009, Australia
82 University General Hospital Attikon, 1 Rimini, 12462 Chaidari, Athens, Greece
83 South Karelia Central Hospital, Lappeenranta, Finland
84 Institute of Cardiovascular Science, University College London, 5 University Street, London WC1E 6JJ, UK
85 Department of Clinical Chemistry and Central Laboratory, University of Ulm, Ulm, Germany
86 Institute of Epidemiology II, Helmholtz Zentrum Muenchen, 85764 Neuherberg, Germany
87 Centro Cardiologico Monzino, IRCCS, via Carlo Parea 4, 20138, Milan, Italy
88 UCL Genetics Institute, Department of Genetics, Evolution and Environment, University College London, Gower Street, London WC1E 6BT, UK
89 MRC Institute of Genetics and Molecular Medicine at the University of Edinburgh, Western General Hospital, Edinburgh, EH4 2XU, UK
90 Department of Epidemiology, Erasmus University Medical Center, P.O. Box 2040, 3000 CA Rotterdam, The Netherlands.
91 Netherland Genomics Initiative, Netherlands Consortium for Healthy Ageing and Centre for Medical Systems Biology, P.O. Box 2040, 3000 CA Rotterdam, The Netherlands
92 Department of Internal Medicine, Erasmus University Medical Center, P.O. Box 2040, 3000 CA Rotterdam, The Netherlands.
93 Oxford National Institute for Health Research Biomedical Research Centre, Churchill Hospital, Old Road Headington, Oxford, OX3 7LJ, UK
94 Molecular Medicine, Department of Medical Sciences, Uppsala University, SE-751 85 Uppsala, Sweden
95 Unit of General Practice, Helsinki University General Hospital, Helsinki, Finland
96 Folkhälsan Research Center, FIN-00014 Helsinki, Finland

SUPPLEMENTARY DATA

97 INSERM CESP U1018, F-94807 Villejuif, France
98 University Paris Sud 11, UMRS 1018, F-94807, Villejuif, France
99 Department of Medicine, Helsinki University Hospital, University of Helsinki, 000290 HUS Helsinki, Finland
100 Dept of Social Services and Health Care, 68601 Jakobstad, Finland
101 Division of Endocrinology, Diabetes and Nutrition, University of Maryland School of Medicine, Baltimore, MD 21201, USA
102 Geriatric Research Education and Clinical Center, Baltimore Veterans Administration Medical Center, Baltimore, MD 21201, USA
103 Department of Medicine/Metabolic Diseases, Heinrich Heine University Düsseldorf, 40225 Düsseldorf, Germany
104 University of Cambridge Metabolic Research Laboratories, Institute of Metabolic Science, Box 289, Addenbrooke's Hospital, Cambridge, CB2
OQQ, UK
105 NIHR Cambridge Biomedical Research Centre, Institute of Metabolic Science, Box 289, Addenbrooke's Hospital, Cambridge, CB2 OQQ, UK
106 Dept of Community Medicine, Faculty of Health Sciences, University of Tromsø, N-9037 Tromsø, Norway
107 Kuopio Research Institute of Exercise Medicine, Kuopio, Finland
108 Department of Clinical Physiology and Nuclear Medicine, Kuopio University Hospital, Kuopio, Finland
109 Department of Medical Sciences, Uppsala University, Akademiska Sjukhuset, SE-751 85 Uppsala, Sweden
110 Department of Dietetics-Nutrition, Harokopio University, 70 El. Venizelou Str, Athens, Greece
111 Faculty of Medicine, Institute of Health Sciences, University of Oulu, Oulu, Finland
112 Unit of General Practice, Oulu University Hospital, Oulu, Finland
113 Finnish Diabetes Association, Kirjoniementie 15, 33680, Tampere, Finland
114 Pirkanmaa Hospital District, Tampere, Finland
115 South Ostrobothnia Central Hospital, 60220 Seinäjoki, Finland
116 Department of Medicine, Central Finland Central Hospital, 40620 Jyväskylä, Finland
117 Department of Genetics, University of North Carolina, Chapel Hill, NC 27599, USA
118 Diabetes and Obesity Research Institute, Cedars-Sinai Medical Center, Los Angeles, California, USA
119 Red RECAVA Grupo RD06/0014/0015, Hospital Universitario La Paz, 28046 Madrid, Spain
120 Centre for Vascular Prevention, Danube-University Krems, 3500 Krems, Austria
121 Division of Endocrinology and Diabetes, Department of Internal Medicine, University Medical Centre Ulm, Ulm, Germany.
122 Genomic Medicine, Imperial College London, Hammersmith Hospital, W12 0NN, London, UK
123 Department of Pharmacological Sciences, University of Milan, via Balzaretti 9, 20133 Milan, Italy.
124 Center for Non-Communicable Diseases Pakistan, Karachi, Pakistan
125 Clinic of Cardiology, West German Heart Centre, University Hospital of Essen, University Duisburg-Essen, 45122 Essen, Germany
126 Hannover Unified Biobank, Hannover Medical School, 30625 Hannover, Germany.
127 Dept of Statistics, University of Oxford, 1 South Parks Road Oxford, OX1 3TG, UK
128 Diabetes Genetics, Institute of Biomedical and Clinical Science, Peninsula Medical School, University of Exeter, Barrack Road, Exeter EX2 5DW,
UK
129 Human Genetics Center, University of Texas Health Science Center at Houston, Houston, TX 77030, USA
130 Human Genome Sequencing Center at Baylor College of Medicine, Houston, TX 77030, USA
131 Cardiovascular Research Center, Massachusetts General Hospital, 185 Cambridge Street, Boston, MA 02114, USA
132 Division of Epidemiology and Community Health, University of Minnesota, Minneapolis, MN 55454, USA
133 General Medicine Division, Massachusetts General Hospital, Boston, Massachusetts, USA
134 Department of Genetics, Harvard Medical School, Boston, MA 02115, USA
135 Department of Molecular Biology, Harvard Medical School, Boston, MA 02115, USA
136 Diabetes Unit, Massachusetts General Hospital, Boston, MA 02144, USA
139 Deceased

SUPPLEMENTARY DATA

MAGIC Investigators Author List

Josée Dupuis^{1,2,177}, Claudia Langenberg^{3,177}, Inga Prokopenko^{4,5,177}, Richa Saxena^{6,7,177}, Nicole Soranzo^{8,9,177}, Anne U Jackson¹⁰, Eleanor Wheeler¹¹, Nicole LGlazer¹², Nabila Bouatia-Naji¹³, Anna LGloyn⁴, Cecilia MLindgren^{4,5}, Reedik Mägi^{4,5}, Andrew P Morris⁵, Joshua Randall⁵, Toby Johnson¹⁴⁻¹⁶, Paul Elliott^{17,176}, Denis Rybin¹⁸, Gudmar Thorleifsson¹⁹, Valgerdur Steinthorsdottir¹⁹, Peter Henneman²⁰, Harald Grallert²¹, Abbas Dehghan²², Jouke Jan Hottenga²³, Christopher SFranklin²⁴, Pau Navarro²⁵, Kijoung Song²⁶, Anuj Goel^{5,27}, John R B Perry²⁸, Josephine MEgan²⁹, Taina Lajunen³⁰, Niels Grarup³¹, Thomas Sparsø³¹, Alex Doney³², Benjamin F Voight^{6,7}, Heather MStringham¹⁰, Man Li³³, Stavroula Kanoni³⁴, Peter Shrader³⁵, Christine Cavalcanti-Proença¹³, Meena Kumari³⁶, Lu Qi³⁷, Nicholas J Timpson³⁸, Christian Gieger²¹, Carina Zabena³⁹, Ghislain Rocheleau^{40,41}, Erik Ingelsson^{42,43}, Ping An⁴⁴, Jeffrey O'Connell⁴⁵, Jian'an Luan³, Amanda Elliott^{6,7}, Steven A McCarroll^{6,7}, Felicity Payne¹¹, Rosa Maria Roccascella¹¹, François Pattou⁴⁶, Praveen Sethupathy⁴⁷, Kristin Ardlie⁴⁸, Yavuz Ariyurek⁴⁹, Beverley Balkau⁵⁰, Philip Barter⁵¹, John P Beilby^{52,53}, Yoav Ben-Shlomo⁵⁴, Rafn Benediktsson^{55,56}, Amanda J Bennett⁴, Sven Bergmann^{14,16}, Murielle Bochud¹⁵, Eric Boerwinkle⁵⁷, Amélie Bonnefond¹³, Lori LBonnycastle⁴⁷, Knut Borch-Johnsen^{58,59}, Yvonne Böttcher⁶⁰, Eric Brunner³⁶, Suzannah J Bumpstead⁸, Guillaume Charpentier⁶¹, Yii-Der Ida Chen⁶², Peter Chines⁴⁷, Robert Clarke⁶³, Lachlan J MCoim¹⁷, Matthew NCooper⁶⁴, Marilyn Cornelis³⁷, Gabe Crawford⁶, Laura Crisponi⁶⁵, Ian NMDay³⁸, Eco J Cde Geus²³, Jerome Delplanque¹³, Christian Dina¹³, Michael R Erdos⁴⁷, Annette CFedson^{64,66}, Antje Fischer-Rosinsky^{67,68}, Nita GForouhi³, Caroline SFOX^{2,69}, Rune Frants⁷⁰, Maria Grazia Franzosi⁷¹, Pilar Galan⁷², Mark OGoodarzi⁶², Jürgen Graessler⁷³, Christopher J Groves⁴, Scott Grundy⁷⁴, Rhian Gwilliam⁸, Ulf Gyllenstein⁷⁵, Samy Hadjadj⁷⁶, Göran Hallmans⁷⁷, Naomí Hammond⁸, Xijing Han¹⁰, Anna-Liisa Hartikainen⁷⁸, Neelam Hassanali⁴, Caroline Hayward²⁵, Simon CHEath⁷⁹, Serge Herberg⁸⁰, Christian Herder⁸¹, Andrew A Hicks⁸², David R Hillman^{66,83}, Aroon DHingorani³⁶, Albert Hofman²², Jennie Hui^{52,84}, Joe Hung^{85,86}, Bo Isomaa^{87,88}, Paul R V Johnson^{4,89}, Torben Jørgensen^{90,91}, Antti Jula⁹², Marika Kaakinen⁹³, Jaakko Kaprio⁹⁴⁻⁹⁶, Y Antero Kesaniemi⁹⁷, Mika Kivimäki³⁶, Beatrice Knight⁹⁸, Seppo Koskinen⁹⁹, Peter Kovacs¹⁰⁰, Kirsten Ohm Kyvik¹⁰¹, GMark Lathrop⁷⁹, Debbie A Lawlor³⁸, Olivier Le Bacquer¹³, Cécile Lecoeur¹³, Yun Li¹⁰, Valeriya Lyssenko¹⁰², Robert Mahley¹⁰³, Massimo Mangino⁹, Alisa KManning¹, Maria Teresa Martínez-Larrad³⁹, Jarred B McAteer^{6,104,105}, Laura J McCulloch⁴, Ruth McPherson¹⁰⁶, Christa Meisinger²¹, David Melzer²⁸, David Meyre¹³, Braxton DMitchell⁴⁵, Mario A Morken⁴⁷, Sutapa Mukherjee^{66,83}, Silvia Naitza⁶⁵, Narisu Narisu⁴⁷, Matthew J Neville^{4,107}, Ben A Oostra¹⁰⁸, Marco Orrù⁶⁵, Ruth Pakyz⁴⁵, Colin NA Palmer¹⁰⁹, Giuseppe Paolisso¹¹⁰, Cristian Pattaro⁸², Daniel Pearson⁴⁷, John F Peden^{5,27}, Nancy LPedersen⁴², Markus Perola^{96,111,112}, Andreas F H Pfeiffer^{67,68}, Irene Pichler⁸², Ozren Polasek¹¹³, Danielle Posthuma^{23,114}, Simon CPotter⁸, Anneli Pouta¹¹⁵, Michael A Province⁴⁴, Bruce MPSaty^{116,117}, Wolfgang Rathmann¹¹⁸, Nigel WRayner^{4,5}, Kenneth Rice¹¹⁹, Samuli Ripatti^{96,111}, Fernando Rivadeneira^{22,120}, Michael Roden^{81,121}, Olov Rolandsson¹²², Anneli Sandback¹²³, Manjinder Sandhu^{3,124}, Serena Sanna⁶⁵, Avan Aihie Sayer¹²⁵, Paul Scheet¹²⁶, Laura J Scott¹⁰, Udo Seedorf¹²⁷, Stephen J Sharp³, Beverly Shields⁹⁸, Gunnar Sigurdsson^{55,56}, Eric J GSijbrands^{22,120}, Angela Silveira¹²⁸, Laila Simpson^{64,66}, Andrew Singleton¹²⁹, Nicholas LSmith^{130,131}, Ulla Sovio¹⁷, Amy Swift⁴⁷, Holly Syddall¹²⁵, Ann-Christine Syvänen¹³², Toshiko Tanaka^{133,134}, Barbara Thorand²¹, Jean Tichet¹³⁵, Anke Tönjes^{60,136}, Tiinamaija Tuomi^{87,137}, André Gutterlinden^{22,120}, Ko Willems van Dijk^{70,138}, Mandy van Hoek¹²⁰, Dhiraj Varma⁸, Sophie Visvikis-Siest¹³⁹, Veronique Vitart²⁵, Nicole Vogelzang¹⁴⁰, Gérard Waeber¹⁴¹, Peter J Wagner^{96,111}, Andrew Walley¹⁴², GBragi Walters¹⁹, Kim LWARD^{64,66}, Hugh Watkins^{5,27}, Michael NWeedon²⁸, Sarah H Wild²⁴, Gonneke Willemsen²³, Jaqueline CMWitteman²², John WGYarnell¹⁴³, Eleftheria Zeggini^{5,8}, Diana Zelenika⁷⁹, Björn Zethelius^{43,144}, Guangju Zhai⁹, Jing Hua Zhao³, MCarola Zillikens¹²⁰, DIAGRAMConsortium¹⁴⁵, GIANTConsortium¹⁴⁵, Global BPgen Consortium¹⁴⁵, Ingrid B Borecki⁴⁴, Ruth J F Loos³, Pierre Meneton⁸⁰, Patrik KEMagnusson⁴², David MNathan^{104,105}, Gordon H Williams^{69,105}, Andrew THattersley⁹⁸, Kaisa Silander^{96,111}, Veikko Salomaa¹⁴⁶, George Davey Smith³⁸, Stefan R Bornstein⁷³, Peter Schwarz⁷³, Joachim Spranger^{67,68}, Fredrik Karpe^{4,107}, Alan R Shuldiner⁴⁵, Cyrus Cooper¹²⁵, George V Dedoussis³⁴, Manuel Serrano-Rios³⁹, Andrew DMorris¹⁰⁹, Lars Lind¹³², Lyle J Palmer^{64,66,84}, Frank B Hu^{47,148}, Paul WFranks¹⁴⁹, Shah Ebrahim¹⁵⁰, Michael Marmot³⁶, WH Linda Kao^{33,151,152}, James SPankow¹⁵³, Michael J Sampson¹⁵⁴, Johanna Kuusisto¹⁵⁵, Markku Laakso¹⁵⁵, Torben Hansen^{31,156}, Oluf Pedersen^{31,59,157}, Peter Paul Pramstaller^{82,158,159}, H Erich Wichmann^{21,160,161}, Thomas Illig²¹, Igor Rudan^{24,162,163}, Alan F Wright²⁵, Michael Stumvoll⁶⁰, Harry Campbell²⁴, James F Wilson²⁴, Anders Hamsten on behalf of Procardis Consortium¹²⁸, Richard N Bergman¹⁶⁴, Thomas A Buchanan^{164,165}, Francis SCollins⁴⁷, Karen LMohlke¹⁶⁶, Jaakko Tuomilehto^{94,167}, Timo TValle¹⁶⁷, David Altshuler^{67,104,105}, Jerome I Rotter⁶², David SSiscovick¹⁶⁹, Brenda WJ H Penninx¹⁴⁰, Dorret I Boomsma²³, Panos Deloukas⁸, Timothy DSpector^{8,9}, Timothy MFrayling²⁸, Luigi Ferrucci¹⁷⁰, Augustine Kong¹⁹, Unnur Thorsteinsdottir^{19,171}, Kari Stefansson^{19,171}, Cornelia Mvan Duijn²², Yuri SAulchenko²², Antonio Cao⁶⁵, Angelo Scuteri^{172,177}, David Schlessinger⁴⁷, Manuela Uda⁶⁵, Aimo Ruokonen¹⁷³, Marjo-Riitta Jarvelin^{17,93, 174}, Dawn MWaterworth²⁶, Peter Vollenweider¹⁴¹, Leena Peltonen^{8,48,96,111,112}, Vincent Mooser²⁶, Goncalo R Abecasis¹⁰, Nicholas J Wareham³, Robert Sladek^{40,41}, Philippe Froguel^{13,142}, Richard MWatanabe^{164,175}, James B Meigs^{35,105}, Leif Groop¹⁰², Michael Boehnke¹⁰, Mark I McCarthy^{4,5,107}, Jose CFlorez^{6,7,104,105} & Inês Barroso¹¹.

MAGIC Investigator Affiliations

¹Department of Biostatistics, Boston University School of Public Health, Boston, Massachusetts, USA. ²National Heart, Lung, and Blood Institute's Framingham Heart Study, Framingham, Massachusetts, USA. ³Medical Research Council (MRC), Epidemiology Unit, Institute of Metabolic Science, Addenbrooke's Hospital, Cambridge, UK. ⁴Oxford Centre for Diabetes, Endocrinology and Metabolism, University of Oxford, Oxford, UK. ⁵Wellcome Trust Centre for Human Genetics, University of Oxford, Oxford, UK. ⁶Program in Medical and Population Genetics, Broad Institute, Cambridge, Massachusetts, USA. ⁷Center for Human Genetic Research, Massachusetts General Hospital, Boston, Massachusetts, USA. ⁸Wellcome Trust Sanger Institute, Hinxton, Cambridge, UK. ⁹Twin Research and Genetic Epidemiology Department, King's College London, St Thomas' Hospital Campus, London, UK. ¹⁰Center for Statistical Genetics, Department of Biostatistics, University of Michigan School of Public Health, Ann Arbor, Michigan, USA. ¹¹Metabolic Disease Group, Wellcome Trust Sanger Institute, Hinxton, Cambridge, UK. ¹²Cardiovascular Health Research Unit and Department of Medicine, University of Washington, Seattle, Washington, USA. ¹³Centre National de la Recherche Scientifique–Unité Mixte de Recherche 8090, Pasteur Institute, Lille 2–Droit et Santé University, Lille, France. ¹⁴Department of Medical Genetics, University of Lausanne, Lausanne, Switzerland. ¹⁵University Institute of Social and Preventative Medicine, Centre Hospitalier Universitaire Vaudois (CHUV) and University of Lausanne, Lausanne, Switzerland. ¹⁶Swiss Institute of

SUPPLEMENTARY DATA

Bioinformatics, Lausanne, Switzerland. ¹⁷Department of Epidemiology and Public Health, Imperial College London, Faculty of Medicine, Norfolk Place, London, UK. ¹⁸Boston University Data Coordinating Center, Boston, Massachusetts, USA. ¹⁹deCODE Genetics, Reykjavik, Iceland. ²⁰Department of Human Genetics, Leiden University Medical Centre, Leiden, The Netherlands. ²¹Institute of Epidemiology, Helmholtz Zentrum Muenchen, German Research Center for Environmental Health, Neuherberg, Germany. ²²Department of Epidemiology, Erasmus Medical College, Rotterdam, The Netherlands. ²³Department of Biological Psychology, VU University Amsterdam, Amsterdam, The Netherlands. ²⁴Centre for Population Health Sciences, University of Edinburgh, Edinburgh, UK. ²⁵MRC Human Genetics Unit, Institute of Genetics and Molecular Medicine, Edinburgh, UK. ²⁶Division of Genetics, Research and Development, GlaxoSmithKline, King of Prussia, Pennsylvania, USA. ²⁷Department of Cardiovascular Medicine, University of Oxford, Oxford, UK. ²⁸Genetics of Complex Traits, Institute of Biomedical and Clinical Sciences, Peninsula College of Medicine and Dentistry, University of Exeter, Exeter, UK. ²⁹National Institute of Aging, Baltimore, Maryland, USA. ³⁰Unit for Child and Adolescent Health and Welfare, National Institute for Health and Welfare, Biocenter Oulu, University of Oulu, Oulu, Finland. ³¹Hagedorn Research Institute, Gentofte, Denmark. ³²Department of Medicine and Therapeutics, Level 7, Ninewells Hospital and Medical School, Dundee, UK. ³³Department of Epidemiology, Bloomberg School of Public Health, Johns Hopkins University, Baltimore, Maryland, USA. ³⁴Department of Nutrition–Dietetics, Harokopio University, Athens, Greece. ³⁵General Medicine Division, Massachusetts General Hospital, Boston, Massachusetts, USA. ³⁶Department of Epidemiology and Public Health, University College London, London, UK. ³⁷Departments of Nutrition and Epidemiology, Harvard School of Public Health, Boston, Massachusetts, USA. ³⁸MRC Centre for Causal Analyses in Translational Epidemiology, University of Bristol, Bristol, UK. ³⁹Fundación para la Investigación Biomédica del Hospital Clínico San Carlos, Madrid, Spain. ⁴⁰Departments of Medicine and Human Genetics, McGill University, Montreal, Canada. ⁴¹Genome Quebec Innovation Centre, Montreal, Canada. ⁴²Department of Medical Epidemiology and Biostatistics, Karolinska Institutet, Stockholm, Sweden. ⁴³Department of Public Health and Caring Sciences, Uppsala University, Uppsala, Sweden. ⁴⁴Division of Statistical Genomics, Department of Genetics, Washington University School of Medicine, St. Louis, Missouri, USA. ⁴⁵Division of Endocrinology, Diabetes and Nutrition, University of Maryland School of Medicine, Baltimore, Maryland, USA. ⁴⁶INSERM U859, Université de Lille-Nord de France, Lille, France. ⁴⁷Genome Technology Branch, National Human Genome Research Institute, Bethesda, Maryland, USA. ⁴⁸The Broad Institute, Cambridge, Massachusetts, USA. ⁴⁹Leiden Genome Technology Center, Leiden University Medical Center, Leiden, The Netherlands. ⁵⁰INSERM U780, Paris Sud University, Villejuif, France. ⁵¹The Heart Research Institute, Sydney, New South Wales, Australia. ⁵²PathWest Laboratory of Western Australia, Department of Molecular Genetics, J Block, QEII Medical Centre, Nedlands West Australia, Australia. ⁵³School of Surgery and Pathology, University of Western Australia, Nedlands West Australia, Australia. ⁵⁴Department of Social Medicine, University of Bristol, Bristol, UK. ⁵⁵Landsþítali University Hospital, Reykjavik, Iceland. ⁵⁶Icelandic Heart Association, Kopavogur, Iceland. ⁵⁷The Human Genetics Center and Institute of Molecular Medicine, University of Texas Health Science Center, Houston, Texas, USA. ⁵⁸Steno Diabetes Center, Gentofte, Denmark. ⁵⁹Faculty of Health Science, University of Aarhus, Aarhus, Denmark. ⁶⁰Department of Medicine, University of Leipzig, Leipzig, Germany. ⁶¹Endocrinology–Diabetology Unit, Corbeil-Essonnes Hospital, Essonnes, France. ⁶²Medical Genetics Institute, Cedars-Sinai Medical Center, Los Angeles, California, USA. ⁶³Clinical Trial Service Unit and Epidemiological Studies Unit, University of Oxford, Oxford, UK. ⁶⁴Centre for Genetic Epidemiology and Biostatistics, University of Western Australia, Perth, Australia. ⁶⁵Istituto di Neurogenetica e Neurofarmacologia (INN), Consiglio Nazionale delle Ricerche, c/o Cittadella Universitaria di Monserrato, Monserrato, Cagliari, Italy. ⁶⁶Western Australian Sleep Disorders Research Institute, Queen Elizabeth Medical Centre II, Perth, Australia. ⁶⁷Department of Endocrinology, Diabetes and Nutrition, Charite-Universitaetsmedizin Berlin, Berlin, Germany. ⁶⁸Department of Clinical Nutrition, German Institute of Human Nutrition Potsdam-Rehbruecke, Nuthetal, Germany. ⁶⁹Division of Endocrinology, Diabetes, and Hypertension, Brigham and Women's Hospital, Harvard Medical School, Boston, Massachusetts, USA. ⁷⁰Department of Human Genetics, Leiden University Medical Center, Leiden, The Netherlands. ⁷¹Department of Cardiovascular Research, Istituto di Ricerche Farmacologiche 'Mario Negri', Milan, Italy. ⁷²Institut National de la Santé et de la Recherche Médicale, Institut National de la Recherche Agronomique, Université Paris 13, Bobigny Cedex, France. ⁷³Department of Medicine III, Division Prevention and Care of Diabetes, University of Dresden, Dresden, Germany. ⁷⁴Center for Human Nutrition, University of Texas Southwestern Medical Center, Dallas, Texas, USA. ⁷⁵Department of Genetics and Pathology, Rudbeck Laboratory, Uppsala University, Uppsala, Sweden. ⁷⁶Centre Hospitalier Universitaire, de Poitiers, Endocrinologie Diabetologie, CIC INSERM 0802, INSERM U927, Université de Poitiers, Unité de Formation et de Recherche, Médecine Pharmacie, Poitiers, France. ⁷⁷Department of Public Health and Clinical Medicine, Section for Nutritional Research, Umeå University, Umeå, Sweden. ⁷⁸Department of Clinical Sciences, Obstetrics and Gynecology, University of Oulu, University of Oulu, Finland. ⁷⁹Centre Nationale de Génotypage/Institut de génomique/Commissariat à l'énergie atomique, Evry Cedex, France. ⁸⁰INSERM U872, Faculté de Médecine Paris Descartes, Paris Cedex, France. ⁸¹Institute for Clinical Diabetology, German Diabetes Center, Leibniz Center for Diabetes Research at Heinrich Heine University Düsseldorf, Düsseldorf, Germany. ⁸²Institute of Genetic Medicine, European Academy Bozen/Bolzano (EURAC), Viale Druso, Bolzano, Italy, Affiliated Institute of the University Lübeck, Lübeck, Germany. ⁸³Department of Pulmonary Physiology, Sir Charles Gairdner Hospital, Perth, Australia. ⁸⁴Busselton Population Medical Research Foundation, Sir Charles Gairdner Hospital, Perth, Australia. ⁸⁵Heart Institute of Western Australia, Sir Charles Gairdner Hospital, Nedlands West Australia, Australia. ⁸⁶School of Medicine and Pharmacology, University of Western Australia, Nedlands West Australia, Australia. ⁸⁷Folkhalsan Research Centre, Helsinki, Finland. ⁸⁸Malmiska Municipal Health Care Center and Hospital, Jakobstad, Finland. ⁸⁹Nuffield Department of Surgery, University of Oxford, Oxford, UK. ⁹⁰Research Centre for Prevention and Health, Glostrup University Hospital, Glostrup, Denmark. ⁹¹Faculty of Health Science, University of Copenhagen, Copenhagen, Denmark. ⁹²National Institute for Health and Welfare, Unit of Population Studies, Turku, Finland. ⁹³Institute of Health Sciences and Biocenter Oulu, University of Oulu, Oulu, Finland. ⁹⁴Department of Public Health, Faculty of Medicine, University of Helsinki, Helsinki, Finland. ⁹⁵National Institute for Health and Welfare, Unit for Child and Adolescent Mental Health, Helsinki, Finland. ⁹⁶Institute for Molecular Medicine Finland (FIMM), University of Helsinki, Helsinki, Finland. ⁹⁷Department of Internal Medicine and Biocenter Oulu, Oulu, Finland. ⁹⁸Diabetes Genetics, Institute of Biomedical and Clinical Science, Peninsula College of Medicine and Dentistry, University of Exeter, Exeter, UK. ⁹⁹National Institute for Health and Welfare, Unit of Living Conditions, Health and Wellbeing, Helsinki, Finland. ¹⁰⁰Interdisciplinary Centre for Clinical Research, University of Leipzig, Leipzig, Germany. ¹⁰¹The Danish Twin Registry, Epidemiology, Institute of Public Health, University of Southern Denmark, Odense, Denmark. ¹⁰²Department of Clinical Sciences, Diabetes and Endocrinology, Lund University, University Hospital Malmö, Malmö, Sweden. ¹⁰³Gladstone Institute of Cardiovascular Disease, University of California, San Francisco, California, USA. ¹⁰⁴Diabetes Research Center, Diabetes Unit, Massachusetts General Hospital, Boston, Massachusetts, USA. ¹⁰⁵Department of Medicine, Harvard Medical School, Boston, Massachusetts, USA. ¹⁰⁶Division of Cardiology, University of Ottawa Heart Institute, Ottawa, Ontario, Canada. ¹⁰⁷Oxford National Institute for Health Research, Biomedical Research Centre, Churchill Hospital, Oxford, UK. ¹⁰⁸Department of Clinical Genetics, Erasmus Medical College, Rotterdam, The Netherlands. ¹⁰⁹Biomedical Research Institute, University of Dundee, Ninewells Hospital and Medical School, Dundee, UK. ¹¹⁰Department of Geriatric Medicine and Metabolic Disease, Second University of Naples, Naples, Italy. ¹¹¹National Institute for Health and Welfare, Unit of Public Health Genomics, Helsinki, Finland. ¹¹²Department of Medical Genetics, University of Helsinki, Helsinki, Finland. ¹¹³Department of Medical Statistics, Epidemiology and Medical Informatics, Andrija Stampar School of Public Health, Medical School, University of Zagreb, Rockefellerova, Zagreb, Croatia. ¹¹⁴Department of Clinical Genetics, VU University and Medical Center, Amsterdam, The Netherlands. ¹¹⁵Department of Obstetrics and Gynaecology, Oulu University Hospital, Oulu, Finland. ¹¹⁶Departments of Medicine, Epidemiology and Health Services, University of Washington, Seattle, Washington, USA. ¹¹⁷Group Health Research Institute, Group Health Cooperative, Seattle, Washington, USA. ¹¹⁸Institute of Biometrics and Epidemiology, German Diabetes Centre, Leibniz Centre at Heinrich Heine University Düsseldorf, Düsseldorf, Germany. ¹¹⁹Department of Biostatistics, University of Washington, Seattle, Washington, USA. ¹²⁰Department of Internal Medicine, Erasmus Medical College, Rotterdam, The Netherlands. ¹²¹Department of Metabolic Diseases, Heinrich Heine University Düsseldorf, Düsseldorf, Germany. ¹²²Department of Public Health and Clinical Medicine, Section for Family Medicine, Umeå University, Umeå, Sweden. ¹²³School of Public Health, Department of General Practice, University of Aarhus, Aarhus, Denmark. ¹²⁴Department of Public Health and Primary Care, Strangeways Research Laboratory, University of Cambridge, Cambridge, UK. ¹²⁵MRC Epidemiology Resource Centre, University of Southampton, Southampton General Hospital,

SUPPLEMENTARY DATA

Southampton, UK. ¹²⁶Department of Epidemiology, University of Texas, M.D. Anderson Cancer Center, Houston, Texas, USA. ¹²⁷Leibniz-Institut für Arterioskleroseforschung an der Universität Münster, Münster, Germany. ¹²⁸Atherosclerosis Research Unit, Department of Medicine, Karolinska Institutet, Stockholm, Sweden. ¹²⁹Laboratory of Neurogenetics, National Institute on Aging, Bethesda, Maryland, USA. ¹³⁰Department of Epidemiology, University of Washington, Seattle, Washington, USA. ¹³¹Seattle Epidemiologic Research and Information Center, Department of Veterans Affairs Office of Research and Development, Seattle, Washington, USA. ¹³²Department of Medical Sciences, Uppsala University, Uppsala, Sweden. ¹³³Medstar Research Institute, Baltimore, Maryland, USA. ¹³⁴Clinical Research Branch, National Institute on Aging, Baltimore, Maryland, USA. ¹³⁵Institut interrégional pour la santé (IRSA), La Riche, France. ¹³⁶Coordination Centre for Clinical Trials, University of Leipzig, Leipzig, Germany. ¹³⁷Department of Medicine, Helsinki University Hospital, University of Helsinki, Helsinki, Finland. ¹³⁸Department of Internal Medicine, Leiden University Medical Centre, Leiden, The Netherlands. ¹³⁹Research Unit, Cardiovascular Genetics, Nancy University Henri Poincaré, Nancy, France. ¹⁴⁰EMGO Institute for Health and Care Research, Department of Psychiatry, VU University Medical Center, Amsterdam, The Netherlands. ¹⁴¹Department of Internal Medicine, Centre Hospitalier Universitaire Vaudois, Lausanne, Switzerland. ¹⁴²Genomic Medicine, Imperial College London, Hammersmith Hospital, London, UK. ¹⁴³Epidemiology and Public Health, Queen's University Belfast, Belfast, UK. ¹⁴⁴Medical Products Agency, Uppsala, Sweden. ¹⁴⁵See Supplementary Note for a full list of authors. ¹⁴⁶National Institute for Health and Welfare, Unit of Chronic Disease Epidemiology and Prevention, Helsinki, Finland. ¹⁴⁷Departments of Nutrition and Epidemiology, Harvard School of Public Health, Boston, Massachusetts, USA. ¹⁴⁸Channing Laboratory, Brigham and Women's Hospital and Harvard Medical School, Boston, Massachusetts, USA. ¹⁴⁹Genetic Epidemiology and Clinical Research Group, Department of Public Health and Clinical Medicine, Section for Medicine, Umeå University Hospital, Umeå, Sweden. ¹⁵⁰London School of Hygiene and Tropical Medicine, London, UK. ¹⁵¹Department of Medicine, School of Medicine, Johns Hopkins University, Baltimore, Maryland, USA. ¹⁵²The Welch Center for Prevention, Epidemiology, and Clinical Research, School of Medicine and Bloomberg School of Public Health, Johns Hopkins University, Baltimore, Maryland, USA. ¹⁵³Division of Epidemiology and Community Health, School of Public Health, University of Minnesota, Minneapolis, Minnesota, USA. ¹⁵⁴Department of Endocrinology and Diabetes, Norfolk and Norwich University Hospital National Health Service Trust, Norwich, UK. ¹⁵⁵Department of Medicine, University of Kuopio and Kuopio University Hospital, Kuopio, Finland. ¹⁵⁶Faculty of Health Science, University of Southern Denmark, Odense, Denmark. ¹⁵⁷Institute of Biomedical Science, Faculty of Health Science, University of Copenhagen, Copenhagen, Denmark. ¹⁵⁸Department of Neurology, General Central Hospital, Bolzano, Italy. ¹⁵⁹Department of Neurology, University of Lübeck, Lübeck, Germany. ¹⁶⁰Institute of Medical Informatics, Biometry and Epidemiology, Ludwig-Maximilians-Universität, Munich, Germany. ¹⁶¹Klinikum Grosshadern, Munich, Germany. ¹⁶²School of Medicine, University of Split, Split, Croatia. ¹⁶³Gen-Info Ltd., Zagreb, Croatia. ¹⁶⁴Department of Physiology and Biophysics, Keck School of Medicine, University of Southern California, Los Angeles, California, USA. ¹⁶⁵Department of Medicine, Division of Endocrinology, Keck School of Medicine, University of Southern California, Los Angeles, California, USA. ¹⁶⁶Department of Genetics, University of North Carolina, Chapel Hill, North Carolina, USA. ¹⁶⁷National Institute for Health and Welfare, Unit of Diabetes Prevention, Helsinki, Finland. ¹⁶⁸South Ostrobothnia Central Hospital, Seinäjoki, Finland. ¹⁶⁹Departments of Medicine and Epidemiology, University of Washington, Seattle, Washington, USA. ¹⁷⁰Longitudinal Studies Section, Clinical Research Branch, National Institute on Aging, NIH, Baltimore, Maryland, USA. ¹⁷¹Faculty of Medicine, University of Iceland, Reykjavík, Iceland. ¹⁷²Lab of Cardiovascular Sciences, National Institute on Aging, National Institutes of Health, Baltimore, Maryland, USA. ¹⁷³Department of Clinical Sciences/Clinical Chemistry, University of Oulu, University of Oulu, Oulu, Finland. ¹⁷⁴National Institute of Health and Welfare, Oulu, Finland. ¹⁷⁵Department of Preventive Medicine, Keck School of Medicine, University of Southern California, Los Angeles, California, USA. ¹⁷⁶MRC–Health Protection Agency Centre for Environment and Health, Imperial College London, London, UK. ¹⁷⁷UOC Geriatria, Istituto Nazionale Ricovero e cura per Anziani (INRCA) IRCCS, Rome, Italy. Correspondence should be addressed to M.B. (boehnke@umich.edu), M.I.M. (mark.mccarthy@dr1.ox.ac.uk), J.C.F. (jcflorez@partners.org) or I.B. (ib1@sanger.ac.uk).