

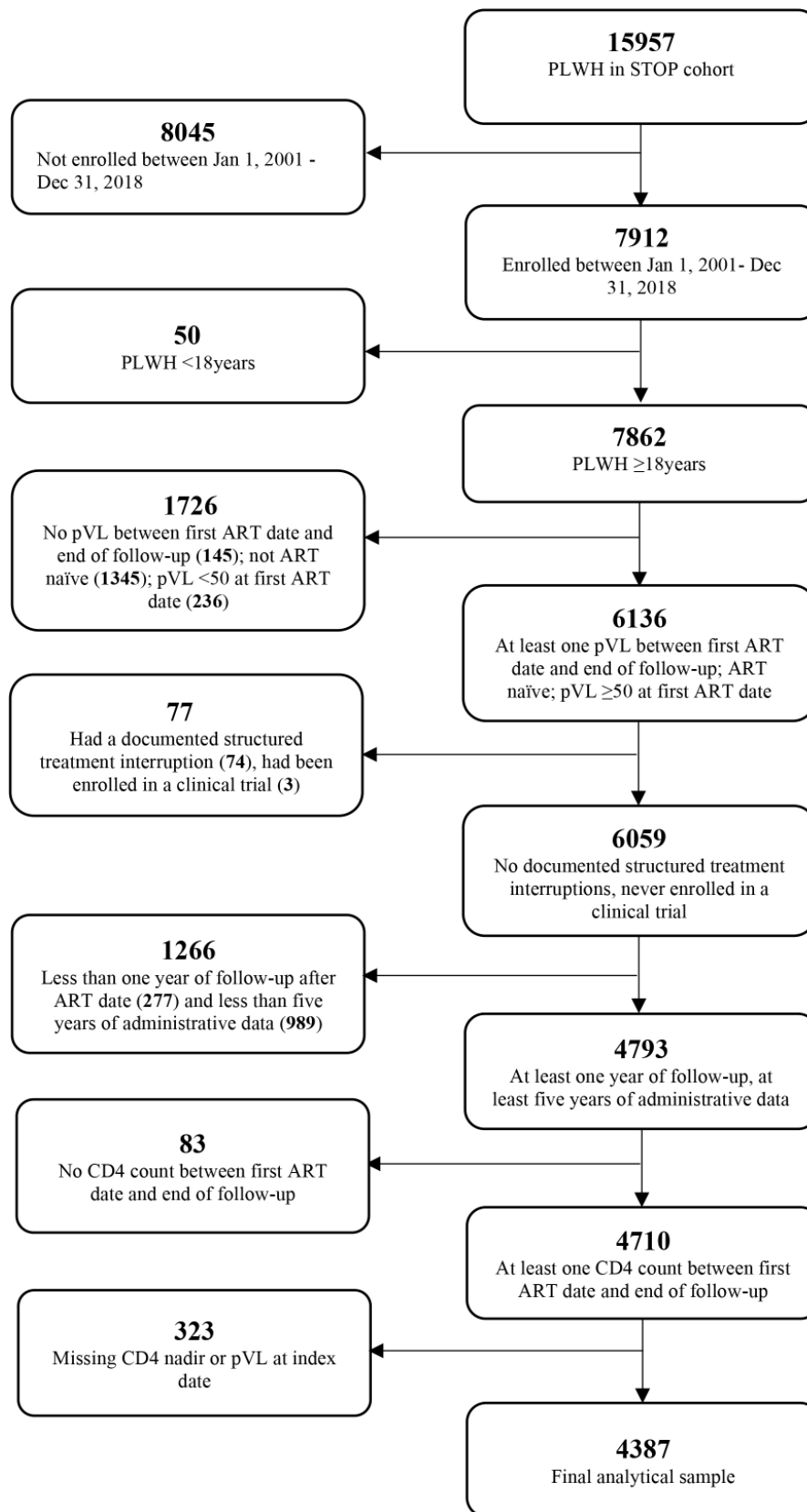
Supplementary material

Supplementary Table S1: List of linked datasets and stewards from the Seek and Treat for Optimal Prevention of HIV/AIDS (STOP HIV/AIDS) population-based cohort utilised in this study

Data Steward	Database	Description and Key data
British Columbia Centre for Excellence in HIV/AIDS (BCCfE)	Drug Treatment and Laboratory Registry	This database captures clinical and laboratory tests and HIV-related treatment and treatment outcomes. It includes data on antiretroviral (ARV) therapy history, approximately 85% of CD4 cell measurements, plasma viral load testing, the occurrence of AIDS-defining illnesses, drug resistance testing and key patient demographic data [1, 2]. In British Columbia, ART and related medical and laboratory monitoring are available free of charge to all people living with HIV residing in the province.
British Columbia Centre for Disease Control (BCCDC)	Provincial HIV/AIDS Database	This database collates all HIV testing events in BC. It includes positive HIV tests, the date of the first positive test, and the occurrence of AIDS-defining illness data [3].
British Columbia Ministry of Health	Medical Services Plan (MSP) billing database	Captures HIV and non-HIV-related outpatient and inpatient care billing for all medical services provided as fee-for-service. Also contains data on diagnostic and laboratory procedures, encounter claims and all fee-for-service dates, diagnoses and costs billed [4].
	PharmaNet	A real-time system that captures all prescriptions for drugs and medical supplies dispensed from community pharmacies and hospital outpatient pharmacies. Data include drug type and name, date and length of prescription, dosage, prescriber code and drug costs. This database does not capture ARV dispensing data [5].
	The Client Roster or Consolidation File	This database captures individual demographic and geographic data. This database is also used to construct population denominators [6].
	Discharge Abstract Database (DAD)	This database captures all discharges, transfers and deaths of all in-patients and day surgery patients from all acute care hospitals across BC [7].
	Vital Statistics	This dataset records death including the date and probable causes of death for all BC Residents [8].

Note: Heath et al., 2014 [9] and Nosyk et al., 2013 [10] provided additional details describing these data sources.

Supplementary Figure S1: Flowchart outlining the derivation of final analytical sample of 4387 people living with HIV in British Columbia, Canada, from 2002–2019



Note: PLWH: People living with HIV; STOP: Seek and Treat for Optimal Prevention of HIV/AIDS; pVL: Viral load; ART: Antiretroviral therapy.

Supplementary Table S2: List of selected comorbidities and relevant case-finding algorithms

Outcome	Case definitions	Diagnostic, Procedure, Drug code	References
Chronic liver disease (CLD)	Cirrhosis	ICD-9 for physician visit: 571	[11]
	1 hospitalisation with a cirrhosis diagnostic code	ICD-9 for hospitalisation: 456.1, 571.2, 571.5	
	OR	ICD-10: I85.9, I98.2, K70.3, K71.7, K74.6	
	2 physician visits with cirrhosis diagnostic code(s) in one year		[11]
	Decompensated Liver Cirrhosis	ICD-9: 456.0, 456.2, 572.2, 572.3, 572.4, 782.4, 789.5:	
	1 hospitalisation with a with a decompensated cirrhosis diagnostic code	ICD-10: I85.0, I86.4, I98.20, I98.3, K72.1, K72.9, K76.6, K76.7, R17, R18	
	OR		[12]
	2 physician visits with decompensated cirrhosis diagnostic code(s) in one year		
	Chronic liver disease (CLD)	ICD-9: 070.2, 070.3, 070.41, 070.44, 070.51, 070.54, 070.7, 275.0, 573.3	
	1 hospitalisation with a CLD diagnostic code	ICD-10: B16, B17.10, B17.11, B18.0, B18.1, B18.2, B19.10, B19.11, B19.20, B19.21, E83.11, K71.6, K75.9	[13]
Alzheimer's/Dementia (Applicable to persons aged 40 years and older)	OR		
	2 physician visits with CLD diagnostic code(s) in one year		
	1 hospitalisation with an Alzheimer's/dementia diagnostic code	ICD-9: 290, 294, 331, 331.0, 331.1, 331.5	[13]
	OR	ICD-10: G30, G31.02, F00, F01, F02, F03	
	OR	DIN List	
	1 prescription for Alzheimer/dementia	2419866, 2419874, 2397595, 2397609, 2397617, 2397625, 2324059, 2324067, 2432684, 2432692, 2362260, 2362279, 2293021, 2293048, 2293056, 2366487, 2336715, 2336723, 2336731, 2336758, 2232043, 2232044, 2269457, 2269465, 2400561, 2400588, 2425157, 2425165, 2425173, 2427567, 2427575, 2427583, 2427591, 2376334, 2412853, 2412861, 2295245, 2295229, 2295237, 2447002, 2447010, 2307685, 2307693, 2307707, 2307715, 2416417, 2416425, 2420597, 2420600, 2421453, 2421461, 2395584, 2395592, 2402645, 2402653, 2413671, 2413698, 2260638, 2425343, 2425351, 2242116, 2242117, 2242118, 2245240, 2242115, 2302853, 2432803, 2302845, 2416573, 2416581, 2416603, 2443015, 2443023, 2443031, 2386011, 2386003, 2386046, 2386038, 2398885, 2398893, 2419238, 2419246, 2419254, 2404419, 2404427, 2416948, 2416956, 2402092, 2402106, 2420821, 2420848, 2420856, 2409887, 2409895, 2401614, 2401622, 2401630, 2401649, 2349116, 2443082, 2446049, 2425742, 2408600, 2408619, 2406985, 2406993, 2407000, 2407019, 2359472, 2359480, 2339439, 2339447, 2339455, 2430371, 2332809, 2332817, 2332825, 2332833, 2439557, 2439565, 2321602, 2321599, 2305984, 2305992, 2306018, 2306026, 2316943, 2316951, 2316978, 2427273, 2308169, 2308177, 2308185, 2308193, 2322331, 2322358, 2333376, 2333384, 2333392, 2398370, 2398389, 2398397, 2321130, 2382830, 2306034, 2306042, 2306050, 2306069, 2446669, 2446677, 2381508, 2381516, 2421364, 2320908, 2311283, 2311291, 2311305, 2311313, 2244300, 2244298, 2244299, 2244302, 2266717, 2266725, 2266733, 2412918, 2412934, 2348950, 2416999, 2417006, 2417014, 2417022, 2312492, 2312506, 2312514, 2423413, 2312522, 2423421, 2375729, 2375737, 2375745, 2375753, 2328666, 2328682, 2367688, 2367696, 2392283, 2392291, 2392305, 2344807, 2375532, 2324563, 2324571, 2324598, 2324601, 2426307, 2426293, 2428482, 2428490, 2340607, 2340615, 2377950, 2377969, 2377977, 2426943, 2426951	[14, 15]
	OR		
	3 physician visits with Alzheimer/dementia within 2 years but interspersed by at least 30 days.		
Diabetes mellitus (DM)	1 hospitalisation with a DM diagnostic code	ICD-9: 250	[14, 15]
	OR	ICD-10: E10, E11, E13, E14	
	OR		

Continued

Supplementary Table S2: Continued

Outcome	Case definitions	Diagnostic, Procedure, Drug code	References
	2 physician visits in one year with DM diagnostic code(s)	Exclusion: Cases of suspected gestational diabetes in women aged 10-54 are not included by excluding hospitalizations, physician claims or prescriptions within the period 120 days preceding or 180 days after hospital records containing birth-related diagnostic codes.	
	OR		
	2 or more insulin prescriptions in one year	ICD-9 excluded: (641, 642, 643, 644, 645, 646, 647, 648, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 66, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 763, V27)	
	OR		
	2 or more oral antihyperglycemic (not including metformin) prescriptions in one year	ICD-10 excluded: (V27, O10, O11, O12, O13, O14, O15, O16, O21, O22, O23, O24, O25, O26, O28, O29, O30, O31, O32, O33, O34, O35, O36, O37, O40, O41, O42, O43, O44, O45, O46, O47, O48, O60, O61, O62, O63, O64, O65, O66, O67, O68, O69, O70, O71, O72, O73, O74, O75, O85, O86, O87, O88, O89, O90, O91, O92, O94, O95, O98, O99, Z37).	
	OR		
	1 insulin and one oral antihyperglycemic (including metformin) in one year	DIN:	
	OR	Antihyperglycemic:	
	2 metformin prescriptions and one physician visit with DM diagnostic code(s) in one year.	2303442, 2303450, 2303469, 2339587, 2339595, 2391600, 2429764, 2429772, 2302861, 2302888, 2302896, 2321475, 2321483, 2321491, 2423286, 2242572, 2242573, 2242574, 2374587, 2374595, 2245272, 2245273, 2245274, 399302, 312711, 1913654, 1913662, 2245247, 2297795, 2407124, 2405067, 2295377, 2295385, 2295393, 2302942, 2302950, 2302977, 2355663, 2355671, 2355698, 2403366, 2326477, 2326485, 2326493, 13889, 2229519, 2438658, 2449765, 808733, 808741, 2298279, 2298287, 2298295, 2373270, 2373289, 2373297, 2354349, 2354357, 2354365, 2417189, 2417197, 2417200, 21849, 2273756, 2403374, 2403382, 2348578, 2340763, 2340771, 2384906, 2384914, 2384922, 2424258, 2424266, 2424274, 2363518, 2363704, 2363712, 2247085, 2247086, 2247087, 2248440, 2248441, 2258781, 2258803, 2258811, 2241112, 2241113, 2241114, 2241111, 2363232, 2363240, 2273764, 2273772, 21350, 2363259, 2444844, 2444852, 2448610, 2361809, 2361817, 271330, 12556, 12564, 586773, 156728, 209937, 377937, 430986, 2274248, 2274256, 2274264, 2274272, 2224550, 2224569, 12599, 454753, 1987836, 1987534, 24708, 24716, 765996, 2356422, 2242987, 15598, 2234513, 2234514, 2345854, 2345862, 2336316, 2020734, 2020742, 2333554, 2375842, 237000, 12602, 12610, 1987828, 2224798, 1987542, 2224771, 2419300, 2419319, 2419327, 2419335, 2419343, 2419351, 2229595, 2229596, 2307669, 2307677, 2307723, 2307170, 2307634, 2307642, 2307650, 2307553, 2307561, 2307588, 2421674, 2421682, 2421690, 2443635, 2443643, 720933, 720941, 480304, 244449, 420336, 480290, 2435462, 2435470, 2279061, 2279088, 2279126, 2248210, 2287072, 2155850, 2248453, 2190885, 2190893, 2239924, 2239925, 2307189, 2307197, 2345366, 2345374, 2345382, 2417049, 2417057, 2417065, 2374013, 2374021, 2374048, 2294400, 2284545, 2284553, 2313596, 2236733, 2236734, 2303124, 2303132, 2303140, 22303140, 2354926, 2354934, 2354942, 2306166, 2306174, 2306182, 2357887, 2357895, 2357909, 2357917, 2357925, 2239926, 2230444, 2230443, 2350459, 2350467, 2147521, 2226804, 2147548, 2226812, 2230036, 2230037, 1959352, 1959360, 2238471, 2239476, 2238469, 2239474, 2238470, 2239475, 2236985, 2238698, 2236986, 2316544, 2312050, 2312069, 2312077, 2439328, 2375850, 2375869, 2375877, 2389312, 2389290, 2389304, 2273136, 2273101, 2273128, 1900927, 1900935, 2301423, 2301431, 2301458, 2415968, 2415976, 2415984, 2231095, 2231096, 2237531, 2236543, 2236548, 2242095, 2242096, 2254719, 2269589, 2269597, 2269600, 2269619, 2248008, 2248009, 2297906, 2297914, 2297922, 2357453, 2357461, 2357488, 2326329, 2326337, 2326345, 2455404, 2455412, 2455420, 2455439, 2455447, 2455455, 2425483, 2425491, 2365529, 2365537, 2397307, 2437899, 13730, 2245439, 2245440, 2245438, 2456575, 2456583, 2456591, 2456605, 2456613, 2456621, 2238103, 1913670, 1913689, 2274914, 2274922, 2274930, 2366347, 2366355, 2366363, 2354144, 2333856, 2333864, 2333872, 2416786, 2416794, 2416808, 2303922, 2388839, 2388847, 2443937, 2443945, 2403250, 2403269, 2403277, 2417219, 2417227, 2417235, 2389169, 2389177, 2389185, 2084341, 2354152, 2354160, 312762, 156663, 431168, 93033, 178543, 209872, 2418002, 2418010, 2418029, 2370921, 2228920, 2228939, 2448599, 2448602, 2434121, 2434148, 2434156, 2351064, 2351056, 2085887, 2449935, 2449943, 2320754, 2320762, 2320770	

Supplementary Table S2: Continued

Outcome	Case definitions	Diagnostic, Procedure, Drug code	References
		Insulin: 612162, 2279460, 2279479, 2279487, 2294346, 1985973, 773654, 1986821, 2022230, 632694, 632678, 1985965, 612359, 650935, 2024292, 2024306, 2024217, 2025248, 2024314, 2024322, 2024241, 2024225, 2024268, 2024233, 2024284, 2024276, 1986791, 612197, 644358, 612200, 2024446, 2024403, 2025256, 612189, 2265435, 2265443, 2244353, 2245397, 2377209, 274127, 542938, 1934066, 612235, 542946, 514551, 2229704, 2229705, 2403412, 2233562, 274119, 539201, 612219, 612170, 2439611, 2240294, 2403420, 2240295, 2240297, 2403439, 2241283, 1962639, 889113, 1962655, 889105, 795879, 1959212, 1962647, 889091, 1962663, 889121, 646148, 587737, 1959239, 2403447, 2241310, 586714, 2415089, 1959220, 733075, 2275864, 2275872, 66123203, 446564, 446580, 446572, 446610, 446602, 513644, 446599, 614416, 1985981, 1985949, 2022249, 1986813, 632651, 552275, 1985957, 552259, 999717, 5894, 1934112, 546348, 612227, 539244, 552267, 1934082, 612251, 275417, 554820, 6009, 648094, 1934074, 2245689, 2251930, 2276410, 2294338, 542911, 1934090, 612278, 275409, 514535, 2412829, 2271842, 2441829, 1934104, 612243, 275425, 1985930, 1986085, 632686, 1986805, 628301, 723789, Metformin: 2365286, 2408228, 2365294, 2408236, 2409283, 2409291, 2257726, 2257734, 2246965, 2284782, 2284790, 2343606, 2343614, 2353377, 2353385, 2378841, 2378868, 2334437, 2238827, 2334445, 2230027, 2385341, 2385368, 2406020, 2406039, 2230026, 2220628, 2231058, 2388766, 2167786, 2229785, 2305062, 2388774, 2148765, 2229656, 2341603, 2341522, 2438275, 2438283, 2364506, 2364514, 2265575, 2265583, 2361264, 2361272, 2162822, 2229517, 2378116, 2378124, 2246964, 2229994, 2242726, 2421828, 2421836, 2242589, 2223562, 2099233, 2162849, 2446065, 314552, 2268493, 2300451, 2268507, 2229516, 2239214, 2252945, 2252953, 2449390, 2449404, 2314894, 2314908, 2339110, 2339129, 2269031, 2269058, 2242931, 2242974, 2233999, 2239081, 2242783, 2246820, 2246821, 2378043, 2378051, 2380196, 2380218, 2380722, 2380730, 2379767, 2379775, 2331519, 2331527, 2045710, 2230475, 2378620, 2378639, 2188902, 2444933, 2444941, 2230671, 2230670, 2231389, 2242793, 2242794.	
Hypertension (Applicable to persons aged 20 years and older)	1 hospitalisation with a hypertension diagnostic code OR 2 physician visits with hypertension diagnostic code(s) in one year.	ICD-9: 401, 402, 403, 404, 405 ICD-10: I10, I11, I12, I13, I15	[16]
Cardiovascular Disease (CVD)	Ischemic Heart Disease (IHD) (Applicable to persons aged 20 years and older) 2 physician visits with Angina ICD-9 code 413 plus 1 prescription in one year; OR 1 specialist visit with Angina ICD-9 code 413 plus 1 prescription in one year; OR 2 physician visits with two ICD-9 codes 410, 411, 412, 413, and 414 in one year; OR 1 CABG, PCI/PCTA procedure code OR	ICD-9: 410, 411, 412, 413, 414 ICD-10: I20, I21, I22, I23, I24, I25 Canadian Classification of Diagnostic, Therapeutic, and Surgical Procedures (CCP): *Coronary artery bypass surgery (CABG): 4811, 4812, 4813, 4814, 4815, 4816, 4817, 4819. *Percutaneous Coronary Intervention/Percutaneous Transluminal Coronary Angioplasty (PCI/PTCA): 4802, 4803 Canadian Classification of Health Interventions (CCI): *CABG: 1IJ57LA, 1IJ57VS, 1IJ76. *PCI/PTCA: 1IJ50, 1IJ57G. DIN: 3662 14214 15954 15962 37613 37621 104736 125849 202959 202967 202975 208973 243116 279536 299790 342734 441686 441694 442925 446661 446688 446696 458686 458694 476579 476587 476595 476609 525529 576174 584223 584258 584266 590673 590681 590738 590746 602892 608785 614262 658812 660655 670944 677469 695726 725242 740721 749362 749370 749389 749397 754188 778869 786640 786667 786683 852384	[17]

Continued

Supplementary Table S2: Continued

Outcome	Case definitions	Diagnostic, Procedure, Drug code	References
Chronic kidney disease	1 hospitalisation with any IHD code(s).	860778 874213 874248 1911902 1911910 1911929 1913921 1926454 1926721 1927809 1946196 2011271 2041715 2041723 2042606 2042614 2042622 2044811 2046156 204616 2058472 2125218 2126559 2145294 2145308 2145316 2162806 2163527 2163535 2164337 2182734 2213370 2230732 2230733 2230734 2231441 2238998 2243588 2272830 2301288 2393433 2407442 2407450 2407469 2407477	
	Transient Ischemic Attack (TIA)	ICD-9: 435	[18]
	(Applicable to persons aged 20 years and older)	ICD-10: H34.0, G45.0, G45.1, G45.2, G45.3, G45.8, G45.9	
	1 hospitalisation with a TIA diagnostic code.		
	Cerebrovascular Accident (CVA/Stroke):	ICD-9: 362.3, 430, 431, 433.x1, 434.x, 436	[19]
	(Applicable to persons aged 20 years and older)	ICD-10: H34.1, I60, I61, I63, I64	
	1 hospitalisation with a CVA diagnostic code.	Excluding I63.6 (Cerebral infarction due to cerebral venous thrombosis) Exclusions: any traumatic brain injury (ICD-9: 800, 801, 802, 803, 804, 850, 851, 852, 853, 854, V57.x ICD-10: S02.x, S02.5, S06.x, Z50.x)	
	Congestive Heart Failure (CHF)	ICD-9: 428	[20]
	1 hospitalisation with a CHF diagnostic code	ICD-10: I50	
	OR		
	2 physician visits in one year with CHF diagnostic code(s)		
	Acute Myocardial Infarction (AMI)	ICD-9: 410	[21]
	1 hospitalisation with an AMI diagnostic code.	ICD-10: I21, I22	
	Chronic kidney disease (CKD)	ICD-9: 581, 582, 583, 585, 586, 587, 589	[22]
	1 hospitalisation with a CKD diagnostic code	ICD-10: N01, N03, N04, N05, N06, N07, N18, N19, N26, N27	
Chronic obstructive pulmonary disease (COPD) (Applicable to person 35 years and older)	OR		
	2 physician visits in one year with CKD diagnostic code(s)		
	Dialysis	00308, 00323, 00350, 00351, 00352, 00355, 00356, 00358, 00359, 00361, 00390, 33708, 33723, 33750, 33751, 33752, 33755, 33756, 33758, 33759, 33761, 33790	[23]
	9 or more physician visits within 90 days with fee item code(s)		
	Kidney Transplant	CCI: 675	[24]
Non-AIDS-defining cancers (NADC)	1 hospitalisation for kidney transplant with procedure code(s)	CCP: 1PC85	
	1 hospitalisation with COPD diagnostic code	ICD-9: 491, 492, 496	[25]
	OR	ICD-10: J41, J42, J43, J44	
Non-AIDS-defining cancers (NADC)	2 physician visits in one year with COPD diagnostic code(s)		
	1 hospitalisation with cancer diagnostic code	ICD-9: 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 170, 171, 172, 173, 174, 175, 179, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239	[26]
	OR		
	2 physician visits in 1 years with cancer diagnostic code(s)		

Continued

Supplementary Table S2: Continued

Outcome	Case definitions	Diagnostic, Procedure, Drug code	References
		ICD-10: C00,C01- C02, C03, C04, C05, C06, C07 - C08, C09, C12, C13,C14, C10, C11,C15, C16, C17, C18, C26.0, C19, C20, C21, C22.0, C22.1, C22.2, C22.3, C22.4, C22.7, C22.9, C23, C24, C25, C26.0, C26.2 - C26.9, C30, C31, C32, C33, C34, C38.0, C38.1, C38.2, C38.3, C38.4, C38.8, C39, C40 - C41, C43, C45, C48, C47, C49, C50, C51, C52, C57, C58, C60, C63, C54, C55, C56, C61, C62, C64, C65, C66, C68, C67, C69, C70, C71, C72, C73, C37, C74 - C75, C77-C80, C81, C90.0, C90.2, C91 - C95, C90.1, C26.1, C44, C76-C80, C88, C96.0-C96.2, C96.7-C96.9, C97	
Substance use disorder (SUD)	1 hospitalisation with a SUD diagnostic code OR 2 physician visits in one year with SUD diagnostic codes, followed by further condition-related codes in subsequent years.	ICD-9: 291, 292, 303, 304, 305 ICD-10: F10, F11, F12, F13, F14, F15, F16, F17, F18, F19	[27]

Note: ICD 9: International Classification of Diseases (Ninth Revisions); ICD 10: International Classification of Diseases (Tenth Revisions). CLD and CKD may include acute kidney or liver conditions unspecified by the ICD codes.



Supplementary Text S1. Creation of mortality risk prediction index scores and one-year all-cause mortality prediction.

Step 1:

We applied our final predictive Cox proportional hazard model to the training dataset and estimated the regression coefficients in the model.

The predicted one-year all-cause mortality can be derived using the conditional survival function $S(t|x) = So(t)^{\exp(x^T \beta)}$, where $So(t)$ is the baseline survival function, x^T is a vector of covariates and β is a vector of coefficients corresponding to the covariates.

Thus, the predicted one-year all-cause mortality can be shown as:

$$\begin{aligned} 1 - \text{Predicted one-year all-cause mortality} &= So(t)^{\exp(x^T \beta)} \\ \text{Predicted one-year all-cause mortality} &= 1 - So(t)^{\exp(x^T \beta)} \\ &= 1 - 0.9912^{\exp(x^T \beta)} \end{aligned}$$

Where,

$$\begin{aligned} x^T \beta &= \sum_{i=1}^{18} X_{i\beta_i} \\ &= CVD \times 0.6350 + CLD \times 0.5407 + CKD \times 0.4836 + COPD \times 0.7202 + NADC \times 0.7688 + SUD \times 0.9571 \\ &\quad + HTN \times (-0.2402) + MST \times 0.8199 + DM \times 0.2500 + IA \times 0.2818 + AGE \text{ LINEAR} \times 0.2966 + SEX \times 0.1976 \\ &\quad + SUPPRESSION \times 0.4879 + CD4 \text{ LINEAR} \times (-0.1807) + CD4 \text{ QUADRATIC} \times 0.0135 + YEARS \text{ ON ART LINEAR} \\ &\quad \times (-0.0664) + YEARSON \text{ ART QUADRATIC} \times 0.0177 + YEARS \text{ ON ART CUBIC} \times (-0.0019) \end{aligned}$$

Note: ART: Antiretroviral therapy; CVD: Cardiovascular disease; CLD: Chronic liver disease; CKD: Chronic kidney disease; COPD: Chronic obstructive pulmonary disease; NADC: Non-AIDS-defining cancers; SUD: Substance use disorder; HTN: Hypertension; MST: Metastatic solid tumor; DM: Diabetes mellitus; IA: Income assistance; AGE LINEAR: (age per 10-year increase - median age per 10-year increase in training set); CD4 LINEAR: (CD4 nadir per 100 cells - median CD4 nadir per 100 cells in training set)²; CD4 QUADRATIC: (CD4 nadir per 100 cells - median CD4 nadir per 100 cells in training set)²; YEARS ON ART LINEAR: (years on ART - median years on ARV in training set); YEARS ON ART QUADRATIC: (years on ART - median years on ART in training set)²; YEARS ON ART CUBIC: (years on ART - median years on ART in training set)³

Step 2: We multiplied and summed each estimated regression coefficient from the mortality risk prediction index by the value of the corresponding covariates for each patient to get a risk coefficient.

Step 3:

Mortality risk prediction index scores were calculated using the formula below;

$$\text{Index score} = \frac{\text{Risk coefficient} - \text{minimum risk score where mortality is 0}}{\text{Maximum risk score where mortality is 100} - \text{minimum risk score where mortality is 0}} \times 100$$

Where:

Risk coefficient: Sum of products of coefficients and covariates

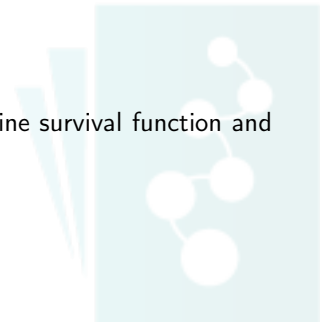
Minimum score: Mathematically derived score when mortality is 0

Maximum score: Mathematically derived score when mortality is 100

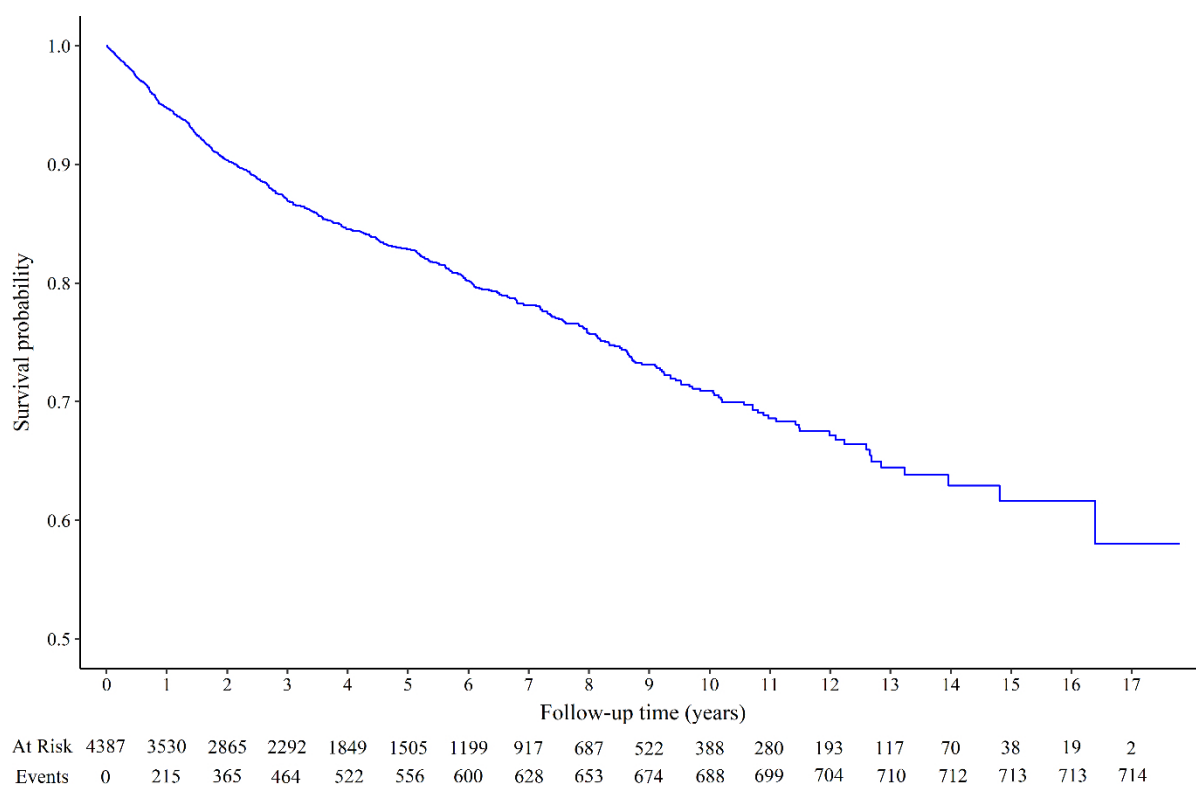
The mortality risk prediction index score obtained is between 0 and 100.

Step 4:

We used the Cox survival function to predict the one-year all-cause mortality probability using the baseline survival function and the sum of risk coefficients [28].



Supplementary Figure S2: Kaplan-Meier survival curve displaying survival probability from the index date to the study end period for people living with HIV in British Columbia, Canada, from 2002 to 2019



Supplementary Table S3: Cox proportional hazard model showing unadjusted hazard ratios and based on the training set

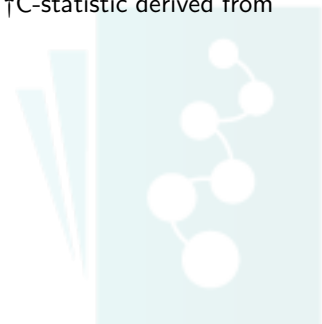
Variables	Unadjusted Hazard Ratio (95% Confidence Interval)
Cardiovascular disease (Ref: No)	
Yes	3.09 (2.46–3.88)
Chronic kidney disease (Ref: No)	
Yes	3.36 (2.64–4.28)
Diabetes mellitus (Ref: No)	
Yes	1.71 (1.29–2.26)
Chronic liver disease (Ref: No)	
Yes	3.34 (2.77–4.02)
Non-AIDS-defining cancers (Ref: No)	
Yes	2.66 (2.09–3.37)
Chronic obstructive pulmonary disease (Ref: No)	
Yes	3.70 (2.94–4.65)
Hypertension (Ref: No)	
Yes	1.51 (1.20–1.91)
Substance use disorder (Ref: No)	
Yes	3.72 (3.08–4.50)
Alzheimer's/Dementia (Ref: No)	
Yes	4.42 (3.26–5.99)
Personality disorder (Ref: No)	
Yes	1.95 (1.53–2.49)
Schizophrenia (Ref: No)	
Yes	1.72 (1.27–2.33)
Mood/Anxiety disorder (Ref: No)	
Yes	1.57 (1.31–1.89)
Rheumatoid arthritis (Ref: No)	
Yes	1.80 (0.74–4.34)
Metastatic solid tumor (Ref: No)	
Yes	4.57 (3.12–6.69)
Osteoporosis (Ref: No)	
Yes	2.59 (1.79–3.75)
Asthma (Ref: No)	
Yes	1.59 (1.28–1.98)
Peptic ulcer (Ref: No)	
Yes	1.66 (1.24–2.22)
Osteoarthritis (Ref: No)	
Yes	1.57 (1.13–2.16)
Plasma viral load suppression (Ref: Yes)	
No	2.77 (2.32–3.32)
Sex at birth (Ref: Male)	
Female	1.82 (1.50–2.21)
Income assistance (Ref: No)	
Yes	2.55 (2.12–3.05)
^a Age per 10-year increase	1.27 (1.18–1.38)
^b CD4 nadir per 100 cells/mm ³	0.70 (0.67–0.74)
^c Years on ART	0.94 (0.91–0.97)

Note: ART: Antiretroviral Therapy; ^aLinear form of age centered at the median (47 years); ^bPolynomial forms of CD4 nadir centered at the median (430 cells/mm³); ^cLinear form of years on ART centered at the median (4 years).

Supplementary Table S4: Cox proportional hazard model showing adjusted hazard ratios and Harrell's c-statistic based on full cohort

Characteristic	Adjusted Hazard Ratio (95% Confidence Interval)
Sex at birth (Ref: Male)	
Female	1.14 (0.96–1.36)
Cardiovascular disease (Ref: No)	
Yes	1.87 (1.51–2.31)
Chronic liver disease (Ref: No)	
Yes	1.48 (1.25–1.76)
Chronic kidney disease (Ref: No)	
Yes	1.62 (1.30–2.00)
Chronic obstructive pulmonary disease (Ref: No)	
Yes	2.04 (1.65–2.51)
Non-AIDS-defining cancers (Ref: No)	
Yes	1.79 (1.42–2.25)
Substance use disorder (Ref: No)	
Yes	2.52 (2.08–3.05)
Diabetes (Ref: No)	
Yes	1.17 (0.91–1.51)
Hypertension (Ref: No)	
Yes	0.86 (0.69–1.08)
Metastatic solid tumor (Ref: No)	
Yes	2.44 (1.73–3.45)
Plasma viral load suppression (Ref: Yes)	
No	1.60 (1.34–1.92)
Income assistance (Ref: No)	
Yes	1.28 (1.08–1.51)
^a Age per 10-year increase	1.35 (1.25–1.47)
^b CD4 nadir per 100 cells/mm ³	
Linear	0.82 (0.81–0.88)
Quadratic	1.02 (1.01–1.02)
^c Years on ART	
Linear	0.93 (0.89–0.97)
Quadratic	1.01 (0.99–1.02)
Cubic	1.00 (0.99–1.00)
†Unadjusted Harrell's c-statistic (95% CI)	0.8227 (0.8077–0.8377)
Optimism-adjusted Harrell's c-statistic (95% CI)	0.8188 (0.8180–0.8196)

Note: ART: Antiretroviral Therapy; ^aLinear form of age centered at the median (47 years); ^bPolynomial forms of CD4 nadir centered at the median (430 cells/mm³); ^cLinear form of years on ART centered at the median (4 years); †C-statistic derived from fitting the full data to the model.



Supplementary Table S5: Data table for predicted one-year all-cause mortality probabilities using our final Cox proportional hazard model vs observed Kaplan-Meier estimates of the one-year all-cause mortality probabilities by subgroups of mean mortality risk prediction index scores using the test dataset

Subgroups	Mean MRP _i score	n	Observed deaths	Observed mortality (95% CI)	Predicted mortality
1	33.2583	31	0	0.0000 (0.0000–0.0000)	0.0029
2	38.0982	171	0	0.0000 (0.0000–0.0000)	0.0053
3	42.5883	267	1	0.0045 (0.0006–0.0317)	0.0092
4	47.3144	278	7	0.0273 (0.0131–0.0565)	0.0164
5	52.4193	256	9	0.0376 (0.0197–0.0712)	0.0305
6	57.3821	171	6	0.0361 (0.0164–0.0787)	0.0554
7	62.5093	150	16	0.1107 (0.0693–0.1745)	0.1015
8	67.2987	72	10	0.1512 (0.0843–0.2632)	0.1755
9	72.2532	41	12	0.2927 (0.1781–0.4575)	0.2988
10	79.2786	26	9	0.3510 (0.2000–0.5671)	0.5693

Note: MRP_i: mortality risk prediction index; n: number of participants in the subgroups, CI: confidence interval.

Supplementary Table S6: Data table for predicted estimates of one-year survival probabilities vs observed adjusted and unadjusted Kaplan-Meier estimates of one-year survival probabilities by subgroups using the full dataset

Subgroups	Mean predictive survival	Unadjusted observed survival	95% CI of unadjusted observed survival	Adjusted observed survival
1	0.7587	0.7347	0.6939–0.7780	0.7400
2	0.9072	0.9018	0.8736–0.9308	0.9015
3	0.9432	0.9293	0.9048–0.9545	0.9282
4	0.9618	0.9830	0.9705–0.9956	0.9823
5	0.9725	0.9703	0.9539–0.9870	0.9697
6	0.9798	0.9832	0.9709–0.9956	0.9830
7	0.9851	0.9899	0.9800–0.9998	0.9889
8	0.9888	0.9973	0.9919–1.0000	0.9972
9	0.9918	1.0000	1.0000–1.0000	1.0000
10	0.9946	0.9971	0.9915–1.0000	0.9972

Note: CI: confidence interval.



Supplementary Table S7: Comparison of included and excluded participants from the study of people living with HIV in British Columbia, Canada, from 2002 to 2019

Characteristic	Included <i>n</i> = 4387	Excluded <i>n</i> = 1672	p-value*
Sex at birth, <i>n</i> (%)			
Male	3570 (81)	1336 (80)	0.2046
Female	817 (19)	336 (20)	
Death during study period, <i>n</i> (%)			
No	3673 (84)	1441 (86)	0.0204
Yes	714 (16)	231 (14)	
Continuous covariates	Median (Q1-Q3)	Median (Q1-Q3)	
Index year	2015 (2011–2017)	2011 (2007–2015)	<0.0001
Age at index date (years)	47 (38–64)	38 (31–46)	<0.0001
Year of ART initiation	2009 (2006–2013)	2009 (2006–2013)	0.9701
Years on ART (years)	4 (2–6)	5 (3–8)	<0.0001
Follow-up time (years)	3.3 (1.4–6.3)	3.3 (1.3–6.3)	0.8140

Note: Q1-Q3: 25th–75th percentiles; ART: Antiretroviral therapy.

*Bivariable comparisons of categorical variables were done by the chi-square test; Bivariable comparisons of continuous variables were done by the Wilcoxon's rank sum test. We compared participants in the final analytical sample to the total number of participants who had less than one year of follow-up, less than five years of administrative data, missing CD4 nadir and viral load. Results are significant at a p-value of <0.05.



Supplementary Table S8: Descriptive characteristics of males included in training and test datasets for people living with HIV in British Columbia, Canada, from 2002 to 2019

Variables	Full cohort (n = 4387) n (%)	Test dataset (n = 1463) n (%)	Training dataset (n = 2924) n (%)	p-value
Death during the study period				
No	3057 (86)	1013 (86)	2044 (86)	0.7671
Yes	513 (14)	166 (14)	347 (14)	
Cardiovascular disease				
No	3275 (92)	1088 (92)	2187 (92)	0.4438
Yes	295 (8)	91 (8)	204 (8)	
Chronic kidney disease				
No	213 (6)	71 (6)	142 (6)	0.9813
Yes	213 (6)	71 (6)	142 (6)	
Diabetes mellitus				
No	3307 (93)	1098 (93)	2209 (92)	0.4656
Yes	263 (7)	81 (7)	182 (8)	
Chronic liver disease				
No	3078 (86)	1000 (85)	2078 (87)	0.0982
Yes	492 (14)	179 (15)	313 (13)	
Non-AIDS-defining cancers				
No	3252 (91)	1074 (91)	2178 (91)	1.0000
Yes	318 (9)	105 (9)	213 (9)	
Chronic obstructive pulmonary disease				
No	3354 (94)	1121 (95)	2233 (93)	0.0554
Yes	216 (6)	58 (5)	158 (7)	
Hypertension				
No	3103 (87)	1034 (88)	2069 (87)	0.3570
Yes	467 (13)	145 (12)	322 (14)	
Substance use disorder				
No	2387 (67)	783 (66)	1604 (67)	0.7160
Yes	1183 (33)	396 (34)	787 (33)	
Alzheimer's/Dementia				
No	3480 (98)	1155 (98)	2325 (97)	0.2358
Yes	90 (2)	24 (2)	66 (3)	
Personality disorder				
No	3285 (92)	1072 (91)	2213 (93)	0.1041
Yes	285 (8)	107 (9)	178 (7)	
Schizophrenia				
No	3373 (95)	1122 (95)	2251 (94)	0.2387
Yes	197 (5)	57 (5)	140 (6)	
Mood/Anxiety disorder				
No	1938 (54)	667 (57)	1271 (53)	0.0586
Yes	1632 (46)	512 (43)	1120 (47)	
Rheumatoid arthritis				
No	3550 (99)	1171 (99)	2379 (99)	0.6696
Yes	20 (1)	8 (1)	12 (1)	
Metastatic solid tumor				
No	3503 (98)	1157 (98)	2346 (98)	1.0000
Yes	67 (2)	22 (2)	45 (2)	

Continued

Supplementary Table S8: Continued

Variables	Full cohort (n = 4387) n (%)	Test dataset (n = 1463) n (%)	Training dataset (n = 2924) n (%)	p-value
Osteoporosis				
No	3495 (98)	1158 (98)	2337 (98)	0.4173
Yes	75 (2)	21 (2)	54 (2)	
Asthma				
No	3182 (89)	1027 (87)	2155 (90)	0.0076
Yes	388 (11)	152 (13)	236 (10)	
Peptic ulcer				
No	3355 (94)	1099 (93)	2256 (94)	0.2038
Yes	215 (6)	80 (7)	135 (6)	
Osteoarthritis				
No	3383 (95)	1120 (95)	2263 (95)	0.7184
Yes	187 (5)	59 (5)	128 (5)	
CD4 nadir, cells/mm ³				
<50	121 (3)	43 (4)	78 (3)	0.3622
50-199	431 (12)	150 (13)	281 (12)	
200-349	725 (20)	221 (18)	504 (21)	
350+	2293 (64)	765 (65)	1528 (64)	
Plasma viral load suppression				
No	941 (26)	334 (28)	607 (25)	0.0663
Yes	2649 (74)	845 (72)	1784 (75)	
Income assistance				
No	2422 (68)	799 (68)	1623 (67)	0.9775
Yes	1148 (32)	380 (32)	768 (33)	
Continuous covariates	Median (Q1-Q3)	Median (Q1-Q3)	Median (Q1-Q3)	
Index year	2015 (2012-2018)	2015 (2011-2018)	2015 (2012-2018)	0.8813
Age at index date (years)	47 (40-55)	47 (39-54)	47 (40-55)	0.3884
Year of ART initiation	2009 (2006-2013)	2010 (2006-2013)	2009 (2006-2013)	0.2004
Years on ART at index date (years)	4.0 (2.0-6.0)	4.0 (2.0-6.0)	4.0 (2.0-70)	0.0999
CD4 nadir at index date (cells/mm ³)	440 (270-620)	430 (260-620)	440 (270-610)	0.8913
Follow-up time at end of follow-up (years)	3.2 (1.3-6.3)	3.3 (1.4-6.4)	3.2 (1.3-6.3)	0.4878

Legend: Q1-Q3: 25th - 75th percentiles; ART: antiretroviral therapy; p-value significance is set at 0.05.



Supplementary Table S9: Descriptive characteristics of females included in training and test datasets for people living with HIV in British Columbia, Canada, from 2002 to 2019

Variables	Full cohort (n = 817) n (%)	Test dataset (n = 284) n (%)	Training dataset (n = 533) n (%)	p-value
Death during the study period				
No	616 (75)	225 (79)	391 (73)	0.0769
Yes	201 (25)	59 (21)	142 (27)	
Cardiovascular disease				
No	757 (93)	267 (94)	490 (92)	0.3445
Yes	60 (7)	17 (6)	43 (8)	
Chronic kidney disease				
No	738 (94)	254 (89)	484 (91)	0.6123
Yes	79 (6)	30 (11)	49 (9)	
Diabetes mellitus				
No	757 (93)	264 (93)	493 (92)	0.9200
Yes	60 (7)	20 (7)	40 (8)	
Chronic liver disease				
No	574 (70)	196 (69)	378 (71)	0.6263
Yes	243 (30)	88 (31)	155 (29)	
Non-AIDS-defining cancers				
No	758 (93)	261 (92)	497 (93)	0.5720
Yes	59 (7)	23 (8)	36 (7)	
Chronic obstructive pulmonary disease				
No	744 (91)	259 (91)	485 (91)	1.0000
Yes	73 (9)	25 (9)	48 (9)	
Hypertension				
No	723 (89)	256 (90)	467 (88)	0.3364
Yes	94 (12)	28 (10)	66 (12)	
Substance use disorder				
No	280 (34)	80 (28)	200 (38)	0.0092
Yes	537 (66)	204 (72)	333 (62)	
Alzheimer's/Dementia				
No	792 (97)	277 (98)	515 (97)	0.6116
Yes	25 (3)	277 (98)	515 (97)	
Personality disorder				
No	693 (85)	245 (86)	448 (84)	0.4605
Yes	124 (15)	39 (14)	85 (16)	
Schizophrenia				
No	751 (92)	255 (90)	496 (93)	0.1341
Yes	66 (8)	29 (10)	37 (7)	
Mood/Anxiety disorder				
No	295 (36)	100 (35)	195 (37)	0.7543
Yes	522 (64)	184 (65)	338 (63)	
Rheumatoid arthritis				
No	799 (98)	277 (98)	522 (98)	0.9032
Yes	18 (2)	7 (2)	11 (2)	
Metastatic solid tumor				
No	805 (99)	279 (98)	526 (99)	0.8409
Yes	12 (1)	5 (2)	7 (1)	

Continued

Supplementary Table S9: Continued

Variables	Full cohort (n = 817) n (%)	Test dataset (n = 284) n (%)	Training dataset (n = 533) n (%)	p-value
Osteoporosis				
No	763 (93)	268 (94)	495 (93)	0.5019
Yes	54 (7)	16 (6)	38 (7)	
Asthma				
No	609 (75)	209 (74)	400 (75)	0.7111
Yes	208 (25)	75 (26)	133 (25)	
Peptic ulcer				
No	724 (89)	259 (91)	465 (87)	0.1142
Yes	93 (11)	25 (9)	68 (13)	
Osteoarthritis				
No	741 (91)	250 (88)	491 (92)	0.0733
Yes	76 (9)	34 (12)	42 (8)	
CD4 nadir, cells/mm ³				
<50	51 (6)	18 (6)	33 (6)	0.2698
50-199	159 (20)	52 (18)	107 (20)	
200-349	170 (20)	50 (18)	120 (23)	
350+	437 (54)	164 (58)	273 (51)	
Plasma viral load suppression				
No	330 (40)	112 (39)	218 (41)	0.7405
Yes	487 (60)	172 (61)	315 (59)	
Income assistance				
No	377 (46)	133 (47)	244 (46)	0.8308
Yes	440 (54)	151 (53)	289 (54)	
Continuous covariates	Median (Q1-Q3)	Median (Q1-Q3)	Median (Q1-Q3)	
Index year	2014 (2010-2017)	2015 (2011-2017)	2014 (2010-2017)	0.3925
Age at index date (years)	43 (36-52)	43 (36-50)	44 (36-52)	0.5497
Year of ART initiation	2009 (2005-2012)	2009 (2006-2012)	2009 (2005-2012)	0.7425
Years on ART at index date (years)	4.0 (2.0-6.0)	4.0 (2.0-6.3)	3.0 (2.0-6.0)	0.1320
CD4 nadir at index date (cells/mm ³)	370 (190-570)	410 (200-600)	360 (190-540)	0.1107
Follow-up time at end of follow-up (years)	3.4 (1.4-6.5)	3.4 (1.6-6.6)	3.3 (1.3-6.4)	0.3437

Legend: Q1-Q3: 25th–75th percentiles; ART: antiretroviral therapy; p-value significance is set at 0.05.



Supplementary Table S10: Cox proportional models for males showing adjusted hazard ratios based on the training dataset and Harrell's c-statistics for the training and test datasets

Variables	Model 1 aHR (95% CI)	Model 2 aHR (95% CI)	Model 3 aHR (95% CI)
Cardiovascular disease (Ref: No)			
Yes	2.01 (1.52-2.67)	1.74 (1.30-2.32)	1.80 (1.32-2.46)
Chronic liver disease (Ref: No)			
Yes	2.11 (1.65-2.71)	2.06 (1.61-2.63)	1.84 (1.43-2.37)
Chronic kidney disease (Ref: No)			
Yes	1.73 (1.27-2.36)	1.75 (1.29-2.38)	1.68 (1.22-2.31)
Chronic obstructive pulmonary disease (Ref: No)			
Yes	2.02 (1.49-2.75)	1.67 (1.24-2.24)	1.76 (1.30-2.39)
Non-AIDS-defining cancers (Ref: No)			
Yes	2.16 (1.59-2.93)	1.97 (1.44-2.69)	2.08 (1.51-2.87)
Substance use disorder (Ref: No)			
Yes	2.87 (2.27-3.62)	3.06 (2.41-3.87)	2.73 (2.11-3.54)
Alzheimer's/Dementia (Ref: No)			
Yes	2.24 (1.56-3.21)	2.26 (1.58-3.23)	1.67 (1.15-2.44)
Metastatic solid tumor (Ref: No)			
Yes	2.58 (1.61-4.15)	2.62 (1.64-4.19)	2.24 (1.38-3.63)
Diabetes mellitus (Ref: No)			
Yes	1.32 (0.94-1.84)		1.34 (0.94-1.92)
Rheumatoid arthritis (Ref: No)			
Yes	2.90 (0.92-9.12)	2.80 (0.89-8.80)	3.73 (1.17-11.94)
Asthma (Ref: No)			
Yes	0.79 (0.57-1.10)		
Hypertension (Ref: No)			
Yes			0.76 (0.55-1.06)
Income assistance (Ref: No)			
Yes			1.54 (1.20-1.96)
^a Age per 10-year increase		1.23 (1.10-1.38)	1.40 (1.24-1.58)
Plasma viral load suppression (Ref: Yes)			
No			1.41 (1.09-1.83)
^b CD4 nadir per 100 cells/mm ³			
Linear			0.85 (0.80-0.90)
Quadratic			1.02 (1.01-1.03)
^c Years on ART			
Linear			0.91 (0.86-0.97)
Quadratic			1.03 (1.01-1.05)
Cubic			1.00 (0.99-1.00)
Dataset statistic	Harrell's c- statistic (95% CI)	Harrell's c- statistic (95% CI)	Harrell's c- statistic (95% CI)
Training dataset	0.7977 (0.7752-0.8202)	0.8002 (0.7771-0.8233)	0.8507 (0.8317-0.8697)
Test dataset	0.7598 (0.7221-0.7975)	0.7677 (0.7304-0.8050)	0.8069 (0.7734-0.8404)

Legend: ART: Antiretroviral Therapy; aHR: adjusted hazard ratio; CI: Confidence Interval; ^aLinear form of age centered at the median (47 years); ^bPolynomial forms of CD4 nadir centered at the median (440 cells/mm³); ^cLinear form of years on ART centered at the median (4 years).

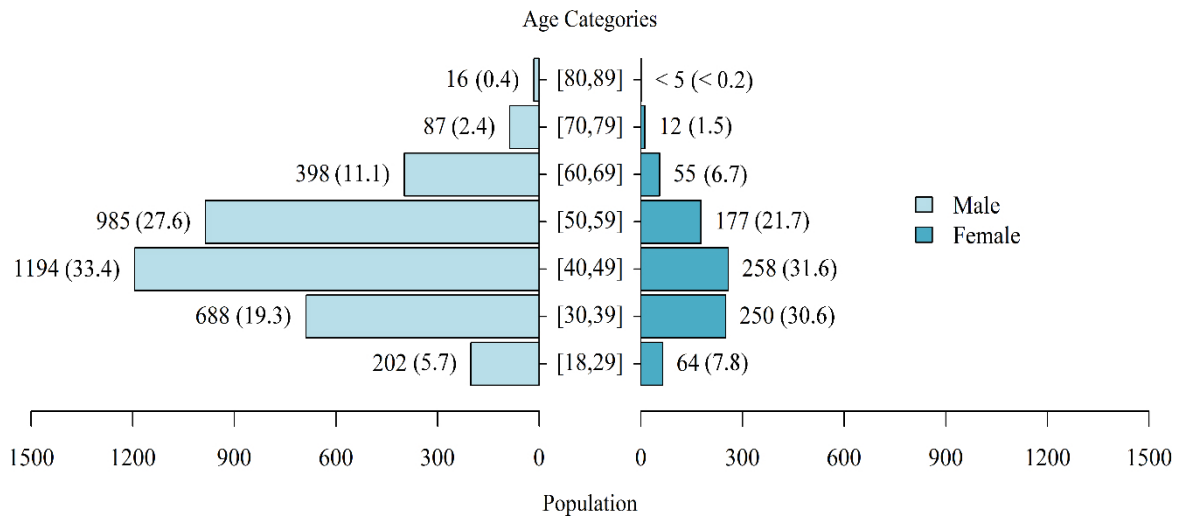
Supplementary Table S11: Cox proportional models for females showing adjusted hazard ratios based on the training dataset and Harrell's c-statistics for the training and test datasets

Variables	Model 1 aHR (95% CI)	Model 2 aHR (95% CI)	Model 3 aHR (95% CI)
Cardiovascular disease (Ref: No)			
Yes	2.11 (1.26-3.51)	2.10 (1.26-3.50)	1.83 (1.10-3.04)
Chronic kidney disease (Ref: No)			
Yes	2.52 (1.58-4.02)	2.41 (1.50-3.86)	1.73 (1.09-2.76)
Chronic obstructive pulmonary disease (Ref: No)			
Yes	2.43 (1.52-3.89)	2.20 (1.34-3.61)	2.96 (1.82-4.82)
Non-AIDS-defining cancers (Ref: No)			
Yes	2.07 (1.12-3.81)	1.99 (1.08-3.68)	2.37 (1.32-4.24)
Substance use disorder (Ref: No)			
Yes	2.60 (1.67-4.06)	2.76 (1.75-4.34)	2.48 (1.54-3.99)
Metastatic solid tumor (Ref: No)			
Yes	2.79 (0.91-8.60)	2.76 (0.88-8.60)	
Mood/Anxiety disorder (Ref: No)			
Yes	0.74 (0.52-1.07)	0.75 (0.52-1.08)	
Peptic ulcer (Ref: No)			
Yes	1.48 (0.94-2.34)	1.49 (0.94-2.36)	1.83 (1.18-2.83)
Hypertension (Ref: No)			
Yes	0.67 (0.38-1.18)	0.64 (0.36-1.13)	
^a Age per 10-year increase		1.11 (0.93-1.32)	1.24 (1.04-1.48)
Plasma viral load suppression (Ref: Yes)			
No			2.01 (1.35-3.00)
^b CD4 nadir per 100 cells/mm ³			0.80 (0.73-0.89)
^c Years on ART			0.96 (0.90-1.02)
Dataset	Harrell's c-statistic (95% CI)	Harrell's c-statistic (95% CI)	Harrell's c-statistic (95% CI)
Training dataset	0.7148 (0.6730-0.7566)	0.7198 (0.6772-0.7624)	0.7835 (0.7470-0.8200)
Test dataset	0.6978 (0.6278-0.7678)	0.6916 (0.6189-0.7643)	0.7492 (0.6777-0.8207)

Legend: ART: Antiretroviral Therapy; aHR: adjusted hazard ratio; CI: Confidence Interval; ^aLinear form of age centered at the median (44 years); ^bPolynomial forms of CD4 nadir centered at the median (360 cells/mm³); ^cLinear form of years on ART centered at the median (3 years).

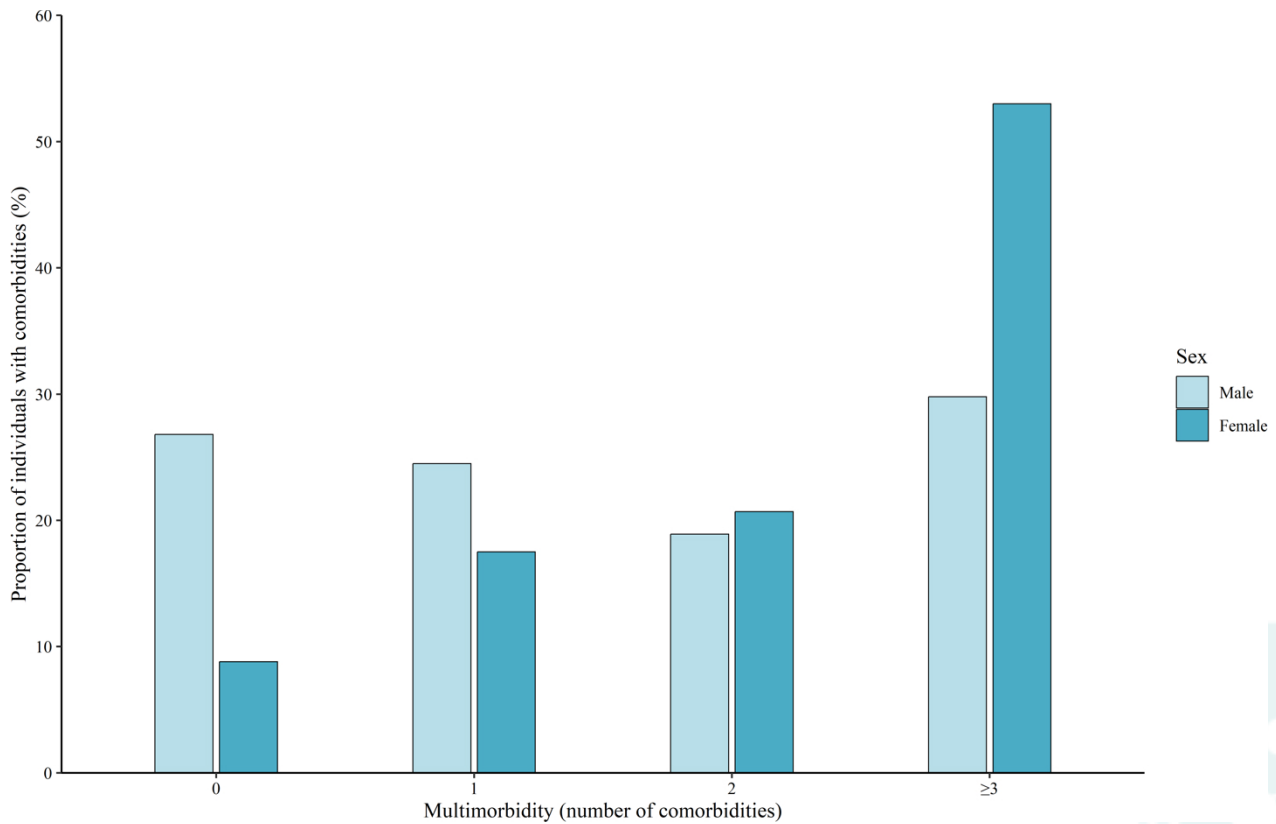


Supplementary Figure S3: Distribution of the full cohort (n = 4387) by age category and sex at birth of people living with HIV in British Columbia, Canada, from 2002 to 2019

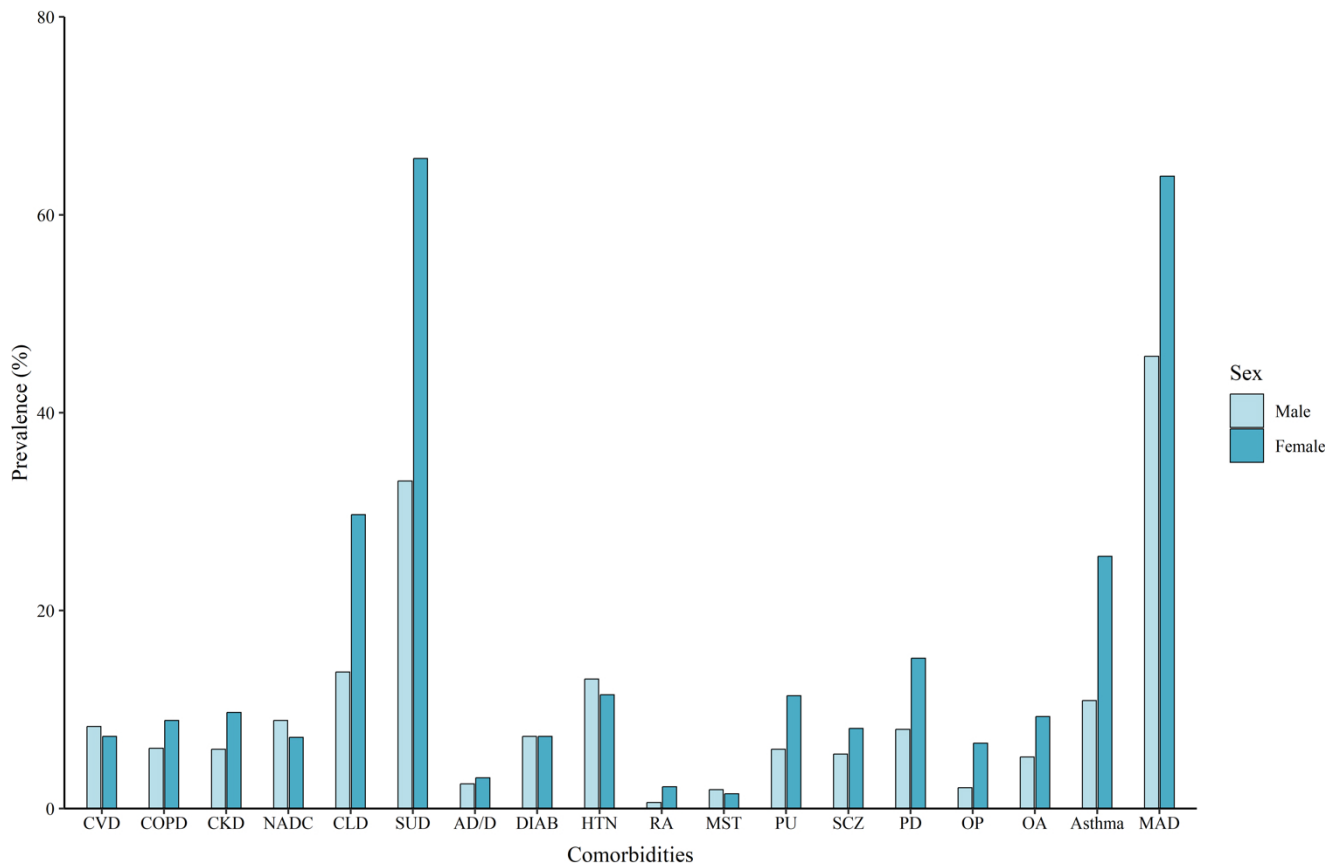


Note: Distribution expressed as number (%).

Supplementary Figure S4: The proportion of participants with or without comorbidities at the index date stratified by multimorbidity groups and by sex at birth among people living with HIV in British Columbia, Canada, from 2002 to 2019

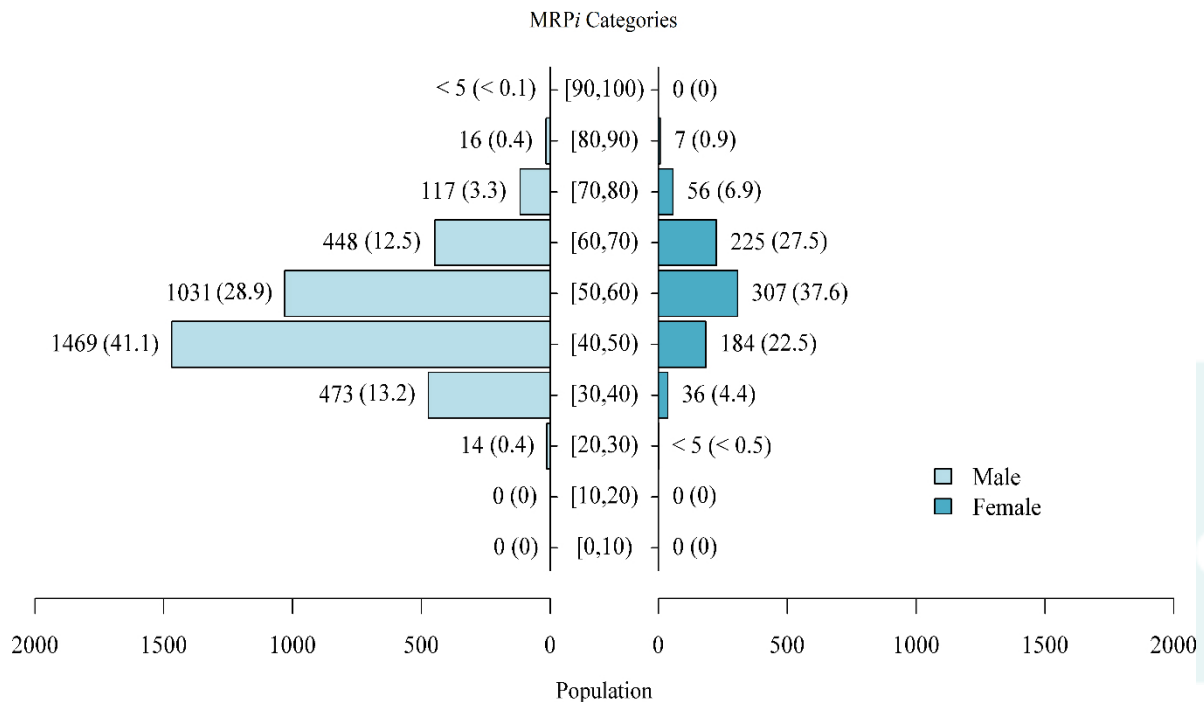


Supplementary Figure S5: Prevalence of comorbidities at the index date stratified by sex at birth among people living with HIV in British Columbia, Canada from 2002 to 2019



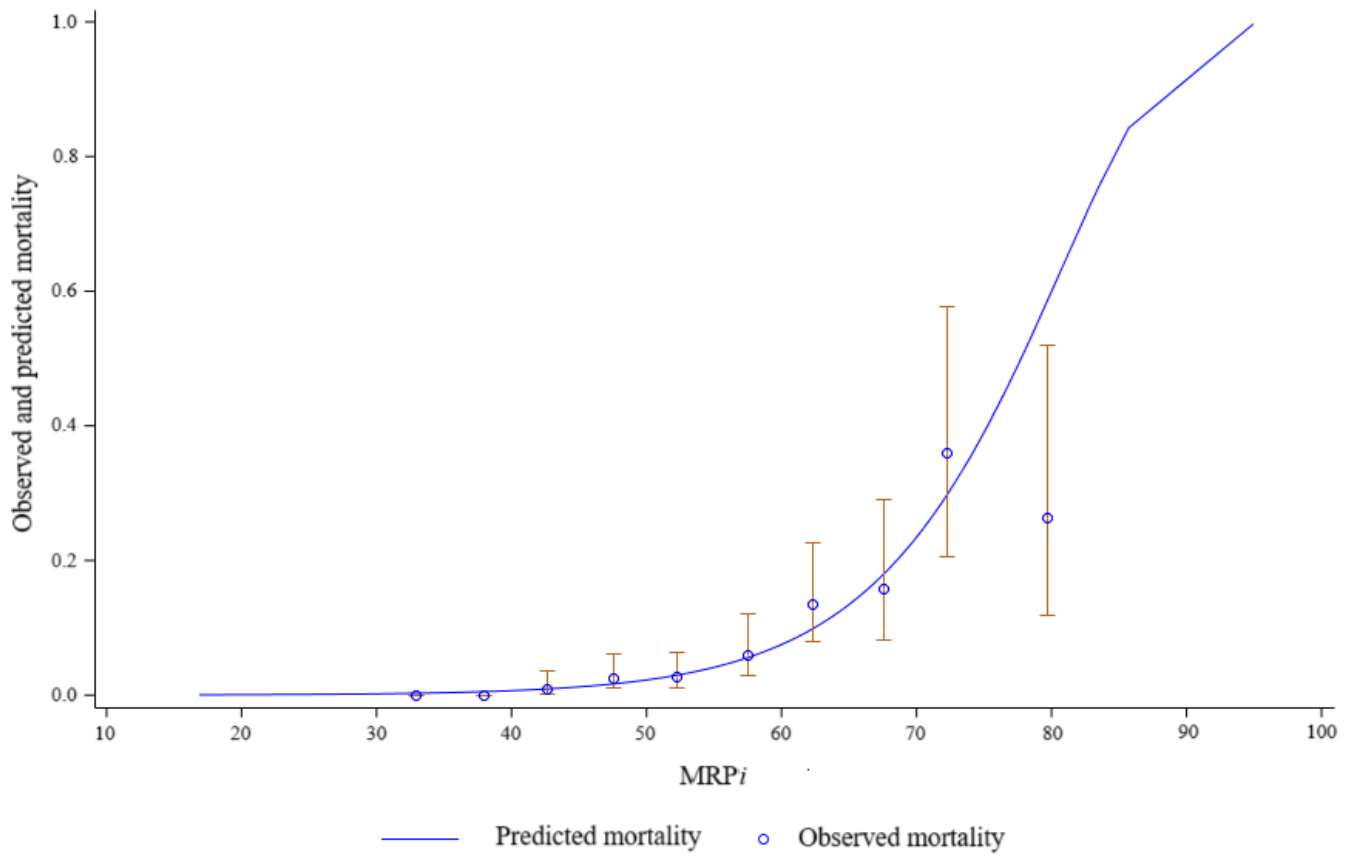
Note: CVD: Cardiovascular disease; COPD: Chronic obstructive pulmonary disease; CKD: Chronic kidney disease; NADC: Non-AIDS-defining cancers; CLD: Chronic liver disease; SUD: Substance use disorder; AD/D: Alzheimer's/Dementia; DIAB: Diabetes; HTN: Hypertension; RA: Rheumatoid arthritis; MST: Metastatic solid tumor; PU: Peptic ulcer; SCZ: Schizophrenia; PD: Personality disorder; OP: Osteoporosis; OA: Osteoarthritis; MAD: Mood/Anxiety disorder.

Supplementary Figure S6: Distribution of the full cohort (n=4387) by mortality risk prediction index score category and sex at birth of people living with HIV in British Columbia, Canada, from 2002 to 2019



Note: MRPi: Mortality risk prediction index. Distribution expressed as number (%).

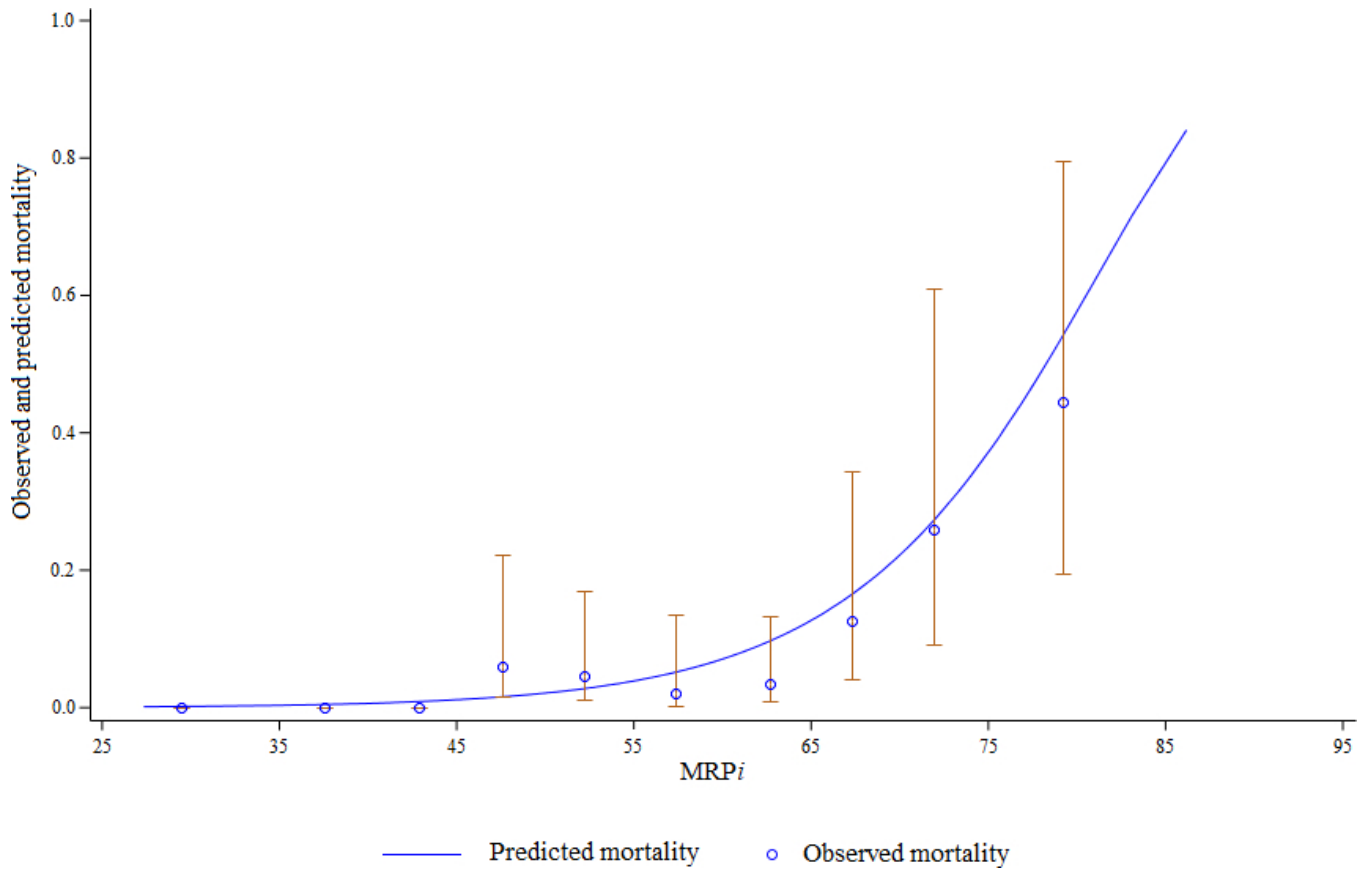
Supplementary Figure S7: Predicted one-year all-cause mortality for males using our final Cox model vs observed Kaplan-Meier estimates of the one-year all-cause mortality probability for males by subgroups of the one-year mortality risk prediction index (MRPi) using the test dataset



Legend: The observed one-year mortality probability is shown with 95% confidence intervals. Solid lines reflect predicted mortality probability calculated using the test dataset (n=1179). MRPi ranges from 0-100; x-axis begins from 10 because the minimum score in our sample is 17.



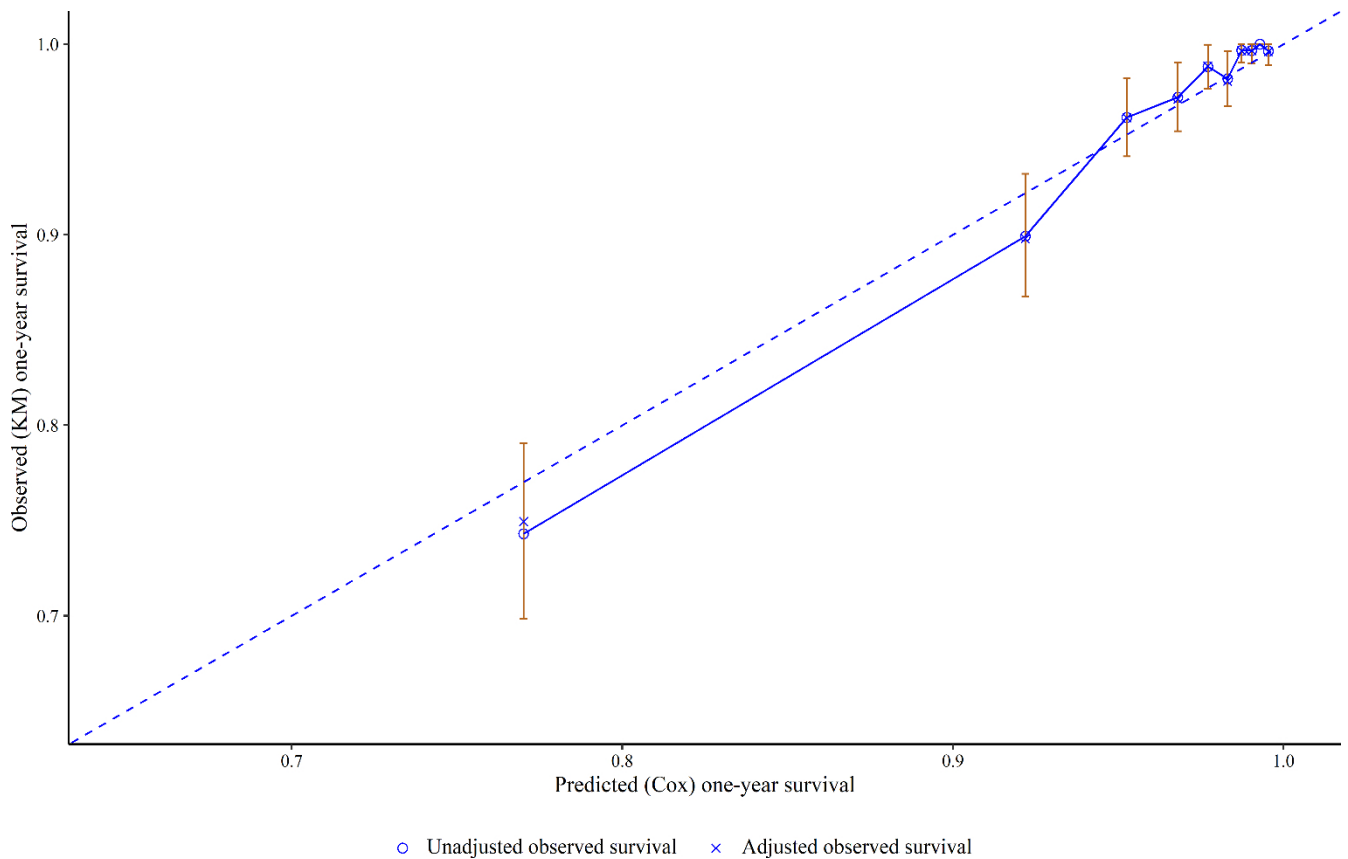
Supplementary Figure S8: Predicted one-year all-cause mortality for females using our final Cox model vs observed Kaplan-Meier estimates of the one-year all-cause mortality probability for females by subgroups of the one-year mortality risk prediction index (MRP_i) using the test dataset



Legend: The observed one-year mortality probability is shown with 95% confidence intervals. Solid lines reflect predicted mortality probability calculated using the test dataset (n=284). MRP_i ranges from 0-100; x-axis begins from 25 because the minimum score in our sample is 27.



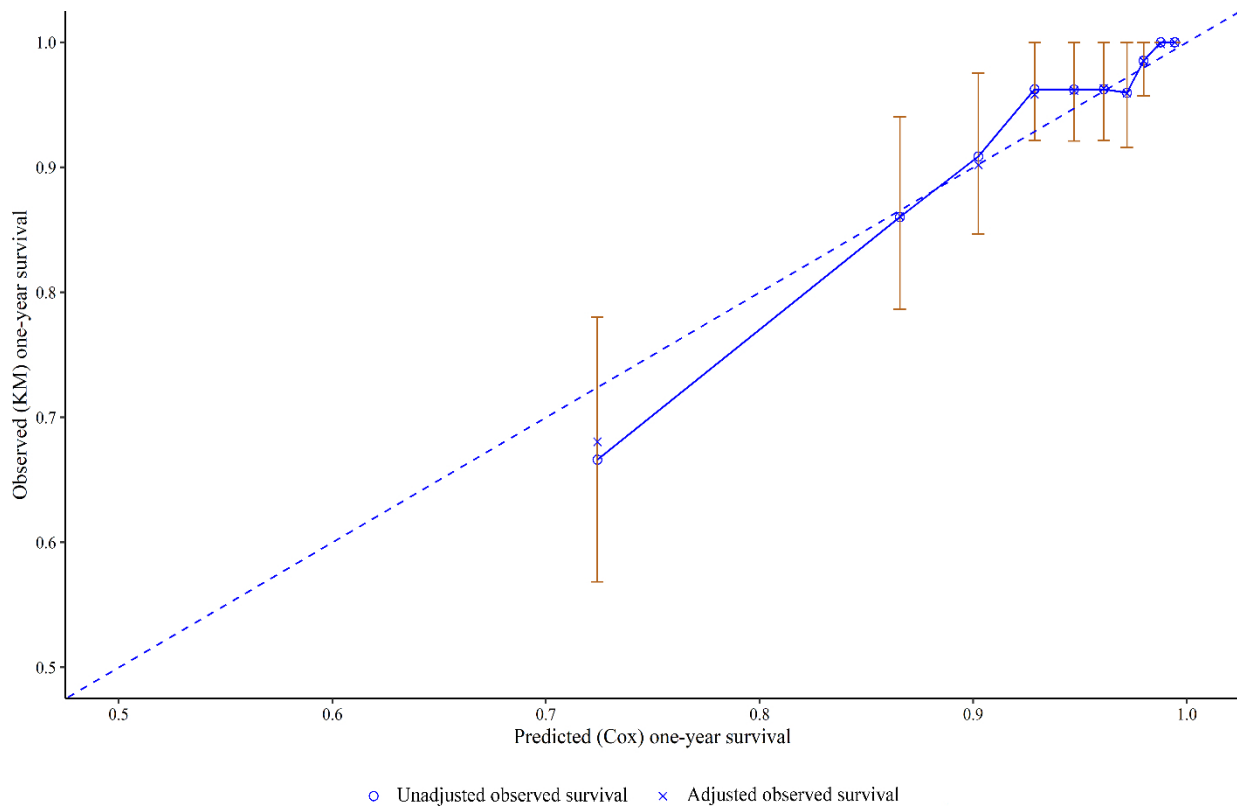
Supplementary Figure S9: Observed Kaplan-Meier estimates vs predicted estimates of one-year survival probabilities for males using the full dataset



Legend: KM; Kaplan-Meier. The observed one-year survival probability is shown with 95% confidence intervals. A solid line is drawn to join the two unadjusted observed survival points. The distance between a 45-degree (dotted) line with slope 1 and intercept 0 and the points reflects the difference between the observed and predicted survival probabilities. We did not have any observed survival probability <75%.



Supplementary Figure S10: Observed Kaplan-Meier estimates vs predicted estimates of one-year survival probabilities for females using the full dataset



Legend: KM; Kaplan-Meier. The observed one-year survival probability is shown with 95% confidence intervals. A solid line is drawn to join the two unadjusted observed survival points. The distance between a 45-degree (dotted) line with slope 1 and intercept 0 and the points reflects the difference between the observed and predicted survival probabilities. We did not have any observed survival probability <70%.



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