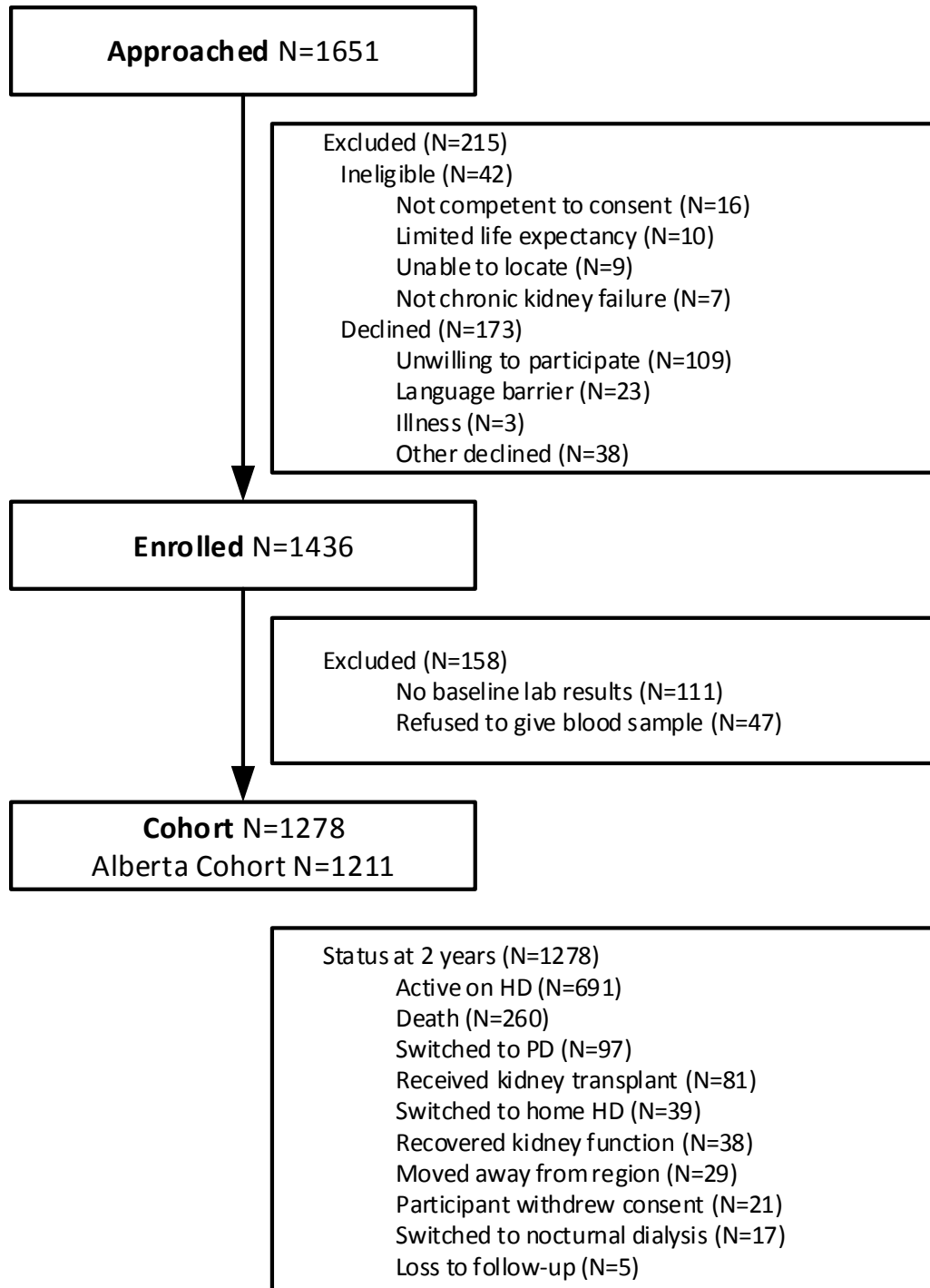


Supplemental Figure S1. Participant flow diagram



HD hemodialysis, PD peritoneal dialysis

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Supplemental Table S1. ICD-9-CM and ICD-10-CA codes for clinical outcomes

Variables	ICD-9-CM	ICD-10-CA
Bacteremia and sepsis	Most responsible discharge codes: 038.0, 038.10, 038.19, 038.2, 038.3, 038.41, 038.42, 038.43, 038.44, 038.49, 038.8, 038.9, 041.9	Most responsible discharge codes: A40, A41, A49.9
Catheterization	Procedure codes: 37.21, 37.22, 37.23	CCI code: 3.IP.10
Coronary artery bypass grafting	Procedure codes: 36.1, 36.2	CCI code:1.IJ.76
Percutaneous coronary intervention	Procedure codes: 36.01, 36.02, 36.05, 36.06	CCI codes: 1.IJ.50, 1.IJ.57.GQ, 1.IL.35
Pneumonia	Most responsible discharge codes: 480.0, 480.1, 480.2, 480.8, 480.9, 481, 482.0, 482.1, 482.2, 482.9, 482.32, 482.39, 482.40, 482.82, 482.83, 482.89, 483.0, 483.1, 483.8, 484.7, 484.8, 485, 486, 487.0, 514	Most responsible discharge codes: J10.0, J12, J13, J14, J15, J16, J17, J18

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Supplemental Table S2. Trace element decile lower limits (µg/L) at baseline

	LDL ¹	1	2	3	4	5	6	7	8	9	10
Aluminum	10.0	0.3	4.1	5.1	5.9	6.9	7.9	9.3	11.0	13.8	21.4
Antimony	0.25	0.01	0.30	0.55	0.82	1.03	1.22	1.45	1.74	2.12	2.76
Arsenic	0.20	0.06	0.36	0.59	0.81	1.09	1.40	1.84	2.57	3.99	6.74
Barium	0.50	0.31	1.14	1.51	1.80	2.08	2.45	2.97	3.71	4.61	5.78
Beryllium	0.250	<0.001	0.005	0.012	0.029	0.130	-	-	-	-	0.250 ²
Cadmium	0.05	<0.01	0.03	0.03	0.04	0.05	0.06	0.07	0.09	0.11	0.17
Caesium	0.05	0.09	0.48	0.58	0.65	0.72	0.79	0.87	0.97	1.10	1.31
Chromium	0.50	0.38	1.25	1.66	2.01	2.36	2.67	3.07	3.52	4.07	5.12
Cobalt	0.05	0.27	0.39	0.44	0.49	0.54	0.59	0.65	0.74	0.88	1.16
Copper	2.5	235	779	877	946	1,016	1,064	1,126	1,204	1,283	1,429
Iron	10	226	766	933	1,086	1,243	1,490	1,844	2,578	6,329	14,822
Lead	0.100	0.60	1.94	2.76	3.53	4.42	5.47	6.76	8.30	10.84	17.43
Manganese	0.50	0.18	0.58	0.71	0.84	0.98	1.15	1.28	1.41	1.59	1.89
Mercury	0.10	0.06	0.08	0.12	0.16	0.22	0.31	0.40	0.52	0.79	1.33
Molybdenum	0.50	0.30	2.47	3.19	3.94	4.60	5.22	5.89	6.77	7.95	10.02
Nickel	0.10	0.59	1.44	1.80	2.13	2.48	2.87	3.40	4.16	6.54	10.78
Platinum	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.01	0.03	-	0.05 ³
Selenium	2.5	33	94	105	111	117	123	128	134	142	156
Silver	0.10	0.01	0.05	0.07	0.10	0.13	0.16	0.21	0.30	0.48	0.90
Strontium	1	15	35	39	42	44	47	50	54	58	67
Thallium	0.050	0.001	0.015	0.018	0.021	0.023	0.025	0.028	0.032	0.036	0.042
Tungsten	0.1	0.002	0.013	0.020	0.027	0.034	0.041	0.050	0.059	0.077	0.113
Uranium ⁴	0.050	<0.001	0.002	0.004	0.005	0.006	0.007	0.008	0.010	0.012	0.026
Vanadium	1.00	0.01	0.04	0.07	0.10	0.16	0.27	0.49	0.70	1.05	1.95
Zinc	2.5	212	619	701	773	841	910	975	1070	1177	1335

LDL lower detection limit

¹Values below the laboratory's lower detection limit are less accurate.

²59% of the beryllium values are 0.25. These have been placed in the 10th decile bin. The 5th decile bin for beryllium contains <10% (1%) of the total values and excludes the value 0.25.

³21% of the platinum values are 0.05. These have been placed in the 10th decile bin. The 8th decile bin for platinum contains <10% (9%) of the total values and excludes the value 0.05.

⁴1 value was missing for uranium. We imputed it using its median value of 0.007.

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Supplemental Table S3. Unadjusted probabilities of clinical outcomes after 2 years by decile of trace element concentration

	Deciles										P-value
	1	2	3	4	5	6	7	8	9	10	
Death											
Selenium	0.32	0.29	0.26	0.23	0.20	0.18	0.16	0.14	0.13	0.11	0.002
Molybdenum	0.25	0.24	0.23	0.22	0.21	0.20	0.19	0.18	0.17	0.16	0.008
Arsenic	0.27	0.25	0.23	0.22	0.21	0.19	0.18	0.17	0.16	0.14	0.009
Iron	0.26	0.25	0.23	0.22	0.21	0.19	0.18	0.17	0.16	0.15	0.01
Mercury	0.26	0.25	0.23	0.22	0.21	0.19	0.18	0.17	0.16	0.15	0.02
Cadmium	0.16	0.16	0.17	0.18	0.19	0.20	0.22	0.23	0.24	0.25	0.03
Strontium	0.25	0.24	0.23	0.22	0.20	0.19	0.18	0.17	0.16	0.15	0.04
Caesium	0.26	0.24	0.23	0.22	0.20	0.19	0.18	0.17	0.16	0.15	0.04
Thallium	0.25	0.24	0.23	0.22	0.20	0.19	0.19	0.18	0.17	0.16	0.05
Copper	0.14	0.15	0.16	0.17	0.19	0.20	0.22	0.23	0.25	0.27	0.05
Cardiovascular event											
Zinc	0.20	0.21	0.21	0.22	0.23	0.24	0.25	0.26	0.27	0.28	0.006
Selenium	0.28	0.27	0.26	0.25	0.24	0.23	0.22	0.21	0.20	0.19	0.05
Infection event											
Caesium	0.13	0.12	0.11	0.11	0.10	0.09	0.08	0.08	0.07	0.06	0.006
Antimony	0.07	0.07	0.08	0.09	0.09	0.10	0.10	0.11	0.12	0.12	0.03
Arsenic	0.12	0.12	0.11	0.10	0.10	0.09	0.08	0.08	0.07	0.07	0.05
Hospitalization											
Caesium	0.81	0.80	0.79	0.78	0.77	0.76	0.75	0.74	0.73	0.72	0.02
Selenium	0.85	0.84	0.82	0.80	0.79	0.77	0.74	0.72	0.70	0.67	0.02
Mercury	0.80	0.80	0.79	0.78	0.77	0.76	0.75	0.75	0.74	0.73	0.02
Vanadium	0.72	0.73	0.74	0.75	0.76	0.77	0.78	0.79	0.80	0.81	0.03
Manganese	0.74	0.74	0.75	0.76	0.76	0.77	0.78	0.78	0.79	0.80	0.05

Using logistic regression, only trace elements with significant linear at $P < 0.05$ with clinical outcomes are shown. They are ordered by strength of significance. The trace elements in blue font indicate that more is associated with a negative outcome.

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Supplemental Table S4. Adjusted odds ratios of clinical outcomes after 2 years (and 95% CI)

Trace elements	Death	Cardiovascular events	Infection events	Hospitalizations
Participants ¹	1,278	1,211	1,211	1,211
Events	260	285	117	928
<i>Model 1 – using all deciles as a linear term</i>				
Per decile				
Arsenic	0.94 (0.89,0.99)		1.08 (1.02,1.14)	
Beryllium				
Caesium	0.93 (0.89,0.99)			
Copper	1.07 (1.02,1.13)			
Selenium	0.88 (0.83,0.93)			0.93 (0.88,0.97)
Vanadium				1.06 (1.01,1.11)
<i>Model 2 – using the lowest and highest deciles vs deciles 2-9</i>				
Lowest decile				
Selenium	3.19 (2.09,4.88)			3.52 (1.79,6.92)
Highest decile				
Barium			2.71 (1.53,4.82)	
Beryllium			2.22 (1.34,3.67)	
Cadmium	1.67 (1.08,2.58)			1.94 (1.07,3.52)
Nickel				0.52 (0.33,0.81)
<i>Model 3 – using the 5th and 95th referent percentiles vs participants in the 6th-94th percentiles</i>				
<5 th referent percentile				
Selenium	3.42 (1.17,9.96)			
>95 th referent percentile				
Copper	3.65 (1.71,7.82)			
Selenium	0.49 (0.36,0.67)			0.62 (0.44,0.88)
Silver				1.92 (1.12,3.27)
Vanadium				1.57 (1.15,2.15)

CI confidence interval

¹Only Albertan participants were included in the modeling of cardiovascular events, infection events, and hospitalizations

All three models use the forward stepwise procedure using all variables from Table 1 and Supplemental Table S3 as candidate variables. Missing values were imputed with the most frequent categorical or median continuous value. Albumin was not a candidate variable for cardiovascular events, infection events, and hospitalizations because it was only available in Albertan participants. This table shows results from 12 models (3 for each approach to modeling the trace elements X 4 for each type of outcome). Only the retained (due to significance at P<0.05) trace element variables are shown. Retained demographic and clinical characteristic variables are not shown.