Added Value of Screening for CKD among the Elderly or Persons with Low Socioeconomic Status

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Abstract

Background and objective Three screening approaches were compared for their ability to detect CKD cases, and identify patients with CKD who have a higher rate of incident cardiovascular disease (CVD) events and renal function decline. Approach 1 was the traditional CKD screening approach, targeting only individuals with known diabetes, hypertension, or CVD history. Approach 2 was defined as Approach 1+elderly, and Approach 3 as Approach 1+low–socioeconomic status (SES) individuals.

Design, setting, participants, & measurements Data on 3411 individuals from the general population in The Netherlands were examined. Individuals aged >60 years were classified as elderly. Persons with low SES was defined as those with primary school or below primary school education. CKD was diagnosed during outpatient clinic visits. Individuals were followed for 9.4±2.6 years during four screening rounds.

Results At baseline, 16%, 29%, and 25% of the general population was to be screened and 36%, 59%, and 51% of the CKD (*n*=263) cases were detected in Approaches 1, 2, and 3, respectively. The numbers of individuals needed to screen to detect one CKD case were 5.6 in Approach 1 and 6.5 each in Approach 2 and 3. In Approach 2 the hazard ratio for incident CVD events was 1.87 (95% confidence interval [95% CI], 1.35 to 2.61) in detected and 1.92 (95% CI, 1.01 to 3.64) in undetected CKD cases compared with persons without CKD, whereas in Approach 3 these values were 2.31 (95% CI, 1.64 to 3.25) and 1.28 (95% CI, 0.77 to 2.13), respectively. In Approach 2, the rate of renal function decline was −1.37 ml/min per 1.73 m^2 per year in detected and −1.13 ml/min per 1.73 m^2 per year in undetected CKD cases. In Approach 3, these figures were −1.41 and −1.14 ml/min per 1.73 m^2 per year, respectively.

Conclusions Adding persons with low SES, rather than adding elderly persons, to the traditional high-risk groups may help detect more persons with CKD who have a higher rate of future CVD events and renal function decline.

Clin J Am Soc Nephrol 10: 562–570, 2015. doi: 10.2215/CJN.09030914

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Introduction

CKD is a major public health problem. The prevalence of CKD is relatively high, estimated to be around 10% on a population level. Even mildly impaired kidney function and elevated albuminuria are associated with cardiovascular morbidity and mortality and with progression to ESRD (1,2). Moreover, the costs of CKD management have increased substantially (3). Because CKD often lacks symptoms in the early stages, the diagnosis is often delayed (4). Detection of CKD in earlier stages provides opportunities for early treatment, thereby slowing CKD progression and reducing the incidence of cardiovascular complications.

For CKD detection, screening of high-risk groups is advised. The traditional CKD screening approach (as advocated in the Kidney Disease Improving Global Outcomes guidelines) recommends screening of patients with known diabetes mellitus, hypertension or cardiovascular disease (CVD) history (5). Even with the adoption of such an approach, a large number of CKD cases still remain undiagnosed. Therefore, adding other risk groups, such as elderly persons (age >60 years), has been advised (6). Several studies have also shown an increased risk of CKD in individuals with low socioeconomic status (SES) and suggested screening for CKD among low-SES groups (7–11). To date, it is not known whether adding elderly persons or individuals with low SES to the traditional CKD screening approach is effective in identifying patients with CKD at risk for adverse health outcomes.

We hypothesized that adding elderly persons or individuals with low SES increases the yield of screening compared with the traditional screening approach. We investigated three screening approaches: Approach 1, the traditional approach (*i.e.*, screening individuals with known diabetes mellitus, hypertension, or CVD history); Approach 2, the traditional approach plus inclusion of individuals older than 60 years; and Approach 3, the traditional approach plus inclusion of individuals with low SES (*i.e.*, individuals with primary school or below primary school education). SES was defined by educational level because low education has a stronger association with CKD in The Netherlands than does low income (12). The screening approaches were compared

for their ability to detect CKD cases. Furthermore, for each screening approach, incident CVD events and renal function decline during follow-up were assessed in detected and undetected CKD cases to determine which screening approach best identifies patients with CKD at risk for adverse health outcomes.

Materials and Methods

Study Design and Population

Data from the Prevention of Renal and Vascular Endstage Disease (PREVEND) study were used. PREVEND is a prospective, observational cohort study designed to investigatethe association of albuminuria with renal and cardiovascular outcomes in the general population. PREVEND comprised 8592 community-dwelling individuals and is enriched for individuals with higher albuminuria (≥10 mg/L). Because this design may affect the findings of the different screening approaches, a subsample of the overall PREVEND cohort representative of the general population was used. For this, all individuals with a urinary albumin concentration <10 mg/L were included and a random subset of individuals with a urinary albumin concentration ≥10 mg/L was added (n=3432) (13). Twenty-one individuals with incomplete information on CKD status at baseline were excluded, leaving 3411 individuals for analysis.

The PREVEND study was approved by the medical ethics committee of the University Medical Center Groningen and is conducted in accordance with the guidelines of the Declaration of Helsinki.

Measurements

Individuals collected two 24-hour urine samples for assessment of albuminuria. Fasting blood samples were obtained for measurement of creatinine, cystatin C, cholesterol, and glucose on a Roche autoanalyzer. Serum creatinine was measured by an enzymatic method (Eastman Kodak, Rochester, NY; isotope dilution mass spectrophotometry traceable; intra- and interassay coefficient of variation [CV], 2.2% and 2.6%, respectively), serum cystatin C by a particle enhanced turbidimetric assay (Gentian, Moss, Norway; International Federation of Clinical Chemistry traceable; intra- and interassay CV, 1.7%–2.2% and 1.7%–3.5%, respectively) and urinary albumin concentration by nephelometry (BNII; Dade Behring Diagnostic, Marburg, Germany; intra- and interassay CV, <2.2% and <2.6%, respectively).

Variables

Diabetes, Hypertension, and CVD History. Diabetes and hypertension were considered to be known when individuals used glucose or BP-lowering medication as per self-report or based on pharmacy records. Unknown diabetes was defined as a fasting glucose ≥126 mg/dl without use of glucose-lowering medication, in accordance with the American Diabetes Association criteria (14), and unknown hypertension as a systolic BP ≥140 mmHg or systolic BP ≥90 mmHg without use of BP-lowering medication in accordance with the criteria of the seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (15). Information on CVD history was obtained from questionnaires; CVD history was defined as a previous hospital admission for a cardiovascular or cerebrovascular event.

SES. SES was defined by information on education level, obtained from baseline questionnaire and categorized as high (bachelor, master, or doctorate graduate), medium (secondary education or nontertiary or short-cycle tertiary education), and low (primary education or below primary education).

CKD. CKD was defined as an eGFR<60 ml/min per 1.73 m^2 or urinary albumin excretion (UAE)≥30 mg/24 hours or both (16). GFR was estimated with both serum creatinine and cystatin C using the recently recommended CKD–Epidemiology Collaboration equation (17). Albuminuria was expressed as the average UAE in two 24-hour urine samples.

Cardiovascular and Renal Outcomes at Follow-up. CVD endpoints were defined as incidence of fatal and nonfatal myocardial infarction, stroke, ischemic heart disease, revascularization procedures, or cardiovascular mortality or hospitalization. Data on mortality and cause of death were received from the Dutch Central Bureau for Statistics. Information on hospitalization for cardiovascular morbidity was obtained from Prismant (Utrecht, The Netherlands), the Dutch national registry of hospital discharge diagnoses. All data were coded according to the International Classification of Diseases, 10th Revision, and the classification of interventions. For the renal outcome, we used change in renal function per year, estimated by the slope of a linear regression line, fitted between two or more serial eGFR values obtained over time using the least-squares principle.

Statistical Analyses

To evaluate the yield of the screening approaches, we calculated the following for each screening approach: (*1*) the proportion of the overall population that required screening, (*2*) the proportion of CKD cases identified, and (*3*) the number of individuals needed to screen to detect one CKD case. In addition, we evaluated the outcome of detected and undetected CKD cases in each screening approach, taking into account CVD events and renal function decline during follow-up. Cox proportional hazard analysis, adjusted for age and sex, was used to calculate risk for incident CVD events. Survival time was defined as the period from the date of the baseline screening to the date of first CVD event or January 1, 2009 (end of follow-up). Individuals were censored in case of death other than that related to CVD or a move to an unknown destination. Multilevel linear regression analysis was used to obtain age- and sex-adjusted rates of eGFR decline, taking variance of individual slopes of renal function change into account.

We also examined whether the yield of adding elderly persons and low-SES individuals together is better than adding them individually to the traditional CKD screening approach. To test whether the yield of additional screening depends on the SES measure, we repeated the analyses using income as an indicator of SES. Low income was defined as the lowest quintile of the poverty income ratio (12,18).

A P value <0.05 was considered to indicate statistical significance. All analyses were conducted using Stata software, version 12.0 (Stata Corp., College Station, TX).

Results

Baseline Characteristics

In all three screening approaches, individuals to be screened were older, had higher body mass indexes, and had higher total blood cholesterol levels compared with individuals not selected for screening. The prevalence of unknown hypertension was higher in individuals to be screened in Approaches 2 and 3 than in individuals identified for screening in Approach 1. In all approaches, baseline eGFR was lower and UAE higher in individuals selected for screening compared with individuals not selected for screening (Table 1).

For each approach, patients with CKD who were detected were older and had lower baseline eGFR and higher UAE than patients with CKD who remained undetected. The prevalence of undiagnosed hypertension and diabetes tended to be higher in undetected than in detected CKD cases in all approaches, but in undetected CKD cases the prevalence was lower in Approaches 2 and 3 than in Approach 1. In Approaches 2 and 3, detected CKD cases had a higher prevalence of unknown hypertension than in Approach 1 (both $P<0.001$). Detected CKD cases in Approach 3 had the lowest age and the highest GFR and UAE compared with detected CKD cases in the other two approaches, although these differences did not reach statistical significance (Table 2).

Population Screening and CKD Detection

The number of individuals to be screened was highest in Approach 2 and lowest in Approach 1 (Table 1). From a total of 263 CKD cases at baseline (Table 2), the proportion of CKD cases detected in Approach 1 was 36% (95% confidence interval [95% CI], 30% to 42%), whereas in Approaches 2 and 3 the proportions were 59% (95% CI, 53% to 65%) and 51% (95% CI, 44% to 56%), respectively. Compared with Approach 1, the proportion of CKD cases detected was significantly higher in Approach 2 and 3 (both $P<0.001$). The identified CKD cases were predominantly defined by albuminuria ≥30 mg/24 hours. The proportion of patients with CKD defined by an eGFR<60 ml/min per 1.73 m^2 was relatively low (Table 2). The number needed to screen to identify one CKD case was roughly similar in the three approaches, although the numbers tended to be slightly higher in Approaches 2 and 3 than in Approach 1, with values of 5.6, 6.5, and 6.5, respectively. The distribution of individuals to be screened and the distribution of detected CKD cases for the three approaches is shown in Figure 1.

Outcomes in CKD Cases

During a mean follow-up (±SD) of 9.4±2.6 years, 275 incident CVD events occurred. Patients with CKD, detected or undetected by the different approaches, had a higher risk of incident CVD events than individuals without CKD of the same age and sex (Figure 2). Only undetected CKD cases in Approach 3 did not have a higher CVD risk compared with persons without CKD. Finally, detected CKD cases had a higher risk for CVD than undetected CKD cases in Approaches 1 and 3, but not in Approach 2.

Serial follow-up of eGFR was available for 80% of the overall population, with an average of 3.1 eGFR measurements (82% and 3.1 in non-CKD cases and 79% and 2.8 in CKD cases, respectively). The rate of renal function decline was significantly higher in detected and undetected CKD cases than in persons without CKD in all three screening approaches (Figure 3). The rate of renal function decline tended to be higher in detected than in undetected cases in Approaches 2 and 3 ($P=0.17$ and $P=0.11$, respectively), whereas in Approach 1 this difference reached statistical significance ($P=0.001$).

Additional Analyses

Compared with the three approaches, adding elderly persons and individuals with low SES to be screened for CKD detected the highest percentage of CKD cases (68%) but also required the highest percentage of the overall population to be screened (35%). The risks for future CVD events and renal function decline were essentially similar to those obtained in Approach 3 (Supplemental Appendix 1). Compared with adding individuals with low SES defined by low education to the traditional target population for CKD screening, adding individuals with low SES defined by low income required a similar number of participants to be screened (P for difference=0.68) but detected fewer CKD cases (P for difference <0.05). The risks for future CVD events and renal function decline were essentially similar when low SES was defined according to income instead of education (Supplemental Appendix 1).

Discussion

We examined the added value of screening for CKD among elderly persons or individuals with low SES. Our results show that the number of individuals needed to screen to detect one CKD case were similar in both approaches and similar to the traditional screening approach (*i.e.*, screening individuals with known hypertension, diabetes, or a CVD history). Adding persons with low SES rather than adding elderly to this traditional approach detected more CKD cases with a high risk for both future CVD events and decline in renal function.

Earlier studies have also reported on CKD screening outcomes when adding elderly as a risk group to the traditional approach. One study used data from the same cohort as the present study, examining CKD screening among elderly persons and individuals with a high urinary albumin concentration (UAC) during a prescreening (19). Results favored additional screening using UAC to detect CKD cases, but prescreening on UAC leads to extra work and costs. A Norwegian study showed that screening elderly persons, along with individuals of known CVD risk factors, was effective in detecting more CKD cases, but that the risk for ESRD among those detected CKD cases was low (20). The yield of adding individuals with low SES to the traditional CKD screening target population has never been examined.

The elderly are at high risk of developing CKD (21), and screening for CKD among the elderly is effective in detecting large numbers of CKD cases (19,20). However, eGFR decreases with aging (21,22). Therefore, adding elderly persons to the traditional CKD screening approach may be efficient in detecting individuals with mildly impaired GFR, but it may not be the most efficient approach to detect CKD cases at increased risk for CKD complications. We found that adding elderly persons to the screened

Table 1. Baseline characteristics of the overall study population and of individuals to be screened and not to be screened per screening approach

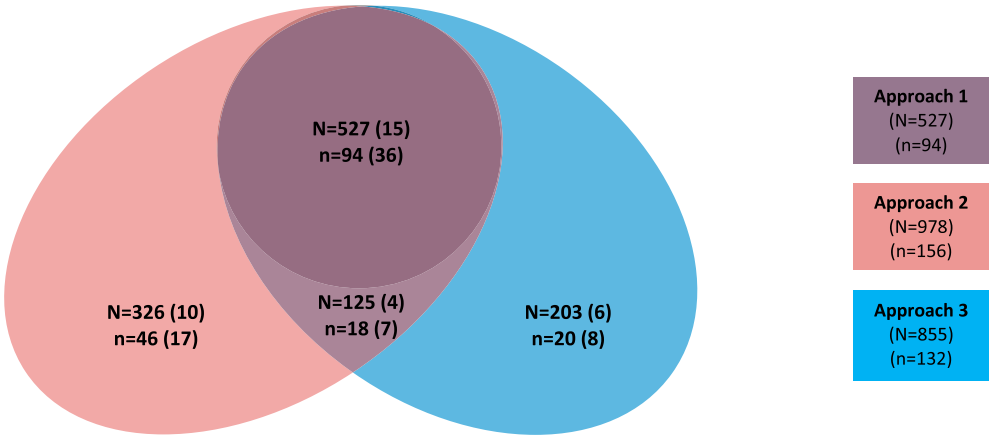
Variable	All (*n*=3411)	Screening Approaches								
		Approach 1 (CVD Risk)			Approach 2 (CVD Risk or Age >60 yr)			Approach 3(CVD Risk or Low SES)		
		Screened: *n*=527 (15%)	Not screened: *n*=2884 (85%)	*P* Value	Screened: *n*=978 (29%)	Not screened: *n*=2433 (71%)	*P* Value	Screened: *n*=855 (25%)	Not screened: *n*=2556 (75%)	*P* Value
Age (yr)	49±12	59±11	47±12	<0.001	63±9.0	43±8.4	<0.001	58±11	46±11	<0.001
Men (%)	45	47	45	0.39	47	45	0.27	44	46	0.38
White (%)	95	94	95	0.53	96	95	0.25	95	95	0.75
Body mass index (kg/m^2)	26±4.1	28±4.2	25±3.9	<0.001	28±4.1	25±3.9	<0.001	28±4.3	25±3.8	<0.001
Cholesterol (mg/dl)	216.2±42.5	223.9±38.6	216.1±42.1	<0.001	231.7±38.1	212.4±42.1	<0.001	227.8±42.3	212.1±42.0	<0.001
Smoking (%)	35	27	36	<0.001	27	38	<0.001	34	35	<0.001
Known (%)										
Hypertension	13	84	0.0	<0.001	45	0.0	<0.001	52	0.0	<0.001
Diabetes mellitus	1.1	7.4	0.0	<0.001	4.0	0.0	<0.001	4.6	0.0	<0.001
CVD history	4.2	27	0.0	<0.001	15	0.0	<0.001	17	0.0	<0.001
Unknown (%)										
Hypertension	16	5.7	18	<0.001	22	13	<0.001	16	14	0.16
Diabetes mellitus	3.4	8.2	2.5	<0.001	6.5	2.1	<0.001	6.2	2.2	<0.001
eGFR (ml/min per 1.73 m^2)	96±16	85±17	97±15	<0.001	84±15	100±14	<0.001	88±16	98±15	<0.001
UAE (mg/24 hr)	7.1 (5.4–11)	8.5 (5.7–17)	6.9 (5.4–10)	<0.001	8.1 (5.7–15)	6.9 (5.4–10)	<0.001	8.4 (5.5–16)	6.9 (5.4–10)	<0.001

Normally distributed variables are presented as mean±SD. Skewed variables are presented as median (interquartile range). CVD, cardiovascular disease; eGFR, estimated glomerular filtration rate; UAE, urinary albumin excretion; SES, socioeconomic status.

Table 2. Characteristics of all CKD cases and of CKD cases that were detected or undetected by the three screening approaches

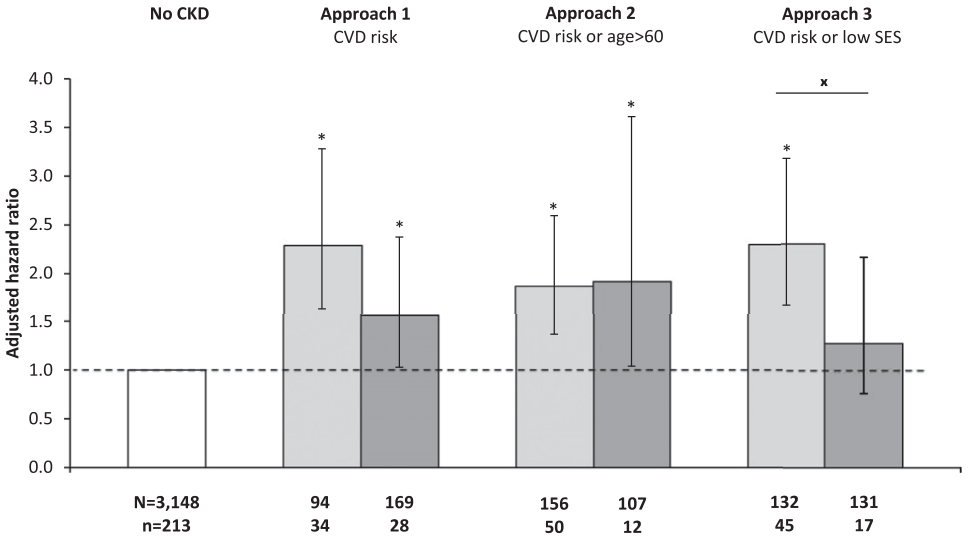
Variable	All (n=263)	Screening Approaches								
		Approach 1 (CVD Risk)			Approach 2 (CVD Risk or Age >60 yr)			Approach 3 (CVD Risk or Low SES)		
		Detected: n=94 (36%)	Undetected: n=169 (64%)	P Value	Detected: n=156 (59%)	Undetected: n=107 (41%)	P Value	Detected: n=132 (51%)	Undetected: n=131 (49%)	P Value
Age (yr)	57±12	64±8.5	53±13	<0.001	66±6.8	45±8.9	<0.001	63±9.4	55±14	<0.001
Men (%)	57	62	54	0.21	62	50	0.05	61	52	0.14
White (%)	95	95	95	0.27	95	95	0.33	95	95	0.96
Body mass index (kg/m^2)	28±4.7	28±3.9	27±5.0	0.64	28±4.1	27±5.3	0.09	28±4.4	27±4.8	0.004
Cholesterol (mg/dl)	227.9±41.7	227.5±42.6	228.1±42.1	0.74	231.7±42.3	223.9±42.5	0.06	227.8±38.6	227.1±46.3	0.86
Smoking (%)	39	25	46	0.001	30	50	0.003	35	42	0.08
Known (%)										
Hypertension	25	68	0.0	<0.001	42	0.0	<0.001	49	0.0	<0.001
Diabetes mellitus	2.4	6.5	0.0	0.001	4.0	0.0	0.04	4.7	0.0	0.02
CVD history	11	27	0.0	<0.001	18	0.0	<0.001	21	0.0	<0.001
Unknown (%)										
Hypertension	35	11	48	<0.001	32	36	0.08	29	41	0.03
Diabetes mellitus	9.7	6.4	12	0.17	6.6	14	0.05	7.6	12	0.26
eGFR (ml/min per 1.73 m^2)	83±22	72±18	89±22	<0.001	72±18	97±19	<0.001	75±19	90±22	<0.001
eGFR<60 ml/min per 1.73 m^2 (%)	27	38	18	<0.001	41	3.0	<0.001	33	18	<0.001
UAE (mg/24 hr)	48 (35–247)	60 (37–128)	55 (37–93)	0.02	58 (36–115)	56 (38–99)	<0.001	62 (37–127)	55 (37–93)	0.05
UAE≥30 mg/24 hr (%)	83	74	88	0.19	74	92	0.04	78	87	0.21

Normally distributed variables are presented as mean ±SD. Skewed variables are presented as median (interquartile range). CKD, chronic kidney disease; CVD, cardiovascular disease; SES, socioeconomic status; eGFR, estimated glomerular filtration rate; UAE, urinary albumin excretion.



Note: Total study population=3,411 and total number of CKD cases=263.

Figure 1. | Number, percentage, and distribution of individuals to be screened for CKD (*N*) and CKD cases detected (*n*) in the three screening approaches. Total study population: *N*=3411; total number of CKD cases, *n*=263.



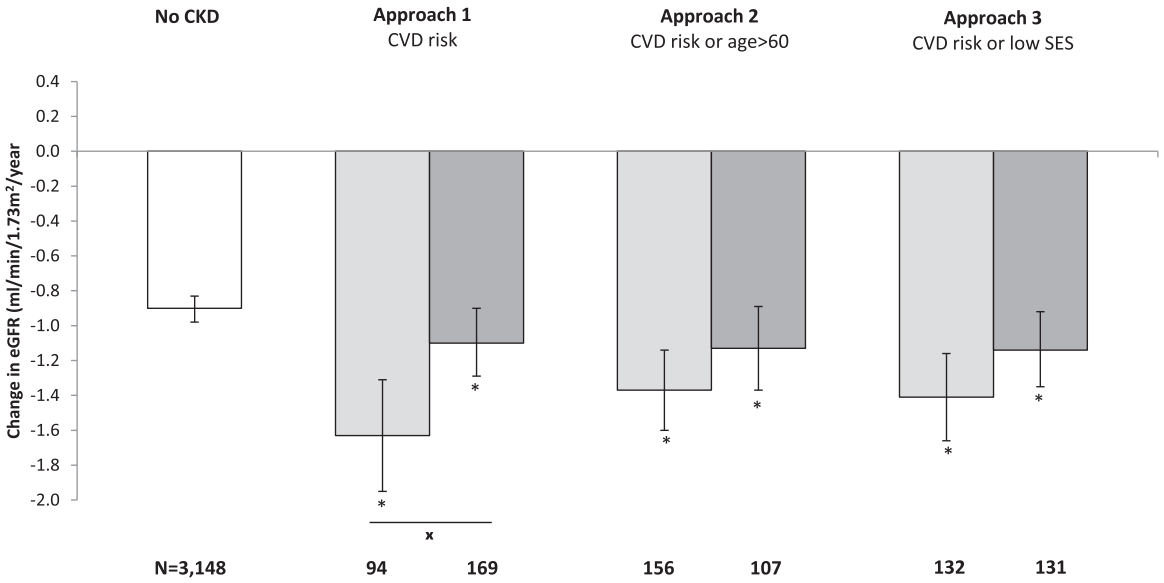
Abbreviations: N=number of participants; n=number of events; CVD=cardiovascular disease; CKD=chronic kidney disease, SES=socioeconomic status.
*p<0.05 for difference between non CKD subjects and CKD cases, ^{x}p<0.05 for difference between detected and non-detected CKD cases in one approach

Figure 2. | Age- and sex-adjusted hazard rates (with 95% confidence interval) for cardiovascular disease (CVD) events in individuals with CKD that were detected (light gray bars) or not detected (dark gray bars) per screening approach, with individuals without CKD at baseline (white bar) as reference. *N*, number of individuals; *n*, number of events; SES, socioeconomic status. *$P<0.05$ compared with non-CKD individuals; x=$P<0.05$ compared with detected CKD cases for the same approach.

population identified an additional 23% of all patients with CKD present in the general population. However, these individuals were at relatively low risk for future CVD events (Figure 2).

Adding individuals with low SES to the traditional target population for CKD screening (Approach 3) led to detection of 51% of all CKD cases. Approach 3 not only detected CKD cases that were at high risk for CKD-related complications but also resulted in delineating a group of undetected CKD cases with a relatively good prognosis compared with nondetected CKD cases in Approach 2, particularly for CVD complications. The higher percentage of smokers among individuals identified by Approach 3 might be a reason for a better prediction of CVD complications compared with the other approaches. Identifying a higher percentage of smokers is therefore an additional benefit of Approach 3.

In an additional analysis, we examined the yield of screening when adding low-income individuals instead of low-education individuals to the traditional target population for CKD screening. This led to essentially similar results, except that adding individuals with low education led to detection of more CKD cases than did adding individuals with low income. We also examined the yield of adding the elderly and individuals with low SES to the traditional target population



Abbreviations: N=number of participants; CVD=cardiovascular disease; CKD=chronic kidney disease; eGFR=estimated glomerular filtration rate.
*P <0.05 compared to non-CKD subjects, x=P <0.05 compared to detected CKD cases for the same approach.

Figure 3. | Age- and sex-adjusted rates of eGFR decline (with 95% confidence interval) in individuals with CKD that were detected (light gray bars) or not detected (dark gray bars) per screening approach, with individuals without CKD at baseline (white bar) as reference. *N*, number of individuals. **P*<0.05 compared with non-CKD individuals; x=*P*<0.05 compared with detected CKD cases for the same approach.

for CKD screening. The number of individuals needed to screen to identify one CKD case in this approach was similar to that seen in Approach 3 (7 and 6.5, respectively). This approach also makes a good distinction regarding prognosis among detected and undetected CKD cases as Approach 3. However, given the current reluctance to add new high-risk groups to be screened for CKD, it seems unlikely that two risk groups will be added simultaneously for CKD screening in the near future.

We found that identified CKD cases were predominantly defined on the basis of increased albuminuria and that these had relatively high eGFRs. Identifying such CKD cases may be of particular interest from a screening perspective because even moderately increased albuminuria is a marker of increased risk for mortality and adverse renal outcomes, independent of renal function (23,24). Furthermore, intervening in individuals with still-preserved kidney function has the potential to delay renal failure more efficiently than in patients with CKD with already impaired kidney function.

Implementation of additional screening for CKD among elderly persons or low-SES groups necessitates the collection of information on age and SES of individuals. Information on age is routinely collected and its operationalization is straightforward. Information on SES can also be collected relatively easily, in particular when it is measured by education level. However, SES can be defined and measured in various ways (*e.g.,* by income, education, occupation, and neighborhood characteristics) (25). Moreover, there is no established threshold to define low SES (25,26). We have previously shown that the optimal SES measure to identify CKD cases may vary regionally, depending on circumstances such as costs of access to health care (12). These considerations indicate that region-specific operationalization of SES will be needed to obtain an optimal yield from a screening approach involving individuals with low SES.

Important strengths of our study are, first, that we assessed eGFR and albuminuria using the gold standards for population studies (*i.e.,* serum creatinine and cystatin C to estimate GFR and 24-hour UAE to assess albuminuria). This triple-marker approach has been shown to be the most accurate in defining CKD. Second, we used an optimized SES measure (*i.e.,* education) to define low SES. Finally, to assess future adverse health outcomes, we followed individuals for a relatively long period (almost 10 years).

Our study also has some limitations. First, the power of our study to detect differences in prognosis between detected and undetected CKD cases was relatively limited. Second, our study population may not be representative of populations of other countries, as populations can differ across countries socioeconomically, racially/ethnically, and with respect to the prevalence of known versus unknown diabetes mellitus and hypertension. Our findings should be confirmed in other populations. However, because our study was conducted in a representative sample of the Dutch population, characterized by a relatively high SES and high percentages of known diabetes and hypertension, our encouraging results may be even better in other populations. Third, examined individuals volunteered to participate in an observational study and thus are usually healthier than people who do not participate. Therefore, the yield of screening and the risk for adverse outcomes might be underestimated. However, this might also occur in actual population screening programs (27) and is therefore unlikely to have biased our results to a large extent.

For CKD screening, adding elderly persons or low-SES groups to the traditional target populations for CKD screening will lead to an increase in workload for health services as the number of individuals needed to be screened increases. Moreover, the CKD cases that are detected require intervention to prevent CKD progression and cardiovascular complications. Comprehensive cost-effectiveness analyses are needed to assess whether the associated costs are in balance with the benefits regarding prevented CKD and CVD events. Our data provide important information to start such studies, as well as information for public health policy makers regarding optimization of strategies for detecting CKD.

In conclusion, our study shows that adding individuals with low SES rather than adding elderly persons to the traditional target population for CKD screening might be helpful in detecting more patients with CKD who have a high risk for future CVD events as well as renal function decline. Confirmation of these results in other populations and cost-effectiveness studies are needed to indicate whether screening individuals with low SES for CKD is justified.

Acknowledgments

We thank individuals who participated in the Prevention of Renal and Vascular End-stage Disease (PREVEND) studies and the staff that helped in data collection.

This study did not receive any specific funding. All authors received funding from their respective institutes. PREVEND is funded by the Dutch Kidney Foundation.

The funding bodies had no role in the design and conduct of the study, in the collection, analysis, and interpretation of the data, or in the decision to publish the manuscript.

The abstract of this manuscript was published in the abstract supplement of the American Society of Nephrology–Kidney Week 2014.

Disclosures

None.

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Received: September 10, 2014 **Accepted:** December 22, 2014

Published online ahead of print. Publication date available at www.cjasn.org.

This article contains supplemental material online at http://cjasn.asnjournals.org/lookup/suppl/doi:10.2215/CJN.09030914/-/DCSupplemental.

See related editorial, "To Screen or Not to Screen: That Is Not (Yet) the Question," on pages 541–543.