

Appendix 1.2: Rationale for including conditions

Table A3: Rationale for including conditions in avoidable mortality and amenable mortality classifications

Age limit: 0 to 74 years, unless otherwise specified

No.	Group	Condition Cause	Limits: Age, sex	Amenable to health care	Rationale for including in:	
					avoidable mortality	amenable mortality
01	Infections	Tuberculosis		✓	Exposure to <i>Mycobacterium tuberculosis</i> is preventable through reducing poverty and overcrowding, and through contact tracing (with immunisation or prophylactic antibiotic treatment being given to contacts). Infection can also be prevented with reasonable effectiveness through BCG immunisation.	Should infection or disease occur, it is readily treatable with antibiotics, although resistant strains may be a problem. <i>(so considered amenable)</i>
02	Infections	Selected invasive bacterial and protozoal infections		✓	Immunisation can prevent a proportion of these serious infections (eg meningococcal, Hib, pneumococcal).	Although not always successful, early detection and effective intensive support coupled with appropriate antibiotic therapy can massively reduce case fatality rates, eg for meningococcal disease, case fatality rate should not exceed 5%. <i>(so considered amenable)</i>
03	Infections	Hepatitis			Substantially preventable through safe injection practice in the case of the blood borne hepatitis B virus and (with more difficulty) hepatitis C virus. Sexually transmitted HBV preventable through condom use. Waterborne HAV and related viruses controllable through sanitary measures (safe sewage disposal and drinking water supplies, standard food safety measures). In addition, HBV and HAV preventable through immunisation. Vertical transmission of HBV from mother to child similarly preventable in most cases.	
04	Infections	HIV/AIDS			Most infections are potentially preventable through condom use, use of clean needles, appropriate management of pregnancy and postnatal care to prevent vertical transmission.	Should infection occur, early detection coupled with appropriate combination antiviral therapy can slow progression to AIDS and yield reasonable long-term survival. <i>(but the contribution of health care insufficient for this cause to be defined as 'mostly' amenable – see Chapter 2, Methods)</i>

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			Cause			avoidable mortality	amenable mortality
05	Infections		Viral pneumonia and influenza			Major cause is influenza, which is generally preventable (disease, not infection) through immunisation. Antiviral agents also now available that may prevent (and also treat) serious clinical complications. Non-smoking may decrease susceptibility.	
06	Neoplasms		Lip, oral cavity and pharynx			Most are related to tobacco or alcohol consumption, and are therefore theoretically preventable. HPV infection may also play a role in some cases.	Treatment (surgery, with adjunctive radio and chemotherapy) also yields reasonable five-year relative survival if detected at early stage. <i>(but the contribution of health care insufficient for this cause to be defined as 'mostly' amenable – see Chapter 2, Methods)</i>
07	Neoplasms		Oesophagus			Squamous carcinomas are largely related to tobacco and alcohol consumption and are thus potentially preventable. Adenocarcinomas of the lower third appear to be related to reflux (Barrett's disease) and so are preventable (through weight control or medical treatment of reflux).	
08	Neoplasms		Stomach			Most cases appear to be related to infection with <i>Helicobacter pylori</i> , and so are preventable (eg through control of overcrowding, poverty or antibiotic therapy). Some cases appear to be related to tobacco, alcohol, salt preservative, or lack of vegetables & fruit and so are again preventable. Adenocarcinomas of the gastro-oesophageal junction appear to be related to reflux (see above).	
09	Neoplasms		Colorectal		✓	Known, modifiable risk factors account for a substantial proportion of cases – including physical inactivity, elevated BMI, dietary factors ranging from intake of meat and dairy products to nitrosamines produced by cooking, and inadequate fruits & vegetables. Genetic factors account for about 10% of cases, and are detectable through screening and resection of polyps before they become malignant.	General population screening for faecal occult blood, followed by endoscopy and resection can reduce mortality by up to 20%. Treatment (surgery, chemo, radiotherapy) of established disease is moderately effective, with good 5 year relative survival for early stage lesions. <i>(so considered amenable, including both screening and treatment)</i>

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10	Neoplasms	Liver				Primary liver cancer is caused predominantly by HBV and HCV infection, and so is theoretically largely preventable through immunisation against HBV. Behavioural measures to reduce exposure to HBV (see above) also important.	Screening HBV carriers for alpha foeto-protein, followed by surgical resection of early stage tumours, also contributes (five year relative survival good provided early stage). <i>(but the contribution of health care insufficient for this cause to be defined as 'mostly' amenable – see Chapter 2, Methods)</i>
11	Neoplasms	Lung				At least 80% of cases result from tobacco smoke exposure, and so are readily preventable (in principle). Adequate fruit & vegetable intake, and control of radon exposure in homes (if geologically relevant) also contribute. Asbestos exposure interacts synergistically with tobacco.	
12	Neoplasms	Melanoma of skin			✓	Most (although not all) cases reflect excessive intermittent exposure to UV radiation (typically from sun bathing) leading to sunburn in childhood or adolescence. As such these cases are theoretically preventable through sun safe behaviour.	Early stage lesions can often be detected in primary care (aided by regular self assessment) and are then curable by simple resection. Five year relative survival is good even for thicker lesions, given access to modern chemo- and other (radio, immuno) therapy, unless metastasis has occurred. <i>(so considered amenable)</i>
13	Neoplasms	Nonmelanotic skin			✓	Shares similar association with UV exposure as for melanoma, so again largely preventable.	Again, lesions often detectable by patient or primary care provider at early stage when they are easily curable by resection. Even more advanced (but not very late stage) lesions are associated with reasonable five years survival, given access to appropriate treatment modalities. <i>(so considered amenable)</i>
14	Neoplasms	Breast	Female		✓	Increasing evidence that a proportion of cases may be preventable through control of BMI, physical activity level, diet, and alcohol consumption, and through breast-feeding. In addition, 30% or greater reduction in mortality possible through mammographic screening of general population (ages 50-69 years or possibly 40-69 years) and more frequent screening of high-risk women.	Surgery together with radio and chemotherapy, and hormone therapy when indicated (oestrogen receptor positive status), yields reasonable five-year relative survival except in late stage disease. <i>(so considered amenable, taking both screening and treatment of non-screen detected disease into account)</i>

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16	Neoplasms	Cervix			✓	<p>HPV has been identified as the cause, so all cases in theory preventable through condom use. HPV vaccine currently undergoing phase 3 clinical trials with early results highly favourable.</p> <p>Tobacco smoking also contributes to a minority of cases (perhaps 10%).</p> <p>Regular screening with LBC or Pap smear, followed by colposcopy and therapeutic biopsy if positive for precancer, can theoretically prevent up to 90% of cases (screening test is not highly sensitive for adenocarcinomas, which make up about 10% of cases; also some interval squamous cancers cannot realistically be prevented).</p>	<p>Even for invasive cancer, surgical treatment along with radio and chemotherapy as required yields reasonable five-year relative survival rates except for late stage (metastatic) disease. <i>(so considered amenable, taking both screening and treatment into account)</i></p>
15	Neoplasms	Uterus			✓	<p>Control of BMI, reduction in oestrogen exposure, and addition of progestin in HRT (or avoidance of excessive duration of HRT) will prevent a substantial proportion of cases. Hysterectomy for benign disease (eg fibroids) obviously also prevents endometrial cancer. Use of tamoxifen is another modifiable risk factor.</p>	<p>Surgery, radio and chemotherapy yield reasonable five-year relative survival, depending on stage at presentation and age. <i>(so considered amenable)</i></p>
17	Neoplasms	Bladder			✓	<p>A high proportion of cases are associated with tobacco smoking. Occupational chemical exposure in the rubber, organic dye, metal refining, paint and petrochemical industries is another avoidable exposure. Other avoidable exposures are certain drugs (phenacetin, chlornaphazin, and chronic cyclophosphamide exposure), diets rich in meat and fat, and external beam radiation.</p>	<p>Treatment is moderately effective, with good five-year relative survival for early stage disease. <i>(so considered amenable)</i></p>

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	Group	Cause			avoidable mortality	amenable mortality
18	Neoplasms	Thyroid		✓	The only known environmental cause is radiation. Many cases seen today reflect therapeutic radiation exposure in the past, given the long latent period. There are some which are genetic/familial (approx. 5% of papillary carcinomas, and others are inherited as a component of familial adenomatous polyposis).	If detected at an early stage (ie as a solitary thyroid nodule), surgical resection followed by adjunctive radioiodine to ablate any remaining thyroid tissue (and lifelong maintenance on replacement thyroid hormone) is almost always curative. Treatment is less successful, but far from useless, at later stages. <i>(so considered amenable, since most cases present at early stage)</i>
19	Neoplasms	Hodgkin's disease		✓	Cause(s) unknown, so prevention not possible.	Highly responsive to chemotherapy with a very high cure rate. <i>(so considered amenable)</i>
20	Neoplasms	Lymphoid leukaemia – acute/ chronic		✓	Limiting exposure to radiation is a proven preventive measure. (Exposure to human or animal viruses suspected but not proven).	Childhood leukaemia is mainly ALL, which responds well to chemotherapy with good cure rates being achievable. Other types are less responsive to treatment, but also less common at younger ages. CLL usually affects adults, and generally has longer survival rates. <i>(so considered amenable)</i>
21	Neoplasms	Benign		✓	Tuberous sclerosis screening.	These cause mortality mainly by acting as space occupying lesions (especially intra-cranially). Almost all are treatable through surgical resection. <i>(so considered amenable)</i>
22	Nutritional, endocrine and metabolic conditions	Thyroid disorders		✓	Iodine deficiency is readily preventable eg through iodisation of table salt or injection of iodised oil depot.	Both hyper- and hypothyroidism are treatable with thyroid hormone replacement or appropriate medical or surgical treatment. <i>(so considered amenable)</i>

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23	Nutritional, endocrine and metabolic conditions	Diabetes mellitus		✓ (0.5)	Type 2 diabetes is largely preventable through control of body weight, healthy diet and physically active lifestyle. Type 1 is as yet unpreventable (many cases believed related to infection, but unproven), but symptoms can be controlled with insulin.	Tight control of blood glucose with insulin or oral hypoglycaemic drugs, and careful management of blood pressure and blood lipids has been proven to reduce micro and (to a lesser extent) macrovascular complications in both type 1 and type 2 disease. Gestational diabetes can be detected and managed, so avoiding poor reproductive outcomes. <i>(considered to reach 50%, rather than 80% threshold for amenability, so random half of cases considered amenable)</i>
24	Drug use disorders	Alcohol related disease			Preventable in theory by moderating alcohol use.	Dual diagnoses and complications eg nutritional deficiencies can be treated. <i>(but the contribution of health care insufficient for this cause to be defined as 'mostly' amenable – see Chapter 2, Methods)</i>
25	Drug use disorders	Illicit drug use disorders			As for alcohol.	Injecting drug use can be made safer through use of clean needles. <i>(but the contribution of health care insufficient for this cause to be defined as 'mostly' amenable – see Chapter 2, Methods)</i>
26	Neurological disorders	Epilepsy		✓	Causes of epilepsy can sometimes be prevented eg meningitis, birth trauma / hypoxia, head injury, alcohol use, drug and toxin exposure, stroke, some space occupying lesions.	Most cases relatively well controlled using appropriate medical therapy. <i>(so considered amenable)</i>
27	Cardiovascular diseases	Rheumatic and other valvular heart disease		✓	Prophylaxis with penicillin generally effective in preventing progression of rheumatic fever (itself largely preventable through effective antibiotic treatment of group A strep infections) to rheumatic heart disease. Poor standards of living especially overcrowding – high prevalence still in remote Aboriginal communities in northern Australia.	Mortality from valvular heart disease (rheumatic, congenital, other) largely preventable through timely and appropriate surgery. <i>(so considered amenable)</i>

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No.	Group	Condition Cause	Limits: Age, sex	Amenable to health care	Rationale for including in:	
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28	Cardiovascular diseases	Hypertensive heart disease		✓	Hypertension can often be prevented through salt restriction, healthy diet including adequate fruit & vegetables, control of body weight, sufficient physical activity, and moderation of alcohol use and environmental stress.	If not, and if no specific cause can be found (eg renal disease), most cases are controllable with antihypertensive drugs (if severity of hypertension or absolute five or ten year cardiovascular risk warrants their use). <i>(so considered amenable)</i>
29	Cardiovascular diseases	Ischaemic heart disease		✓ (0.5)	Atherosclerosis is largely preventable through diet (especially fatty acid intake, consumption of fruit & veg, fish, nuts), physical activity, control of body weight and control of diabetes and hypertension. Smoking, high blood pressure and stress are other major modifiable risk factors. It is estimated that at least 80% of cases are preventable. There is good evidence that moderate alcohol use is protective.	Medical treatment of established disease, including thrombolysis for acute myocardial infarction, can reduce mortality substantially. <i>(by about 50%, so random half of cases considered to be amenable)</i>
30	Cardiovascular diseases	Cerebrovascular diseases		✓ (0.5)	Major risk factor for haemorrhagic stroke is high blood pressure. Ischaemic stroke is a manifestation of atherosclerosis, so shares the same risk factors as ischaemic heart disease. Atrial fibrillation is another major modifiable risk factor.	At least 70% of strokes are preventable through primary prevention. Screening for risk factors such as hypertension and atrial fibrillation (with appropriate medical management), preventive carotid endarterectomy when indicated, appropriate use of thrombolysis, and effective management such as provided by dedicated stroke units, can reduce mortality significantly. <i>(by about 50%, so random half of cases considered to be amenable)</i>
31	Cardiovascular diseases	Aortic aneurysm			Abdominal aortic aneurysm is generally a manifestation of atherosclerosis and so shares the same risk and protective factors as ischaemic heart disease.	Recently, screening by ultrasound (followed by surgery) has been shown to be cost effective for middle aged males in European / North American populations. Once leakage or rupture occurs, surgery and intensive care still has some success if rapid transport to an appropriate hospital is possible <i>(but the contribution of health care insufficient for this cause to be defined as 'mostly' amenable – see Chapter 2, Methods)</i>

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			Age, sex	Amenable to health care	avoidable mortality	amenable mortality
32	Genitourinary disorders	Nephritis and nephrosis		✓	Some cases can be prevented eg glomerulonephritis resulting from group A streptococcus infection.	Effective medical management is available for most types. If renal failure supervenes, dialysis and transplantation are options. <i>(so considered amenable)</i>
33	Genitourinary disorders	Obstructive uropathy & prostatic hyperplasia		✓		Medical or (more generally) surgical removal of the obstruction is generally curative (eg benign prostatic hypertrophy, urinary calculus), assuming the underlying cause is benign. <i>(so considered amenable)</i>
34	Respiratory diseases	DVT with pulmonary embolism			If the cause of the embolus is DVT, this is theoretically partly preventable eg through avoidance of prolonged periods of immobility, exercise, use of elasticised stockings, and anticoagulation agents.	Treatment of pulmonary embolism can reduce case fatality substantially <i>(but the contribution of health care insufficient for this cause to be defined as 'mostly' amenable – see Chapter 2, Methods)</i>
35	Respiratory diseases	COPD	45-74 years		Almost all cases are related to tobacco smoking, so are theoretically preventable. Air pollution (sulphur dioxide (SO ₂) and particulate matter) also plays a role and is likewise theoretically preventable. COPD is also more prevalent in workers who engage in occupations exposing them to either inorganic or organic dusts or to noxious gases. Also some evidence that repeated acute respiratory illnesses in smokers, and severe viral pneumonia early in life may lead to chronic obstruction, predominantly in small airways.	Effective treatment can partly control symptoms and prolong survival, especially if detected early. Stopping smoking does not reverse the damage, but slows the rate of further deterioration in lung function. <i>(but the contribution of health care insufficient for this cause to be defined as 'mostly' amenable – see Chapter 2, Methods)</i>
36	Respiratory diseases	Asthma	0-44 years	✓	Asthma can often be controlled by avoiding allergens and other triggers.	Attacks can also be prevented using prophylactic drugs, or medically treated with generally good results. Mortality from asthma should be a rare event. <i>(so considered amenable)</i>
37	Digestive disorders	Peptic ulcer disease		✓	Cases related to infection with <i>Helicobacter pylori</i> are preventable (eg through control of overcrowding, poverty or antibiotic therapy).	Treatment of <i>H. pylori</i> and pharmacological control of gastric acid secretion (or sensitivity to acid) can effectively cure or control a high proportion of cases. <i>(so considered amenable)</i>

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38	Digestive disorders	Acute abdomen, appendicitis, intestinal obstruction, cholecystitis/ lithiasis, pancreatitis, hernia		✓		Medical or surgical management should be effective in a high proportion of cases, depending on the underlying cause, and factors such as age, timeliness of intervention, quality of care. <i>(so considered amenable)</i>
40	Digestive disorders	Chronic liver disease (excluding alcohol related disease)			A substantial proportion can be prevented by HBV immunisation and management of alcohol use.	Progression of several types of chronic liver disease can be halted or at least slowed by appropriate medical management. <i>(but the contribution of health care insufficient for this cause to be defined as 'mostly' amenable – see Chapter 2, Methods)</i>
41	Maternal & infant causes	Birth defects		✓	At least one third of neural tube defects can be prevented through folic acid supplementation and fortification. Other preventable strategies are immunisation against infections such as rubella, and pre-birth genetic screening.	Many life threatening birth defects can be surgically treated with good outcomes. <i>(so considered amenable)</i>
42	Maternal & infant causes	Complications of perinatal period		✓	Most are related to low birth weight resulting from premature delivery. Others reflect birth trauma / hypoxia. The birth weight distribution can be shifted by improving diet in pregnancy and avoiding exposure to tobacco smoke, alcohol, certain drugs and other toxins. Good obstetric care should minimise the risk of birth trauma / hypoxia.	Given the birth of a very low birth weight infant, neonatal intensive care can make a substantial difference to survival chances. <i>(taking both neonatal intensive care and obstetric care into account, and excluding very low birthweight infants, considered to be amenable)</i>
43	Unintentional injuries	Road traffic injuries			The major risk factors are speed (in excess of what the network will safely allow), drink driving and non-use of safety belts. All are theoretically responsive to engineering, enforcement and educational interventions (preferably in combination). In fact, by definition all injury deaths are potentially avoidable, although this may be unachievable in practice.	Significant advances in emergency retrieval and transport services, trauma and emergency medicine and surgical management have improved survival rates. <i>(but the contribution of health care insufficient for this cause to be defined as 'mostly' amenable – see Chapter 2, Methods)</i>

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44	Unintentional injuries	Falls			Most fatal falls involve toddlers, and frail elderly people. In the former case, child proofing home, childcare and other environments in which young children spend time, is highly effective (coupled with close parental or adult supervision, especially in the playground). For older people, the risk of falling can be reduced by checking medications, resistance training, wearing hip protector pads and environmental modification of the home.	Significant advances in emergency retrieval and transport services, trauma and emergency medicine and surgical management have improved survival rates. <i>(but the contribution of health care insufficient for this cause to be defined as 'mostly' amenable – see Chapter 2, Methods)</i>
45	Unintentional injuries	Fires, burns			Thermal injuries are in theory preventable by environmental modification eg domestic hot water temperature, domestic smoke alarms, short kettle cords, building design and many others. Smoking is a preventable risk factor.	If thermal injury occurs, specialist treatment is effective albeit often prolonged and painful unless the burns are very extensive. <i>(but the contribution of health care insufficient for this cause to be defined as 'mostly' amenable – see Chapter 2, Methods)</i>
46	Unintentional injuries	Accidental poisonings			Occupational legislation should prevent this in the workplace. In the home, most cases involve toddlers and environmental modifications like child safe closures for medicine and household chemical containers, use of safe storage (eg locked, high medicine cabinet) are highly effective.	If poisoning does occur, prompt advice from a poisons centre and appropriate medical care ensures a very low case fatality rate. <i>(but the contribution of health care insufficient for this cause to be defined as 'mostly' amenable – see Chapter 2, Methods)</i>
47	Unintentional injuries	Drownings			Recreational drownings account for about half of all immersion injury deaths, and are in theory preventable through environmental or behaviour modification eg swimming between the flags, wearing life jackets when boating. Non-recreational drowning (ie when the contact with the water body was unintentional) is also partly susceptible to environmental modification eg swimming pool fencing laws. Other drownings relate to transport safety and share similar risk factors discussed above for road safety – including having alcohol as an important risk factor.	Significant advances in resuscitation techniques, emergency retrieval and transport services, and emergency medical management have contributed to improved survival rates. <i>(but the contribution of health care insufficient for this cause to be defined as 'mostly' amenable – see Chapter 2, Methods)</i>

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48	Intentional injuries	Suicide and self inflicted injuries			At the individual level, many suicides (especially among youth and young adults) are associated with treatable factors such as an alcohol or drug problem, or with clinical depression and other serious mental illnesses. These can be effectively treated if youth health services and other community mental health services can overcome access barriers and provide effective counselling, support and other forms of social and medical assistance. At the population level, risk factors for youth suicide include youth unemployment, poverty, stress relating to romantic relationships or other aspects of socialisation (including social isolation, bullying) and concern about academic performance (perhaps related to job prospects). The evidence for effectiveness of services or policies in addressing these social determinants of suicide is less clear.	
49	Intentional injuries	Violence			Again, interpersonal violence is theoretically fully preventable by definition. In practice, however, a range of criminal justice, social and health care interventions may have some effectiveness. Alcohol & drug related interventions are very important. At a population level, however, some societies are clearly much more prone to violence than others. Policies that build social cohesion, promote employment, provide a safety net for those in most need (including access to adequate income and decent housing), foster gender and race equality, minimise harms from alcohol and drug use, and restrict access to handguns, are likely to experience lower levels of violence.	Significant advances in emergency retrieval and transport services, trauma and emergency medicine and surgical management have improved survival rates. <i>(but the contribution of health care insufficient for this cause to be defined as 'mostly' amenable – see Chapter 2, Methods)</i>

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