

Supplemental Table S1. Definitions of Covariates and Outcome

Diagnosis	ICD-10 code/Claim code	Diagnostic definition
Outcome		
Osteoporosis	M80, M81, M82	
Variables		
Income	1) Low 2) Middle 3) High	1) 0,1,2,3 in decile 2) 4,5,6,7 in decile 3) 8,9,10 in decile
Residence	1) Urban 2) Rural	1) Seoul, Busan, Daegu, Incheon, Gwangju, Daejeon, and Ulsan 2) Gyeonggi Province, Gangwon Province, North and South Chungcheong Provinces, North and South Jeolla
Heavy drink		Male: 7 drinks at least twice per week Female: 5 drinks at least twice per week
Alcohol intake		Number of alcohol consumption per week
Alcohol binge		Male: 5 drinks per session Female: 4 drinks per session
Regular exercise		Vigorous activity at least 3 times per week Mild activity at least 5 times per week Walk at least 5 times per week
Body mass index	1) Underweight 2) Normal 3) Overweight 4) Obese	1) <18.5 kg/m ² 2) 18.5–22.9 kg/m ² 3) 23.0–24.9 kg/m ² 4) ≥25 kg/m ²
Steroid use	193302ATB, 193305ATB, 217034ASY, 217001ATB, 193601BIJ, 193603BIJ, 193604BIJ, 217131COS, 217132COS, 217135COS, 217136COS, 217137COS, 217138COS, 217139COS, 193432COM, 193433COM, 193434CLT, 193435CLT, 193438CLT, 217531CCM, 217532CCM, 217533CCM, 217534CCM, 217535CLT, 217536CCM, 217537CCM, 141901ATB, 141903ATB, 142230BIJ, 142232BIJ, 141930COO, 141931COS, 141906CIM, 142231COO, 141910CSI, 142130CCM, 142131CCM, 142133CCM, 243201ATB, 243202ATB, 243203ATB, 243336BIJ, 243335BIJ, 243337BIJ, 243340COS, 243330CLQ, 243331CCM, 243339COM, 160201ATB, 170901ATB, 170906ATB, 170931COM, 170932CCM, 170947COM, 170938CLT, 170939CLT, 170942CLT, 170943CLT, 170933CSS, 170950CLT, 170941CLT, 170944CLT, 170945CLT, 170946CLT, 170934CSS, 171030CCM, 171130CCM	
Thyroidectomy	1) Total thyroidectomy: P4561, P4552 2) Lobectomy: P4551, P4553, P4554	
TSH suppression treatment, Levothyroxine ^a	183601ATB, 183602ATB, 183603ATB, 183604ATB, 183606ATB, 183607ATB, 183608ATB, 183609ATB, 183610ATB, 183611ATB	
Comorbidities		
Hypertension	I10, I11, I12, I13, I15	Blood pressure ≥140/90 mm Hg
Diabetes mellitus	E10–E14	Fasting plasma glucose ≥126 mg/dL
Dyslipidemia	E78	Total cholesterol ≥240 mg/dL
Anemia		Hemoglobin <13 g/dL (male) or <12 g/dL (female)
Rheumatoid arthritis	M05, M06	
Fracture	S02, S12, S22, S32, S42, S52, S62, S72, S82, S92, T02, T08, T10, T12, M485, M495	
Hypothyroidism	E03	
Hyperthyroidism	E05	
Charlson comorbidity index (score)		
Myocardial infarction (1 point)	I21, I22, I252	

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Diagnosis	ICD-10 code/Claim code	Diagnostic definition
Congestive heart failure (1 point)	I099, I110, I130, I132, I255, I420, I425, I426, I427, I428, I429, I43, I50, P290	
Peripheral vascular disease (1 point)	I70, I71, I731, I738, I739, I771, I790, I792, K551, K558, K559, Z958, Z959	
Cerebrovascular disease (1 point)	G45, G46, I60, I61, I62, I63, I64, I65, I66, I67, I68, I69, H340	
Dementia (1 point)	F00, F01, F02, F03, G30, F051, G311	
Chronic pulmonary disease (1 point)	I278, I279, J40, J41, J42, J43, J44, J45, J46, J47, J60, J61, J62, J63, J64, J65, J66, J67, J684, J701, J703	
Connective tissue disease (1 point)	M05, M06, M315, M32, M33, M34, M351, M353, M360	
Peptic ulcer disease (1 point)	K25, K26, K27, K28	
Mild liver disease (1 point)	B18, K700, K701, K702, K703, K709, K713, K714, K715, K717, K73, K74, K760, K762, K763, K764, K768, K769, Z944	
Moderate or severe liver disease (3 points)	I850, I859, I864, I982, K704, K711, K721, K729, K765, K766, K767	
Diabetes without complications (1 point)	E100, E101, E106, E108, E109, E110, E111, E116, E118, E119, E120, E121, E126, E128, E129, E130, E131, E136, E138, E139, E140, E141, E146, E148, E149	
Diabetes with complications (2 points)	E102, E103, E104, E105, E107, E112, E113, E114, E115, E117, E122, E123, E124, E125, E127, E132, E133, E134, E135, E137, E142, E143, E144, E145, E147	
Paraplegia and hemiplegia (2 points)	G041, G114, G800, G801, G802, G81, G82, G830, G831, G832, G833, G834, G839	
Renal disease (2 points)	I120, I131, N030, N031, N032, N033, N034, N035, N036, N037, N038, N039, N050, N051, N052, N053, N054, N055, N056, N057, N058, N059, N18, N19, N250, Z490, Z491, Z492, Z940, Z992	
Cancer (2 points)	C00, C01, C02, C03, C04, C05, C06, C07, C08, C09, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C26, C30, C31, C32, C33, C34, C37, C38, C39, C40, C41, C43, C45, C46, C47, C48, C49, C50, C51, C52, C53, C54, C55, C56, C57, C58, C60, C61, C62, C63, C64, C65, C66, C67, C68, C69, C70, C71, C72, C73, C74, C75, C76, C81, C82, C83, C84, C85, C88, C90, C91, C92, C93, C94, C95, C96, C97	
Metastatic carcinoma (6 points)	C77, C78, C79, C80	
AIDS/HIV (6 points)	B20, B21, B22, B24	

Variables retrieved from qualification and health examination data to assess demographic characteristics at the index date.

ICD-10, International Classification of Diseases, 10th Revision; TSH, thyroid-stimulating hormone; AIDS, acquired immunodeficiency syndrome; HIV, human immunodeficiency virus.

^aTSH suppression treatment is a binary variable indicating whether a patient received any levothyroxine prescriptions after thyroid cancer diagnosis. Levothyroxine refers to the average daily dose within 1 year after the index date.