

SA NBD-GBD and SA NBD-WHO cause list mappings for the second South African National Burden of Disease

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Acronyms

CRA	Comparative Risk Assessment
AIDS	Acquired Immune Deficiency Syndrome
GBD	Global Burden of Disease
GC	Garbage code
GHE	Global Health Estimate
HIV	Human Immunodeficiency virus
ICD-10	International Statistical Classification of Disease and Related Health Conditions 10 th revision
IHME	Institute for Health Metrics and Evaluation
NBD	National Burden of Disease
N-GBD code	New GBD code
N-WHO code	New WHO code
SA	South Africa
SA NBD 2	Second South African National Burden of Disease Study
TB	Tuberculosis
WHO	World Health Organization

Glossary

Broad cause groups

Type 1 (pre-transitional causes): Communicable diseases, maternal causes, perinatal conditions and nutritional deficiencies. Due to the large burden of HIV/AIDS and TB in South Africa, and the strong shift towards an integrated approach to address the challenge of HIV/AIDS and TB, these two diseases are treated as a separate group within Type 1. Therefore, Type 1 is divided into 2 subgroups namely: (a) Type 1a - maternal, perinatal, nutritional and other infectious diseases; and (b) Type 1b - HIV/AIDS and TB.

Type 2 (non-communicable diseases): These include malignant neoplasms; cardiovascular diseases; chronic respiratory diseases; digestive, musculoskeletal and genitourinary conditions; as well as mental disorders and neurological conditions.

Type 3 (Injuries): Unintentional and intentional injuries.

Disease categories in the second SA NBD list

Cardiovascular diseases

Cardiovascular disease (CVD) covers a wide array of disorders, including diseases of the cardiac muscle and the vascular system supplying the heart, brain and other vital organs. The most common manifestations of CVD are ischaemic heart disease, congestive heart failure and stroke.

Conditions originating during the perinatal period

Deaths from these causes (primarily low birth weight and birth trauma/asphyxia) may occur at any age, but are largely confined to the perinatal period. This group of causes is distinct from perinatal mortality defined on the basis of age and includes stillbirths from 27 weeks of gestation and live births that die up to six days of age.

Congenital abnormalities

Malformations, deformities and chromosomal abnormalities that are present at birth.

Diabetes mellitus

Diabetes mellitus, or simply diabetes, is a group of metabolic diseases in which a person has high blood glucose levels, either because the pancreas does not produce enough insulin, or because cells do not respond to the insulin that is produced. This includes type-1 and type-2 diabetes mellitus.

Digestive diseases

Diseases of the digestive system such as gastric ulcers, appendicitis and liver disease, excluding cancers.

Endocrine, nutritional, and other blood and immune disorders

Blood disorders such as haemolytic anaemia, disorders of the immune mechanism (non-HIV related), thyroid disorders, glucose and pancreatic regulatory disorders, endocrine gland disorders, obesity and other metabolic disorders.

Genito-urinary diseases

Renal and other urinary diseases, and gynaecological and prostatic conditions, excluding cancers.

HIV/AIDS and TB

HIV/AIDS, and all forms of TB, are placed together in a separate category due to their large burden and their need for integrated care in South Africa.

Infectious/parasitic diseases

Caused by the transmission of a parasite, virus, fungus or bacteria. These include sexually transmitted infections, diarrhoeal disease, vaccine-preventable childhood diseases, meningitis and encephalitis, malaria, and a few others.

Intentional injuries

Due to violence and subdivided into self-inflicted injuries, interpersonal violence, legal intervention and war-related injuries.

Malignant neoplasms

Cancer is a broad group of diseases that involve unregulated cell growth. In cancer, cells divide and grow uncontrollably, forming malignant tumours (neoplasms), and invade nearby parts of the body. The cancer may also spread to more distant parts of the body through the lymphatic system or bloodstream.

Maternal conditions

Deaths of women while pregnant or within 42 days of termination of pregnancy from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes. Maternal deaths can result from direct or indirect causes.

- ***Direct maternal death:*** Deaths resulting from obstetric complications of the pregnancy state (pregnancy, labour and puerperium), from interventions, omissions, incorrect treatment or a chain of events resulting from any of the above.
- ***Indirect maternal death:*** Deaths resulting from previous existing disease, or disease that developed during pregnancy, which were not due to direct obstetric causes but were aggravated by the physiological effects of pregnancy.

Mental disorders

Mental and behavioural disorders including depression, anxiety, schizophrenia, alcohol and drug abuse, eating disorders, childhood-behaviour disorders, development disorders and mental retardation.

Musculoskeletal disorders

Rheumatoid and osteoarthritis, back and neck pain and other musculoskeletal disorders.

Nervous system disorders

Neuro-psychiatric conditions including Alzheimer's and Parkinson's disease, and other neurological degenerative diseases including epilepsy and other neurological conditions.

Nutritional conditions

Malnutrition resulting from energy or nutrient deficiencies, or other nutritional disorders.

Oral conditions

Dental caries, periodontal diseases and other oral conditions.

Respiratory diseases

Chronic respiratory conditions such as asthma or chronic obstructive pulmonary disease, excluding infections.

Respiratory infections

These include respiratory tract infections and otitis media (middle-ear infection). Respiratory tract infection refers to a number of infectious diseases involving the respiratory tract. These infections are further classified as upper respiratory tract infections (URI or URTI) or lower respiratory tract infections (LRI or LRTI). An example of a lower respiratory infection is pneumonia and that of an upper respiratory infection is the common cold.

Sense organ diseases

Conditions affecting sight and hearing.

Skin diseases

Skin infections and disorders, excluding cancer.

Unintentional injuries

Due to fate, accidents, or other unpredictable and uncontrollable events, and subdivided into road-traffic injuries, poisoning, falls, fires, drowning, surgical and medical misadventure, suffocation and foreign bodies, and other unintentional injuries.

Comparative Risk Assessment

A comprehensive, standardised demographic and epidemiological conceptual and methodological framework to estimate the relative contribution of selected risk factors to the disease and injury burden of a country or region, making use of comparable data on risk factor exposure and effects in populations.

Garbage codes

Global burden of disease experts coined this term to describe ICD codes for mortality data that do not signify an underlying cause of death. These include ill-defined signs and symptoms, intermediate causes of death (e.g. septicaemia), mechanisms of death (e.g. cardiac arrest) or partially specified causes (e.g. cancer with unknown sites).

Global Burden of Disease study (GBD)

A comprehensive worldwide observational epidemiological study— undertaken by the Institute for Health Metrics (IHME) and collaborators— that describes mortality and morbidity from major diseases, injuries and risk factors to health at global, national and regional levels. In this report, the GBD study refers to the study conducted by IHME.

National Burden of Disease study (NBD)

A comprehensive demographic and epidemiological framework to estimate health gaps of a country for an extensive set of disease and injury causes, and for major risk factors, using all available mortality and health data, and methods to ensure internal consistency and comparability of estimates.

WHO Burden of Disease study

This study undertaken by the World Health Organization provides a framework for integrating, validating, analysing and disseminating information that is available on mortality and health in populations in all regions of the world to assess the comparative importance of diseases, injuries and risk factors in causing premature death, loss of health and disability in different populations.

Executive Summary

The Burden of Disease Research Unit at the South African Medical Research Council is currently undertaking the Second National Burden of Disease study for South Africa (SA NBD2). Despite South Africa having data sources to estimate mortality, data to estimate non-fatal burden are sparse. The Global Burden of Disease (GBD) study and the WHO Burden of Disease Study produced years of life lived with a disability (YLDs) by causes, disease categories and broad cause group for South Africa that could be used to fill this gap.

Each burden of disease study has a list of aggregated causes, disease categories and broad cause groups that is coined the burden of disease list. The structure and composition of the list used in a burden of disease study has implications for the resultant rankings of diseases. The burden of disease list for the SANBD2, the GBD and the WHO studies have similar disease lists with some differences.

This document outlines the method used to map the SA NBD2 list to the GBD list, as well as the SA NBD2 list to the WHO list. Amongst other things, the mapping will be used to harness the YLD estimates from either the GBD or the WHO study for estimation of Disability Adjusted Life Years for South Africa.

1 Introduction

A disease list is essential for a burden of disease study. It defines how causes are aggregated which has consequences on the rankings of single causes. The list developed for the second South African National Burden of Disease (SA NBD 2) study (Pillay-van Wyk *et al.* 2014) took into account the list from the initial SA NBD study which was developed for the South African context with its specific disease burden as well as data availability (Bradshaw *et al.* 2003).

The steps to develop the revised SA NBD list included a review of the following lists in terms of the International Classification of Diseases, Tenth Revision (ICD-10) (WHO 2016): the list used for the initial SA NBD study (Bradshaw *et al.* 2003); the list used by WHO for their burden of disease studies (WHO 2014); the revisions of the 2005 GBD study (GBD 2005); the changes for the revised 2010 GBD list (Naghavi *et al.* 2010, Murray *et al.* 2012); and, the 2013 GBD list (personal communication); together with consultation with experts.

The level of disaggregation of conditions in the SA NBD list has been guided by the criteria used in the GBD lists. These include the number of deaths due to specific causes: causes required for public health policy or health services and health budget, and causes that are not so broad as to be uninformative for public health policy yet not too specific to make comparisons with other settings difficult.

This document outlines the method used to create a map between the SA NBD list and the GBD list, as well as a map between the SA NBD list and the WHO list. Amongst other things, the mapping will be used to harness the years of life lived with disability (YLD) estimates for calculating the Disability Adjusted Life Years (DALY) estimates for South Africa.

1.1 SA NBD list

The current SA NBD list has 140 conditions, grouped into 23 disease categories that fall into three broad cause groups. Given the size of the HIV/AIDS and related TB epidemics, the first broad cause group has been divided into two parts allowing for these epidemics to form their own group. The SA NBD list (updated in March 2014) is shown in Table 1.

Table 1: National burden of disease list for the SA NBD 2 study

Category	Code	SA NBD cause	ICD-10 codes
Type I: Communicable, maternal, perinatal and nutritional conditions			
A	HIV/AIDS and TB		
	ZA 1	Tuberculosis	A15-A19, B90, U51, U52, J90, J94

Category	Code	SA NBD cause	ICD-10 codes
	ZA 2	HIV/AIDS	B20-B24, B33, B45, B59, C46, D84
B	Infectious and parasitic diseases		
	ZA 3	Sexually transmitted infections excluding HIV	A50>=1 month, A51-A53, A54>=1 month, A55-A63, N70-N73, A64
	ZA 4	Diarrhoeal diseases	A00-A09, K52
	ZA 5	Vaccine-preventable childhood	A33-A35 >= 1 month, A36-A37, A80, B01, B05-B06, B26, B91
	ZA 6	Meningitis and encephalitis	A39, G00-G03, G05, A83-A87, G04, G09, G93
	ZA 7	Hepatitis	B15-B19
	ZA 8	Septicaemia	A40-A41
	ZA 9	Malaria	B50-B54
	ZA 10	Intestinal parasites, other parasitic and vector diseases	A82, A90-A91, A95, B55-B57, B65, B67-B74, B76-B82, B89
	ZA 11	Other infectious diseases	A20-A28, A30-A32, A38, A42-A49, A65-A69, A70-A74, A75-A79, A81, A88-A89, A92-A94, A96-A99, B00, B02-B04, B07-B09, B25, B27-B32, B34, B37-B44, B46-B49, B58, B60-B64, B66, B75, B83, B92, B95-B99, B94
C	Respiratory infections		
	ZA 12	Lower respiratory infections	J09-J18, J20-J22, P23 >6 days, J86
	ZA 13	Upper respiratory infections	J00-J06
	ZA 14	Otitis media	H65-H66
D	Maternal conditions		
	ZA 15	Maternal haemorrhage	O20, O44-O46, O67, O72
	ZA 16	Maternal sepsis	085-086
	ZA 17	Hypertensive disorders of pregnancy	O10-O16
	ZA 18	Obstructed labour	O64-O66
	ZA 19	Abortion	O00-O08
	ZA 20	Indirect maternal causes	O98, O99
	ZA 21	Other maternal	O21-O43, O47-O48, O60-O63, O68-O71, O73-O75, O80-O84, O87-O92, O94-O96
E	Conditions originating during the perinatal period		
	ZA 22	Preterm birth complications	P01, P07, P22, P23 <6 days, P25-P28, P29, P52, P61, P77, P80
	ZA 23	Birth asphyxia and trauma	P02, P03, P10-P15, P20-P21, P24, P50, P90-P91
	ZA 24	Sepsis and other newborn infectious conditions	P35, P36-P39, P60, (A33-A35, A50, A54) < 1 month
	ZA 25	Other non-infectious conditions arising in the perinatal period	P00, P04, P05, P08, P51, P53-P59, P62-P74, P76, P78-P79, P81-P89, P93-P94
F	Nutritional deficiencies		
	ZA 26	Protein-energy malnutrition	E40-E46
	ZA 27	Vitamin-A deficiency	E50
	ZA 28	Iron-deficiency anaemia	D50

Category	Code	SA NBD cause	ICD-10 codes
	ZA 29	Other nutritional disorders	D51-D53, E00-E02, E51-E63
Type II: Non-communicable diseases			
G	Malignant neoplasms		
	ZA 30	Mouth cancer	C00-C08
	ZA 31	Oropharynx, nasopharynx and other pharynx cancers	C09-C13
	ZA 32	Oesophageal cancer	C15
	ZA 33	Stomach cancer	C16
	ZA 34	Colo-rectal cancer	C18-C21
	ZA 35	Liver cancer	C22
	ZA 36	Gallbladder and biliary tract cancers	C23-C24
	ZA 37	Pancreas cancer	C25
	ZA 38	Larynx cancer	C32
	ZA 39	Trachea, bronchi and lung cancers	C33-C34
	ZA 40	Melanoma cancer	C43
	ZA 41	Other skin cancers	C44
	ZA 42	Breast cancer	C50
	ZA 43	Cervix cancer	C53
	ZA 44	Corpus uteri cancer	C54-C55
	ZA 45	Ovary cancer	C56
	ZA 46	Prostate cancer	C61
	ZA 47	Testis cancer	C62
	ZA 48	Bladder cancer	C67
	ZA 49	Kidney cancer	C64-C66, C68
	ZA 50	Brain cancer	C70-C72
	ZA 51	Thyroid cancer	C73
	ZA 52	Hodgkin's lymphoma	C81
	ZA 53	Non-Hodgkin's lymphoma	C82-C85, C96
	ZA 54	Multiple myeloma	C88, C90
	ZA 55	Leukaemia	C91-C95
	ZA 56	Other malignant neoplasms	C17, C30-C31, C37-C38, C40-C41, C45, C47-C49, C51-C52, C57-C58, C60, C63, C69, C74-C75, C77-C79, C97
H	Other neoplasms		
	ZA 57	Other neoplasms	D01-D48
I	Diabetes mellitus		
	ZA 58	Diabetes mellitus	E10-E14
J	Endocrine nutritional, blood and immune disorders		
	ZA 59	Endocrine nutritional, blood and immune disorders	D55-D62, D64, D66-D83, D86-D89, E03-E07, E15-E16, E20-E32, E34, E65-E68, E70-E80, E83-E85, E88
K	Mental disorders		

Category	Code	SA NBD cause	ICD-10 codes
	ZA 60	Unipolar depressive disorder	F32-F33
	ZA 61	Bipolar affective disorder	F30-F31
	ZA 62	Schizophrenia	F20-F29
	ZA 63	Alcohol dependence	F10
	ZA 64	Drug use	F11-F16, F18-F19
	ZA 65	Anxiety disorders	F40-F44
	ZA 66	Eating disorders	F50
	ZA 67	Development disorders	F80-F82, F84, F88-F89
	ZA 68	Childhood-behaviour disorders	F90-F92
	ZA 69	Mental retardation not included as sequelae elsewhere	F70-F73, F78, F79
	ZA 70	Other mental and behavioural disorders	F04-F07, F09, F17, F34-39, F45-F48, F51-F59, F60-F69, F93-F98
L	Nervous system disorders		
	ZA 71	Alzheimer's and other degenerative diseases of the nervous system	F01, F03, G30-G31
	ZA 72	Parkinson's disease	G20-G21
	ZA 73	Multiple sclerosis	G35
	ZA 74	Epilepsy	G40-G41
	ZA 75	Migraine	G43
	ZA 76	Non-migraine headache	G44
	ZA 77	Other neurological conditions	G06-G08, G10-G13, G14, G22-G25, G32, G36-37, G45-G47, G50-G62, G64, G70-G72, G90-G91, G95-G98, G80>=20 years
M	Sense organ diseases		
	ZA 78	Glaucoma	H40
	ZA 79	Cataracts	H25-H26
	ZA 80	Hearing loss not due to other diseases or injuries	H90-H91
	ZA 81	Other vision loss	H30-H35, H49-H54
	ZA 82	Other sense organ disorders	H00-H21, H27, H43-H47, H55-H57, H60-H61, H68-H83, H92-H93
N	Cardiovascular diseases		
	ZA 83	Rheumatic heart disease	I00-I09
	ZA 84	Hypertensive heart disease	I11
	ZA 85	Ischaemic heart disease	I20-I25
	ZA 86	Pericarditis, endocarditis and myocarditis	I30, I31-I33, I38-I40
	ZA 87	Cardiomyopathy	I42
	ZA 88	Cerebrovascular disease	I60-I69, G81
	ZA 89	Conduction disorders and other dysrhythmias	I44, I45, I47, I48
	ZA 90	Aortic aneurism	I71

Category	Code	SA NBD cause	ICD-10 codes
	ZA 91	Peripheral vascular disorders	I73
	ZA 92	Other circulatory diseases	I27, I28, I34-I37, I72, I77, I78, I80, I82-I84, I86-I89, I95-I98
O	Respiratory diseases		
	ZA 93	Chronic obstructive pulmonary disease	J40-J44
	ZA 94	Pneumoconiosis	J60-J65
	ZA 95	Asthma	J45-J46
	ZA 96	Other interstitial lung disease	J84
	ZA 97	Other respiratory	J30-J39, J47, J66-J68, J70, J82, J85, J91-J92, J95, J98, J99
P	Digestive diseases		
	ZA 98	Peptic ulcer disease	K25-K27
	ZA 99	Appendicitis	K35-K37
	ZA 100	Intestinal obstruction and strangulated hernia	K40-K46, K56
	ZA 101	Non-infective inflammatory bowel disease	K50-K51
	ZA 102	Cirrhosis and liver disease	K70, K73, K74, K72, I85
	ZA 103	Gall bladder and bile duct disease	K80-K83
	ZA 104	Pancreatitis	K85, K86
	ZA 105	Other digestive diseases	K20-K22, K28-K31, K38, K55, K57-K63, K71, K76, K77, K90-K91, I81
Q	Genito-urinary diseases		
	ZA 106	Renal disease	N00-N08, N10-N12, N17-N19, I12, I13
	ZA 107	Benign prostatic hypertrophy	N40
	ZA 108	Other urinary and gynaecological diseases	N13-N16, N20- N23, N25-N39, N41-N51, N60-N64, N75-N96, N97-N98
R	Skin diseases		
	ZA 109	Skin diseases	L00-L08, L10-L14, L20-L30, L40-L98, B35-B36, B85-B88
S	Musculoskeletal diseases		
	ZA 110	Rheumatoid arthritis	M05-M06
	ZA 111	Osteoarthritis	M15-M19
	ZA 112	Back and neck pain	M47-M54
	ZA 113	Other musculoskeletal disorders	M00-M02, M08, M10-M13, M20-M46, M60-M85, M87-M99
T	Congenital abnormalities		
	ZA 114	Neural tube defects	Q00, Q03, Q05
	ZA 115	Cleft lip and cleft palate	Q35-Q37
	ZA 116	Congenital heart anomalies	Q20-Q28
	ZA 117	Congenital disorders of GIT	Q38-Q45
	ZA 118	Urogenital malformations	Q50-Q64
	ZA 119	Fetal alcohol syndrome	Q86

Category	Code	SA NBD cause	ICD-10 codes
	ZA 120	Down syndrome	Q90
	ZA 121	Other chromosomal abnormalities	Q91-Q99
	ZA 122	Other congenital abnormalities	Q01, Q02, Q04, Q06-Q07, Q10-Q18, Q30-Q34, Q65-Q85, Q87-Q89, P75
U	Oral conditions		
	ZA 123	Dental caries	K02
	ZA 124	Periodontal disease	K05
	ZA 125	Other oral diseases	K00-K01, K03-K04, K06-K14
Type III: Injuries			
V	Unintentional injuries		
	ZA 126	Road injuries	V01-V04, V06, V09-V80, V82-V85, V87, V89
	ZA 127	Other transport accidents	V05, V81, V86, V88, V91, V93-V98
	ZA 128	Poisonings (including herbal)	X40-X49, Y67
	ZA 129	Falls	W00-W19
	ZA 130	Fires, heat and hot substances	X00-X19
	ZA 131	Drowning	V90, V92, W65-W70, W73, W74
	ZA 132	Hanging, strangulation and other threats to breathing	W75-W84, Y37
	132.1	Mining accidents	W77, Y37
	132.2	Other threats to breathing	W75-W76, W78-W84
	ZA 133	Mechanical forces	W24-W34, W45-W46
	ZA 134	Exposure to natural forces	X30-X39
	ZA 135	Adverse effects of medical and surgical treatment	Y39-Y66, Y68-Y84, Y88
	ZA 136	Animal contact	W53-W59, X20-X27, X29
	ZA 137	Other unintentional injuries	W20-W23, W35-W44, W49-W52, W60, W64, W85-W94, W99, X28, X50-X58, Y38
W	Intentional injuries		
	ZA 138	Self-inflicted injuries	X60-X84
	ZA 139	Interpersonal violence	X85-X99, Y00-Y09
	139.1	Interpersonal violence with firearm	X93-X95
	139.2	Interpersonal violence without firearm	X85-X92, X96-X99, Y00-Y08
	ZA 140	Legal intervention	Y35-Y36

1.2 SA NBD – GBD map

The SA NBD list has three levels of aggregation, namely: (1) broad cause groups, (2) disease categories and (3) single causes. The SA NBD list was mapped against the GBD list that had a fourth level comprising more detailed single causes. The GBD 2013 list has 301 conditions that are divided into four levels: broad cause groups, disease categories, single causes and finer single causes (Global Burden

of Disease Study 2013 Collaborators, 2015). The GBD list that we have mapped excluded 8 neglected tropical diseases (Chagas disease, African trypanosomiasis, Lymphatic filariasis, Onchocerciasis, Trachoma, Dengue, Yellow fever and Food-borne trematodiasis) and included 2 additional conditions (Indirect maternal deaths and Aortic aneurysm) resulting in 295 conditions in total. See [Appendix 1](#) for the full GBD list that we used. The mapping was not straightforward because the SA NBD list is defined in terms of 3 digit International Classification of Disease (ICD 10) codes while the GBD list uses 4 digit ICD 10 codes. Furthermore, the allocation of ICD codes to garbage causes differs between lists For example South Africa reports septicaemia as a cause as it has locally relevant public health importance, while the GBD study considers this a garbage cause.

Mapping involved comparing the ICD-10 codes included in the single conditions in each list and identifying differences in the aggregations and allocation to garbage. It was then assessed whether a one-to-one, one-to-many, many-to-one or many-to-many match would be appropriate. The comparison shows where the same ICD-10 codes were used on both the NBD and GBD cause lists, or ICD-10 codes used on one list but not the other, and mapping decisions are summarized in [Appendix 2](#). A new N-GBD code was assigned to each mapped grouping, and a new descriptive name was assigned for the mapped grouping if a new combination was created.

- **One to one:** An SA NBD cause was matched as is to a GBD cause. Ninety-nine SA NBD causes were matched one to one with GBD causes. Matching was sometimes perfect, e.g. ZA 17 and ZA 18 with the same ICD 10 codes; and sometimes slightly different, e.g. ZA 1 and ZA 2 largely matched on the two lists, but some differences were noted for ICD 10 codes. Minor discrepancies in ICD 10 codes, judged in terms of number of deaths involved were ignored but when the match was not perfect, this was indicated in the summary of the matching [Appendix 3](#).
- **One to many:** One SA NBD cause was mapped to more than one GBD cause. Fifteen SA NBD causes were each mapped to many GBD causes. For example, ZA 4 (Diarrhoeal diseases) was mapped to three GBD causes (Diarrhoeal diseases, Intestinal infectious diseases and Other infectious diseases because they had mostly similar ICD 10 codes (*Appendix 2*))
- **Many to one:** More than one SA NBD causes were mapped with a single GBD cause, and a new cause name given to the group. Four SA NBD causes were mapped to a single GBD cause. For example, ZA 117 (Congenital disorders of the GIT), ZA 118 (Urogenital malformations), ZA 119 (Foetal alcohol syndrome) and ZA 122 (Other congenital anomalies) ICD-10 codes were mapped to those of a single cause (Other congenital anomalies) on the GBD list. A new code (N-GBD 109) and cause name (Congenital anomalies) were assigned. (*Appendix 2*)

- **Many to many:** ICD-10 codes of multiple SA NBD causes were mapped to multiple GBD causes. In these cases, new descriptive names and codes (N-GBD) were assigned to identify the groups. For example, ZA 67 (Developmental diseases) and ZA 70 (Other mental and behavioural diseases) were combined with more than one GBD causes (Autistic spectrum syndrome and Other mental and substance use disorders). A new code (N-GBD 66) and cause name (Other mental and behavioural) were assigned. Twenty-two SA NBD causes (in varying groups) were matched many to many.

Table 2 shows the SA NBD-GBD map of the 140 SA NBD conditions and the 301 GBD conditions to a combined list of 123 conditions, including the level (mostly level 3 - single cause and a few level 4 conditions) to which they were mapped.

Table 2: SA NBD-GBD map

N-GBD Code	New name	ZA code	SA NBD cause	GBD cause	GBD Cause ID	GBD cause level
Group I: Communicable, maternal, perinatal and nutritional conditions						
HIV/AIDS and TB						
N-GBD 1		ZA 1	Tuberculosis	Tuberculosis	297	<i>Level 3</i>
N-GBD 2		ZA 2	HIV/AIDS	HIV/AIDS	298	
Infectious and parasitic diseases						
N-GBD 3		ZA 3	Sexually transmitted infections excluding HIV	Sexually transmitted diseases excluding HIV	393	<i>Level 3</i>
N-GBD 4		ZA 4	Diarrhoeal diseases	Diarrheal diseases	302	
				Intestinal infectious diseases	318	
N-GBD 5		ZA 5	Vaccine preventable childhood	Diphtheria	338	
				Whooping cough	339	
				Tetanus	340	
				Measles	341	
				Varicella and herpes zoster	342	
N-GBD 6		ZA 6	Meningitis and encephalitis	Encephalitis	337	
				Meningitis	332	
N-GBD 7		ZA 7	Hepatitis	Hepatitis	400	
N-GBD 8		ZA 9	Malaria	Malaria	345	
N-GBD 9	Other infectious	ZA 8	*Septicaemia			
		ZA 10		Rabies	359	
				Leishmaniasis	347	

N-GBD Code	New name	ZA code	SA NBD cause	GBD cause	GBD Cause ID	GBD cause level
			Intestinal parasites, other parasitic and vector diseases	Schistosomiasis	351	
				Cysticercosis	352	
				Cystic echinococcosis	353	
				Intestinal nematode infections	360	
				Other neglected tropical diseases	365	
		ZA 11	Other infectious diseases	408		
				Leprosy	405	
Respiratory infections						
N-GBD 10		ZA 12	Lower respiratory infections	Lower respiratory infections	322	<i>Level 3</i>
N-GBD 11		ZA 13	Upper respiratory infections	Upper respiratory infections	328	
N-GBD 12		ZA 14	Otitis media	Otitis media	329	
Maternal conditions						
N-GBD 13		ZA 15	Maternal haemorrhage	Maternal hemorrhage	367	<i>Level 3</i>
N-GBD 14		ZA 16	Maternal sepsis	Maternal sepsis and other maternal infections	368	
N-GBD 15		ZA 17	Hypertensive disorders of pregnancy	Maternal hypertensive disorders	369	
N-GBD 16		ZA 18	Obstructed labour	Maternal obstructed labor	370	
N-GBD 17		ZA 19	Abortion	Complications of abortion	371	
N-GBD 18		ZA 20	Indirect maternal causes	Indirect maternal deaths	375	
N-GBD 19		ZA 21	Other maternal	Other maternal disorders	379	
Conditions originating during the perinatal period						
N-GBD 20		ZA 22	Preterm birth complications	Preterm birth complications	381	<i>Level 3</i>
N-GBD 21		ZA 23	Birth asphyxia and trauma	Neonatal encephalopathy due to birth asphyxia and trauma	382	
N-GBD 22		ZA 24	Sepsis and other newborn infectious conditions	Neonatal sepsis and other neonatal infections	383	
N-GBD 23		ZA 25	Other non-infectious conditions arising in the perinatal period	Hemolytic disease and other neonatal jaundice	384	
				Other neonatal disorders	385	
Nutritional deficiencies						
N-GBD 24		ZA 26	Protein-energy malnutrition	Protein-energy malnutrition	387	<i>Level 3</i>
N-GBD 25		ZA 27	Vitamin A deficiency	Vitamin A deficiency	389	

N-GBD Code	New name	ZA code	SA NBD cause	GBD cause	GBD Cause ID	GBD cause level
N-GBD 26		ZA 28	Iron deficiency anaemia	Iron-deficiency anemia	390	
N-GBD 27		ZA 29	Other nutritional disorders	Other nutritional deficiencies	391	
				Iodine deficiency	388	
Group II: Non-communicable diseases						
Malignant neoplasms						
N-GBD 28		ZA 30	Mouth cancer	Lip and oral cavity cancer	444	
N-GBD 29		ZA 31	Oropharynx, nasopharynx and other pharynx cancers	Nasopharynx cancer	447	
				Other pharynx cancer	450	
N-GBD 30		ZA 32	Oesophageal cancer	Esophageal cancer	411	
N-GBD 31		ZA 33	Stomach cancer	Stomach cancer	414	
N-GBD 32		ZA 34	Colo-rectal cancer	Colon and rectum cancer	441	
N-GBD 33		ZA 35	Liver cancer	Liver cancer	417	
N-GBD 34		ZA 36	Gallbladder and biliary tract cancers	Gallbladder and biliary tract cancer	453	
N-GBD 35		ZA 37	Pancreas cancer	Pancreatic cancer	456	
N-GBD 36		ZA 38	Larynx cancer	Larynx cancer	423	
N-GBD 37		ZA 39	Trachea, bronchi and lung cancers	Tracheal, bronchus and lung cancer	426	
N-GBD 38		ZA 40	Melanoma cancer	Malignant skin melanoma	459	
N-GBD 39		ZA 41	Other skin cancers	Non-melanoma skin cancer	462	Level 3
N-GBD 40		ZA 42	Breast cancer	Breast cancer	429	
N-GBD 41		ZA 43	Cervix cancer	Cervical cancer	432	
N-GBD 42		ZA 44	Corpus uteri cancer	Uterine cancer	435	
N-GBD 43		ZA 45	Ovary cancer	Ovarian cancer	465	
N-GBD 44		ZA 46	Prostate cancer	Prostate cancer	438	
N-GBD 45		ZA 47	Testis cancer	Testicular cancer	468	
N-GBD 46		ZA 48	Bladder cancer	Bladder cancer	474	
N-GBD 47		ZA 49	Kidney cancer	Kidney cancer	471	
N-GBD 48		ZA 50	Brain cancer	Brain and nervous system cancer	477	
N-GBD 49		ZA 51	Thyroid cancer	Thyroid cancer	480	
N-GBD 50		ZA 52	Hodgkin's lymphoma	Hodgkin disease	484	
N-GBD 51		ZA 53	Non-Hodgkin's lymphoma	Non-Hodgkin lymphoma	485	
N-GBD 52		ZA 54	Multiple myeloma	Multiple myeloma	486	
N-GBD 53		ZA 55	Leukaemia	Leukemia	487	
Malignant neoplasms						
N-GBD 54	Other neoplasms	ZA 56	Other malignant neoplasms	Mesothelioma	483	Level 3

N-GBD Code	New name	ZA code	SA NBD cause	GBD cause	GBD Cause ID	GBD cause level
		ZA 57	Other neoplasms	Other neoplasms	488	
Diabetes Mellitus						
N-GBD 55		ZA 58	Diabetes mellitus	Diabetes mellitus	587	<i>Level 3</i>
				Chronic kidney disease due to diabetes mellitus	590	<i>Level 4</i>
Endocrine nutritional, blood and immune disorders						
N-GBD 56		ZA 59	Endocrine nutritional, blood and immune disorders	Endocrine, metabolic, blood and immune disorders	619	<i>Level 3</i>
				Hemoglobinopathies and hemolytic anemias	613	
Mental disorders						
N-GBD 57		ZA 60	Unipolar depressive disorder	Depressive disorders	567	<i>Level 3</i>
N-GBD 58		ZA 61	Bipolar affective disorder	Bipolar disorders	570	
N-GBD 59		ZA 62	Schizophrenia	Schizophrenia	559	
N-GBD 60		ZA 63	Alcohol dependence	Alcohol use disorders	560	
N-GBD 61		ZA 64	Drug use	Drug use disorders	561	
N-GBD 62		ZA 65	Anxiety disorders	Anxiety disorders	571	
N-GBD 63		ZA 66	Eating disorders	Eating disorders	572	
N-GBD 64		ZA 68	Childhood behaviour disorders	Attention-deficit hyperactivity disorders	578	
				Conduct disorders	579	
N-GBD 65		ZA 69	Mental retardation not included as sequelae elsewhere	Idiopathic intellectual disabilities	582	
N-GBD 66	Other mental and behavioural	ZA 67	Developmental diseases	Autistic spectrum syndrome	575	
		ZA 70	Other mental and behavioural disorders	Other mental and substance use disorders	585	
Nervous system disorders						
N-GBD 67		ZA 71	Alzheimer's and other degenerative diseases of nervous system	Alzheimer disease and other dementias	543	<i>Level 3</i>
N-GBD 68		ZA 72	Parkinson disease	Parkinson disease	544	
N-GBD 69		ZA 73	Multiple sclerosis	Multiple sclerosis	546	
N-GBD 70		ZA 74	Epilepsy	Epilepsy	545	
N-GBD 71		ZA 75	Migraine	Migraine	547	
N-GBD 72		ZA 76	Non-migraine headache	Tension headache	548	
				Medication overuse headache	549	
N-GBD 73		ZA 77	Other neurological conditions	Other neurological disorders	557	
Sense organ diseases						
N-GBD 74		ZA 78	Glaucoma	Glaucoma	670	<i>Level 4</i>

N-GBD Code	New name	ZA code	SA NBD cause	GBD cause	GBD Cause ID	GBD cause level
N-GBD 75		ZA 79	Cataracts	Cataracts	671	
N-GBD 76	Other sense organs	ZA 80	Hearing loss not due to other diseases or injuries	Age-related and other hearing loss	674	
		ZA 81	Other vision loss	Macular degeneration	672	
				Uncorrected refractive error	673	
				Age-related and other vision loss	675	
		ZA 82	Other sense organ disorders	Other sense organ diseases	679	
Cardiovascular diseases						
N-GBD 77		ZA 83	Rheumatic heart disease	Rheumatic heart disease	492	
N-GBD 78		ZA 84	Hypertensive heart disease	Hypertensive heart disease	498	
N-GBD 79		ZA 85	Ischaemic heart disease	Ischemic heart disease	493	
N-GBD 80		ZA 88	Cerebrovascular disease	Cerebrovascular disease	494	
N-GBD 81		ZA 90	Aortic aneurysm	Aortic aneurysm	501	
N-GBD 82		ZA 91	Peripheral vascular disorders	Peripheral vascular disease	502	
N-GBD 83	Cardio-vascular diseases	ZA 86	Pericarditis, endocarditis and myocarditis	Cardiomyopathy and myocarditis	499	<i>Level 3</i>
		ZA 87	Cardiomyopathy			
				Endocarditis	503	
		ZA 89	Conduction disorders and other dysrhythmias	Atrial fibrillation and flutter	500	
		ZA 92	Other circulatory diseases	Other cardiovascular and circulatory diseases	507	
Respiratory diseases						
N-GBD 84		ZA 93	Chronic obstructive pulmonary disease	Chronic obstructive pulmonary disease	509	
N-GBD 85		ZA 94	Pneumoconiosis	Pneumoconiosis	510	
N-GBD 86		ZA 95	Asthma	Asthma	515	
N-GBD 87		ZA 96	Other interstitial lung disease	Interstitial lung disease and pulmonary sarcoidosis	516	<i>Level 3</i>
N-GBD 88		ZA 97	Other respiratory	Other chronic respiratory diseases	520	
Digestive diseases						
N-GBD 89		ZA 98	Peptic ulcer disease	Peptic ulcer disease	527	
N-GBD 90		ZA 99	Appendicitis	Appendicitis	529	<i>Level 3</i>
N-GBD 91		ZA 100	Intestinal obstruction and strangulated hernia	Inguinal, femoral and abdominal hernia	531	

N-GBD Code	New name	ZA code	SA NBD cause	GBD cause	GBD Cause ID	GBD cause level
				Paralytic ileus and intestinal obstruction	530	
N-GBD 92		ZA 101	Non-infective inflammatory bowel disease	Inflammatory bowel disease	532	
N-GBD 93		ZA 102	Cirrhosis and liver disease	Cirrhosis due to hepatitis B	522	
				Cirrhosis due to hepatitis C	523	
				Cirrhosis due to alcohol use	524	
				Cirrhosis due to other causes	525	
N-GBD 94		ZA 103	Gall bladder and bile duct disease	Gallbladder and biliary diseases	534	
N-GBD 95		ZA 104	Pancreatitis	Pancreatitis	535	
N-GBD 96		ZA 105	Other digestive diseases	Other digestive diseases	541	
				Vascular intestinal disorders	533	
				Gastritis and duodenitis	528	
Genito-urinary diseases						
N-GBD 97		ZA 107	Benign prostatic hypertrophy	Benign prostatic hyperplasia	597	<i>Level 4</i>
N-GBD 98	Genito-urinary diseases	ZA 106	Renal disease	Acute glomerulonephritis	588	<i>Level 3</i>
				Chronic kidney disease due to hypertension	591	<i>Level 4</i>
				Chronic kidney disease due to glomerulonephritis	592	
				Chronic kidney disease due to other causes	593	
		ZA 108	Other urinary and gynaecological diseases	Urolithiasis	596	<i>Level 4</i>
				Other urinary diseases	602	
				Interstitial nephritis and urinary tract infections	595	<i>Level 3</i>
				Gynecological diseases	603	
			Male infertility due to other causes	598	<i>Level 4</i>	
Skin Diseases						
N-GBD 99		ZA 109	Skin diseases	Skin and subcutaneous diseases	653	<i>Level 3</i>
Musculo-skeletal diseases						
N-GBD 100		ZA 110	Rheumatoid arthritis	Rheumatoid arthritis	627	<i>Level 3</i>
N-GBD 101		ZA 111	Osteoarthritis	Osteoarthritis	628	
N-GBD 102		ZA 112	Back and neck pain	Low back and neck pain	629	
N-GBD 103		ZA 113	Other musculoskeletal disorders	Other musculoskeletal disorders	639	

N-GBD Code	New name	ZA code	SA NBD cause	GBD cause	GBD Cause ID	GBD cause level
				Gout	632	
Congenital abnormalities						
N-GBD 104		ZA 121	Other chromosomal abnormalities	Chromosomal unbalanced rearrangements	648	Level 4
				Turner's syndrome	646	
				Klinefelter syndrome	647	
N-GBD 105		ZA 114	Neural tube defects	Neural tube defects	642	
N-GBD 106		ZA 115	Cleft lip and cleft palate	Orofacial clefts	644	
N-GBD 107		ZA 116	Congenital heart anomalies	Congenital heart anomalies	643	
N-GBD 108		ZA 120	Down syndrome	Down syndrome	645	
N-GBD 109	Congenital anomalies	ZA 117	Congenital disorders of GIT	Other congenital anomalies	652	
		ZA 118	Urogenital malformations			
		ZA 119	Fetal alcohol syndrome			
		ZA 122	Other congenital abnormalities			
Oral conditions						
N-GBD 110	Oral disorders	ZA 123	Dental caries	Deciduous caries	681	Level 4
				Permanent caries	682	
		ZA 124	Periodontal disease	Periodontal diseases	683	
				Edentulism and severe tooth loss	684	
		ZA 125	Other oral diseases	Other oral disorders	685	
Group III: Injuries						
Unintentional injuries						
N-GBD 111		ZA 126	Road injuries	Road injuries	689	Level 3
N-GBD 112		ZA 127	Other transport accidents	Other transport injuries	695	
N-GBD 113		ZA 128	Poisonings (including herbal)	Poisonings	700	
N-GBD 114		ZA 129	Falls	Falls	697	
N-GBD 115		ZA 130	Fires, heat and hot substances	Fire, heat and hot substances	699	
N-GBD 116		ZA 131	Drowning	Drowning	698	
N-GBD 117	Unintentional injuries	ZA 132	Hanging, strangulation and other threats to breathing	Exposure to mechanical forces	704	
		ZA 133	Mechanical forces			
		ZA 137	Other unintentional injuries	Other unintentional injuries	716	
				Foreign body	712	
N-GBD 118		ZA 134	Exposure to natural forces	Exposure to forces of nature	729	

N-GBD Code	New name	ZA code	SA NBD cause	GBD cause	GBD Cause ID	GBD cause level
N-GBD 119		ZA 135	Adverse effects of medical and surgical treatment	Adverse effects of medical treatment	708	
N-GBD 120		ZA 136	Animal contact	Animal contact	709	
Intentional injuries						
N-GBD 121		ZA 138	Self-inflicted injuries	Self-harm	718	Level 3
N-GBD 122		ZA 139	Interpersonal violence	Interpersonal violence	724	
N-GBD 123		ZA 140	Legal intervention	Collective violence and legal intervention	730	Level 3

*Septicaemia is classified as a garbage cause in GBD.

1.3 SA NBD – WHO map

The WHO 2013 cause list (WHO 2014) has 119 conditions, grouped into 22 disease categories and 3 broad cause groups ([Appendix 4](#)). The same steps as those outlined above for the map to GBD list were used in mapping the SA NBD list to the WHO cause list.

- One to one:** An SA NBD cause was matched as is to a WHO cause. Eighty-three SA NBD causes were mapped one to one with WHO causes. Mapping was sometimes perfect, e.g. ZA 16 to ZA 18 with the same ICD-10 codes; and sometimes slightly different, e.g. ZA 57 and ZA 59 ([Appendix 5](#)).
- One to many:** One SA NBD cause was mapped to more than one WHO cause. Four SA NBD causes were each matched to many WHO causes. For example, ZA 81 (Other vision loss) was mapped to three WHO causes (Other vision loss, Refractive errors and Macular degeneration because they had similar ICD-10 codes).
- Many to one:** More than one SA NBD causes were mapped with a single WHO cause, and a new cause name given to the group. Thirty-one SA NBD causes were mapped in varying groupings to a single WHO cause. For example, ZA 20 (Indirect maternal causes), and ZA 21 (Other maternal) ICD-10 codes were mapped to those of a single cause (Other maternal condition) on the WHO list. A new code (N-WHO 17) and cause name (Other maternal conditions) were assigned.
- Many to many:** ICD-10 codes of multiple SA NBD causes were mapped to multiple WHO causes. In these cases, new descriptive names and codes (N-WHO) were assigned to identify the groups. For example, ZA 123 (Dental caries), ZA 124 (Periodontal disease) and ZA 125 (Other oral diseases) were combined with more than one WHO causes (Dental caries, Periodontal disease and Edentulism). A new code (N-WHO 92) and cause name (Oral

conditions) were assigned. Twenty-two SA NBD causes (in varying groups) were matched many to many.

Table 3 shows the SA NBD-WHO map of 140 SA NBD conditions and the 119 WHO conditions to a combined list of 102 conditions.

Table 3: SA NBD-WHO map

N-WHO code	New name	ZA code	SA NBD cause name	Code	GHE cause name
Group I: Communicable, maternal, perinatal and nutritional conditions				I. Communicable, maternal, perinatal and nutritional conditions	
	HIV/AIDS and TB			A. Infectious and parasitic diseases	
N-WHO 1		ZA 1	Tuberculosis	1	Tuberculosis
N-WHO 2		ZA 2	HIV/AIDS	3	HIV/AIDS
	Infectious and parasitic diseases				
N-WHO 3		ZA 3	Sexually transmitted infections excluding HIV	2	Sexually transmitted diseases (STDs) excluding HIV
				a	Syphilis
				b	Chlamydia
				c	Gonorrhoea
				d	Trichomoniasis
			e	Other STDs	
N-WHO 4		ZA 4	Diarrhoeal diseases	4	4. Diarrhoeal diseases
N-WHO 5		ZA 5	Vaccine-preventable childhood	5	Childhood-cluster diseases
				a	N-Whooping cough
				b	Diphtheria
				c	Measles
			d	Tetanus	
N-WHO 6		ZA 6	Meningitis and encephalitis	6	Meningitis
				7	Encephalitis
N-WHO 7		ZA 7	Hepatitis	8	Hepatitis B
				9	Hepatitis C
N-WHO 8	Other infectious	ZA 8	Septicaemia		
		ZA 9	Malaria	10a	Malaria
		ZA 10	Intestinal parasites, other parasitic and vector diseases	10	Parasitic and vector diseases
				b	Trypanosomiasis
				c	Chagas disease
				d	Schistosomiasis
				e	Leishmaniasis
f	Lymphatic filariasis				
g	Onchocerciasis				

N-WHO code	New name	ZA code	SA NBD cause name	Code	GHE cause name
				h	Leprosy
				i	Dengue
				j	Trachoma
				k	Rabies
				11	Intestinal nematode infections
				a	Ascariasis
				b	Trichuriasis
				c	Hookworm disease
		ZA 11	Other infectious diseases	12	Other infectious diseases
	Respiratory infections				B. Respiratory infections
N-WHO 9		ZA 12	Lower respiratory infections	1	Lower respiratory infections
N-WHO 10		ZA 13	Upper respiratory infections	2	Upper respiratory infections
N-WHO 11		ZA 14	Otitis media	3	Otitis media
	Maternal conditions				C. Maternal conditions
N-WHO 12		ZA 15	Maternal haemorrhage	1	Maternal haemorrhage
N-WHO 13		ZA 16	Maternal sepsis	2	Maternal sepsis
N-WHO 14		ZA 17	Hypertensive disorders of pregnancy	3	Hypertensive disorders of pregnancy
N-WHO 15		ZA 18	Obstructed labour	4	Obstructed labour
N-WHO 16		ZA 19	Abortion	5	Abortion
N-WHO 17	Other maternal conditions	ZA 20	Indirect maternal causes	6	Other maternal conditions
		ZA 21	Other maternal		
	Conditions originating during the perinatal period				D. Neonatal conditions
N-WHO 18		ZA 22	Preterm birth complications	1	Preterm birth complications
N-WHO 19		ZA 23	Birth asphyxia and trauma	2	Birth asphyxia and birth trauma
N-WHO 20		ZA 24	Sepsis and other newborn infectious conditions	3	Neonatal sepsis and infections
N-WHO 21		ZA 25	Other non-infectious conditions arising in the perinatal period	4	Other neonatal conditions
	Nutritional deficiencies				E. Nutritional deficiencies
N-WHO 22		ZA 26	Protein-energy malnutrition	1	Protein-energy malnutrition
N-WHO 23		ZA 27	Vitamin A deficiency	3	Vitamin A deficiency
N-WHO 24		ZA 28	Iron deficiency anaemia	4	Iron-deficiency anaemia

N-WHO code	New name	ZA code	SA NBD cause name	Code	GHE cause name
N-WHO 25		ZA 29	Other nutritional disorders	5	5. Other nutritional disorders
				2	2. Iodine deficiency
Group II: Non-communicable diseases				II. Non-communicable diseases	
Malignant neoplasms				A. Malignant neoplasms	
N-WHO 26	Mouth and oropharynx cancers	ZA 30	Mouth cancer	1	Mouth and oropharynx cancers
		ZA 31	Oropharynx, nasopharynx and other pharynx cancers		
N-WHO 27		ZA 32	Oesophageal cancer	2	Oesophagus cancer
N-WHO 28		ZA 33	Stomach cancer	3	Stomach cancer
N-WHO 29		ZA 34	Colo-rectal cancer	4	Colon and rectum cancers
N-WHO 30		ZA 35	Liver cancer	5	Liver cancer
N-WHO 31		ZA 37	Pancreas cancer	6	Pancreas cancer
N-WHO 32		ZA 39	Trachea, bronchi and lung cancers	7	Trachea, bronchus and lung cancers
N-WHO 33	Melanoma and skin cancers	ZA 40	Melanoma cancer	8	Melanoma and other skin cancers
		ZA 41	Other skin cancers		
N-WHO 34		ZA 42	Breast cancer	9	Breast cancer
N-WHO 35		ZA 43	Cervix cancer	10	Cervix uteri cancer
N-WHO 36		ZA 44	Corpus uteri cancer	11	Corpus uteri cancer
N-WHO 37		ZA 45	Ovary cancer	12	Ovary cancer
N-WHO 38		ZA 46	Prostate cancer	13	Prostate cancer
N-WHO 39		ZA 48	Bladder cancer	14	Bladder cancer
N-WHO 40	Lymphomas and multiple myeloma	ZA 52	Hodgkin's lymphoma	15	Lymphomas and multiple myeloma
		ZA 53	Non-Hodgkin's lymphoma		
		ZA 54	Multiple myeloma		
N-WHO 41		ZA 55	Leukaemia	16	Leukaemia
N-WHO 42	Other malignant neoplasms	ZA 36	Gallbladder and biliary tract cancers	17	Other malignant neoplasms
		ZA 38	Larynx cancer		
		ZA 47	Testis cancer		
		ZA 49	Kidney cancer		
		ZA 50	Brain cancer		
		ZA 51	Thyroid cancer		
		ZA 56	Other malignant neoplasms		
Other neoplasms					
N-WHO 43		ZA 57	Other neoplasms	B. Other neoplasms	
Diabetes Mellitus					
N-WHO 44		ZA 58	Diabetes mellitus	C. Diabetes mellitus	

N-WHO code	New name	ZA code	SA NBD cause name	Code	GHE cause name
	Endocrine nutritional, blood and immune disorders				
N-WHO 45		ZA 59	Endocrine nutritional, blood and immune disorders	D. Endocrine, blood, immune disorders	
	Mental disorders			E. Mental and behavioural disorders	
N-WHO 46		ZA 60	Unipolar depressive disorder	1	Unipolar depressive disorders
N-WHO 47		ZA 61	Bipolar affective disorder	2	Bipolar affective disorder
N-WHO 48		ZA 62	Schizophrenia	3	Schizophrenia
N-WHO 49		ZA 63	Alcohol dependence	4	Alcohol-use disorders
N-WHO 50		ZA 64	Drug use	5	Drug-use disorders
N-WHO 51		ZA 65	Anxiety disorders	6	Anxiety disorders
N-WHO 52		ZA 66	Eating disorders	7	Eating disorders
N-WHO 53		ZA 68	Childhood behaviour disorders	9	Childhood behavioural disorders
N-WHO 54		ZA 69	Mental retardation not included as sequelae elsewhere	10	Idiopathic intellectual disability
N-WHO 55	Other mental and behavioural disorders	ZA 67	Development disorders	8	Pervasive developmental disorders
		ZA 70	Other mental and behavioural disorders	11	Other mental and behavioural disorders
	Nervous system disorders			F. Neurological conditions	
N-WHO 56		ZA 71	Alzheimer's and other degenerative diseases of nervous system	1	Alzheimer's disease and other dementias
N-WHO 57		ZA 72	Parkinson's disease	2	Parkinson disease
N-WHO 58		ZA 73	Multiple sclerosis	4	Multiple sclerosis
N-WHO 59		ZA 74	Epilepsy	3	Epilepsy
N-WHO 60		ZA 75	Migraine	5	Migraine
N-WHO 61		ZA 76	Non-migraine headache	6	Non-migraine headache
N-WHO 62		ZA 77	Other neurological conditions	7	Other neurological conditions
	Sense organ diseases			G. Sense organ diseases	
N-WHO 63		ZA 78	Glaucoma	1	Glaucoma
N-WHO 64		ZA 79	Cataracts	2	Cataracts
N-WHO 65		ZA 80	Hearing loss not due to other diseases or injuries	6	Other hearing loss
N-WHO 66		ZA 81	Other vision loss	5	Other vision loss
				3	Refractive errors
				4	Macular degeneration

N-WHO code	New name	ZA code	SA NBD cause name	Code	GHE cause name
N-WHO 67		ZA 82	Other sense organ disorders	7	Other sense organ disorders
	Cardiovascular disease			H. Cardiovascular diseases	
N-WHO 68		ZA 84	Hypertensive heart disease	2	Hypertensive heart disease
N-WHO 69		ZA 85	Ischaemic heart disease	3	Ischaemic heart disease
N-WHO 70	Cardiomyopathy, myocarditis, endocarditis	ZA 86	Pericarditis, endocarditis and myocarditis	5	Cardiomyopathy, myocarditis, endocarditis
		ZA 87	Cardiomyopathy		
N-WHO 71		ZA 88	Cerebrovascular disease	4	Stroke
N-WHO 72	Other cardiovascular diseases	ZA 83	Rheumatic heart disease	1	Rheumatic heart disease
		ZA 89	Conduction disorders and other dysrhythmias		
		ZA 90	Aortic aneurism		
		ZA 91	Peripheral vascular disorders		
		ZA 92	Other circulatory diseases	6	Other cardiovascular diseases
	Respiratory disease			I. Respiratory diseases	
N-WHO 73		ZA 93	Chronic obstructive pulmonary disease	1	Chronic obstructive pulmonary disease
N-WHO 74		ZA 95	Asthma	2	Asthma
N-WHO 75	Other respiratory diseases	ZA 94	Pneumoconiosis	3	Other respiratory diseases
		ZA 96	Other interstitial lung disease		
		ZA 97	Other respiratory		
	Digestive diseases			J. Digestive diseases	
N-WHO 76		ZA 98	Peptic ulcer disease	1	Peptic ulcer disease
N-WHO 77		ZA 99	Appendicitis	3	Appendicitis
N-WHO 78	Other digestive diseases	ZA 100	Intestinal obstruction and strangulated hernia		
		ZA 101	Non-infective inflammatory bowel disease		
		ZA 102	Cirrhosis and liver disease	2	Cirrhosis of the liver
		ZA 103	Gall bladder and bile duct disease		
		ZA 104	Pancreatitis		
		ZA 105	Other digestive diseases	4	Other digestive diseases

N-WHO code	New name	ZA code	SA NBD cause name	Code	GHE cause name
	Genito-urinary diseases			K. Genitourinary diseases	
N-WHO 79		ZA 106	Renal disease	1	Kidney diseases
N-WHO 80		ZA 107	Benign prostatic hypertrophy	2	2. Hyperplasia of prostate
N-WHO 81		ZA 108	Other urinary and gynaecological diseases	3	3. Urolithiasis
				4	4. Other genitourinary disorders
				5	5. Infertility
				6	6. Gynecological diseases
	Skin Diseases			L. Skin diseases	
N-WHO 82		ZA 109	Skin diseases		
	Musculo-skeletal diseases			M. Musculoskeletal diseases	
N-WHO 83		ZA 110	Rheumatoid arthritis	1	Rheumatoid arthritis
N-WHO 84		ZA 111	Osteoarthritis	2	Osteoarthritis
N-WHO 85	Other musculoskeletal disorders	ZA 112	Back and neck pain	4	Back and neck pain
		ZA 113	Other musculo-skeletal disorders	3	Gout
				5	Other musculoskeletal disorders
	Congenital abnormalities			N. Congenital anomalies	
N-WHO 86		ZA 114	Neural tube defects	1	Neural tube defects
N-WHO 87		ZA 115	Cleft lip and cleft palate	2	Cleft lip and cleft palate
N-WHO 88		ZA 116	Congenital heart anomalies	4	Congenital heart anomalies
N-WHO 89		ZA 120	Down syndrome	3	Down syndrome
N-WHO 90		ZA 121	Other chromosomal abnormalities	5	Other chromosomal anomalies
N-WHO 91	Other congenital anomalies	ZA 117	Congenital disorders of GIT	6	Other congenital anomalies
		ZA 118	Urogenital malformations		
		ZA 119	Fetal alcohol syndrome		
		ZA 122	Other congenital abnormalities		
	Oral conditions			O. Oral conditions	
N-WHO 92	Oral conditions	ZA 123	Dental caries	1	Dental caries
		ZA 124	Periodontal disease	2	Periodontal disease
		ZA 125	Other oral diseases	3	Edentulism

N-WHO code	New name	ZA code	SA NBD cause name	Code	GHE cause name
Group III: Injuries				III. Injuries	
	Unintentional injuries			A. Unintentional injuries	
N-WHO 93		ZA 126	Road injuries	1	Road injury
N-WHO 94		ZA 128	Poisonings (including herbal)	2	Poisonings
N-WHO 95		ZA 129	Falls	3	Falls
N-WHO 96		ZA 130	Fires, heat and hot substances	4	Fire, heat and hot substances
N-WHO 97		ZA 131	Drowning	5	Drownings
N-WHO 98		ZA 134	Exposure to natural forces	6	Exposure to forces of nature
N-WHO 99	Other unintentional injuries	ZA 127	Other transport accidents	7	Other unintentional injuries
		ZA 132	Hanging, strangulation and other threats to breathing		
		ZA 133	Mechanical forces		
		ZA 135	Adverse effects of medical and surgical treatment		
		ZA 136	Animal contact		
		ZA 137	Other unintentional injuries		
	Intentional injuries			B. Intentional injuries	
N-WHO 100		ZA 138	Self-inflicted injuries	1	1. Self-harm
N-WHO 101		ZA 139	Interpersonal violence	2	Interpersonal violence
N-WHO 102		ZA 140	Legal intervention	3	Collective violence and legal intervention

2. Discussion

Mapping of the SA NBD cause list to the WHO list was more straightforward than mapping to the GBD list, reflecting the common root of the lists that were grounded in the original GBD studies. More causes were mapped with a perfect match comparing the SA NBD-WHO map with the SA NBD-GBD map i.e. 66.3% vs. 53.6% respectively. A similar pattern was observed when comparing the three broad cause groups for the SA NBD-WHO map and SA NBD-GBD map. Group 2, Non-communicable diseases, had the highest percentage of codes that matched perfectly — 79.2% and 63.6% in the SA NBD-WHO and SA NBD-GBD mappings respectively (Table 4). The GBD 2010 study introduced a more complex list and consequently a more complicated mapping. None-the-less, there is good compatibility between the 123 mapped conditions in the SA NBD-GBD grouping.

Table 4: Percentage of conditions in each broad group that matched perfectly (One-to-one)

SA NBD-GBD			SA NBD-WHO		
1 – 1			1 – 1		
Groups	Not perfectly matched (%)	Perfectly matched (%)	Groups	Not perfectly matched (%)	Perfectly matched (%)
Group 1	71.4	28.6	Group 1	61.9	38.1
Group 2	36.4	63.6	Group 2	20.8	79.2
Group 3	58.3	41.7	Group 3	44.4	55.6
Overall	46.4	53.6	Overall	33.7	66.3

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Appendices

Appendix 1: GBD cause list by level

Level 1 (Broad cause group)		Level 2 (Categories)		Level 3 (Single causes)		Level 4 (Finer single causes)	
Cause ID	Cause name	Cause ID	Cause name	Cause ID	Cause name	Cause ID	Cause name
295	Communicable, maternal, neonatal, and nutritional diseases	296	HIV/AIDS and tuberculosis	297	Tuberculosis		
				298	HIV/AIDS	299	HIV/AIDS resulting in mycobacterial infection
				300	HIV/AIDS resulting in other diseases		
		301	Diarrhea, lower respiratory, and other common infectious diseases	302	Diarrheal diseases		
				318	Intestinal infectious diseases	319	Typhoid fever
						320	Paratyphoid fever
						321	Other intestinal infectious diseases
				322	Lower respiratory infections		
				328	Upper respiratory infections		
				329	Otitis media		
				332	Meningitis	333	Pneumococcal meningitis
		334	H influenzae type B meningitis				
		335	Meningococcal meningitis				
		336	Other meningitis				

				337	Encephalitis								
				338	Diphtheria								
				339	Whooping cough								
				340	Tetanus								
				341	Measles								
				342	Varicella and herpes zoster								
		344	Neglected tropical diseases and malaria			345	Malaria						
						347	Leishmaniasis			348	Visceral leishmaniasis		
										349	Cutaneous and mucocutaneous leishmaniasis		
										351	Schistosomiasis		
										352	Cysticercosis		
								353	Cystic echinococcosis				
								359	Rabies				
								360	Intestinal nematode infections	361	Ascariasis		
										362	Trichuriasis		
										363	Hookworm disease		
								365	Other neglected tropical diseases				
		366	Maternal disorders			367	Maternal hemorrhage						
						368	Maternal sepsis and other maternal infections						
						369	Maternal hypertensive disorders						

				370	Obstructed labor				
				371	Complications of abortion				
				375	Indirect maternal deaths				
				379	Other maternal disorders				
		380	Neonatal disorders			381	Preterm birth complications		
						382	Neonatal encephalopathy due to birth asphyxia and trauma		
						383	Neonatal sepsis and other neonatal infections		
						384	Hemolytic disease and other neonatal jaundice		
						385	Other neonatal disorders		
		386	Nutritional deficiencies			387	Protein-energy malnutrition		
						388	Iodine deficiency		
						389	Vitamin A deficiency		
						390	Iron-deficiency anemia		
						391	Other nutritional deficiencies		
		392	Other communi-cable, maternal, neonatal, and nutritional diseases			393	Sexually transmitted diseases excluding HIV	394	Syphilis
								395	Chlamydial infection
396	Gonococcal infection								

						397	Trichomoniasis
						398	Genital herpes
						399	Other sexually transmitted diseases
				400	Hepatitis	401	Hepatitis A
						402	Hepatitis B
						403	Hepatitis C
						404	Hepatitis E
				405	Leprosy		
				408	Other infectious diseases		
409	Non-communicable diseases	410	Neoplasms	411	Esophageal cancer		
				414	Stomach cancer		
				417	Liver cancer	418	Liver cancer due to hepatitis B
						419	Liver cancer due to hepatitis C
						420	Liver cancer due to alcohol use
						421	Liver cancer due to other causes
				423	Larynx cancer		
				426	Tracheal, bronchus and lung cancer		
				429	Breast cancer		
				432	Cervical cancer		
				435	Uterine cancer		
				438	Prostate cancer		

				441	Colon and rectum cancer		
				444	Lip and oral cavity cancer		
				447	Nasopharynx cancer		
				450	Other pharynx cancer		
				453	Gallbladder and biliary tract cancer		
				456	Pancreatic cancer		
				459	Malignant skin melanoma		
				462	Non-melanoma skin cancer		
				465	Ovarian cancer		
				468	Testicular cancer		
				471	Kidney cancer		
				474	Bladder cancer		
				477	Brain and nervous system cancer		
				480	Thyroid cancer		
				483	Mesothelioma		
				484	Hodgkin lymphoma		
				485	Non-Hodgkin lymphoma		
				486	Multiple myeloma		
				487	Leukemia		
				488	Other neoplasms		
		491	Cardio-vascular diseases	492	Rheumatic heart disease		

				493	Ischemic heart disease		
				494	Cerebro-vascular disease	495	Ischemic stroke
						496	Hemorrhagic stroke
				498	Hypertensive heart disease		
				499	Cardiomyopathy and myocarditis		
				500	Atrial fibrillation and flutter		
				501	Aortic aneurysm		
				502	Peripheral vascular disease		
				503	Endocarditis		
				507	Other cardio-vascular and circulatory diseases		
		508	Chronic respiratory diseases	509	Chronic obstructive pulmonary disease		
				510	Pneumoconiosis	511	Silicosis
						512	Asbestosis
						513	Coal workers pneumoconiosis
						514	Other pneumoconiosis
				515	Asthma		
				516	Interstitial lung disease and pulmonary sarcoidosis		
				520	Other chronic respiratory diseases		

		521	Cirrhosis	522	Cirrhosis due to hepatitis B		
				523	Cirrhosis due to hepatitis C		
				524	Cirrhosis due to alcohol use		
				525	Cirrhosis due to other causes		
		526	Digestive diseases	527	Peptic ulcer disease		
				528	Gastritis and duodenitis		
				529	Appendicitis		
				530	Paralytic ileus and intestinal obstruction		
				531	Inguinal, femoral and abdominal hernia		
				532	Inflammatory bowel disease		
				533	Vascular intestinal disorders		
				534	Gallbladder and biliary diseases		
				535	Pancreatitis		
542	Neurological disorders	541	Other digestive diseases				
		543	Alzheimer disease and other dementias				
		544	Parkinson disease				
		545	Epilepsy				
				546	Multiple sclerosis		

				547	Migraine						
				548	Tension-type headache						
				549	Medication overuse headache						
				557	Other neurological disorders						
		558	Mental and substance use disorders			559	Schizophrenia				
						560	Alcohol use disorders				
				561	Drug use disorders			562	Opioid use disorders		
								563	Cocaine use disorders		
								564	Amphetamine use disorders		
								565	Cannabis use disorders		
								566	Other drug use disorders		
				567	Depressive disorders			568	Major depressive disorder		
								569	Dysthymia		
				570	Bipolar disorder						
				571	Anxiety disorders						
572	Eating disorders			573	Anorexia nervosa						
				574	Bulimia nervosa						
575	Autistic spectrum disorders			576	Autism						
				577	Asperger syndrome						
578	Attention-deficit/hyper-activity disorder										

				579	Conduct disorder				
				582	Idiopathic intellectual disability				
				585	Other mental and substance-use disorders				
		586	Diabetes, urogenital, blood and endocrine diseases			587	Diabetes mellitus		
						588	Acute glomerulo-nephritis		
				589	Chronic kidney disease	590	Chronic kidney disease due to diabetes mellitus		
						591	Chronic kidney disease due to hypertension		
						592	Chronic kidney disease due to glomerulonephritis		
						593	Chronic kidney disease due to other causes		
				594	Urinary diseases and male infertility	595	Interstitial nephritis and urinary tract infections		
						596	Urolithiasis		
						597	Benign prostatic hyperplasia		
						598	Male infertility due to other causes		
				602	Other urinary diseases				
603	Gynecological diseases	604	Uterine fibroids						

					605	Polycystic ovarian syndrome			
					606	Female infertility due to other causes			
					607	Endometriosis			
					608	Genital prolapse			
					609	Premenstrual syndrome			
					612	Other gynecological diseases			
				613	Hemoglobinopathies and hemolytic anemias	614	Thalassemias		
						615	Sickle cell disorders		
						616	G6PD deficiency		
						618	Other hemoglobinopathies and hemolytic anemias		
						837	Thalassemia trait		
						838	Sickle cell trait		
						839	G6PD trait		
		619	Endocrine, metabolic, blood, and immune disorders						
		626	Musculo-skeletal disorders	627	Rheumatoid arthritis				
				628	Osteoarthritis				
				629	Low back and neck pain	630	Low back pain		
						631	Neck pain		
				632	Gout				
				639	Other musculo-skeletal disorders				

		640	Other non-communicable diseases	641	Congenital anomalies	642	Neural tube defects
						643	Congenital heart anomalies
						644	Orofacial clefts
						645	Down syndrome
						646	Turner syndrome
						647	Klinefelter syndrome
						648	Chromosomal unbalanced rearrangements
						652	Other congenital anomalies
				653	Skin and sub-cutaneous diseases	654	Dermatitis
						655	Psoriasis
						656	Cellulitis
						657	Pyoderma
						658	Scabies
						659	Fungal skin diseases
						660	Viral skin diseases
						661	Acne vulgaris
						662	Alopecia areata
						663	Pruritus
						664	Urticaria
				665	Decubitus ulcer		
668	Other skin and subcutaneous diseases						
669	Sense organ diseases	670	Glaucoma				

					671	Cataract							
					672	Macular degeneration							
					673	Uncorrected refractive error							
					674	Age-related and other hearing loss							
					675	Age-related and other vision loss							
					679	Other sense organ diseases							
				680	Oral disorders	681	Deciduous caries						
						682	Permanent caries						
						683	Periodontal diseases						
						684	Edentulism and severe tooth loss						
						685	Other oral disorders						
				687	Injuries	688	Transport injuries	689	Road injuries	690	Pedestrian road injuries		
										691	Cyclist road injuries		
										692	Motorcyclist road injuries		
										693	Motor vehicle road injuries		
694	Other road injuries												
695	Other transport injuries												
696	Unintentional injuries	697	Falls										
		698	Drowning										
		699	Fire, heat, and hot substances										
		700	Poisonings										
		704		705	Unintentional firearm injuries								

					Exposure to mechanical forces	706	Unintentional suffocation		
						707	Other exposure to mechanical forces		
				708	Adverse effects of medical treatment				
				709	Animal contact	710	Venomous animal contact		
						711	Non-venomous animal contact		
				712	Foreign body	713	Pulmonary aspiration and foreign body in airway		
						714	Foreign body in eyes		
						715	Foreign body in other body part		
				716	Other unintentional injuries				
				717	Self-harm and interpersonal violence	718	Self-harm		
						724	Interpersonal violence	725	Assault by firearm
								726	Assault by sharp object
				727	Assault by other means				
				728	Forces of nature, war, and legal intervention	729	Exposure to forces of nature		
730	Collective violence and legal intervention								

Source: Adapted from document obtained via personal communication with Professor Theo Vos from the Institute of Health metrics, University of Washington (20 June 2015)

Appendix 2: SA NBD-GBD Mapping decision

		New SA NBD list March 2014		GBD list 2016					
	Code	SA NBD Cause	ICD 10 Codes	GBD cause	ICD 10 codes	Same in GBD and SA NBD	In SA NBD not GBD	In GBD not SA NBD	Comments
Category	Group I: Communicable, maternal, perinatal and nutritional conditions								
A	HIV/AIDS and TB								
	ZA 1	Tuberculosis	A15-A19, B90, U51, U52, J90, J94	Tuberculosis	A10-A14, A15-A19.9, B90-B90.9, K67.3, K93.0, M49.0, P37.0, Z03.0, Z11.1, Z20.1, Z23.2	A15-A19, B90	U51, U52, J90, J94	A10-A14	J90, J94 are garbage codes (GC) in GBD. U51, U52 not in GBD. A10-A14 not in SA NBD.
	ZA 2	HIV/AIDS	B20-B24, B33, B45, B59, C46, D84	HIV/AIDS	B20-B24.9, D84, D84.9, Z11.4, Z20.6, Z21, Z22.6, Z83.0	B20-B24, D84	B33, B45, B59, C46		B33, B45, classified as Other infectious, B59 as Other neglected tropical diseases in GBD. C46 is GC in GBD.
B	Infectious and parasitic diseases								
	ZA 3	Sexually transmitted infections excluding HIV	A50>=1 month, A51-A53, A54>=1 month, A55-A63, N70-N73, A64	Sexually transmitted diseases excluding HIV	A50-A60.9, A63-A63.8, B63, K67.0-K67.2, M03.1, M73.0, M73.1, N70-N71.9, N73-N74.8, Z11.3, Z20.2, Z22.4	A51-A60, A63, N70-N71, N73	A50>=1 month, A61-A62, A64, N72	B63, N74	A61-A62, A64 are GC in GBD. N72 classified as Gynecological diseases in GBD. A50 as sepsis/other new born infection in SA NBD. B63, N74 not in SA NBD.

New SA NBD list March 2014		GBD list 2016						
Code	SA NBD Cause	ICD 10 Codes	GBD cause	ICD 10 codes	Same in GBD and SA NBD	In SA NBD not GBD	In GBD not SA NBD	Comments
ZA 4	Diarrhoeal diseases	A00-A09, K52	Diarrheal diseases	A00-A00.9, A02-A04.1, A04.3, A04.5-A07, A07.2-A07.4, A08-A09.9, R19.7, Z22.1, Z23.0	A00, A02-A04, A05-A07, A08-A09	A01, K52		A01 is GC in GBD. K52 classified as inflammatory bowel disease in GBD.
			Intestinal infectious diseases	A01.0-A01.4, A04.2, A04.4, A07.0, A07.1, A07.8, A07.9, Z11.0, Z20.0-Z20.09, Z22.0				
			Other intestinal infectious diseases	A04.2, A04.4, A07.0, A07.1, A07.8, A07.9, Z11.0, Z20.0-Z20.09				
ZA 5	Vaccine preventable childhood	A33-A35 >= 1 month, A36-A37, A80, B01, B05-B06, B26, B91	Diphtheria	A36-A36.9, Z22.2, Z23.6	A33-A35, A36, A37, B01, B05	A80, B06, B26, B91	B02	A80, B06, B26, B91 classified as Other infectious diseases in GBD. B02 classified as Other infectious diseases in SA NBD.
			Whooping cough	A37-A37.91, Z23.7				
			Tetanus	A33-A35.0, Z23.5				
			Measles	B05-B05.9, Z24.4				
			Varicella and herpes zoster	B01-B02.9, P35.8, Z20.820				

New SA NBD list March 2014		GBD list 2016							
Code	SA NBD Cause	ICD 10 Codes	GBD cause	ICD 10 codes	Same in GBD and SA NBD	In SA NBD not GBD	In GBD not SA NBD	Comments	
ZA 6	Meningitis and encephalitis	A39, G00-G03, G05, A83-A87, G04, G09, G93	Encephalitis	A83-A86.4, B94.1, F07.1, G04-G05.8, Z24.1	A39, A83-A86, A87, G03, G04-G05,	G00-G02, G09, G93		G00, G01-G02, G09, G93 are GC in GBD.	
			Meningitis	A39-A39.9, A87-A87.9, G00.0-G00.8, G03-G03.8, Z20.811, Z22.31					
ZA 7	Hepatitis	B15-B19	Hepatitis	B15-B17.2, B19.1-B19.21, B94.2, P35.3, Z20.5, Z22.5-Z22.59, Z24.6	B15-B17	B18, B19		B18 classified as cirrhosis in GBD. B19 is GC in GBD.	
ZA 8	Septicaemia	A40-A41	GC					A40-A41 are GC in GBD.	
ZA 9	Malaria	B50-B54	Malaria	B50-B54.0, P37.3, P37.4	B50-B54				
ZA 10	Intestinal parasites, other parasitic and vector diseases	A82, A90-A91, A95, B55-B57, B65, B67-B74, B76-B82, B89	Rabies	A82-A82.9, Z20.3, Z24.2	A82, A90-A91, A95, B56, B57, B65, B67-B69, B70-B72, B78, B80-B81	B55, B73-B74, B76-B77, B79, B82, B89	A68, A96, B75, B83	B55, B82, B89 are GC in GBD. B73 classified as Onchocerciasis; B74 as Lymphatic filariasis; B76 as Hookworm disease; B77 as Ascariasis; B79 as Trichuriasis in GBD. A68, A96, B75, B83 classified as other	
			Dengue	A90-A91.9					
			Yellow fever	A95-A95.9, Z24.3					

New SA NBD list March 2014		GBD list 2016							
Code	SA NBD Cause	ICD 10 Codes	GBD cause	ICD 10 codes	Same in GBD and SA NBD	In SA NBD not GBD	In GBD not SA NBD	Comments	
			Chagas disease	B57-B57.5				infectious diseases in SA NBD.	
			Leishmaniasis	B55.0-B55.2, Z26.0					
			African trypanosomiasis	B56-B56.9					
			Schistosomiasis	B65-B65.9					
			Cysticercosis	B69-B69.9					
			Cystic echinococcosis	B67-B67.99					
			Other neglected tropical diseases	A68-A68.9, A69.2-A69.5, A75-A75.9, A77-A79.9, A92-A94.0, A96-A96.9, A98-A98.8, B58-B60.8, B68-B68.9, B70-B72.0, B74.3-B75, B78-B78.9, B80-B81.8, B83-B83.8, P37.1					

	ZA 11	Other infectious diseases	A20-A28, A30-A32, A38, A42-A49, A65-A69, A70-A74, A75-A79, A81, A88-A89, A92-A94, A96-A99, B00, B02-B04, B07-B09, B25, B27-B32, B34, B37-B44, B46-B49, B58, B60-B64, B66, B75, B83, B92, B95-B99, B94	Other infectious diseases	A20-A28.9, A31, A31.0, A31.8-A32.9, A38-A38.9, A42-A44.9, A48.1, A48.2, A48.4-A48.52, A49.1, A65-A67.9, A69-A69.1, A69.8-A70, A74, A74.8-A74.9, A80-A81.9, A88-A89.9, B00-B00.9, B03, B04, B06-B06.9, B10-B10.89, B25-B27.99, B29.4, B33-B33.8, B37-B37.2, B37.5-B49.9, B91, B95-B95.5, G14, G14.6, I00, I02, I02.9, J02.0, J03.0-J03.01, K67.8, K74.7, K74.8, M49.1, M89.6-M89.69, P35-P35.2, P35.9, P37, P37.2, P37.5-P37.9, Z20.4, Z20.810, Z22.8, Z22.9, Z23.3, Z23.4, Z24.0, Z24.5, Z25.0	A20-A28, A31, A32, A38, A42-A44, A65-A67, A69, A70, A74, A81, A88-A89, B00, B03, B04, B25, B37-B44, B46-B49, B95	A30, A45-A49, A68, A71-A73, A75-A79, A92-A94, A96-A99, B02, B07-B09, B27-B32, B34, B58, B60-B64, B66, B75, B83, B92, B96-B99, B94	A80, B06, B10, B26, B33, B45, B91, G14, I00, I02, P35, P37	A45, A47-49, A72, A73, A76, A97, A99, B28, B29, B31, B32, B34, B61, B62, B64, B94, B96-B99 are GC in GBD. A30, B92 as leprosy; I00, I02 as strep; A46 as Pyoderma; B07-B09 as Viral skin diseases; A71 as Trachoma; A75, A77-A79, A92-A94, A96, A98, B58, B60, B75, B83 as Other neglected tropical diseases; B27 as Other infectious diseases; B30 as Other sense organ diseases transmitted diseases excluding HIV; B02 as Varicella and herpes zoster; B66 as Food-borne trematodiasis in GBD. P35, P37 classified as sepsis/newborn infectious; I00, I02 as rheumatic heart disease; G14 as other neurological conditions; A80, B06, B91 as vaccine preventable childhood; B26 as mumps; B33, B45 as HIV/AIDS in SA NBD. B10 not in SA NBD.
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New SA NBD list March 2014			GBD list 2016						
	Code	SA NBD Cause	ICD 10 Codes	GBD cause	ICD 10 codes	Same in GBD and SA NBD	In SA NBD not GBD	In GBD not SA NBD	Comments
C	Respiratory infections								
	ZA 12	Lower respiratory infections	J09-J18, J20-J22, P23 >6 days, J86	Lower respiratory infections	J09-J15.8, J16-J16.9, J20-J21.9, P23-P23.9, Z25.1	J09-J15, J16, J20, J21, P23	J17, J18, J22, J86		J17, J18, J22, J86 are GC in GBD.
	ZA 13	Upper respiratory infections	J00-J06	Upper respiratory infections	J00-J02, J02.8-J03, J03.8-J06.9, J36, J36.0	J00-J02, J03, J04-J06		J36	J36 classified as other respiratory in SA NBD.
	ZA 14	Otitis media	H65-H66	Otitis media	H65-H75.83	H65-H66		H67-H75	H67 not in SA NBD. H68-H75 classified as other sense organ disorders in SA NBD.
D	Maternal conditions								
	ZA 15	Maternal haemorrhage	O20, O44-O46, O67, O72	Maternal hemorrhage	O20-O20.9, O43.2-O43.239, O44-O46.93, O67-O67.9, O71-O71.4, O72-O72.3	O20, O44-O46, O67, O72		O71	O71 classified as other maternal in SA NBD.
	ZA 16	Maternal sepsis	085-086	Maternal sepsis and other maternal infections	O23-O23.93, O85-O86.89, O91-O91.23	085-086		O23, O91	O23, O91 classified as other maternal in SA NBD.
	ZA 17	Hypertensive disorders of pregnancy	O10-O16	Maternal hypertensive disorders	O10-O16.9	O10-O16			
	ZA 18	Obstructed labour	O64-O66	Maternal obstructed labor	O64-O66.9, O71.5-O71.9	O64-O66			
	ZA 19	Abortion	O00-O08	Complications of abortion	N96, O00-O07.9	O00-O07	O08		O08 GC in GBD.

New SA NBD list March 2014		GBD list 2016							
Code	SA NBD Cause	ICD 10 Codes	GBD cause	ICD 10 codes	Same in GBD and SA NBD	In SA NBD not GBD	In GBD not SA NBD	Comments	
ZA 20	Indirect maternal causes	O98, O99	Indirect maternal deaths	^a No ICD codes assigned				O98, O99 are GC in GBD.	
	Other maternal	O21-O43, O47-O48, O60-O63, O68-O71, O73-O75, O80-O84, O87-O92, O94-O96	Other maternal disorders	^a No ICD codes assigned				O21-O22.93, O24-O43, O47-O48, O60-O63, O68-O70, O73-O75, O80-O84, O87-O90, O92, O94-O96 are GC in GBD. O23, O91 are classified as maternal sepsis and other maternal infection in GBD. O71 classified as maternal haemorrhage in GBD.	
E	Conditions originating during the perinatal period								
ZA 22	Preterm birth complications	P01, P07, P22, P23 <6 days, P25-P28, P29, P52, P61, P77, P80	Neonatal preterm birth complications	P01.0, P01.1, P07-P07.39, P22-P22.9, P25-P28.9, P61.2, P77-P77.9	P07, P22, P25-P28, P77	P01, P23 <6 days, P29, P52, P61, P80		P01, P29, P52, P61, P80 classified as Other neonatal diseases; P23 as Other lower respiratory infections in GBD.	
	Birth asphyxia and trauma	P02, P03, P10-P15, P20-P21, P24, P50, P90-P91	Neonatal encephalopathy due to birth asphyxia and trauma	P01.7-P03.1, P03.6-P03.9, P10-P15.9, P20, P21, P24-P24.9, P90-P91.9	P02, P03, P10-P15, P20, P21, P24, P90-P91	P50		P50 classified as Other neonatal diseases in GBD.	

New SA NBD list March 2014			GBD list 2016										
Code	SA NBD Cause	ICD 10 Codes	GBD cause	ICD 10 codes	Same in GBD and SA NBD	In SA NBD not GBD	In GBD not SA NBD	Comments					
ZA 24	Sepsis and other newborn infectious conditions	P35, P36-P39, P60, (A33-A35, A50, A54) < 1 month	Neonatal sepsis and other neonatal infections	P36-P36.9, P38-P39.9	P36, P38-P39	P35, P37, P60, (A33-A35, A50, A54) < 1 month		P35, P37 classified as Other infectious diseases; P60 classified as Other neonatal diseases in GBD.					
	ZA 25	Other non-infectious conditions arising in the perinatal period	P00, P04, P05, P08, P51, P53-P59, P62-P74, P76, P78-P79, P81-P89, P93-P94	Hemolytic disease and other neonatal jaundice					P55-P59.9	P00, P04-P05, P08, P51, P53-P54, P55, P70, P71-P72, P74-P76, P78, P81, P83-P84, P93-P94	P62-P69, P73, P79, P82, P85-P89	P01, P09, P19, P29, P50, P52, P60-P61, P80, P92, P96	P62-P69, P73, P79, P82, P85-P89 are GC in GBD. P09, P19 not in SA NBD. P01, P29, P52, P61, P80 classified as Preterm birth complications; P50 as Birth asphyxia and trauma; P60 as Sepsis/other newborn infectious in SA NBD. P92, P96 are GC in SA NBD.
									Other neonatal disorders				
F	Nutritional deficiencies												
ZA 26	Protein-energy malnutrition	E40-E46	Protein-energy malnutrition	E40-E46.9, E64.0	E40-E46								
ZA 27	Vitamin A deficiency	E50	Vitamin A deficiency	E50-E50.9, E64.1	E50								

New SA NBD list March 2014		GBD list 2016							
Code	SA NBD Cause	ICD 10 Codes	GBD cause	ICD 10 codes	Same in GBD and SA NBD	In SA NBD not GBD	In GBD not SA NBD	Comments	
ZA 28	Iron deficiency anaemia	D50	Iron-deficiency anemia	D50-D50.9, D62-D63.8, D64.1-D64.3, D64.8-D64.9, D69.9	D50		D62, D63	D62 classified as Endocrine nutritional, blood and immune disorders in SA NBD. D63 not in SA NBD.	
ZA 29	Other nutritional disorders	D51-D53, E00-E02, E51-E63	Other nutritional deficiencies	D51-D52.0, D52.8-D53.9, E51-E61.9, E63-E64, E64.2, E64.3, M12.1-M12.19, Z13.2-Z13.3	E00-E02, E51-E61, E63, D51-D53	E62	E64	E62 is GC in GBD. E64 is GC in SA NBD.	
			Iodine deficiency	E00-E02					
Group II: Non-communicable diseases									
G	Malignant neoplasms								
ZA 30	Mouth cancer	C00-C08	Lip and oral cavity cancer	C00-C08.9, Z85.81, Z85.810	C00-C08				
ZA 31	Oropharynx, nasopharynx and other pharynx cancers	C09-C13	Nasopharynx cancer	C11-C11.9	C09-C13				
			Other pharynx cancer	C09-C10.9, C12-C13.9					
ZA 32	Oesophageal cancer	C15	Esophageal cancer	C15-C15.9, Z85.01	C15				
ZA 33	Stomach cancer	C16	Stomach cancer	C16-C16.9, Z12.0, Z85.02-Z85.028	C16				

New SA NBD list March 2014			GBD list 2016					
Code	SA NBD Cause	ICD 10 Codes	GBD cause	ICD 10 codes	Same in GBD and SA NBD	In SA NBD not GBD	In GBD not SA NBD	Comments
ZA 34	Colo-rectal cancer	C18-C21	Colon and rectum cancer	C18-C20.0, C20.9-C21.8, K63.5, Z12.1-Z12.13, Z85.03-Z85.048, Z86.010	C18-C21			
ZA 35	Liver cancer	C22	Liver cancer	C22-C22.9, Z85.05	C22			
ZA 36	Gallbladder and biliary tract cancers	C23-C24	Gallbladder and biliary tract cancer	C20.8, C23-C24.9	C23-C24			
ZA 37	Pancreas cancer	C25	Pancreatic cancer	C25-C25.9, Z85.07	C25			
ZA 38	Larynx cancer	C32	Larynx cancer	C32-C32.9, Z85.21	C32			
ZA 39	Trachea, bronchi and lung cancers	C33-C34	Tracheal, bronchus and lung cancer	C33-C34.92, Z12.2, Z80.1, Z80.2, Z85.1-Z85.20	C33-C34			
ZA 40	Melanoma cancer	C43	Malignant skin melanoma	C43-C43.9, C4A, Z85.72, Z85.82-Z85.828	C43			
ZA 41	Other skin cancers	C44	Non-melanoma skin cancer	C44-C44.99	C44			
ZA 42	Breast cancer	C50	Breast cancer	C50-C50.119, C50.2-C50.929, Z12.3-Z12.39, Z80.3, Z85.3	C50			
ZA 43	Cervix cancer	C53	Cervical cancer	C53-C53.9, Z12.4, Z85.41	C53			
ZA 44	Corpus uteri cancer	C54-C55	Uterine cancer	C54-C54.9, Z85.42	C54	C55		C55 is GC in GBD.

New SA NBD list March 2014			GBD list 2016						
Code	SA NBD Cause	ICD 10 Codes	GBD cause	ICD 10 codes	Same in GBD and SA NBD	In SA NBD not GBD	In GBD not SA NBD	Comments	
ZA 45	Ovary cancer	C56	Ovarian cancer	C56-C56.9, Z80.41, Z85.43	C56				
ZA 46	Prostate cancer	C61	Prostate cancer	C61-C61.9, Z12.5, Z80.42, Z85.46	C61				
ZA 47	Testis cancer	C62	Testicular cancer	C62-C62.92, Z80.43, Z85.47, Z85.48	C62				
ZA 48	Bladder cancer	C67	Bladder cancer	C67-C67.9, Z12.6-Z12.79, Z80.52, Z85.51	C67				
ZA 49	Kidney cancer	C64-C66, C68	Kidney cancer	C64-C65.9, Z80.51, Z85.52-Z85.54	C64-C65	C66, C68		C66 classified as Other neoplasms; C68 as GC in GBD	
ZA 50	Brain cancer	C70-C72	Brain and nervous system cancer	C70-C72.9, Z85.841, Z85.848	C70-C72				
ZA 51	Thyroid cancer	C73	Thyroid cancer	C73-C73.9, Z85.850	C73				
ZA 52	Hodgkin's lymphoma	C81	Hodgkin disease	C81-C81.99, Z85.71	C81				
ZA 53	Non-Hodgkin's lymphoma	C82-C85, C96	Non-Hodgkin lymphoma	C82-C86.6, C96-C97.9, D36.0, D47.0-D47.2, D47.9	C82-C85, C96		C86, C97	C97 classified as other malignant neoplasm in SA NBD. C86 is not in SA NBD	
ZA 54	Multiple myeloma	C88, C90	Multiple myeloma	C88-C90.32	C88, C90				
ZA 55	Leukaemia	C91-C95	Leukemia	C91-C95.92, Z80.6, Z85.6	C91-C95				

New SA NBD list March 2014		GBD list 2016							
Code	SA NBD Cause	ICD 10 Codes	GBD cause	ICD 10 codes	Same in GBD and SA NBD	In SA NBD not GBD	In GBD not SA NBD	Comments	
ZA 56	Other malignant neoplasms	C17, C30-C31, C37-C38, C40-C41, C45, C47-C49, C51-C52, C57-C58, C60, C63, C69, C74-C75, C77-C79, C97	Other neoplasms	C17-C17.9, C30-C31.9, C37-C38.8, C40-C41.9, C47-C49.9, C50.12-C50.129, C51-C52.9, C57-C57.8, C58, C58.0, C60-C60.9, C63-C63.8, C66-C66.9, C68.0-C68.8, C69-C69.92, C74-C75.8,	C17, C30-C31, C37-C38, C40-C41, C45, C47-C49, C51-C52, C57-C58, C60, C63, C69, C74-C75	C77-C79, C97	C66	C77-C79 are GC in GBD. C45 classified as Mesothelioma; C97 as Non-Hodgkin lymphoma in GBD. C66 classified as kidney in SA NBD.	
				Mesothelioma					C45-C45.9
H	Other neoplasms						N60, N87		

		New SA NBD list March 2014		GBD list 2016					
	Code	SA NBD Cause	ICD 10 Codes	GBD cause	ICD 10 codes	Same in GBD and SA NBD	In SA NBD not GBD	In GBD not SA NBD	Comments
	ZA 57	Other neoplasms	D01-D48	Other neoplasms	D00.00-D00.2, D01.0-D01.3, D02.0-D02.3, D03-D06.9, D07.0-D07.2, D07.4, D07.5, D09.0, D09.2-D09.8, D10.0-D10.7, D11-D12.9, D13.0-D13.7, D14.0-D14.32, D15-D25.9, D26.0, D26.1, D27-D27.9, D28.0-D28.7, D29.0-D29.8, D30.0-D30.8, D31-D36, D36.1-D36.7, D37.01-D37.5, D38.0-D38.5, D39.1-D39.8, D40.0-D40.8, D41.0-D41.8, D42-D43.9, D44.0-D44.8, D45-D47, D47.3-D47.7, D48.0-D48.7, D49.2-D49.4, D49.6, D49.81, K31.7, K62.0, K62.1, N60-N60.99, N84.0-N84.8, N87-N87.9, Z12.8-Z12.9, Z85.06-Z85.068, Z85.22-Z85.29, Z85.83-Z85.840, Z86.000, Z86.001, Z86.011	D03-D06, D11-D12, D15-D25, D27, D31-D36, D42-D43, D45-D47	D01-D02, D07-D10, D13-D14, D26, D28, D29, D30, D37, D38, D39, D40, D41, D44, D48		D01, D02, D07-D10, D13-D14, D26, D28, D29, D30, D37-D41, D44, D48 are GC in GBD. N60, N87 classified as Other urinary and gynaecological diseases in SA NBD.
I	Diabetes Mellitus								
	ZA 58	Diabetes mellitus	E10-E14	Diabetes mellitus	E10-E10.11, E10.3-E11.1, E11.3-E12.1, E12.3-E13.11, E13.3-E14.1, E14.3-E14.9, P70.0-P70.2, R73-R73.9, Z13.1, Z83.3	E10-E14		R 73	R73 is GC in SA NBD.

New SA NBD list March 2014		GBD list 2016							
Code	SA NBD Cause	ICD 10 Codes	GBD cause	ICD 10 codes	Same in GBD and SA NBD	In SA NBD not GBD	In GBD not SA NBD	Comments	
			Chronic kidney disease due to diabetes mellitus	E10.2-E10.29, E11.2-E11.29, E12.2, E13.2-E13.29, E14.2					
J	Endocrine nutritional, blood and immune disorders								

					<p>D52.1, D59.0, D59.2, D59.6, D61.1, D66-D69.8, D70-D75.89, D76-D78.89, D80-D83.9, D84.0-D84.8, D86.3-D86.87, D89-D89.9, E03-E07.1, E09-E09.9, E15-E16.9, E20-E28.1, E28.3-E34.8, E36-E36.8, E65-E68, E70-E85.29, E87.71, E88-E89.9, G21.1-G21.19, G24.0-G24.09, G25.1, G25.4, G25.6-G25.79, G72.0, G93.7, G97-G97.9, H59-H59.89, H95-H95.9, I95.2, I95.3, I97-I98.9, J70.2-J70.5, J95-J95.9, K43-K43.9, K62.7, K91-K92, K94-K95.89, L23.3, L24.4, L25.1, L27.0, L27.1, L56, L56.0, L58-L58.9, M10.2-M10.29, M83.5, M87.1-M87.19, M96-M96.9, N14-N14.4, N65-N65.1, N99-N99.9, P03.2-P03.5, P96.2, P96.5, R50.2, R50.82, R50.83, Z21.0, Z42-Z43.0, Z43.8, Z43.9, Z48-Z48.9, Z51-Z51.9, Z83.4-Z83.49, Z88-Z88.9, Z92-Z94.0, Z94.6, Z94.8-Z94.9, Z96-Z96.49, Z96.6-Z97.2, Z97.8-Z99.12</p>					<p>D62 classified as Iron-deficiency anaemia; D64, D87, D88 are GC in GBD. D86 classified as Interstitial lung disease and pulmonary sarcoidosis in GBD. G97 classified as Other neurological conditions; I97, I98 as Other circulatory diseases; J95 as Other respiratory; K43 as intestinal obstruction; K91 as Other digestive diseases; L56, L58 as Skin diseases; M96 as Other musculoskeletal; N14 as Other urinary and gynaecological diseases in SA NBD. E33, E36, E81-E82, E89, H59, H95, K92, K94, K95, N65, N99, Z42, Z43, Z48, Z51, Z88, Z92-Z94, Z96, Z97 are not in SA NBD.</p>
	ZA 59	Endocrine nutritional, blood and immune disorders	D55-D62, D64, D66-D83, D86-D89, E03-E07, E15-E16, E20-E32, E34, E65-E68, E70-E80, E83-E85, E88	Endocrine, metabolic, blood, and immune disorders		D55-D61, D66-D69, D70-D75, D76-D78, D80-D83, D89, E03-E07, E15-E16, E20-E28, E29-E32, E34, E65-E68, E70-E80, E83-E85, E88	D62, D64, D79, D86, D87-D88,	E33, E36, E81-E82, E89, G97, H59, H95, I97-I98, J95, K43, K91-K92, K94-K95, L56, L58, M96, N14, N65, N99, Z42-Z43, Z48, Z51, Z88, Z92-Z94, Z96, Z97		

		New SA NBD list March 2014		GBD list 2016					
	Code	SA NBD Cause	ICD 10 Codes	GBD cause	ICD 10 codes	Same in GBD and SA NBD	In SA NBD not GBD	In GBD not SA NBD	Comments
				Haemoglobinopathies and haemolytic anaemias	D55-D58.9, D59.1,D59.3, D59.5, D60-D61.09, D61.2-D61.9, D64.0, D64.4				
K	Mental disorders								
	ZA 60	Unipolar depressive disorder	F32-F33	Depressive disorders	F32-F33.9, F34.1	F32-F33			
	ZA 61	Bipolar affective disorder	F30-F31	Bipolar disorder	F06.3-F06.34, F30-F31.9, F34.0	F30-F31			
	ZA 62	Schizophrenia	F20-F29	Schizophrenia	F06.2, F20-F23.9, F25-F29.9	F20-F23, F25-F29	F24		F24 classified as Other mental and substance use disorders in GBD.
	ZA 63	Alcohol dependence	F10	Alcohol-use disorders	F10-F10.99, G62.1,G72.1, Q86.0, R78.0, X45-X45.9, Z81.1	F10		X45	X45 classified as poisoning (including herbs) in SA NBD.
	ZA 64	Drug use	F11-F16, F18-F19,	Drug-use disorders	F11-F16.99, F18-F19.99, P96.1, R78.1-R78.5, X49-X49.9, Z81.2-Z81.4	F11-F16, F18-F19		X49	X49 classified as poisoning (including herbs) in SA NBD.
	ZA 65	Anxiety disorders	F40-F44	Anxiety disorders	F06.4-F06.7, F40-F44.9	F40-F44			
	ZA 66	Eating disorders	F50	Eating disorders	F50.0-F50.5		F50		F50 is GC in GBD.

New SA NBD list March 2014			GBD list 2016						
Code	SA NBD Cause	ICD 10 Codes	GBD cause	ICD 10 codes	Same in GBD and SA NBD	In SA NBD not GBD	In GBD not SA NBD	Comments	
ZA 67	Development disorders	F80-F82, F84, F88-F89	Autistic spectrum disorders	F84.0-F84.8		F80-F82, F84, F88-F89		F80-F82 classified as Other mental and substance-use disorder in GBD. F84, F88-F89 are GC in GBD.	
ZA 68	Childhood behaviour disorders	F90-F92	Attention-deficit/hyperactivity disorder	F90-F90.9	F90-F92		F93-F94	F93, F94 classified as Other mental and behavioural disorders in SA NBD.	
			Conduct disorder	F91-F94.9					
ZA 69	Mental retardation not included as sequelae elsewhere	F70-F73, F78, F79	Idiopathic intellectual disability	F70-F79.9,Z81.0	F70-F73, F78, F79		F74-F77	F74-F77 not in SA NBD.	
ZA 70	Other mental and behavioural disorders	F04-F07, F09, F17, F34-39, F45-F48, F51-F59, F60-F69, F93-F98	Other mental and substance use disorders	F17-F17.9, F24, F34, F34.8, F45-F49, F51-F52.9, F54-F69.0, F80-F83, F89.0, F95-F98.6, F99.0, G47-G47.29, G47.4-G47.9, R43.0, R43.1	F17, F34, F45-F48, F51-F52, F54-F69, F95-F98	F04-F07, F09, F35-39, F53, F93-F94	F24, F49, F80-F83, G47	F04-F07, F09, F35-39, F53 are GC in GBD. F93-F94 as conduct disorder in GBD. F80-F82 classified as developmental disorders; G47 as Other neurological conditions in SA NBD. F24 classified as Schizophrenia; F49, F83 not in SA NBD.	

		New SA NBD list March 2014		GBD list 2016					
	Code	SA NBD Cause	ICD 10 Codes	GBD cause	ICD 10 codes	Same in GBD and SA NBD	In SA NBD not GBD	In GBD not SA NBD	Comments
L	Nervous system disorders								
	ZA 71	Alzheimer's and other degenerative diseases of nervous system	F01, F03, G30-G31	Alzheimer disease and other dementias	F00-F03.91, G30-G31.9	F01, F03, G30-G31		F00, F02	F00, F02 classified as Alzheimer disease and other dementias in GBD.
	ZA 72	Parkinson disease	G20-G21	Parkinson disease	G20-G21.0, G21.2-G22.0	G20-G21			
	ZA 73	Multiple sclerosis	G35	Multiple sclerosis	G35-G35.9	G35			
	ZA 74	Epilepsy	G40-G41	Epilepsy	G40-G41.9	G40-G41, Z82.0			
	ZA 75	Migraine	G43	Migraine	G43-G43.919	G43			
	ZA 76	Non-migraine headache	G44	Tension-type headache	G44-G44.229, G44.8-G44.89	G44			
				Medication overuse headache	G44.4-G44.59				

New SA NBD list March 2014		GBD list 2016							
Code	SA NBD Cause	ICD 10 Codes	GBD cause	ICD 10 codes	Same in GBD and SA NBD	In SA NBD not GBD	In GBD not SA NBD	Comments	
ZA 77	Other neurological conditions	G06-G08, G10-G13, G14, G22-G25, G32, G36-37, G45-G47, G50-G62, G64, G70-G72, G90-G91, G95-G98, G80>=20 years	Other neurological disorders	G10-G13.8, G23-G24, G24.1-G25.0, G25.2, G25.3, G25.5, G25.8-G26.0, G36-G37.9, G50-G52.9, G54, G54.0, G54.5, G54.8, G54.9, G56-G57, G57.2-G58.7, G60-G62, G62.2, G64, G64.0, G70-G72, G72.2-G73.7, G90-G90.9, G95-G95.9, M33-M33.99, M60-M60.19, M60.8-M63.89, M79-M79.9	G10-G13, G23-G25, G36-37, G50-G52, G54, G56-G58, G60-G62, G64, G70-G72, G90, G95	G06-G08, G14, G22, G32, G45-G47, G53, G55, G59, G91, G96-G98, G80>=20 years	G13, G26, G73, M33, M60, M61-M63, M79	G06-G08, G32, G53, G55, G59, G80, G91, G96, G98 are GC in GBD. G14 as infectious; G22 as Parkinson disease; G45-G46 as Ischemic stroke; G47 as Other mental and substance use disorders; G97 as Endocrine, metabolic, drug and immune disorders in GBD. M33, M60, M61-M63, M79 classified as Other musculoskeletal in SA NBD. G26, G73 not in SA NBD.	
M	Sense organ diseases								
ZA 78	Glaucoma	H40	Glaucoma	H36, H36.0, H40-H40.9, H42-H42.8	H40		H36, H42	H36, H42 not in SA NBD.	
ZA 79	Cataracts	H25-H26	Cataract	H25-H26.09, H26.2-H26.9, H28-H28.2	H25-H26		H28	H28 not in SA NBD.	
ZA 80	Hearing loss not due to other diseases or injuries	H90-H91	Age-related and other hearing loss	H80-H80.93, H90-H91.93, H93-H94.83	H90-H91		H80, H93-H94	H80, H93 classified as Other sense organ disorders in SA NBD. H94 is not in SA NBD.	
ZA 81	Other vision loss	H30-H35, H49-H54	Age-related and other vision loss	H30-H32.0, H33-H35.23, H35.4-H35.9, H43-H43.9, H46-H48.1, H52-H54.9	H30-H32, H33-H35, H49-H51, H52-H54		H43, H46-H48	H43, H47 classified as Other sense organ disorders in SA NBD.	

New SA NBD list March 2014		GBD list 2016							
Code	SA NBD Cause	ICD 10 Codes	GBD cause	ICD 10 codes	Same in GBD and SA NBD	In SA NBD not GBD	In GBD not SA NBD	Comments	
			Macular degeneration	H35.3-H35.389				H46, H48 are not in SA NBD.	
			Uncorrected refractive error	H49-H51.9					
ZA 82	Other sense organ disorders	H00-H21, H27, H43-H47, H55-H57, H60-H61, H68-H83, H92-H93	Other sense organ diseases	B30-B30.9, B31.9, B32.3, B32.4, H00-H02.8, H02.82-H02.9, H04-H05.429, H05.8-H06.3, H10-H11.9, H13-H13.8, H15-H22.8, H27-H27.9, H28.8, H32.8, H36.8, H44-H44.539, H44.8-H45.8, H48.8, H55-H55.89, H57-H58.9, H60-H62.8, H81-H83.93	H00-H02, H04-H06, H10-H11, H13, H15-H21, H27, H44-H45, H55, H57, H60-H61, H81-H83	H03, H07-H09, H12, H14, H43, H46-H47, H56, H68-H80, H92-H93	B30, H22, H58, H62	H03, H07-H09, H12, H14, H56, H76-H79, H92 are GC in GBD. H43, H46, H47 classified as Age-related and other vision loss; H68-H75 as Otitis media; H80, H93 as Age-related and other hearing loss in GBD. B30 classified as Other infectious diseases; H22, H58, H62 are not in SA NBD.	
N	Cardiovascular disease								
ZA 83	Rheumatic heart disease	I00-I09	Rheumatic heart disease	I01-I01.9 ,I02.0, I05-I09.9	I01, I05-I09	I00, I02-I04		I03-I04 are GC in GBD. I00, I02 classified as Other infectious diseases in GBD.	
ZA 84	Hypertensive heart disease	I11	Hypertensive heart disease	I11-I11.9	I11				
ZA 85	Ischaemic heart disease	I20-I25	Ischemic heart disease	I20-I25.9, Z82.4-Z82.49	I20-I25				

New SA NBD list March 2014			GBD list 2016						
Code	SA NBD Cause	ICD 10 Codes	GBD cause	ICD 10 codes	Same in GBD and SA NBD	In SA NBD not GBD	In GBD not SA NBD	Comments	
ZA 86	Pericarditis, endocarditis and myocarditis	I30, I31, I33, I38-I40	Cardio-myopathy and myocarditis	I40-I42.9, I51.4-I51.6	I33, I39-I40, I42	I30, I31, I38	I41	I30, I31, I38 classified as Other cardiovascular and circulatory diseases in GBD. I41 not in SA NBD.	
ZA 87	Cardio-myopathy	I42							
			Endocarditis	I33-I33.9, I39-I39.9					
ZA 88	Cerebro-vascular disease	I60-I69, G81	Cerebrovascular disease	G45-G46.8, I60-I61.9, I62.0-I62.03, I63-I63.9, I64.0-I66.9, I67.0-I67.3, I67.5-I67.7, I69.0-I69.198, I69.20-I69.398, Z82.3	I60, I61, I63, I65-I66	I62, I64, I67-I69, G81		I62, I64, I67-I69, G81 GC in GBD.	
ZA 89	Conduction disorders and other dysrhythmias	I44, I45, I47, I48,	Atrial fibrillation and flutter	I48-I48.92	I48	I44, I45	I47	I44-I45 are GC in GBD. I47 classified as Other cardiovascular and circulatory diseases in GBD.	
ZA 90	Aortic aneurism	I71	Aortic aneurysm	^a No ICD codes assigned		I71		I71 is GC in GBD.	
ZA 91	Peripheral vascular disorders	I73	Peripheral vascular disease	I70.2-I70.799 , I73-I73.9	I73				

New SA NBD list March 2014		GBD list 2016							
Code	SA NBD Cause	ICD 10 Codes	GBD cause	ICD 10 codes	Same in GBD and SA NBD	In SA NBD not GBD	In GBD not SA NBD	Comments	
ZA 92	Other circulatory diseases	I27, I28, I34-I37, I72, I77, I78, I80, I82-I84, I86-I89, I95-I98	Other cardiovascular and circulatory diseases	I28-I28.8 ,I30-I31.1, I31.8, I31.9, I34-I38.9, I47-I47.9, I51.0-I51.3, I70.8, I72-I72.9, I74-I78.9, I80-I83.93, I86-I89.9, I91.9	I28, I34-I37, I72, I77-I78, I80, I82-I84, I86-I89	I27, I95-I98	I30, I47, I74-I76, I81	I27, I95, I96 as GC in GBD. I97, I98 classified as Endocrine, metabolic, blood, and immune disorders in GBD. I74 is GC in SA NBD. I75, I76 not in SA NBD. I30 classified as pericarditis, I47 as conduction disorders and other dysrhythmias; I81 as other digestive diseases in SA NBD.	
O	Respiratory disease								
ZA 93	Chronic obstructive pulmonary disease	J40-J44	Chronic obstructive pulmonary disease	J40-J44.9, J47-J47.9	J40-J44		J47	J47 classified as "other respiratory" in SA NBD.	
ZA 94	Pneumoconiosis	J60-J65	Pneumoconiosis	J60-J63.8, J65,J65.0, J92.0	J60-J63, J65	J64		J64 is GC in GBD.	
ZA 95	Asthma	J45-J46	Asthma	J45-J46.9, Z82.5	J45-J46				
ZA 96	Other interstitial lung disease	J84	Interstitial lung disease and pulmonary sarcoidosis	D86-D86.2, D86.89, D86.9, J84-J84.9	J84		D86	D86 classified as endocrine nutritional in SA NBD.	

	New SA NBD list March 2014			GBD list 2016					
	Code	SA NBD Cause	ICD 10 Codes	GBD cause	ICD 10 codes	Same in GBD and SA NBD	In SA NBD not GBD	In GBD not SA NBD	Comments
	ZA 97	Other respiratory	J30-J39, J47, J66-J68, J70, J82, J85, J91-J92, J95, J98, J99	Other chronic respiratory diseases	G47.3-G47.39, J30-J35.9, J37-J39.9, J66-J68.9, J70-J70.1, J70.8, J70.9, J82, J91-J92, J92.9, J98-J98.09, J98.4-J98.6	J30-J35, J37-J39, J66-J68, J70, J82, J91-J92, J98	J36, J47, J85, J95, J99		J85, J99 are GC in GBD. J36 classified as Upper respiratory infections; J47 as Chronic obstructive pulmonary disease; J95 as Endocrine, metabolic, blood, and immune disorders in GBD.
P	Digestive diseases								
	ZA 98	Peptic ulcer disease	K25-K27	Peptic ulcer disease	K25-K28.9, K31, K31.1-K31.6, K31.8, K31.82-K31.89	K25-K27		K28, 31	K28, K31 classified as Other digestive diseases in SA NBD.
	ZA 99	Appendicitis	K35-K37	Appendicitis	K35-K37.9, K38.3	K35-K37			
	ZA 100	Intestinal obstruction and strangulated hernia	K40-K46, K56	Inguinal, femoral and abdominal hernia	K40-K42.9, K44-K46.9	K40-K42, K44-K46, K56	K43		K43 classified as Endocrine, metabolic, blood, and immune disorders in GBD.
				Paralytic ileus and intestinal obstruction	K56-K56.9				
	ZA 101	Non-infective inflammatory bowel disease	K50-K51	Inflammatory bowel disease	K50-K52.9, K58.0, M09.1	K50-K51		K52	K52 classified as Diarrhoeal diseases in SA NBD.

New SA NBD list March 2014		GBD list 2016							
Code	SA NBD Cause	ICD 10 Codes	GBD cause	ICD 10 codes	Same in GBD and SA NBD	In SA NBD not GBD	In GBD not SA NBD	Comments	
ZA 102	Cirrhosis and liver disease	K70, K73, K74, K72, I85	Cirrhosis	B18-B18.9, I85-I85.9, K70-K70.9, K71.3-K71.51, K71.7, K72.1-K74.69, K74.9, K75.8-K76.0, K76.6, K76.7, K76.9, Z52.6, Z94.4	K70, K73, K74, I85	K72	B18, K76	K72 is gc in GBD. B18 classified as hepatitis; K76 as Other digestive diseases in SA NBD.	
			Cirrhosis due to hepatitis B						
			Cirrhosis due to hepatitis C						
			Cirrhosis due to alcohol use						
			Cirrhosis due to other causes						
ZA 103	Gall bladder and bile duct disease	K80-K83	Gallbladder and biliary diseases	K80-K83.9	K80-K83				
ZA 104	Pancreatitis	K85, K86	Pancreatitis	K85-K86.9	K85, K86				

New SA NBD list March 2014		GBD list 2016							
	Code	SA NBD Cause	ICD 10 Codes	GBD cause	ICD 10 codes	Same in GBD and SA NBD	In SA NBD not GBD	In GBD not SA NBD	Comments
	ZA 105	Other digestive diseases	K20-K22, K28-K31, K38, K55, K57-K63, K71, K76, K77, K90-K91, I81	Other digestive diseases	I84-I84.9, K00-K01.1, K03-K04.99, K06-K15.9, K20-K22.9, K31.0, K31.81-K31.819, K38-K38.2, K38.8, K38.9, K57-K57.93, K58.9-K62, K62.2-K62.6, K62.8-K62.9, K64-K64.9, K66.8, K67, K68-K68.9, K75.2-K75.4, K76.1-K76.5, K76.8-K76.89, K77-K77.8, K90-K90.9, K92.8-K92.89, R12-R14.3	K20-K22, K29, K38, K55, K57, K59-K62, K77, K90	K28, K30, K31, K58, K63, K71, K76, K91, I81	K00-K01, K06-K15, K64, K67, K68, I84, R12-R14	<p>K30, K58, K63, K71 are GC in GBD. K28, K31 classified as Peptic ulcer disease; K29 classified as Gastritis and duodenitis; K55 as Vascular intestinal disorders; K76 as cirrhosis; K91 as Endocrine, metabolic, blood, and immune disorders; I81 as other cardiovascular and circulatory diseases in GBD. K00-K01, K06-K14 classified as Other oral diseases; K64, K67, K68, R12-R14 are GC in SA NBD. I84 classified as other circulatory diseases in SA NBD. K15 not in SA NBD.</p>
				Vascular intestinal disorders	K55-K55.9				
				Gastritis and duodenitis	K29-K29.91				
Q	Genito-urinary diseases								
	ZA 106	Renal disease	N00-N08, N10-N12, N17-N19, I12, I13	Chronic kidney disease	E10.2-E10.29, E11.2-E11.29, E12.2, E13.2-E13.29, E14.2, I12-I13.9, N02-N08.8, N15.0, N18-N18.9, Z49-Z49.32, Z52.4, Z99.2	N00-N08, N18	N10-N12, N17, N19	Z49	<p>N17, N19 classified as gc in GBD. N10-N12 classified as Urinary diseases and male infertility in GBD. Z49 not in SA NBD.</p>

New SA NBD list March 2014			GBD list 2016						
Code	SA NBD Cause	ICD 10 Codes	GBD cause	ICD 10 codes	Same in GBD and SA NBD	In SA NBD not GBD	In GBD not SA NBD	Comments	
			Acute glomerulo-nephritis	N00-N01.9					
			Chronic kidney disease due to glomerulo-nephritis	N03-N06.9					
			Chronic kidney disease due to other causes	N02-N02.9, N07-N08.8, N15.0					
			Chronic kidney disease due to hypertension	I12-I13.9					
ZA 107	Benign prostatic hypertrophy	N40	Benign prostatic hyperplasia	N40-N40.9	N40				
ZA 108	Other urinary and gynaecological diseases	N13-N16, N20-N23, N25-N39, N41-N51, N60-N64, N75-N96, N97-N98	Urinary diseases and male infertility	N10-N12.9, N15, N15.1-N16.8, N20-N23.0, N25-N32.0, N32.3, N32.4, N34-N37.8, N39-N39.8, N40-N53.9, Z43.5-Z43.7, Z84.1, Z84.2	N15, N16, N20-N23, N25-N32, N34-N37, N39, N41-N45, N46, N47, N48-N51, N61-N64, N75-N77, N80-N81, N83, N85-N86, N88-N91, N95, N97	N13-N14, N33, N38, N60, N78-N79, N82, N84, N87, N92-N94, N96, N98	N10-N12, N40, N52-N53, N72	N13, N33, N38, N78, N79, N82, N84, N92-N94, N98 are GC in GBD. N14 is classified as Endocrine, metabolic, blood, and immune disorders; N60, N87 as Other neoplasms; N96 as complications of abortion in GBD. N10-N12 classified as renal diseases; N40 as benign prostatic hyperplasia; N72 as	
			Urolithiasis	N20-N23.0					
			Other urinary diseases	N25-N29.8, N31-N32.0, N32.3, N32.4, N35-N37.8, N39, N39.3-N39.8, N41-N45.9, N47-N53.9					

New SA NBD list March 2014		GBD list 2016						
Code	SA NBD Cause	ICD 10 Codes	GBD cause	ICD 10 codes	Same in GBD and SA NBD	In SA NBD not GBD	In GBD not SA NBD	Comments
			Interstitial nephritis and urinary tract infections	N10-N12.9, N15, N15.1-N16.8, N30-N30.91, N34-N34.3, N39.0-N39.2				STIs excluding HIV in SA NBD.
			Gynecological diseases	B37.3-B37.49, E28.2, N61-N64.9, N72, N72.0, N75-N77.8, N80-N81.9, N83-N83.9, N85-N86, N88-N91.5, N94.3, N95, N95.1-N95.9, N97-N97.9, Z01.4-Z01.7, Z31-Z31.9, Z86.1-Z86.19, Z87.4-Z87.448				
			Male infertility due to other causes	N46-N46.9, Z43.7				
R	Skin Diseases							
	ZA 109	Skin diseases	L00-L08, L10-L14, L20-L30, L40-L98, B35-B36, B85-B88	Skin and subcutaneous diseases	A31.1, A31.2, A46, A46.0, B07-B09, B35-B36.9, B85-B88.9, L00-L05.92, L08-L08.9, L10-L14.0, L20-L23.2, L23.4-L24.3, L24.5-L25.0, L25.2-L27, L27.2-L30.9, L40-L45, L49-L55.9, L56.1-L57.9, L59-L60.9, L62-L68.9, L70-L76.82, L80-L92.9, L94-L95.9, L97-L98.6, Z41.1, Z84.0, Z87.2, Z94.5	L00-L05, L08, L10-L14, L20-L23, L24, L25-L27, L28-L30, L40-L45, L49-L55, L57, L59-L60, L62-L68, L70-L76, L80-L92, L94-L95, L97-L98, B35-B36, B85-B88	L06-L07, L46-L48, L56, L58, L61, L69, L77-L79, L93, L96	A46, B07-B09, L06-L07, L46-L48, L61, L69, L77-L79, L96 are GC in GBD. L56, L58 classified as Endocrine, metabolic, blood, and immune disorders; L93 as Other musculoskeletal disorders in GBD. A46, B07-B09 classified as other infectious diseases in SA NBD.
S	Musculoskeletal diseases							

New SA NBD list March 2014		GBD list 2016							
Code	SA NBD Cause	ICD 10 Codes	GBD cause	ICD 10 codes	Same in GBD and SA NBD	In SA NBD not GBD	In GBD not SA NBD	Comments	
ZA 110	Rheumatoid arthritis	M05-M06	Rheumatoid arthritis	M05-M06.9, M08.0-M08.89	M05-M06				
ZA 111	Osteoarthritis	M15-M19	Osteoarthritis	M13-M13.9, M15-M19.079	M15-M19		M13	M13 classified as Other musculoskeletal disorders in SA NBD.	
ZA 112	Back and neck pain	M47-M54	Low back and neck pain	G54.1-G54.4, G57.0-G57.12, M43.2-M43.9, M45-M49, M49.2-M51.9, M53-M54.9, M99, M99.1-M99.9	M47-M49, M50-M51, M53-M54	M52	M45-M46, M99	M52 is GC in GBD. M45-M46, M99 classified as Other musculoskeletal disorders in SA NBD.	
ZA 113	Other musculo-skeletal disorders	M00-M02, M08, M10-M13, M20-M46, M60-M85, M87-M99	Other musculoskeletal disorders	I27.1, L93-L93.2, M00-M03.0, M03.2, M03.6, M07-M08, M08.9-M09.0, M09.2, M09.8, M11-M12, M12.2-M12.49, M12.8-M12.9, M14-M14.89, M22-M25.879, M30-M32.9, M34-M36.8, M40-M43.19, M65-M68.8, M70-M73, M73.8, M75-M77.9, M80-M83.4, M83.8-M87.09, M87.3-M89.59, M89.7-M95.9, M99.0-M99.09	M00-M02, M08, M11-M12, M22-M25, M30-M32, M34-M36, M40-M43, M65-M68, M70-M73, M75-M77, M80-M83, M84-M85, M87, M88-M89, M90-M95	M10, M13, M20-M21, M26-M29, M33, M37-M39, M44-M46, M60-M64, M69, M74, M78-M79, M96-M99	L93, M03, M07, M14, M86	M28, M29, M37-M39, M44, M64, M69, M74, M78, M97, M98 are gc in GBD. M20, M21 classified as Long term sequelae due to the injuries in skeletal system; M26, M27 as oral disorders; M33, M60, M61-M63, M79 as other neurological disorders; M45-M46, M99 as Low back and neck pain; M96 as Endocrine, metabolic, blood, and immune disorders in GBD.	

New SA NBD list March 2014		GBD list 2016						
Code	SA NBD Cause	ICD 10 Codes	GBD cause	ICD 10 codes	Same in GBD and SA NBD	In SA NBD not GBD	In GBD not SA NBD	Comments
			Gout	M10-M10.19, M10.3-M10.9	M10			L93 classified as skin diseases in SA NBD. M03, M07, M14 not in SA NBD. M86 is GC in SA NBD.
T	Congenital abnormalities							
ZA 114	Neural tube defects	Q00, Q03, Q05	Neural tube defects	Q00-Q01.9, Q05-Q05.9	Q00, Q05	Q03		Q03 classified as Other congenital anomalies in GBD.
ZA 115	Cleft lip and cleft palate	Q35-Q37	Orofacial clefts	Q35-Q37.9	Q35-Q37			
ZA 116	Congenital heart anomalies	Q20-Q28	Congenital heart anomalies	Q20-Q28.9	Q20-Q28			
ZA 120	Down syndrome	Q90	Down syndrome	Q90-Q90.9	Q90			
ZA 121	Other chromosomal abnormalities	Q91-Q99	Chromosomal unbalanced rearrangements	Q91-Q93.9, Q95-Q95.9, Q97-Q97.9, Q99-Q99.8	Q91-Q93, Q95, Q97	Q94		Q94 is GC in GBD.
			Turner syndrome	Q96-Q96.9	Q96			
			Klinefelter syndrome	Q98-Q98.9	Q98			
ZA 117	Congenital disorders of GIT	Q38-Q45	Other congenital anomalies	P96.0, Q02-Q04.9, Q06-Q07.9, Q10-Q18.9, Q30-Q34.9, Q38-Q45.9, Q50-Q86, Q86.1-Q87.89, Q89-Q89.8	Q38-Q45			
ZA 118	Urogenital malformations	Q50-Q64			Q50-Q64			
ZA 119	Fetal alcohol syndrome	Q86			Q86			

New SA NBD list March 2014			GBD list 2016						
	Code	SA NBD Cause	ICD 10 Codes	GBD cause	ICD 10 codes	Same in GBD and SA NBD	In SA NBD not GBD	In GBD not SA NBD	Comments
	ZA 122	Other congenital abnormalities	Q01, Q02, Q04, Q06-Q07, Q10-Q18, Q30-Q34, Q65-Q85, Q87-Q89, P75			Q02, Q04, Q06-Q07, Q10-Q18, Q30-Q34, Q65-Q85, Q87, Q89	Q01, Q88, P75	Q03	Q88 is GC in GBD. Q01 classified as Neural tube defects; P75 as Other neonatal disorders in GBD. Q03 classified as neural tube defects in SA NBD.
U	Oral conditions								
	ZA 123	Dental caries	K02	Deciduous caries					
				Permanent caries	K02-K02.9	K02			
	ZA 124	Periodontal disease	K05	Periodontal diseases	K05-K05.6	K05			
				Edentulism and severe tooth loss					
	ZA 125	Other oral diseases	K00-K01, K03-K04, K06-K14	Other oral disorders	M26-M27.9		K00-K01, K03-K04, K06-K14	M26-M27	K00-K01, K03-K04, K06-K14 classified as Other digestive diseases in GBD. M26-M27 classified as Other musculoskeletal in SA NBD.
	Group III: Injuries								
V	Unintentional injuries								
	ZA 126	Road injuries	V01-V04, V06, V09-V80, V82-V85, V87, V89	Road injuries	V01-V04.99, V06-V80.929, V82-V82.9, V87.2, V87.3	V01-V04, V06, V09-V80, V82	V83-V85, V87, V89	V07-V08	V83-V85 classified as Other transport injuries; V87, V89 are GC in GBD.

New SA NBD list March 2014			GBD list 2016						
Code	SA NBD Cause	ICD 10 Codes	GBD cause	ICD 10 codes	Same in GBD and SA NBD	In SA NBD not GBD	In GBD not SA NBD	Comments	
								V07-V08 not in SA NBD.	
			Pedestrian road injuries	V01-V04.99,V06-V09.9					
			Cyclist road injuries	V10-V19.9					
			Motorcyclist road injuries	V20-V29.9					
			Motor vehicle road injuries	V30-V79.9,V87.2,V87.3					
			Other road injuries	V80-V80.929,V82-V82.9					
ZA 127	Other transport accidents	V05, V81, V86, V88, V91, V93-V98	Other transport injuries	V00-V00.898,V05-V05.99,V81-V81.9,V83-V86.99,V88.2,V88.3,V91-V91.9,V93-V98.8	V05, V81, V86, V91, V93-V98	V88	V00, V83-V85	V88 is GC in GBD. V83-V85 classified as Road injuries; V00 not in SA NBD.	
ZA 128	Poisonings (including herbal)	X40-X49, Y67	Poisonings	X40-X40.9, X43-X43.9, X46-X48.9, Z03.6	X40, X43, X46-X48	X41-X42, X44-X45, X49, Y67		X41-X42, X44 are GC in GBD. X45 classified as Alcohol use disorders; X49 as Other drug use disorders in GBD. Y67 not in GBD.	
ZA 129	Falls	W00-W19	Falls	W00-W19.9	W00-W19				
ZA 130	Fires, heat and hot substances	X00-X19	Fire, heat and hot substances	X00-X06.9, X08-X19.9, X20.5	X00-X06, X08-X19	X07		X07 is GC in GBD.	

New SA NBD list March 2014			GBD list 2016						
Code	SA NBD Cause	ICD 10 Codes	GBD cause	ICD 10 codes	Same in GBD and SA NBD	In SA NBD not GBD	In GBD not SA NBD	Comments	
ZA 131	Drowning	V90, V92, W65-W70, W73, W74	Drowning	V90,V90.0,V90.01-V90.9,V92-V92.9,W65-W70.9,W73-W74.9	V90, V92, W65-W70, W73, W74				
ZA 132	Hanging, strangulation and other threats to breathing	W75-W84, Y37	Exposure to mechanical forces	W20-W38.9,W40-W43.9,W45.0-W45.2,W46-W46.1,W49-W52,W52.3,W75-W76.9, Z04.2	W75-W76		W20-W23, W35-W38, W40-W43, W49-W52	W82 is GC in GBD. Y37 classified as Forces of nature, war, and legal intervention; W77, W81 as Other unintentional injuries; W78-W80, W83-W84 as Pulmonary aspiration and foreign body in airway in GBD. W20-W23, W35-W38, W40-W43, W49-W52 classified as Other unintentional injuries in SA NBD.	
ZA 132.1	Mining accidents	W77, Y37							
ZA 132.2	Other threats to breathing	W75-W76, W78-W84							
ZA 133	Mechanical forces	W24-W34, W45-W46			W24-W34, W46	W45	W45 classified as Foreign body in other body part in GBD		
ZA 134	Exposure to natural forces	X30-X39	Exposure to forces of nature	X30-X39.9	X30-X39				
ZA 135	Adverse effects of medical and surgical treatment	Y39-Y66, Y68-Y84, Y88	Adverse effects of medical treatment	Y38.9-Y84.9,Y88-Y88.3	Y39-Y66, Y68-Y84, Y88		Y67	Y67 classified as poisoning (including herbs) in SA NBD	

New SA NBD list March 2014		GBD list 2016							
	Code	SA NBD Cause	ICD 10 Codes	GBD cause	ICD 10 codes	Same in GBD and SA NBD	In SA NBD not GBD	In GBD not SA NBD	Comments
	ZA 136	Animal contact	W53-W59, X20-X27, X29	Animal contact	W52.0-W52.2,W52.4-W62.9,W64-W64.9, X20-X20.4, X20.6-X29.9	W53-W59, X20, X21-X27, X29		W60-W62, W64, X28	X28, W60, W64 classified as Other unintentional injuries in SA NBD. W61-W62 not in SA NBD.
	ZA 137	Other unintentional injuries	W20-W23, W35-W44, W49-W52, W60, W64, W85-W94, W99, X28, X50-X58, Y38	Other unintentional injuries	W39-W39.9,W77-W77.9,W81-W81.9,W85-W94.9,W97.9,W99-W99.9, X50-X54.9, X57-X58.9	W39, W44, W85-W94, W99, X50-X54, X57-X58	W20-W23, W35-W38, W40-W43, W49-W52, W60, W64, X28, X55-X56, Y38	W45, W77, W78-W80, W81, W83-W84, Z18	X55-X56 are GC in GBD. W20-W23, W35-W38, W40-W43, W49-W52 classified as Other exposure to mechanical forces; W60, W64 as Non-venomous animal contact; X28 Venomous animal contact; Y38 as Forces of nature, war, and legal intervention in GBD.
				Foreign body	H02.81-H02.819, H05.5-H05.53, H44.6-H44.799, M60.2-M60.28,W44-W45,W45.3-W45.9,W46.2,W78-W80.9,W83-W84.9, Z18-Z18.9				W77, W78-W80, W81, W83-W84 classified as hanging and strangulation and other threats to breathing; W45 as Mechanical forces in SA NBD. Z18 not in SA NBD.
W	Intentional injuries								
	ZA 138	Self-inflicted injuries	X60-X84	Self-harm	X60-X84.9	X60-X84			

New SA NBD list March 2014		GBD list 2016							
Code	SA NBD Cause	ICD 10 Codes	GBD cause	ICD 10 codes	Same in GBD and SA NBD	In SA NBD not GBD	In GBD not SA NBD	Comments	
ZA 139	Interpersonal violence	X85-X99, Y00-Y09	Interpersonal violence	X85-Y08.9, Y87.1, Y87.2, Z04.4-Z04.5	X85-X99, Y00-Y08	Y09		Y09 is gc in GBD.	
ZA 139.1	Interpersonal violence with firearm	X93-X95	Assault by firearm	X93-X94.0, X94.3-X94.7, X94.9-X95.9, X96.5					
ZA 139.2	Interpersonal violence without firearm	X85-X92, X96-X99, Y00-Y08	Assault by sharp object	X99-X99.9					
			Assault by other means	X85-X92.9, X94.1, X94.2, X94.8, X96-X96.4, X96.6-X98.9, Y00-Y08.9, Y87.1					
ZA 140	Legal intervention	Y35-Y36	Collective violence and legal intervention	Y35-Y38.893, Y89.0, Y89.1	Y35-Y36		Y37-Y38	Y37 classified as hanging and strangulation and other threats to breathing; Y38 as other unintentional injuries in SA NBD.	

^aICD-10 codes not assigned by GBD but data available in the dataset.

Appendix 3: Summary of matching of SA NBD-GBD causes

Group	1 – 1	1 - Many	Many - 1	Many - Many
Group I: Communicable, maternal, perinatal and nutritional conditions	ZA 1-3*, ZA 7*, ZA 9 [†] , ZA 12- ZA 16*, ZA 17 –ZA 18 [†] , ZA 19-ZA 22*, ZA 23 [†] , ZA 24*, ZA 26-ZA 27 [†] , ZA 28*	ZA 4; ZA 5; ZA 6; ZA 25; ZA 29		ZA 8, 10 and 11
Group II: Non-communicable diseases	ZA 30 [†] , ZA 32 - ZA 43 [†] , ZA 44*, ZA 45 - ZA 48 [†] , 49*, ZA 50 - ZA 52 [†] , ZA 53*, ZA 54 –ZA 55 [†] , ZA 60- ZA 61 [†] , ZA 62–ZA 64*, ZA 65 [†] , ZA 66*, ZA 69*, ZA 71*, ZA 72–ZA 75 [†] , ZA 77*, ZA 78 -ZA 79*, ZA 83*, ZA 84 –ZA 85 [†] , ZA 88*, ZA 90*, ZA 91 [†] , ZA 93– ZA 94*, ZA 95 [†] , ZA 96 - ZA 98*, ZA 99 [†] , ZA 101*, ZA 103– ZA 104 [†] , ZA 107 [†] , ZA 109*, ZA 110 [†] , ZA111-ZA 112*, ZA 114*, ZA 115-ZA 116 [†] , ZA 120 [†]	ZA 31; ZA 58; ZA 59; ZA 68; ZA 76; ZA 100; ZA 102; ZA 105; ZA 113; ZA 121	ZA 117-ZA 119 and ZA 122	ZA 56 and ZA 57; ZA 67 and ZA 70; ZA 80 – ZA 82; ZA 86, ZA 87, ZA 89 and ZA 92; ZA 106 and ZA 108; ZA 123-ZA 125
Group III: Injuries	ZA 126- ZA 128*, ZA 129 [†] , ZA 130*, ZA 131 [†] , ZA 134 [†] , ZA 135-ZA 136*, ZA 138, ZA139 [†] , ZA 140*			ZA 132, ZA 133 and ZA 137

[†]Perfect matching; *Not perfect matching.

Appendix 4: WHO cause list

Code	GHE Cause Name	ICD-10 Code
1	I. Communicable, maternal, perinatal and nutritional conditions^a	A00-B99, G00-G04, N70-N73, J00-J22, H65-H68, O00-O99, P00-P96, E00-E02, E40-E46, E50-E64, D50-D53, D64.9, U04
2	A. Infectious and parasitic diseases	A00-B99, G00, G03-G04, N70-N73
3	1. Tuberculosis	A15-A19, B90
4	2. Sexually transmitted diseases (STDs) excluding HIV	A50-A64, N70-N73
5	a. Syphilis	A50-A53
6	b. Chlamydia	A55-A56
7	c. Gonorrhoea	A54
8	d. Trichomoniasis	A59
9	e. Other STDs	A57-A58, A60-A64, N70-N73
10	3. HIV/AIDS	B20-B24
11	4. Diarrhoeal diseases ^b	A00, A01, A03, A04, A06-A09
12	5. Childhood-cluster diseases	A33-A37, B05
13	a. Whooping cough	A37
14	b. Diphtheria	A36
15	c. Measles	B05
16	d. Tetanus	A33-A35
17	6. Meningitis	A39, G00, G03
18	7. Encephalitis ^b	A83-A86, B94.1, G04
19	8. Hepatitis B	B16-B19 (minus B17.1, B18.2)
20	9. Hepatitis C	B17.1, B18.2
21	10. Parasitic and vector diseases	A30, A71, A82, A90-A91, B50-B57, B65, B73, B74.0-B74.2
22	a. Malaria	B50-B54, P37.3, P37.4
23	b. Trypanosomiasis	B56
24	c. Chagas disease	B57
25	d. Schistosomiasis	B65
26	e. Leishmaniasis	B55
27	f. Lymphatic filariasis	B74.0-B74.2
28	g. Onchocerciasis	B73
29	h. Leprosy	A30
30	i. Dengue	A90-A91
31	j. Trachoma	A71
32	k. Rabies	A82
33	11. Intestinal nematode infections	B76-B77, B79
34	a. Ascariasis	B77
35	b. Trichuriasis	B79
36	c. Hookworm disease	B76

Code	GHE Cause Name	ICD-10 Code
37	12. Other infectious diseases	A02, A05, A20-A28, A31, A32, A38, A40-A49, A65-A70, A74-A79, A80-A81, A87-A89, A92-A99, B00-B04, B06-B15, B25-B49, B58-B60, B64, B66-B72, B74.3-B74.9, B75, B78, B80-B89, B91-B99 (minus B94.1)
38	B. Respiratory infections ^b	J00-J22, H65-H68, P23, U04
39	1. Lower respiratory infections	J09-J22, P23, U04
40	2. Upper respiratory infections	J00-J06
41	3. Otitis media	H65-H68
42	C. Maternal conditions	O00-O99
43	1. Maternal haemorrhage	O44-O46, O67, O72
44	2. Maternal sepsis	O85-O86
45	3. Hypertensive disorders of pregnancy	O10-O16
46	4. Obstructed labour	O64-O66
47	5. Abortion	O00-O07
48	6. Other maternal conditions	O20-O43, O47-O63, O68-O71, O73-O75, O87-O99
49	D. Neonatal conditions	P00-P96 excluding P37.3, P37.4
50	1. Preterm birth complications ^b	P05, P07, P22, P27-P28
51	2. Birth asphyxia and birth trauma ^b	P03, P10-P15, P20-P21, P24-P26, P29
52	3. Neonatal sepsis and infections	P35-P39 (excluding P37.3, P37.4)
53	4. Other neonatal conditions	P00-P02, P04, P08, P50-P96
54	E. Nutritional deficiencies	E00-E02, E40-E46, E50-E64, D50-D53, D64.9
55	1. Protein-energy malnutrition	E40-E46
56	2. Iodine deficiency	E00-E02
57	3. Vitamin A deficiency	E50
58	4. Iron-deficiency anaemia	D50, D64.9
59	5. Other nutritional disorders	D51-D53, E51-E64
60	II. Non-communicable diseases^a	C00-C97, D00-D48, D55-D64 (minus D 64.9), D65-D89, E03-E07, E10-E16, E20-E34, E65-E88, F01-F99, G06-G98, H00-H61, H68-H93, I00-I99, J30-J98, K00-K92, N00-N64, N75-N98, L00-L98, M00-M99, Q00-Q99, X41-X42 ^b , X45 ^b
61	A. Malignant neoplasms	C00-C97
62	1. Mouth and oropharynx cancers ^d	C00-C14
63	2. Oesophagus cancer ^d	C15
64	3. Stomach cancer ^d	C16
65	4. Colon and rectum cancers ^d	C18-C21
66	5. Liver cancer	C22
67	6. Pancreas cancer	C25
68	7. Trachea, bronchus and lung cancers	C33-C34
69	8. Melanoma and other skin cancers ^d	C43-C44
70	9. Breast cancer ^d	C50
71	10. Cervix uteri cancer ^d	C53
72	11. Corpus uteri cancer ^d	C54-C55

Code	GHE Cause Name	ICD-10 Code
73	12. Ovary cancer	C56
74	13. Prostate cancer ^d	C61
75	14. Bladder cancer ^d	C67
76	15. Lymphomas and multiple myeloma ^d	C81-C90, C96
77	16. Leukaemia ^d	C91-C95
78	17. Other malignant neoplasms ^d	C17, C23, C24, C26-C32, C37-C41, C45-C49, C51, C52, C57-C60, C62-C66, C68-C80, C97
79	B. Other neoplasms	D00-D48
80	C. Diabetes mellitus	E10-E14
81	D. Endocrine, blood, immune disorders	D55-D64 (minus D64.9), D65-D89, E03-E07, E15-E34, E65-E88
82	E. Mental and behavioural disorders	F04-F99, X41-X42 ^c , X45 ^c
83	1. Unipolar depressive disorders	F32-F33, F34.1
84	2. Bipolar affective disorder	F30-F31
85	3. Schizophrenia	F20-F29
86	4. Alcohol use disorders	F10, X45 ^c
87	5. Drug use disorders	F11-F16, F18-F19, X41-X42 ^c
88	6. Anxiety disorders	F40-F44
89	7. Eating disorders	F50
90	8. Pervasive developmental disorders	F84
91	9. Childhood behavioural disorders	F90-F92
92	10. Idiopathic intellectual disability	F70-F79
93	11. Other mental and behavioural disorders	F04-F09, F17, F34-F39 (minus F34.1), F45-F48, F51-F69, F80-F83, F88-F89, F93-F99
94	F. Neurological conditions	F01-F03, G06 -G98
95	1. Alzheimer's disease and other dementias	F01-F03, G30-G31
96	2. Parkinson disease	G20-G21
97	4. Multiple sclerosis	G35
98	3. Epilepsy	G40-G41
99	5. Migraine	G43
100	6. Non-migraine headache	G44
101	7. Other neurological conditions	G06-G12, G23-G25, G36-G37, G45-G98
102	G. Sense organ diseases	H00-H61, H69-H93
103	1. Glaucoma	H40
104	2. Cataracts	H25-H26
105	3. Refractive errors	H49-H52
106	4. Macular degeneration	H35.3
107	5. Other vision loss	H30-H35 (minus H35.3), H53-H54
108	6. Other hearing loss	H90-H91
109	7. Other sense organ disorders	H00-H21, H27, H43-H47, H55-H61, H69-H83, H92-H93
110	H. Cardiovascular diseases	I00-I99
111	1. Rheumatic heart disease	I01-I09

Code	GHE Cause Name	ICD-10 Code
112	2. Hypertensive heart disease	I10-I15
113	3. Ischaemic heart disease	I20-I25
114	4. Stroke	I60-I69
115	5. Cardiomyopathy, myocarditis, endocarditis	I30-I33, I38, I40, I42
116	6. Other cardiovascular diseases ^e	I00, I26-I28, I34-I37, I44-I51, I70-I99
117	I. Respiratory diseases	J30-J98
118	1. Chronic obstructive pulmonary disease	J40-J44
119	2. Asthma	J45-J46
120	3. Other respiratory diseases	J30-J39, J47-J98
121	J. Digestive diseases	K20-K92
122	1. Peptic ulcer disease	K25-K27
123	2. Cirrhosis of the liver	K70, K74
124	3. Appendicitis	K35-K37
125	4. Other digestive diseases	K20-K22, K28-K31, K38-K66, K71-K73, K75-K92
126	K. Genitourinary diseases	N00-N64, N75-N76, N80-N98
127	1. Kidney diseases	N00-N19
128	2. Hyperplasia of prostate	N40
129	3. Urolithiasis	N20-N23
130	4. Other genitourinary disorders	N25-N39, N41-N45, N47-N51
131	5. Infertility	N46, N97
132	6. Gynecological diseases	N60-N64, N75-N76, N80-N96, N98
133	L. Skin diseases	L00-L98
134	M. Musculoskeletal diseases	M00-M99
135	1. Rheumatoid arthritis	M05-M06
136	2. Osteoarthritis	M15-M19
137	4. Back and neck pain	M45-M48, M50-M54
138	3. Gout	M10
139	5. Other musculoskeletal disorders	M00, M02, M08, M11-M13, M20-M43, M60-M99
140	N. Congenital anomalies	Q00-Q99
141	1. Neural tube defects	Q00, Q05
142	2. Cleft lip and cleft palate	Q35-Q37
143	4. Congenital heart anomalies	Q20-Q28
144	3. Down syndrome	Q90
145	5. Other chromosomal anomalies	Q91-Q99
146	6. Other congenital anomalies	Q01-Q04, Q06-Q18, Q30-Q34, Q38-Q89
147	O. Oral conditions	K00-K14
148	1. Dental caries	K00-K04, K06-K14
149	2. Periodontal disease	K05
150	3. Edentulism	—
151	III. Injuries	V01-Y89
152	A. Unintentional injuries^f	V01-X40, X43-X44, X46-59, Y40-Y86, Y88, Y89
153	1. Road injury ^g	V01-V04, V06, V09-V80, V87, V89, V99

Code	GHE Cause Name	ICD-10 Code
154	2. Poisonings	X40, X43-X44, X46-X49
155	3. Falls	W00-W19
156	4. Fire, heat and hot substances	X00-X19
157	5. Drownings	W65-W74
158	6. Exposure to forces of nature	X30-X39
159	7. Other unintentional injuries	Rest of V, W20-W64, W75-W99, X20-X29, X50-X59, Y40-Y86, Y88, Y89
160	B. Intentional injuries^f	X60-Y09, Y35-Y36, Y870, Y871
161	1. Self-harm	X60-X84, Y870
162	2. Interpersonal violence	X85-Y09, Y871
163	3. Collective violence and legal intervention	Y35-Y36

—, not available

^a Deaths coded to “Symptoms, signs and ill-defined conditions” (R00-R99) are distributed proportionately to all causes within Group I and Group II.

^b For deaths under age 5, refer to classification in Annex Table B.

^c As from 2006, deaths from causes F10-F19 with fourth character .0 (Acute intoxication) are coded to the category of accidental poisoning according to the updated ICD-10 instructions.

^d Cancer deaths coded to ICD categories for malignant neoplasms of other and unspecified sites including those whose point of origin cannot be determined, and secondary and unspecified neoplasms (ICD-10 C76, C80, C97) were redistributed *pro-rata* across the footnoted malignant neoplasm categories within each age–sex group, so that the category “Other malignant neoplasms” includes only malignant neoplasms of other specified sites (Ref Mathers et al 2006 DCP chapter).

^e Ischaemic heart disease deaths may be miscoded to a number of so-called cardiovascular “garbage” codes. These include heart failure, ventricular dysrhythmias, generalised atherosclerosis and ill-defined descriptions and complications of heart disease. Proportions of deaths coded to these causes were redistributed to ischaemic heart disease as described in (GPE discussion paper). Relevant ICD-10 codes are I47.2, I49.0, I46, I50, I51.4, I51.5, I51.6, I51.9 and I70.9.

^f Injury deaths where the intent is not determined (Y10-Y34, Y872) are distributed proportionately to all causes below the group level for injuries.

^g For countries with 3-digit ICD10 data, for “Road injury” use: V01-V04, V06, V09-V80, V87, V89 and V99. For countries with 4-digit ICD10 data, for “Road injury” use:

Source: Adapted from WHO methods and data sources for country-level causes of death 2000-2012 (Global Health Estimates Technical Paper WHO/HIS/HSI/GHE/2014.7). Geneva: Department of Health Statistics and Information Systems, World Health Organization, 2014.

Appendix 5: Summary of matching of SA NBD-WHO causes

Group	1 – 1	1 - Many	Many - 1	Many - Many
Group I: Communicable, maternal, perinatal and nutritional conditions	ZA 1-ZA 2*, ZA 3 [†] , ZA 4-ZA 5*, ZA 12*, ZA 13 [†] , ZA 14*, ZA 15*, ZA 16-ZA 18 [†] , ZA 19*, ZA 22-ZA 25*, ZA 26-ZA 28 [†] , ZA 29*	ZA 6, ZA 7	ZA 20 and ZA 21	ZA 8, ZA 9 ZA 10 and ZA 11
Group II: Non-communicable diseases	ZA 32-ZA 35 [†] , ZA 37 [†] , ZA 39 [†] , ZA 42-ZA 46 [†] , ZA 48 [†] , ZA 55 [†] , ZA 57*, ZA 58 [†] , ZA 59*, ZA 60-ZA 62 [†] , ZA 63-ZA 64*, ZA 65-ZA 66 [†] , ZA 68-ZA 69 [†] , ZA 71-ZA 76 [†] , ZA 77*, ZA 78-ZA 80 [†] , ZA 82*, ZA 84*, ZA 85 [†] , ZA 88*, ZA 93 [†] , ZA 95 [†] , ZA 98-ZA 99 [†] , ZA 106*, ZA 107 [†] , ZA 109*, ZA 110-ZA 111 [†] , ZA 114*, ZA 115-ZA 116 [†] , ZA 120-ZA 121 [†] ,	ZA 81; ZA 108	ZA 30 and ZA 31; ZA 40 and ZA 41; ZA 52, ZA 53 and ZA 54; ZA 36, ZA 38, ZA 47, ZA 49, ZA 50, ZA 51 and ZA 56; ZA 86 and ZA 87; ZA 94, ZA 96 and ZA 97; ZA 117, ZA 118, ZA 119 and ZA 122	ZA 67 and ZA 70; ZA 83, ZA 89, ZA 90, ZA 91 and ZA 92; ZA 100, ZA 101, ZA 102, ZA 103, ZA 104 and ZA 105; ZA 112 and ZA 113; ZA 123, ZA 124 and ZA 125
Group III: Injuries	ZA 126*, ZA 128*, ZA 129-ZA 130 [†] , ZA 131*, ZA 134 [†] , ZA 138 [†] , ZA 139*, ZA 140 [†]		ZA 127, ZA 132, ZA 133, ZA 135, ZA 136 and ZA 137	

[†]Perfect matching; *Not perfect matching