Supplemental Table 1 | Association of laboratory and kidney stone history parameters as main explanatory variables with Z-scores at the lumbar spine as outcome variable after exclusion of potentially confounding medication intake (calcium and/or vitamin D supplements, thiazide or loop diuretics, and alkali supplements). Multivariable models are adjusted for the co-variables sex (women versus men), age, BMI, eGFR, and tobacco consumption. The number (N) of participants, unadjusted and adjusted beta coefficients (β), their 95% confidence intervals (95% CI) and the corresponding p-values are indicated for each model. All continuous explanatory variables in the models were scaled to standard deviation (SD) and every one SD increase in the continous explanatory variable results in an average increase of the β value in Z-scores at the lumbar spine as outcome variable. Abbreviations: BMI, body mass index; BSA, body surface area; eGFR, estimated glomerular filtration rate.

	Unadjusted Model			Multivariable Model		
Explanatory variable	**N**	**β;95% CI**	***p*-value**	**N**	**β;95% CI**	***p*-value**
Blood						
eGFR, mL/min per 1.73 m^2 BSA	422	-0.072;-0.102 to -0.041	5.7E-06	337	-0.042;-0.083 to -0.001	0.043
Calcium total, mmol/L	422	-0.035;-0.066 to -0.004	0.026	337	-0.016;-0.05-0.018	0.36
Phosphate, mmol/L	420	0.012;-0.019-0.043	0.46	337	0.002;-0.03-0.033	0.92
Magnesium, mmol/L	418	-0.019;-0.05-0.012	0.24	335	-0.018;-0.048-0.012	0.24
Uric acid, µmol/L	420	0.013;-0.018-0.045	0.40	335	0.016;-0.013-0.045	0.28
Bicarbonate, mmol/L	412	-0.034;-0.065 to -0.003	0.032	330	0.007;-0.026-0.041	0.67
Glucose, mmol/L	411	0.014;-0.017-0.046	0.37	330	0;-0.031-0.031	0.99
Alkaline phosphatase, IU/mL	421	-0.028;-0.06-0.003	0.080	336	-0.031;-0.063-0.002	0.062
PTH, pg/mL	421	-0.024;-0.055-0.007	0.12	336	-0.031;-0.063-0	0.048
25-OH-Vitamin D_3, ng/mL	263	0.022;-0.019-0.063	0.29	200	0.028;-0.016-0.072	0.21
1,25-OH-Vitamin D_3, pg/mL	416	-0.039;-0.07 to -0.008	0.013	332	-0.008;-0.04-0.024	0.61
Urine	408	-0.002;-0.034-0.029	0.88			
Sodium, mmol/24 h	408	-0.002;-0.034-0.029	0.88	324	0.023;-0.012-0.058	0.20
Sodium, mmol/24 h – restricted diet	354	-0.02;-0.055-0.016	0.27	286	0.009;-0.027-0.044	0.64
Potassium, mmol/24 h	407	0.032;0-0.063	0.050	323	0.031;-0.004-0.066	0.081
Calcium, mmol/24 h	406	-0.029;-0.061-0.003	0.073	324	0;-0.034-0.034	0.98
Calcium, mmol/24 h – restricted diet	358	-0.044;-0.079 to -0.009	0.013	289	-0.013;-0.05-0.023	0.47
Phosphate, mmol/24 h	406	-0.016;-0.048-0.016	0.34	324	0.02;-0.016-0.057	0.28
Magnesium, mmol/24 h	406	-0.01;-0.042-0.022	0.53	324	0.008;-0.024-0.041	0.62

Uric acid, µmol/24 h	406	-0.018;-0.05-0.014	0.28	324	0.022;-0.016-0.06	0.25
Urea, mmol/24 h	406	0.006;-0.026-0.038	0.71	323	0.035;-0.002-0.071	0.061
Citrate, mmol/24 h	404	0.029;-0.003-0.06	0.077	322	0.013;-0.018-0.045	0.41
Oxalate, mmol/24 h	404	-0.018;-0.049-0.014	0.27	322	-0.014;-0.043-0.015	0.33
Sulfate, mmol/24 h	397	-0.009;-0.042-0.023	0.57	317	0.048;-0.046-0.142	0.32
NGIA, mmol/24 h	370	0.041;0.007-0.074	0.017	297	0.035;-0.005-0.075	0.086
pH, 24 h	393	-0.039;-0.071 to -0.006	0.019	312	-0.004;-0.038-0.03	0.81
Fasting calcium/creatinine, mmol/mmol	394	-0.053;-0.084 to -0.021	0.0013	314	-0.032;-0.064-0.001	0.055
Post-load calcium/creatinine, mmol/mmol	396	-0.075;-0.106 to -0.045	2.3E-06	315	-0.058;-0.1 to -0.016	0.0065
ΔCa: post-load─fasting, mmol/mmol	347	-0.073;-0.105 to -0.041	1.1E-05	279	-0.053;-0.09 to -0.016	0.0046
Kidney stone history and composition						
Age at first stone event, y	404	0.056;0.024-0.087	5.5E-04	321	-0.001;-0.044-0.042	0.96
Number of stone events	426	0.021;-0.01-0.052	0.18	337	0.012;-0.017-0.04	0.42
Recurrent stone former (yes)	426	0.017;-0.014-0.048	0.28	337	0.026;-0.006-0.059	0.11
Calcium oxalate monohydrate content, %	333	0.026;-0.008-0.06	0.13	268	0.012;-0.023-0.046	0.51
Calcium oxalate dihydrate content, %	333	-0.058;-0.091 to -0.024	8.9E-04	268	-0.047;-0.081 to -0.013	0.0064
Apatite, %	333	0.013;-0.022-0.047	0.47	268	0.013;-0.026-0.051	0.52

Supplemental Table 2 | Association of laboratory and kidney stone history parameters as main explanatory variables with Z-scores at the femoral neck as outcome variable after exclusion of potentially confounding medication intake (calcium and/or vitamin D supplements, thiazide or loop diuretics, and alkali supplements). Multivariable models are adjusted for the co-variables sex (women versus men), age, BMI, eGFR, and tobacco consumption. The number (N) of participants, unadjusted and adjusted beta coefficients (β), their 95% confidence intervals (95% CI) and the corresponding p-values are indicated for each model. All continuous explanatory variables in the models were scaled to standard deviation (SD) and every one SD increase in the continous explanatory variable results in an average increase of the β value in Z-scores at the femoral neck as outcome variable. Abbreviations: BMI, body mass index; BSA, body surface area; eGFR, estimated glomerular filtration rate.

	Unadjusted Model			Multivariable Model		
Explanatory variable	**N**	**β; 95% CI**	***p*-value**	**N**	**β; 95% CI**	***p*-value**
Blood						
eGFR, mL/min per 1.73 m^2 BSA	422	-0.02;-0.043-0.002	0.076	336	0.009;-0.023-0.041	0.59
Calcium total, mmol/L	422	-0.016;-0.038-0.007	0.18	336	-0.013;-0.039-0.014	0.34
Phosphate, mmol/L	420	0.01;-0.012-0.033	0.36	336	0.012;-0.012-0.037	0.33
Magnesium, mmol/L	418	0.005;-0.018-0.028	0.67	334	0;-0.024-0.024	1.00
Uric acid, µmol/L	421	-0.001;-0.024-0.021	0.93	335	-0.002;-0.025-0.02	0.84
Bicarbonate, mmol/L	411	-0.007;-0.029-0.016	0.55	328	0.02;-0.006-0.046	0.13
Glucose, mmol/L	411	0.022;-0.001-0.044	0.059	329	0.006;-0.018-0.03	0.62
Alkaline phosphatase, IU/mL	422	-0.017;-0.039-0.006	0.15	336	-0.034;-0.059 to -0.01	0.0066
PTH, pg/mL	421	-0.019;-0.041-0.004	0.10	335	-0.027;-0.051 to -0.002	0.032
25-OH-Vitamin D_3, ng/mL	264	0.025;-0.005-0.055	0.10	200	0.027;-0.01-0.065	0.15
1,25-OH-Vitamin D_3, pg/mL	416	-0.022;-0.044-0.001	0.062	331	-0.005;-0.03-0.021	0.71
Urine						
Sodium, mmol/24 h	408	0.021;-0.002-0.045	0.068	323	0.02;-0.008-0.048	0.16
Sodium, mmol/24 h – restricted diet	354	0.014;-0.011-0.038	0.28	285	0.009;-0.018-0.036	0.52
Potassium, mmol/24 h	407	0.047;0.024-0.07	6.0E-05	322	0.043;0.016-0.071	0.0020
Calcium, mmol/24 h	406	0.028;0.005-0.051	0.016	323	0.034;0.007-0.06	0.013
Calcium, mmol/24 h – restricted diet	358	0.024;0-0.048	0.052	288	0.023;-0.005-0.05	0.11
Phosphate, mmol/24 h	406	0.027;0.004-0.05	0.021	323	0.026;-0.003-0.056	0.077
Magnesium, mmol/24 h	406	0.032;0.008-0.055	0.0075	323	0.041;0.015-0.066	0.0018

Uric acid, µmol/24 h	406	0.022;-0.001-0.045	0.063	323	0.03;0-0.059	0.052
Urea, mmol/24 h	406	0.04;0.017-0.063	6.6E-04	322	0.038;0.009-0.067	0.010
Citrate, mmol/24 h	404	0.034;0.011-0.058	0.0043	321	0.023;-0.003-0.049	0.079
Oxalate, mmol/24 h	404	-0.003;-0.027-0.02	0.78	321	-0.005;-0.028-0.017	0.64
Sulfate, mmol/24 h	397	0.011;-0.013-0.035	0.36	316	0.061;-0.014-0.135	0.11
NGIA, mmol/24 h	371	0.03;0.006-0.055	0.016	297	0.034;0.002-0.065	0.039
pH, 24 h	394	-0.015;-0.039-0.008	0.20	312	0.01;-0.016-0.036	0.46
Fasting calcium/creatinine, mmol/mmol	392	-0.004;-0.028-0.019	0.72	311	-0.006;-0.031-0.019	0.63
Post-load calcium/creatinine, mmol/mmol	395	-0.017;-0.04-0.005	0.13	313	-0.018;-0.049-0.014	0.27
ΔCa: post-load─fasting, mmol/mmol	347	-0.029;-0.053 to -0.005	0.019	278	-0.009;-0.037-0.02	0.56
Kidney stone history and composition						
Age at first stone event, y	404	0.018;-0.005-0.041	0.12	320	-0.015;-0.049-0.019	0.39
Number of stone events	426	0.012;-0.01-0.035	0.27	336	0.01;-0.013-0.032	0.39
Recurrent stone former (yes)	426	0.002;-0.02-0.024	0.86	336	0.006;-0.019-0.031	0.64
Calcium oxalate monohydrate content, %	332	-0.004;-0.03-0.022	0.78	266	-0.012;-0.041-0.016	0.39
Calcium oxalate dihydrate content, %	332	-0.012;-0.038-0.013	0.35	266	-0.016;-0.044-0.012	0.25
Apatite content, %	332	0.01;-0.016-0.035	0.46	266	0.018;-0.013-0.049	0.25

Modified STROBE Statement—checklist of items that should be included in reports of observational studies (Cohort/Cross-sectional and case-control studies)

	Item No	Recommendation
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract. **Page 2 of manuscript (Abstract)**
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found **Page 2 of manuscript (Abstract)**
Introduction		
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported **Pages 4 and 5 of manuscript (Introduction)**
Objectives	3	State specific objectives, including any prespecified hypotheses **Page 5 of manuscript (Introduction)**
Methods		
Study design	4	Present key elements of study design early in the paper **Page 2 of manuscript (Abstract)** **Pages 6 - 8 of manuscript (Methods)**
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection **Pages 4 – 6 of manuscript (Methods)**
Participants	6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up **Pages 6 and 7 of manuscript (Methods)** *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls **N/A**

		Cross-sectional study—Give the eligibility criteria, and the sources and methods of selection of participants **N/A**
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable **Pages 6 – 8 of manuscript (Methods)** **Tables 2-4, Supplemental Tables 1 and 2**
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). **Pages 6 – 8 of manuscript (Methods)**
Bias	9	Describe any efforts to address potential sources of bias **Pages 6 – 8 of manuscript (Methods)**
Study size	10	Explain how the study size was arrived at (if applicable) **N/A**
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why **Pages 6 – 8 of manuscript (Methods)**
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding **Page 8 of manuscript (Methods)**
		(*b*) Describe any methods used to examine subgroups and interactions **Page 8 of manuscript (Methods)**
		(*c*) Explain how missing data were addressed **Pages 26 - 29 of manuscript (Tables). Number of individual patients and number of observations indicated.**
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed **N/A** *Case-control study*—If applicable, explain how matching of cases and controls was addressed

		Cross-sectional study—If applicable, describe analytical methods taking account of sampling strategy
		(*e*) Describe any sensitivity analyses **Supplemental Tables 1 and 2, Pages 12(Results section) and 13-15 (Discussion section)**
Results		
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analyzed **Tables 1-4**
		(c) **Use of a flow diagram** **Not done, but described in detail in Methods section.**
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders **Table 1**
		(b) Indicate number of participants with missing data for each variable of interest **Tables 1-4**
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount) **N/A**
Outcome data	15*	*Cohort study*—Report numbers of outcome events or summary measures over time **Tables 1-4**
		Case-control study—Report numbers in each exposure category, or summary measures of exposure **N/A**
		Cross-sectional study—Report numbers of outcome events or summary measures **N/A**

Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included **Tables 3 and 4**
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses **Tables 2 – 4, Supplemental Tables 1 and 2**
Discussion		
Key results	18	Summarise key results with reference to study objectives **Pages 13 – 15 (Discussion)**
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias **Pages 13 – 15 (Discussion)**
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence **Pages 13 – 15 (Discussion)**
Generalisability	21	Discuss the generalisability (external validity) of the study results **Pages 13 – 15 (Discussion)**

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.