Nitsch, D; Grams, M; Sang, Y; Black, C; Cirillo, M; Djurdjev, O; Iseki, K; Jassal, SK; Kimm, H; Kronenberg, F; Oien, CM; Levey, AS; Levin, A; Woodward, M; Hemmelgarn, BR; for the Chronic Kidney Disease Prognosis Consortium, (incd. Flet, AE; ), (2013) Associations of estimated glomerular filtration rate and albuminuria with mortality and renal failure by sex: a meta-analysis. BMJ (Clinical research ed), 346. f324. ISSN 0959-8138 DOI: https://doi.org/10.1136/bmj.f324

Downloaded from: http://researchonline.lshtm.ac.uk/612447/

DOI: 10.1136/bmj.f324

Usage Guidelines

Please refer to usage guidelines at http://researchonline.lshtm.ac.uk/policies.html or alternatively contact researchonline@lshtm.ac.uk.

Available under license: http://creativecommons.org/licenses/by-nc-nd/2.5/
Appendix 1. Acronyms or abbreviations for studies included in the current report and their key references linked to the Web references

1. General population cohorts

Aichi: Aichi Workers’ Cohort
AKDN (Dip): Alberta Kidney Disease Network
ARIC: Atherosclerosis Risk in Communities Study
AusDiab: Australian Diabetes, Obesity, and Lifestyle Study
Beaver Dam: Beaver Dam CKD Study
Beijing: Beijing Cohort Study
CHS: Cardiovascular Health Study
CIRCS: Circulatory Risk in Communities Study
COBRA: COBRA Study
ESTHER: ESTHER Study
Framingham: Framingham Heart Study
Gubbio: Gubbio Study
HUNT: Nord Trøndelag Health Study
IPHS: Ibaraki Prefectural Health Study
MESA: Multi-Ethnic Study of Atherosclerosis
MRC Older People: MRC Study of assessment of older people
NHANES III: Third US National Health and Nutrition Examination Survey
Ohasama: Ohasama Study
Okinawa83: Okinawa 83 Cohort
Okinawa93: Okinawa 93 Cohort
PREVEND: Prevention of Renal and Vascular End-stage Disease Study
Rancho Bernardo: Rancho Bernardo Study
REGARDS: Reasons for Geographic And Racial Differences in Stroke Study
Severance: Severance Cohort Study
Taiwan: Taiwan MJ Cohort Study
ULSAM: Uppsala Longitudinal Study of Adult Men
2. High-risk cohorts
ADVANCE: The Action in Diabetes and Vascular Disease: Preterax and Diamicron Modified Release Controlled Evaluation (ADVANCE) trial\textsuperscript{27}
AKDN (ACR): Alberta Kidney Disease Network\textsuperscript{2}
CARE: The Cholesterol and Recurrent Events (CARE) Trial\textsuperscript{28}
KEEP: Kidney Early Evaluation Program\textsuperscript{29}
KP Hawaii: Kaiser Permanente Hawaii Cohort\textsuperscript{30}
MRFIT: Multiple Risk Factor Intervention Trial\textsuperscript{31}
Pima: Pima Indian Study\textsuperscript{32}
ZODIAC: Zwolle Outpatient Diabetes project Integrating Available Care\textsuperscript{33}

3. CKD cohorts
AASK: African American Study of Kidney Disease and Hypertension\textsuperscript{34}
BC CKD: British Columbia CKD Study\textsuperscript{35}
CRIB: Chronic Renal Impairment in Birmingham\textsuperscript{36}
Geisinger: Geisinger CKD Study\textsuperscript{37}
GLOMMS-1: Grampian Laboratory Outcomes, Morbidity and Mortality Studies – 1\textsuperscript{38}
KPNW: Kaiser Permanente Northwest\textsuperscript{39}
MASTERPLAN: Multifactorial Approach and Superior Treatment Efficacy in Renal Patients with the Aid of a Nurse Practitioner\textsuperscript{40}
MDRD: Modification of Diet in Renal Disease Study\textsuperscript{41}
MMKD: Mild to Moderate Kidney Disease Study\textsuperscript{42}
Nephro Test: NephroTest Study\textsuperscript{43}
RENAAL: Reduction of Endpoints in Non-insulin Dependent Diabetes Mellitus with the Angiotensin II Antagonist Losartan\textsuperscript{44}
Steno: Steno Type 1 Diabetes Study\textsuperscript{45}
Sunnybrook: Sunnybrook Cohort\textsuperscript{46}
Appendix 2. Data analysis overview and analytic notes for some of individual studies

Overview:
As previously reported,\textsuperscript{47,48} participating studies were asked to prepare a dataset with approximately 30 variables (follow-up time, event variable, and several predictors including age, gender, race, and serum creatinine to estimate GFR and albuminuria). Because the analysis used the CKD-EPI formula, the race variable only distinguished between black and non-black, under the assumption that this formula performs reasonably well in other ethnic groups. To minimize heterogeneity, we circulated guidelines for definitions of variables (e.g. hypertension, diabetes, smoking) and dataset preparation. Analyses were restricted to subjects aged 18 years or older. We instructed studies not to impute the two key kidney measures, eGFR (i.e., age, gender, race, and serum creatinine) and albuminuria. Values of eGFR >200 were treated as 200. Zero values of ACR were treated as 0.1 for log transformation. For other variables in the models with missing values we imputed with the mean value of the covariate. Individuals with practically impossible values of covariates, i.e., systolic blood pressure <50 or >300 mmHg or BMI <10 or >100 kg/m\textsuperscript{2} were excluded from the analysis (\(<0.01\) %).

For 35 of the 45 studies analysis was done at the Data Coordination Center at Johns Hopkins University; for the remainder the standard code was run in-house at individual study centers, with the output returned to the Data Coordinating Center. The code was written in STATA by the Data Coordinating Center. The standard code was designed to automatically save all output needed for the meta-analysis. The Data Coordinating Center then pooled the estimates across studies using STATA.

Studies were instructed to standardize and calibrate their serum creatinine to their best ability and report the method of standardization. The reported creatinine calibration allows grouping studies into studies that reported using an IDMS traceable method or conducted some serum creatinine calibration to IDMS traceable methods (AKDN, AusDiab, Beaver Dam, Geisinger, GLOMMS-1, Gubbio, HUNT, KEEP, KPNW, MMKD, NephroTest, NHANES III, Okinawa 83 and 93, Rancho Bernardo, REGARDS) and studies where the creatinine standardization was not done (AASK, ADVANCE, Aichi, ARIC, British Columbia CKD, Beijing, CARE, CHS, CIRCS, COBRA, CRIB, ESTHER, Framingham, IPHS, KP Hawaii, MASTERPLAN, MDRD, MESA, MRC Older People, MRFIT, Ohasama, Pima, PREVEND, RENAAL, Severance, STENO, Sunnybrook, Taiwan, ULSAM, ZODIAC). Retrospective assessment of creatinine calibration without direct collection of laboratory data is limited since substantial creatinine calibration differences have been documented even within a single laboratory using the same method over time.

The reference range of eGFR (90-104 ml/min/1.73 m\textsuperscript{2}) was chosen based on the optimal level of GFR (\(\geq 90\) ml/min/1.73 m\textsuperscript{2}) reported in current clinical guidelines\textsuperscript{49,50} and the fact that some studies have reported higher mortality risk at high eGFR.\textsuperscript{51-53} The reference point of eGFR (95 ml/min/1.73 m\textsuperscript{2}) was then arbitrarily chosen within the reference range but not in the knots (90 and 105) used to create splines.
Following the published results from individual studies, we assumed the proportional hazards model provided the best summary of the data in each study and did not summarize statistics on deviations from proportionality across the covariates.

**Notes for individual studies:**

1. General population cohorts

Aichi: Blood pressure was measured by auscultation with an appropriate arm cuff and a mercury column manometer or an automatic sphygmomanometer after at least 5 minutes of rest.

ARIC: Blood pressure was measured twice using a random-zero sphygmomanometer after 5 minutes of rest. The average of the two measurements was recorded.

AusDiab: Blood pressure measurement was performed in a seated position using a dinamap/mercury sphygmomanometer after participants had rested for at least 5 minutes. Three readings were taken at 1-minute intervals. The mean of the first two readings was recorded. If the difference between the three readings was greater than 10mmHg, the mean of the two closest measurements was used.

AKDN: Although this study has not collected information on race, the proportion of blacks in the province of Alberta is considered <1%. Other variables that were not collected in this study are systolic blood pressure, total cholesterol concentration, and smoking. Hypertension is defined based on administrative data.

Beaver Dam: Blood pressure was measured 3 times using a random zero mercury sphygmomanometer after 5 minutes of rest. The average of the last two measurements was reported.

Beijing: Blood pressure was taken 3 times after resting for at least 30 min using a standard mercury sphygmomanometer. The mean of the first 2 readings was calculated, unless the difference between these readings was >10 mmHg, in which case the mean of the 2 closest of 3 measurements was used.

CHS: This study consists of participants only aged 65 or older and thus did not contribute to the subgroup analysis of younger population. Blood pressure was measured 3 times in the seated position with a random zero sphygmomanometer and the average was recorded.

CIRCS: Blood pressure was measured using standard mercury sphygmomanometers on the right arm of seated participants after at least a 5-minute rest. When the first systolic blood pressure reading was \( \geq 140 \text{ mmHg} \) and/or diastolic blood pressure was \( \geq 90 \text{ mmHg} \), the physicians repeated the measurement. For these cases, the second reading was used in the analyses, and otherwise the first reading was used.
COBRA: Current smokers in this study include chewable tobacco users. Blood pressure was then measured 3 times with a calibrated automated device in the sitting position after 5 minutes of rest. The average of the last two measurements was recorded.

ESTHER: This study only measured urine albumin excretion with the minimum detection value of 11.3 mg/L (equivalent to ACR 17 mg/g) and thus its reference proteinuria group (≤11.3 mg/L) was likely to contain individuals with ACR ≥10 mg/g. Therefore, this study was meta-analyzed with the dipstick studies, translating urine albumin excretion (≤11.3, 11.4-19.9, 20-199 and ≥200 mg/L to -, ±, +, and ≥++). Blood pressure measurement was taken in the physicians’ offices as routine part of the health check-up and documented accordingly on the respective questionnaire. It was explicitly stated in the questionnaire to repeat any measurements over 140/90mmHg.

Framingham: Blood pressure was obtained twice in the left arm of seated subjects using a mercury column sphygmomanometer positioned near eye level. The average of two readings was used for each blood pressure variable.

Gubbio: This study consists of participants aged between 45 and 64 and thus did not contribute to the subgroup analysis of older population. Blood pressure was measured 3 times 1 minute apart using a mercury column sphygmomanometer after a 5 minute rest. The averaged values of second and third readings were recorded.

HUNT: This study is a general-population study overall but measured urine albumin mainly in participants with treated hypertension or diabetes. However, this study was categorized as a general population cohort, since they measured albuminuria in a 5% random sample out of ≈65,000 participants and, thus, the relationship between kidney measures and risk was maintained. This study has not collected use of anti-diabetic medication and use of statins (and thus hypercholesterolemia). Most of the glucose measurements were non-fasting. Three consecutive standardized blood pressure measurements were recorded, with a 1-minute interval. Measurements were performed in the sitting position after a minimum of 2 minutes of rest using an automatic oscillometric method. The mean of the second and third measurements was recorded.

IPHS: This study categorized their dipstick data - and ± into the same group. Therefore, dipstick data - and ± were treated as a reference group, and this study did not contribute to estimates of dipstick ±. Blood pressure was measured using a standard mercury sphygmomanometer on the right arm of seated participants who had rested for at least 5 minutes. When systolic BP was greater than 150 mm Hg or diastolic BP was greater than 90 mm Hg, BP was measured again after several deep breaths, and the lower BP values, which were almost always observed after the second measurement, were used for analyses.

MESA: Blood pressure was measured 3 times in the seated position using an automated oscillometric sphygmomanometer after 5 minutes of rest. The average of the last two measurements was used in analysis.

MRC Older People: This study categorized their dipstick data - and ± into the same group. Therefore, dipstick data - and ± were treated as a reference group, and this study did not
contribute to estimates of dipstick ±. This study has not collected total cholesterol. This study consists of participants aged ≥75 years old and thus did not contribute to the subgroup analysis of younger population. Blood pressure was measured 2 times using Hawkskey Random Zero Sphynomanometers. The average was recorded.

NHANESIII: This study did not collect data on total cholesterol, hypercholesterolemia, or use of anti-diabetic medications. Blood pressure was measured 3 times using a mercury sphygmomanometer after 5 minutes of rest. The average of the second and third values was used.

Ohasama: This study has not collected data on use of anti-diabetic medications. Blood pressure was measured 2 times using a semiautomatic devise after at least 2 minutes of rest. The average of these 2 readings was recorded.

Okinawa 83: This study has not collected data on fasting glucose, smoking, history of cardiovascular disease, anti-diabetic or anti-hypertensive medications. Hypertension was defined using blood pressure (systolic ≥140 mmHg and diastolic ≥90 mmHg) measurements only. Blood pressure was measured with a standard mercury sphygmomanometer while the person being screened is in the sitting position.

Okinawa 93: This study has not collected data on fasting glucose, smoking, history of cardiovascular disease, anti-diabetic or anti-hypertensive medications. Hypertension was defined using blood pressure (systolic ≥140 mmHg and diastolic ≥90 mmHg) measurements only. Blood pressure was measured with a standard mercury sphygmomanometer while the person being screened is in the sitting position.

PREVEND: At baseline, PREVEND study participants had two visits to the study outpatient clinic within ~3 weeks. Blood pressure was measured at both visits in supine position, every minute, for 10 and 8 min, respectively, with an automatic Dinamap XL Model 9300 series device (Johnson and Johnson, Medical Inc., Arlington, TX). Systolic and diastolic BP was calculated as the mean of the last two measurements of the two visits.

Rancho Bernardo: Systolic and diastolic blood pressures were measured twice using a mercury sphygmomanometer in seated subjects after a 5 minute rest.

REGARDS: Blood pressure was measured 2 times using a standard aneroid sphygmomanometer.

Severance: Blood pressure was measured 2 times using a standard electronic sphygmomanometer after a 5 minutes rest. The average of two consecutive measurements with a 5 minute interval was used for analysis.

Taiwan: Blood pressure in the right arm was measured twice at 10 minute intervals, with the participants seated after a 5 minute rest, using a computerized auto-mercury sphygmomanometer. The mean of the 2 measurements was used for the analysis.

ULSAM: This study measured urinary albumin excretion rate (µg/min), which was converted to mg/day by multiplying 1.44. All participants aged 65 or older and thus this study did not
contribute to the subgroup analysis of younger population. This study consists of only men. Blood pressure was measured 2 times in the right arm after a 10 minute rest. The mean of the two values was used in analyses.

2. High-risk cohorts

ADVANCE: This study is an intervention study which includes participants with diabetes only. Blood pressure was measured 2 times using a standardised automated sphygmomanometer after 5 minutes of rest. The mean of the two measurements was recorded.

CARE: This study is an intervention study in which all patients had a previous myocardial infarction. This study did not include dipstick category “+++”. Due to many missing values, data for fasting glucose and BMI were not included.

KEEP: Blood pressure was measured 2 times using either an oscillometric device (digital or electronic) or aneroid devices (manual inflatable cuff with stethoscope) after 5 minutes of rest. The average of the two measurements was recorded.

KP Hawaii: In this study for participants with only ACR, PCR was imputed by ACR * 1.5. This study did not collect data on fasting glucose, hypertension status, hypercholesterolemia status, diastolic blood pressure, anti-diabetic or anti-hypertensive medications. Hypertension was defined using systolic blood pressure (≥140 mmHg) measurements only. Outpatient blood pressure values recorded in the electronic medical record.

MRFIT: This study is an intervention study which includes men at above risk (study specified) for coronary heart disease based on higher levels of blood pressure, serum cholesterol, and cigarette use. Men were excluded if their serum creatinine was > 2.0 mg/dl. The study only included men. Blood pressure was measured 3 times using a standard nonzero mercury sphygmomanometer. The mean of the second and third diastolic blood pressures was used.

Pima: This study consists entirely of Pima and the closely-related Tohono O’odham Indians. ACR was measured in a spot urine specimen. History of cardiovascular disease was not recorded in this study. Blood pressure was measured 2 times using a mercury sphygmomanometer after 5 minutes of rest. The two measures were averaged.

ZODIAC: This study includes only individuals with type 2 diabetes. This study has not collected data on fasting glucose or hypercholesterolemia. Blood pressure was measured 2 times with a Welch Allyn Sphygmomanometer in the supine position after at least 5 min of rest. The mean blood pressure of two recordings was calculated.

3. CKD cohorts

AASK: This study is an intervention study which includes African American participants only. All participants were free of diabetes. Blood pressure was measured 3 times using a Hawksley
random zero sphygmomanometer after 5 minutes of rest. The mean of the last two readings was recorded.

CRIB: Blood pressure was recorded on two occasions 5 minutes apart with the subject in the sitting position and the arm rested on a table, using an automated oscillometric device. Mean systolic, diastolic, and pulse pressures were calculated.

Geisinger: This study includes all Geisinger primary care recipients, 18 years or older as of index date, and who have CKD, defined as two or more outpatient eGFR values < 60 by CKD-EPI equation. Covariates obtained most closely to index date within a past year were included in models. The measurement of blood pressure in all Geisinger Clinics is performed with sphygmomanometers from a single manufacturer. Individual clinics order whichever model they choose. During the study time frame, the majority of clinics were using aneroid sphygmomanometers. However, measurements were also taken using mercury sphygmomanometers.

GLOMMS-1: This study did not collect data on use of anti-diabetic or anti-hypertensive medication, total cholesterol, systolic or diastolic blood pressure, or BMI. Diabetes and hypertension status were coded based on hospital physician or general practitioner diagnosis recorded in case notes. The ethnicity of the Grampian population is relatively homogenous with overall 98.3% of males and 98.4% of females being white. Indians account for 0.2% of the population, Pakastani and other South Asian individuals account for 0.3%, Chinese 0.3% and 0.8% are recorded as other.

KPNW: This study defined diabetes using their own clinical tool that includes diagnosis codes, treatment codes, and laboratory values. This study has not collected use of anti-diabetic medications. Outpatient blood pressure values recorded in the electronic medical record.

MASTERPLAN: This study measured ACR in patients with albuminuria in the low range, PCR in patients with overt proteinuria. Thus, for those participants with only ACR, PCR was imputed by ACR * 1.5. Blood pressure was measured 5 times using an oscillometric device after 15 minutes of rest. The mean of the five measures was recorded.

MDRD: This study has not collected use of anti-diabetic or anti-hypertensive medications, use of statins, or hypercholesterolemia. Blood pressure was measured 3 times using a random zero sphygmomanometer after 5 minutes of rest. The average of the last two measurements was recorded.

MMKD: This study measured 24h proteinuria. Blood pressure was measured using a sphygmomanometer during recruitment of the patient.

NephroTest: Blood pressure was measured 3 times using a standardised automated sphygmomanometer (Omron ou Baxter) after 30 minutes of rest. The measurements were averaged.
RENAAL: This was a clinical trial. Blood pressure was measured 3 times at 1 minute intervals using a standard mercury sphygmomanometer after at least 5 minutes of rest. The mean value of the 3 readings was recorded for each visit. None of the 3 consecutive DBP readings could have differed from the mean by more than 5 mm Hg. If a greater difference occurred, additional readings were obtained until 3 consecutive DBP readings met this requirement.

Steno: Although this study has recruited type 1 diabetes mellitus patients with and without diabetic nephropathy, only participants with ACR ≥ 30 mg/g at baseline were included in this study as a CKD cohort. All participants had hypercholesterolemia. Blood pressure was measured 2 times with a standard mercury sphygmomanometer or Hawksley random zero sphygmomanometer after at least 10 minutes of rest. The two readings were averaged.

Sunnybrook: Blood pressure was measured 6 times using an automated device. The first was discarded and the last 5 were averaged.
### Appendix 3. Acknowledgements and funding for collaborating cohorts

<table>
<thead>
<tr>
<th>Study</th>
<th>List of sponsors</th>
</tr>
</thead>
<tbody>
<tr>
<td>AASK</td>
<td>NIDDK</td>
</tr>
<tr>
<td>ADVANCE</td>
<td>National Health and Medical Research Council of Australia program grant 571281; Servier</td>
</tr>
<tr>
<td>Aichi</td>
<td>KAKENHI (09470112, 13470087, 17390185, 18590594, 20590641, 20790438, 22390133)</td>
</tr>
<tr>
<td>AKDN</td>
<td>Canadian Institutes of Health Research; Alberta Innovates - Health Solutions; Kidney Foundation of Canada</td>
</tr>
<tr>
<td>ARIC</td>
<td>The Atherosclerosis Risk in Communities Study is carried out as a collaborative study supported by National Heart, Lung, and Blood Institute contracts (HHSN268201100005C, HHSN268201100006C, HHSN268201100007C, HHSN268201100008C, HHSN268201100009C, HHSN268201100010C, HHSN268201100011C, and HHSN268201100012C). The authors thank the staff and participants of the ARIC study for their important contributions.</td>
</tr>
<tr>
<td>AusDiab</td>
<td>The Baker IDI Heart and Diabetes Institute, Melbourne, Australia, their sponsors, and the National Health and Medical Research Council of Australia (NHMRC grant 233200), Amgen Australia, Kidney Health Australia and The Royal Prince Alfred Hospital, Sydney, Australia.</td>
</tr>
<tr>
<td>BC Cohort</td>
<td>BC Provincial Renal Agency, an Agency of the Provincial Health Services Authority in collaboration with University of British Columbia.</td>
</tr>
<tr>
<td>Beaver Dam</td>
<td>NIH/NIDDK DK73217NIH/NEI EY 006594</td>
</tr>
<tr>
<td>Beijing</td>
<td>The research for this study was supported by the Program for New Century Excellent Talents in University (BMU2009131) from the Ministry of Education of the People’s Republic of China, and the grants for the Early Detection and Prevention of Non-communicable Chronic Diseases from the International Society of Nephrology Research Committee.</td>
</tr>
<tr>
<td>CARE</td>
<td>Alberta Heritage Foundation for Medical Research/Alberta Innovates Health Solutions Interdisciplinary Team Grants Program</td>
</tr>
<tr>
<td>CHS</td>
<td>The research reported in this article was supported by contracts HHSN2682012000036C, N01-HC-85239, N01-HC-85079 through N01-HC-85086, N01-HC-35129, N01 HC-15103, N01 HC-55222, N01-HC-75150, N01-HC-45133, and grant HL080295 from the National Heart, Lung, and Blood Institute (NHLBI), with additional contribution from the National Institute of Neurological Disorders and Stroke (NINDS). Additional support was provided through AG-023629, AG-15928, AG-20098, and AG-027058 from the National Institute on Aging (NIA). A full list of principal CHS investigators and institutions can be found at <a href="http://www.chs-nhlbi.org/pi.htm">http://www.chs-nhlbi.org/pi.htm</a>.</td>
</tr>
<tr>
<td>CIRCS</td>
<td>N/A</td>
</tr>
<tr>
<td>Source</td>
<td>Funding Information</td>
</tr>
<tr>
<td>----------------</td>
<td>--------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>COBRA</td>
<td>Wellcome Trust, UK</td>
</tr>
</tbody>
</table>
| CRIB           | British Renal Society Project Grant Award  
British Heart Foundation Project Grant Award. |
| ESTHER         | Ministry of Research, Science and the Arts Baden-Württemberg (Stuttgart, Germany),  
Federal Ministry of Education and Research (Berlin, Germany),  
Federal Ministry of Family Affairs, Senior Citizens, Women and Youth (Berlin, Germany),  
European Commission FP7 framework programme of DG-Research (CHANCES Project). Measurement of urinary albumin was funded by Dade-Behring, Marburg, Germany. |
| Framingham     | NHLBI Framingham Heart Study (N01-HC-25195).                                         |
| Geisinger      | Geisinger Clinic                                                                     |
| GLOMMS-1       | Chief Scientist Office CZH/4/656                                                      |
| Gubbio         | Municipal and Health Authorities of Gubbio, Italy; Federico II University,  
Naples, Italy; University of Milan, Milan, Italy; Istituto Superiore di Sanità,  
Rome, Italy; Northwestern University, Chicago, USA; University of Salerno, Italy; Merck Sharp & Dohme – Italy. |
| HUNT           | N/A                                                                                  |
| IPHS           | N/A                                                                                  |
| KEEP           | N/A                                                                                  |
| KP Hawaii      | N/A                                                                                  |
| KPNW           | Amgen                                                                                  |
| MASTERPLAN     | The MASTERPLAN study is a clinical trial with trial registration ISRCTN registry: 73187232. Sources of funding: The MASTERPLAN Study was supported by grants from the Dutch Kidney Foundation (Nierstichting Nederland, number PV 01), and the Netherlands Heart Foundation (Nederlandse Hartstichting, number 2003 B261). Unrestricted grants were provided by Amgen, Genzyme, Pfizer and Sanofi-Aventis. |
| MDRD           | NIDDK U01 DK35073 and K23 DK67303, K23 DK02904                                         |
| MESA           | This research was supported by contracts N01-HC-95159 through N01-HC-95169 from the National Heart, Lung, and Blood Institute. The authors thank the other investigators, the staff, and the participants of the MESA study for their valuable contributions. A full list of participating MESA investigators and institutions can be found at [http://www.mesa-nhlbi.org](http://www.mesa-nhlbi.org). |
| MMKD           | The MMKD study was funded by the Austrian Heart Fund and by the Innsbruck Medical University. |
| MRC Older People | UK Medical Research Council, Department of Health for England, Wales and the  
Scottish Office and Kidney Research UK                                            |
| MRFIT          | The Multiple Risk Factor Intervention Trial was contracted by the National Heart,  
Lung, and Blood Institute (NHLBI), National Institutes of Health (NIH), Bethesda, Md. Follow-up after the end of the trial was supported with NIH/NHLBI grants R01-HL-43232 and R01-HL-68140. The principal investigators and senior staff of the clinical centers, coordinating center, other support centers and key committees are listed in a previous report |
<table>
<thead>
<tr>
<th>Study</th>
<th>Support Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>NHANES III</td>
<td>United States Center for Disease Control</td>
</tr>
<tr>
<td>NephroTest</td>
<td>The NephroTest CKD cohort study is supported by grants from: Inserm GIS-IReSP AO 8113LS TGJR; French Ministry of Health AOM 09114 and AOM 10245; Inserm AO 8022LS; Agence de la Biomédecine R0 8156LL, AURA, and Roche 2009-152-447G. The Nephrotest initiative was also sponsored by unrestricted grants from F.Hoffman-La Roche Ltd. The authors thank the collaborators and the staff of the NephroTest Study: Gauci C, Karras A, Maruani G, Daugas E, d'Auzac C, Jacquot C, Thervet E, Roland M, Letavernier E, Boffa JJ, Ronco P, Fessi H, du Halgouet C, Vrtovsnik F, Urena P.</td>
</tr>
<tr>
<td>OKINAWA 83</td>
<td>N/A</td>
</tr>
<tr>
<td>OKINAWA 93</td>
<td>N/A</td>
</tr>
<tr>
<td>Pima</td>
<td>This work was supported by the Intramural Research Program of the National Institute of Diabetes and Digestive and Kidney Diseases</td>
</tr>
<tr>
<td>PREVEND</td>
<td>The PREVEND study is supported by several grants from the Dutch Kidney Foundation, and grants from the Dutch Heart Foundation, the Dutch Government (NWO), the US National Institutes of Health (NIH) and the University Medical Center Groningen, The Netherlands (UMCG). Dade Behring, Marburg, Germany supplied equipment and reagents for nephelometric measurement of urinary albumin.</td>
</tr>
<tr>
<td>Rancho Bernardo</td>
<td>NIA AG07181 and AG028507 NIDDK DK31801</td>
</tr>
<tr>
<td>REGARDS</td>
<td>This research project is supported by a cooperative agreement U01 NS041588 from the National Institute of Neurological Disorders and Stroke, National Institutes of Health, Department of Health and Human Service. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institute of Neurological Disorders and Stroke or the National Institutes of Health. Representatives of the funding agency have been involved in the review of the manuscript but not directly involved in the collection, management, analysis or interpretation of the data. The authors thank the other investigators, the staff, and the participants of the REGARDS study for their valuable contributions. A full list of participating REGARDS investigators and institutions can be found at <a href="http://www.regardsstudy.org">http://www.regardsstudy.org</a>. Additional funding was provided by an investigator-initiated grant-in-aid from Amgen. Representatives from Amgen did not have any role in the design and conduct of the study, the collection, management, analysis, and interpretation of the data, or the preparation or approval of the manuscript.</td>
</tr>
<tr>
<td>Study</td>
<td>Support Details</td>
</tr>
<tr>
<td>---------</td>
<td>----------------</td>
</tr>
<tr>
<td>RENAAL</td>
<td>The RENAAL trial was supported by Merck and Company.</td>
</tr>
<tr>
<td>Severance</td>
<td>Seoul city R&amp;BD program (10526), Korea, The National R&amp;D Program for Cancer Control, Ministry for Health, Welfare and Family affairs, Republic of Korea (1220180), and The National Research Foundation of Korea(NRF) grant funded by the Korea government(MEST) (2011-0029348).</td>
</tr>
<tr>
<td>STENO</td>
<td>N/A</td>
</tr>
<tr>
<td>Taiwan</td>
<td>This study was supported by Taiwan Department of Health Clinical Trial and Research Centre of Excellence (DOH 101-TD-B-111-004)</td>
</tr>
<tr>
<td>ULSAM</td>
<td>The Swedish Research Council (2006-6555), the Swedish Heart-Lung Foundation, Dalarna University, and Uppsala University.</td>
</tr>
<tr>
<td>ZODIAC</td>
<td>N/A</td>
</tr>
</tbody>
</table>
References


