

APPENDIX 2: SEARCH STRATEGIES

Searches were performed by the World Health Organization information specialists, in collaboration with researchers with expertise in the field from the WHO *Initiative for Vaccine Research department*.

1 Embase and Medline (Elsevier www.embase.com interface)

Searched from 1966 to 27 November 2012

No age, human or year limits were applied

Details of the search strategy that was used are provided in Table 1

Table 1: Search strategy to identify studies in Embase

Searches	Results
'child'/exp OR 'child' OR 'children'/exp OR 'children' OR 'youth'/exp OR 'youth' OR youth* OR newborn* OR 'newborn'/exp OR 'newborn' OR 'new born' OR 'childhood disease'/exp OR 'childhood disease' OR 'baby'/exp OR 'baby' OR babies OR 'infant'/exp OR 'infant' OR infant* OR childhood* OR toddler* OR kid OR kids OR 'young patient' OR boy* OR girl* OR 'young age' OR pediater* OR paediatric* OR 'child death'/exp OR 'child death' OR 'child health'/exp OR 'child health' OR 'child care'/exp OR 'child care' OR 'childhood mortality'/exp OR 'childhood mortality' OR 'child hospitalization'/exp OR 'child hospitalization' OR 'pediatric hospital'/exp OR 'pediatric hospital' OR child*	3,751,199
'measles vaccine'/exp OR 'anti measles vaccin' OR 'attenuated live measles vaccine' OR 'attenuated live rubeola virus vaccine' OR 'attenuated measles vaccine' OR 'attenuvax' OR 'cam-kovac' OR 'diplovax' OR 'edmonston zagreb vaccine' OR 'fibroblast grown measles vaccine' OR 'formalin killed measles vaccine' OR 'hyperimmune measles serum' OR 'killed measles vaccine' OR 'killed measles virus vaccine' OR 'lirugen' OR 'lirugen measles' OR 'live attenuated measles vaccine' OR 'live attenuated measles vaccine moraten strain' OR 'live attenuated measles vaccine schwarz strain' OR 'live attenuated measles virus vaccine' OR 'live distemper vaccine' OR 'live distemper virus vaccine' OR 'live measles vaccine' OR 'live rubeola virus vaccine' OR 'm-vac' OR 'measle vaccine' OR 'measles killed vaccine' OR 'measles killed virus vaccine' OR 'measles live vaccine' OR 'measles vaccine, chick embryo fibroblast grown' OR 'measles vaccine, human diploid cell grown' OR 'measles vaccine, tween ether' OR 'measles virus vaccine' OR 'measles virus vaccine live' OR 'mevulin-l' OR 'morbilli vaccine' OR 'morbilvax' OR 'rimevax' OR 'rouvax' OR 'rubeola vaccine' OR 'rubeovax' OR 'tween ether measles vaccine' OR 'vaccine, measles' OR 'vaccine, rubeola' OR 'jeryl lynn moraten vaccine' OR 'mm vax' OR 'mmvax' OR 'mumps measles vaccine' OR 'rimparix' OR 'urabe am 9 rimparix' OR 'urabe am 9 schwarz vaccine' OR 'chickenpox measles mumps rubella vaccine'/exp OR 'measles mumps rubella varicella vaccine' OR 'measles plus mumps plus rubella plus varicella vaccine live' OR 'proquad'	9,439
'BCG vaccine'/exp OR 'antituberculosis vaccine' OR 'b.c.g.' OR 'b.c.g. vaccine' OR 'bacillus Calmette Guerin' OR 'bacillus calmette guerin vaccine' OR 'BCG' OR 'bcg cell wall vaccine' OR 'bcg copenhagen 1331' OR 'BCG live' OR 'bcg test' OR 'calgevax' OR 'calmette guerin bacillus' OR 'calmette vaccine' OR 'calmette s vaccine' OR 'calmettes vaccine' OR 'immucyst' OR 'immun bcg pasteur' OR 'monovax' OR 'mva 85a' OR 'mva85a' OR 'mycobacterium bcg' OR 'mycobax' OR 'onco tice' OR 'oncotic' OR 'paxis' OR 'pastimmun' OR 'theracys intravesical' OR 'tice bcg' OR 'tice bcg vaccine' OR 'ticebcg' OR 'tubercle bacilli vaccine' OR 'tuberculosis vaccine' OR 'tuberculosis vaccines'	39,365
'diphtheria pertussis tetanus vaccine'/exp OR 'absorbed pertussis diphtheria tetanus vaccine' OR 'acel immune' OR 'acel imune' OR 'acelluvax dpt' OR 'acelluvax DTP' OR 'adacel' OR 'adsorbed dt coq' OR 'anatoxal di te per berna' OR 'boostrix' OR 'certiva' OR 'covaxis' OR 'd.t. coq' OR 'daptacel' OR 'dif per tet all' OR 'diphtheria-tetanus-acellular pertussis vaccines' OR 'diphtheria-tetanus-pertussis vaccine' OR 'diphtheria plus pertussis	11,728

Searches	Results
plus tetanus' OR 'diphtheria tetanus acellular pertussis vaccines' OR 'diphtheria tetanus pertussis trivaccine' OR 'diphtheria tetanus pertussis vaccine' OR 'diphtheria tetanus whooping cough vaccine' OR 'diteper anatoxal berna vaccine' OR 'dpt' OR 'DPT vaccine' OR 'DTAP vaccine' OR 'DTP vaccine' OR 'infanrix' OR 'neodiftepertus' OR 'p.d.t. vax purified' OR 'pertugen' OR 'pertussis diphtheria tetanus vaccine' OR 'tetanus diphtheria pertussis vaccine' OR 'tri immunol' OR 'triacelluvax' OR 'triauxis' OR 'tripacel' OR 'tripedia' OR 'triplo vaccine' OR 'tripvac' OR 'tritanrix' OR 'trivax' OR 'vaccine, pertussis diphtheria tetanus' OR 'DTP vaccine' OR 'Infanrix'	
'sex difference'/exp OR 'sex differences' OR 'dimorphism, sex' OR 'factor, sex' OR 'gender difference' OR 'gender differences' OR 'sex dimorphism' OR 'sex factor' OR 'sex factors' OR 'sexual difference' OR 'sexual dimorphism' OR 'sexual size dimorphism' OR 'evolution, sex' OR 'sex characteristics' OR 'sex development' OR 'sex evolution' OR 'advanced puberty' OR 'pseudopuberty' OR 'pubescence' OR 'sex differentiation'/exp OR 'sex related factors' OR 'sex related factor' OR 'sexual development'/exp OR 'male'/exp AND 'female'/exp AND 'gender'/exp OR 'boy'/exp AND 'girl'/exp AND 'gender'/exp	3,668
Activins OR 'cytokine'/exp OR activin OR 'adipocytokines' OR 'adipokine' OR 'adipokines' OR 'adipose tissue derived cytokine' OR 'Acrp 30' OR 'Acrp30' OR 'adipocyte complement related protein 30' OR 'adipocyte most abundant protein 1' OR 'adipoq' OR 'APM 1' OR 'APM1' OR 'GBP 28' OR 'GBP28' OR 'gelatin binding protein 28' OR 'AIF 1' OR 'AIF1' OR 'cytokine AIF 1' OR 'cytokine AIF1' OR 'daintain' OR 'a proliferation inducing ligand' OR 'a proliferation inducing ligand protein' OR 'antigen CD256' OR 'CD256 antigen' OR 'protein APRIL' OR 'protein TALL2' OR 'protein TNFSF 13' OR 'protein TNFSF13' OR 'TALL 2 protein' OR 'TALL2 protein' OR 'TNF and ApoL related leukocyte expressed ligand 2' OR 'TNF related death ligand 1' OR 'TNFSF 13 protein' OR 'TNFSF13 protein' OR 'tumor necrosis factor and apolipoprotein related leukocyte expressed ligand 2' OR 'tumor necrosis factor ligand superfamily member 13' OR 'tumor necrosis factor related death ligand 1' OR 'tumor necrosis factor SF13' OR 'tumor necrosis factor superfamily member 13' OR 'B lymphocyte activating factor [134-285]' OR 'B lymphocyte stimulator [134-285]' OR 'ATX protein' OR 'ectonucleotide pyrophosphatase phosphodiesterase 2' OR 'ENPP2 protein' OR 'PDNP2 protein' OR 'protein ATX' OR 'protein ENPP2' OR 'protein PDNP2' OR 'antigen CD257' OR 'B-cell activating factor' OR 'B cell activation factor' OR 'B lymphocyte activating factor' OR 'B lymphocyte stimulator' OR 'B lymphocyte stimulator protein' OR 'BAFF' OR 'BLyS protein' OR 'CD257 antigen' OR 'protein BLyS' OR 'protein TALL 1' OR 'protein TALL1' OR 'protein TNFSF13B' OR 'TALL 1 protein' OR 'TALL1 protein' OR 'TNF and ApoL related leukocyte expressed ligand 1' OR 'TNFSF13B protein' OR 'tumor necrosis factor and apolipoprotein related leukocyte expressed ligand 1' OR 'tumor necrosis factor ligand superfamily member 13B' OR 'B cell differentiation factor' OR 'bcdF' OR 'B cell growth factor' OR 'bcgF' OR 'growth factor, b cell' OR 'bone morphogenetic proteins' OR 'bone morphogenic protein' OR 'BMP 12' OR 'BMP12' OR 'cartilage derived morphogenetic protein 3' OR 'CDMP 3' OR 'CDMP3' OR 'GDF 7' OR 'GDF7' OR 'growth and differentiation factor 7' OR 'growth differentiation factor 7' OR 'BMP 15' OR 'BMP15' OR 'GDF 9B' OR 'GDF9B' OR 'growth and differentiation factor 9B' OR 'growth differentiation factor 9B' OR 'BMP 2' OR 'BMP2' OR 'BMP 4' OR 'BMP4' OR 'BMP 5' OR 'BMP5' OR 'BMP 6' OR 'BMP6' OR 'BMP 9' OR 'BMP9' OR 'GDF 2' OR 'GDF2' OR 'growth and differentiation factor 2' OR 'growth differentiation factor 2' OR '4-1BB ligand' OR '4 1BB ligand' OR '4 1BBL protein' OR 'CD137L' OR 'ligand 4 1BB' OR 'protein 4 1BBL' OR 'antigen CD153' OR 'CD153 antigen' OR 'CD153 antigens' OR 'CD30L' OR 'protein TNFSF 8' OR 'protein TNFSF8' OR 'TNFSF 8 protein' OR 'TNFSF8 protein' OR 'tumor necrosis factor ligand superfamily member 8' OR 'tumor necrosis factor superfamily member 8' OR 'antigen CD154' OR 'CD154 antigen' OR 'CD40L' OR 'CD40L antigen' OR 'protein TNFSF 5' OR 'protein TNFSF5' OR 'TNFSF 5 protein' OR 'TNFSF5 protein' OR 'tumor necrosis factor ligand superfamily member 5' OR 'tumor necrosis factor superfamily member 5' OR 'antigen cd70' OR 'antigens, CD70' OR 'CD27 ligand' OR 'CD27L' OR 'CD70 antigens' OR 'colony-stimulating factors' OR 'colony stimulating activity' OR 'colony stimulating factors' OR 'fibroblast derived differentiation inducing factor' OR 'ectodermal dysplasia protein' OR 'ectodysplasin 1' OR 'ectodysplasins' OR 'EDA A protein' OR 'EDA protein' OR 'protein EDA' OR 'protein EDA A' OR 'am 424' OR 'am424' OR 'recombinant human leukemia inhibitory factor' OR 'recombinant leukemia inhibitory factor' OR 'EMAP II' OR 'endothelial monocyte activating	1,387,342

polypeptide 2' OR 'antigen CD178' OR 'CD178 antigen' OR 'CD95 ligand' OR 'CD95L' OR 'CD95L protein' OR 'Fas antigen ligand' OR 'Fas ligand protein' OR 'FasL protein' OR 'protein CD95L' OR 'protein FasL' OR 'protein TNFSF 6' OR 'protein TNFSF6' OR 'TNF superfamily member 6' OR 'TNFSF 6 protein' OR 'TNFSF6 protein' OR 'tumor necrosis factor ligand superfamily member 6' OR 'fibroblast growth factors' OR 'fibroblast stimulating factor' OR 'heparin binding growth factor' OR 'fgf 1' OR 'FGF1' OR 'fgf 10' OR 'FGF10' OR 'fgf 14' OR 'FGF14' OR 'fgf 16' OR 'FGF16' OR 'fgf 18' OR 'FGF18' OR 'fgf 19' OR 'FGF19' OR 'fgf2' OR 'FGF 2' OR 'fgf21' OR 'FGF 21' OR 'fgf23' OR 'FGF 23' OR 'fgf3' OR 'FGF 3' OR 'fgf4' OR 'FGF 4' OR 'fgf5' OR 'FGF 5' OR 'fgf6' OR 'FGF 6' OR 'fgf8' OR 'FGF 8' OR 'fgf9' OR 'FGF 9' OR 'interleukin' OR 'interleukins' OR 'il 1' OR 'il 2' OR 'il 4' OR 'il 5' OR 'il 6' OR 'il 9' OR 'il 10' OR 'il 12' OR 'il 13' OR 'il 17' OR 'il 23' OR 'interferon' OR 'helper cell type 1' OR 'T helper 1' OR 'T helper type 1' OR 'Th1 cells' OR 'helper cell type 2' OR 'T helper 2' OR 'T helper type 2' OR 'Th2 cells' OR 'helper cell'/exp OR 't helper' OR 'B lymphocyte'/exp OR 'B-lymphocyte subsets' OR 'B-lymphocytes' OR 'b-lymphocytes, regulatory' OR 'B cell' OR 'bone marrow derived lymphocyte' OR 'bone marrow lymphocyte' OR 'bursa derived lymphocyte' OR 'lymphocyte, b' OR 'lymphocyte, bone marrow derived' OR 'lymphocyte, bursa derived' OR 'regulatory B lymphocyte' OR 'antibody-producing cells' OR 'antibody forming cell' OR 'antibody producing cell' OR 'immunoglobulin forming cell' OR 'B memory cell' OR 'B memory cells' OR 'B memory lymphocyte' OR 'B memory lymphocytes' OR 'memory B cell' OR 'memory B cells' OR 'memory B lymphocyte' OR 'memory B lymphocytes' OR 'cell, plasma' OR 'flamed plasma cell' OR 'flamed plasmacell' OR 'plasma cells' OR 'plasmacyte' OR 'plasmacyte' OR 'plasmacyte' OR 'plasmacyte, flamed' OR 'B cell precursor' OR 'B cell precursors' OR 'B cell progenitor' OR 'B cell progenitors' OR 'B lineage precursor' OR 'B lineage precursors' OR 'B lineage progenitor' OR 'B lineage progenitors' OR 'B lymphocyte precursor' OR 'B lymphocyte progenitor' OR 'B lymphocyte progenitors' OR 'B lymphoid precursor cell' OR 'B lymphoid precursor cells' OR 'B lymphoid progenitor' OR 'B lymphoid progenitors' OR 'B precursor' OR 'B precursors' OR 'B progenitor' OR 'B progenitors' OR 'cell, pre B' OR 'immature B cell' OR 'immature B cells' OR 'pre B cell' OR 'pre B cells' OR 'precursor B cell' OR 'precursor B cells' OR 'precursor B lymphocyte' OR 'precursor B lymphocytes' OR 'precursor cells, B-lymphoid' OR 'precursor cells, B lymphoid' OR 'pro-B cell' OR 'pro-B cells' OR 'progenitor B cell' OR 'progenitor B cells' OR 'transitional B cell' OR 'transitional B cells' OR "tumor necrosis factor receptor 1"/exp OR "tumor necrosis factor receptor 1" OR "CD120a antigen" OR "receptors, tumor necrosis factor, type I" OR "tumor necrosis factor receptor type 1" OR "tumor necrosis factor receptor type I" OR 'dendritic cell'/exp OR 'dendritic cells' OR 'dendritic cell' OR 'langerhans cell' OR 'langerhans cells' OR 'T lymphocyte'/exp OR 'amplifier t lymphocyte' OR 'lymphocyte, thymus' OR 'T-lymphocytes' OR 't-lymphocytes, suppressor-inducer' OR 'T cell' OR 'T cells' OR 'thymic lymphocyte' OR 'thymus dependant lymphocyte' OR 'thymus dependent cell' OR 'thymus dependent lymphocyte' OR 'thymus derived cell' OR 'thymus derived lymphocyte' OR 'thymus lymphocyte'

'retinol'/exp OR '3, 7 dimethyl 9 (2, 6, 6 trimethyl 1 cyclohexen 1 yl) 2, 4, 6, 8 nonatetraen 1 ol' OR '3, 7 dimethyl 9 (2, 6, 6 trimethyl 1 cyclohexenyl) 2, 4, 6, 8 nonatetraen 1 ol' OR 'a 313' OR 'a fil' OR 'a mulsal' OR 'a mulsin' OR 'a mulsine' OR 'a sol' OR 'a vi pel' OR 'a vit' OR 'a vitadit' OR 'a vitamin' OR 'a vitan' OR 'a313' OR 'acon' OR 'acrisina' OR 'acrisine' OR 'actifral a' OR 'adatone' OR 'afaxin' OR 'afaxine' OR 'afilina' OR 'afiline' OR 'agiolan' OR 'alcovit a' OR 'alfa monovite' OR 'alfa sir' OR 'alfaergin' OR 'alfaergine' OR 'alfamin' OR 'alfamine' OR 'alfamonovit' OR 'alfasir' OR 'alfasole' OR 'alfasterolo' OR 'alfatar' OR 'alfavena' OR 'alfavene' OR 'alfavitina' OR 'alfavitine' OR 'alfene' OR 'all trans retinol' OR 'alphalin' OR 'alphaline' OR 'alphasterol' OR 'amulsal' OR 'amulsin' OR 'amulsine' OR 'amulvit' OR 'anatola' OR 'anatole' OR 'anavit' OR 'anti infective vitamin' OR 'antixerophthalmic vitamin' OR 'aoral' OR 'apexol' OR 'apostavit' OR 'aquasol a' OR 'arcavit A' OR 'asol' OR 'asteril' OR 'atav' OR 'aterapion' OR 'avibon' OR 'avibon theraplix' OR 'avimin' OR 'avimine' OR 'avipel' OR 'avipur' OR 'avit' OR 'avitabiol' OR 'avitadit' OR 'avital' OR 'avitaminum kolin' OR 'avitan' OR 'avitana' OR 'avitane' OR 'avite' OR 'avital' OR 'avitina' OR 'avitol' OR 'avogina' OR 'avogine' OR 'avoleum' OR 'axerodina' OR 'axerodine' OR 'axerol' OR 'axerophthol' OR 'axerophthylum' OR 'bentavit a' OR 'bentavite a' OR 'bio tan' OR 'biosterol' OR 'biotan' OR 'chivibit a' OR 'cytobiase' OR 'dagravit a' OR 'davitamona' OR 'difitamin a' OR 'dohyfral a' OR 'elageno a' OR 'endo a' OR 'envit a' OR 'epiteliol' OR

56,112

	Searches	Results
	' evitol zambeletti' OR ' fletase' OR ' gadeol' OR ' gadol' OR ' halivitan' OR ' halivitane' OR ' homagenets aoral' OR ' hydrosol' OR ' ido a' OR ' ido a 50' OR ' idratene' OR ' inovitan a' OR ' lord factor' OR ' meditalfa' OR ' mulsal a' OR ' multamine' OR ' nio a let' OR ' oleovit a' OR ' oleovitamin a' OR ' ophthalmalin' OR ' panvita' OR ' plivit a' OR ' prepalin' OR ' prepaline' OR ' preparato a' OR ' primavit' OR ' quotivit' OR ' retinol alcohol' OR ' retinyl alcohol' OR ' ro-a-vit' OR ' ro a vit' OR ' super a' OR ' testavol' OR ' ucemine a' OR ' vaconex' OR ' vaflo' OR ' veroftal' OR ' vi alpha' OR ' vi dom a' OR ' viadenin' OR ' vialpha' OR ' viatate' OR ' vidoma' OR ' vitadone' OR ' vitadral' OR ' vitalen a' OR ' vitalfa' OR ' vitama' OR ' vitamin A' OR ' vitamin a alcohol' OR ' vitamin ai' OR ' vitaplex a' OR ' vitapur a' OR ' vitasan a' OR ' vitavel a' OR ' vitpex' OR ' vogan' OR ' vogan neu' OR ' wandervit a' OR ' xerophthol' OR 'vitamin A'	
	Death OR deaths OR died OR mortality OR 'mortality'/exp OR mortalities OR fatal OR dying OR deceased OR "life threatening" OR "severe reaction" OR ICU OR "intensive care" OR emergency OR urgent OR fatalities OR casualty OR casualties OR lethality OR necrosis OR heterologous OR 'non specific' OR nonspecific OR 'non-specific'	3,369,761
	'tetanus toxoid'/exp OR 'anatetall' OR 'anatoxal tetanica berna' OR 'anti tetanus toxoid' OR 'antitetanus toxoid' OR 'antitetanus vaccine' OR 'clostet' OR 'plain tetanus vaccine' OR 'tanrix' OR 'te anatoxal' OR 'te anatoxal berna' OR 'tet-tox' OR 'tetanol' OR 'tetanus anatoxin' OR 'tetanus toxoid fluid' OR 'tetanus toxoid vaccine' OR 'tetanus vaccine' OR 'tetatox' OR 'tetatoxoid' OR 'tetavax' OR 'tetanus toxoid' OR '57425-69-1' OR '93384-51-1'	18,380
o	'pertussis vaccine'/exp OR 'acellular pertussis vaccine' OR 'acelluvax' OR 'bordetella pertussis vaccin' OR 'Bordetella pertussis vaccine' OR 'jnih 6' OR 'pertussis acellular vaccine' OR 'pertussis vaccin' OR 'pertuvac' OR 'whooping cough vaccine'	7,746
1	Step 1 AND Step 3 AND Step 5	225
2	Step 1 AND Step 3 AND Step 8	
3	Step 1 AND Step 2 AND Step 7	100
4	Step 1 AND Step 4 AND Step 5	167
5	Step 1 AND Step 4 AND Step 8	896
6	Step 1 AND Step 4 AND Step 7	137
7	Step 1 AND Step 4 AND Step 6	2536
8	Step 1 AND Step 2 AND Step 5	210
9	Step 1 AND Step 2 AND Step 8	1751
o	Step 1 AND Step 4 AND Step 8	1823
1	Step 1 AND Step 4 AND Step 7	206
2	Step 4 AND Step 6	1268

	Searches	Results
3	Step 10 AND Step 6	95
4	Step 9 AND Step 6 NOT (Animal/exp NOT Human/exp)	2,811
5	Step 3 AND Step 6 NOT ((Animal/exp NOT Human/exp)) NOT neoplasm/exp	4,855

2 Global Index Medicus (www.globalhealthlibrary.net)

Searched on 11 March 2013

No age, human or year limits were applied

The Global Index Medicus provides worldwide access to biomedical and public health literature produced by and within low- and middle- income countries. The databases searched through the Global Index Medicus were: African Index Medicus (AIM, 1964-2013), Latin American and Caribbean Health Sciences (LILACs, 1980-2013), African Index Medicus, Eastern Mediterranean Index Medicus (IMEAR, 1966-2013), South-East Asia (IMSEAR 1947-2013), Western Pacific (WPRIM, 1964-2013). Details of the search strategy that was used are provided in Table 2.

Table 2: Search strategy for the Global Index Medicus

#	Searches	Results
1	((child) OR (child) OR (children) OR (children) OR (youth) OR (youth) OR youth* OR newborn* OR (newborn) OR (newborn) OR (new born) OR (childhood disease) OR (childhood disease) OR (baby) OR (baby) OR babies OR (infant) OR (infant) OR infant* OR childhood* OR toddler* OR kid OR kids OR (young patient) OR boy* OR girl* OR (young age) OR pediater* OR paediatric* OR (child death) OR (child death) OR (child health) OR (child health) OR (child care) OR (child care) OR (childhood mortality) OR (childhood mortality) OR (child hospitalization) OR (child hospitalization) OR (pediatric hospital) OR (pediatric hospital) OR child*)	3,751,199
2	((measles vaccine) OR (anti measles vaccin) OR (attenuated live measles vaccine) OR (attenuated live rubeola virus vaccine) OR (attenuated measles vaccine) OR (attenuvax) OR (cam kovac) OR (diplovax) OR (edmonston zagreb vaccine) OR (fibroblast grown measles vaccine) OR (formalin killed measles vaccine) OR (hyperimmune measles serum) OR (killed measles vaccine) OR (killed measles virus vaccine) OR (lirugen) OR (lirugen measles) OR (live attenuated measles vaccine) OR (live attenuated measles vaccine moraten strain) OR (live attenuated measles vaccine schwarz strain) OR (live attenuated measles virus vaccine) OR (live distemper vaccine) OR (live distemper virus vaccine) OR (live measles vaccine) OR (live rubeola virus vaccine) OR (m vac) OR (measle vaccine) OR (measles killed vaccine) OR (measles killed virus vaccine) OR (measles live vaccine) OR (measles virus vaccine) OR (measles virus vaccine live) OR (meviline 1) OR (morbili vaccine) OR (morbilvax) OR (rimevax) OR (rouvax) OR (rubeola vaccine) OR (rubeovax) OR (tween ether measles vaccine) OR (jeryl lynn moraten vaccine) OR (mm vax) OR (mmvax) OR (rimparix) OR (urabe am 9 rimparix) OR (urabe am 9 schwarz vaccine) OR (chickenpox measles mumps rubella vaccine) OR (measles mumps rubella varicella vaccine) OR (measles plus mumps plus rubella plus varicella vaccine live) OR (proquad))	9,439
3	((BCG) OR (antituberculosis vaccine) OR Calmette OR Guérin OR (copenhagen 1331) OR (BCG live) OR calgevax OR calmettes OR immucyst OR monovax OR mva OR 85a OR mva85a OR mycobax OR onco OR tice OR oncotic)	39,365

#	Searches	Results
	OR pacis OR pastimmun OR (theracys intravesical) OR (ticebcg) OR (tubercle bacilli vaccine) OR (tuberculosis vaccine) OR (tuberculosis vaccines))	
4	((tetanus vaccine) OR (acel immune) OR (acel imune) OR (acelluvax dpt) OR (adacel) OR (adsorbed dt coq) OR (anatoxal di te per berna) OR boostrix OR certiva OR covaxis OR daptacel OR (dif per tet all) OR (pertussis vaccines) OR (diphtheria plus pertussis plus tetanus) OR (diphtheria tetanus acellular pertussis vaccines) OR (diphtheria tetanus pertussis trivaccine) OR (diphtheria tetanus pertussis vaccine) OR (diphtheria tetanus whooping cough vaccine) OR (diteper anatoxal berna vaccine) OR dpt OR (DPT vaccine) OR (DTAP vaccine) OR (DTP vaccine) OR infanrix OR neodiftepertus OR (vax purified) OR pertugen OR (pertussis diphtheria tetanus vaccine) OR (tetanus diphtheria pertussis vaccine) OR (tri immunol) OR triacelluvax OR triaxis OR tripacel OR tripedia OR (triplo vaccine) OR tripvac OR tritanrix OR trivax OR (DTP vaccine) OR <i>Infanrix</i>)	11,728
5	((sex difference) OR (sex differences) OR (dimorphism) OR (gender difference) OR (gender differences) OR (sex dimorphism) OR (sex factor) OR (sex factors) OR (sexual difference) OR (sexual dimorphism) OR (sexual size dimorphism) OR (sex characteristics) OR (sex development) OR (sex evolution) OR (advanced puberty) OR (pseudopuberty) OR (pubescence) OR (sex differentiation) OR (sex related factors) OR (sex related factor) OR (sexual development) OR (male AND female AND gender) OR (boy AND girl AND gender))	3,668
6	(Activins OR (cytokine) OR activin OR (adipocytokines) OR (adipokine) OR (adipokines) OR (adipose tissue derived cytokine) OR (Acrp 30) OR (Acrp30) OR (adipocyte complement related protein 30) OR (adipocyte most abundant protein 1) OR (adipoq) OR (APM 1) OR (APMi) OR (GBP 28) OR (GBP28) OR (gelatin binding protein 28) OR (AIF 1) OR (AIF1) OR (cytokine AIF 1) OR (cytokine AIF1) OR (daintain) OR (antigen CD256) OR (CD256 antigen) OR (protein APRIL) OR (protein TALL2) OR (protein TNFSF 13) OR (protein TNFSF13) OR (TALL 2 protein) OR (TALL2 protein) OR (TNF and ApoL related leukocyte expressed ligand 2) OR (TNF related death ligand 1) OR (TNFSF 13 protein) OR (TNFSF13 protein) OR (tumor necrosis factor and apolipoprotein related leukocyte expressed ligand 2) OR (tumor necrosis factor ligand superfamily member 13) OR (tumor necrosis factor related death ligand 1) OR (tumor necrosis factor SF13) OR (tumor necrosis factor superfamily member 13) OR (B lymphocyte activating factor) OR (ATX protein) OR (ectonucleotide pyrophosphatase phosphodiesterase 2) OR (ENPP2 protein) OR (PDNP2 protein) OR (protein ATX) OR (protein ENPP2) OR (protein PDNP2) OR (antigen CD257) OR (B-cell activating factor) OR (B cell activation factor) OR (B lymphocyte activating factor) OR (B lymphocyte stimulator) OR (B lymphocyte stimulator protein) OR (BAFF) OR (BLyS protein) OR (CD257 antigen) OR (protein BLyS) OR (protein TALL 1) OR (protein TALL1) OR (protein TNFSF13B) OR (TALL 1 protein) OR (TALL1 protein) OR (TNF and ApoL related leukocyte expressed ligand 1) OR (TNFSF13B protein) OR (tumor necrosis factor and apolipoprotein related leukocyte expressed ligand 1) OR (tumor necrosis factor ligand superfamily member 13B) OR (B cell differentiation factor) OR (bcdf) OR (B cell growth factor) OR (bcgf) OR (bone morphogenetic proteins) OR (bone morphogenic protein) OR (BMP 12) OR (BMP12) OR (cartilage derived morphogenetic protein 3) OR (CDMP 3) OR (CDMP3) OR (GDF 7) OR (GDF7) OR (growth and differentiation factor 7) OR (growth differentiation factor 7) OR (BMP 15) OR (BMP15) OR (GDF 9B) OR (GDF9B) OR (growth and differentiation factor 9B) OR (growth differentiation factor 9B) OR (BMP 2) OR (BMP2) OR (BMP 4) OR (BMP4) OR (BMP 5) OR (BMP5) OR (BMP 6) OR (BMP6) OR (BMP 9) OR (BMP9) OR (GDF 2) OR (GDF2) OR (growth and differentiation factor 2) OR (growth differentiation factor 2) OR (4-1BB ligand) OR (4 1BB ligand) OR (4 1BBL protein) OR (CD137L) OR (ligand 4 1BB) OR (protein 4 1BBL) OR (antigen CD153) OR (CD153 antigen) OR (CD153 antigens) OR (CD30L) OR	1,387,342

#	Searches	Results
	<p>(protein TNFSF 8) OR (protein TNFSF8) OR (TNFSF 8 protein) OR (TNFSF8 protein) OR (tumor necrosis factor ligand superfamily member 8) OR (tumor necrosis factor superfamily member 8) OR (antigen CD154) OR (CD154 antigen) OR (CD40L) OR (CD40L antigen) OR (protein TNFSF 5) OR (protein TNFSF5) OR (TNFSF 5 protein) OR (TNFSF5 protein) OR (tumor necrosis factor ligand superfamily member 5) OR (tumor necrosis factor superfamily member 5) OR (antigen cd70) OR (CD70) OR (CD27 ligand) OR (CD27L) OR (CD70 antigens) OR (colony-stimulating factors) OR (colony stimulating activity) OR (colony stimulating factors) OR (fibroblast derived differentiation inducing factor) OR (ectodermal dysplasia protein) OR (ectodysplasin 1) OR (ectodysplasins) OR (EDA A protein) OR (EDA protein) OR (protein EDA) OR (protein EDA A) OR (am 424) OR (am424) OR (recombinant human leukemia inhibitory factor) OR (recombinant leukemia inhibitory factor) OR (EMAP II) OR (endothelial monocyte activating polypeptide 2) OR (antigen CD178) OR (CD178 antigen) OR (CD95 ligand) OR (CD95L) OR (CD95L protein) OR (Fas antigen ligand) OR (Fas ligand protein) OR (FasL protein) OR (protein CD95L) OR (protein FasL) OR (protein TNFSF 6) OR (protein TNFSF6) OR (TNF superfamily member 6) OR (TNFSF 6 protein) OR (TNFSF6 protein) OR (tumor necrosis factor ligand superfamily member 6) OR (fibroblast growth factors) OR (fibroblast stimulating factor) OR (heparin binding growth factor) OR (fgf 1) OR (FGF1) OR (fgf 10) OR (FGF10) OR (fgf 14) OR (FGF14) OR (fgf 16) OR (FGF16) OR (fgf 18) OR (FGF18) OR (fgf 19) OR (FGF19) OR (fgf2) OR (FGF 2) OR (fgf21) OR (FGF 21) OR (fgf23) OR (FGF 23) OR (fgf3) OR (FGF 3) OR (fgf4) OR (FGF 4) OR (fgf5) OR (FGF 5) OR (fgf6) OR (FGF 6) OR (fgf8) OR (FGF 8) OR (fgf9) OR (FGF 9) OR (interleukin) OR (interleukins) OR (il 1) OR (il 2) OR (il 4) OR (il 5) OR (il 6) OR (il 9) OR (il 10) OR (il 12) OR (il 13) OR (il 17) OR (il 23) OR (interferon) OR (helper cell type 1) OR (T helper 1) OR (T helper type 1) OR (Th1 cells) OR (helper cell type 2) OR (T helper 2) OR (T helper type 2) OR (Th2 cells) OR (helper cell) OR (t helper) OR (B lymphocyte) OR (B-lymphocyte subsets) OR (B-lymphocytes) OR (lymphocyte) OR (antibody-producing cells) OR (antibody forming cell) OR (antibody producing cell) OR (immunoglobulin forming cell) OR (B memory cell) OR (B memory cells) OR (B memory lymphocyte) OR (B memory lymphocytes) OR (memory B cell) OR (memory B cells) OR (memory B lymphocyte) OR (memory B lymphocytes) OR (flamed plasma cell) OR (flamed plasmacell) OR (plasma cells) OR (plasmacyte) OR (plasmatocyte) OR (plasmocyte) OR (B cell precursor) OR (B cell precursors) OR (B cell progenitor) OR (B cell progenitors) OR (B lineage precursor) OR (B lineage precursors) OR (B lineage progenitor) OR (B lineage progenitors) OR (B lymphocyte precursor) OR (B lymphocyte progenitor) OR (B lymphocyte progenitors) OR (B lymphoid precursor cell) OR (B lymphoid precursor cells) OR (B lymphoid progenitor) OR (B lymphoid progenitors) OR (B precursor) OR (B precursors) OR (B progenitor) OR (B progenitors) OR OR (immature B cell) OR (immature B cells) OR (pre B cell) OR (pre B cells) OR (precursor B cell) OR (precursor B cells) OR (precursor B lymphocyte) OR (precursor B lymphocytes) OR (pro-B cell) OR (pro-B cells) OR (progenitor B cell) OR (progenitor B cells) OR (transitional B cell) OR (transitional B cells) OR (tumor necrosis factor receptor 1) OR (tumor necrosis factor receptor 1) OR (CD120a antigen) OR (dendritic cells) OR (dendritic cell) OR (langerhans cell) OR (langerhans cells) OR (T lymphocyte) OR (amplifier t lymphocyte) OR (T-lymphocytes) OR (T cell) OR (T cells) OR (thymic lymphocyte) OR (thymus dependant lymphocyte) OR (thymus dependent cell) OR (thymus dependent lymphocyte) OR (thymus derived cell) OR (thymus derived lymphocyte) OR (thymus lymphocyte))</p>	
7	<p>(retinol OR dimethyl OR trimethyl OR cyclohexen OR nonatetraen OR cyclohexenyl OR (nonatetraen) OR (a 313) OR (a fil) OR (a mulsal) OR (a mulsin) OR (a mulsine) OR (a sol) OR (a vi pel) OR (a vit) OR (a vitadit) OR (a vitamin) OR (a vitan) OR a313 OR acon OR acrisina OR (acrisine) OR (actifral a) OR adatone OR afaxin OR afaxine OR afilina</p>	<p>56,112</p>

#	Searches	Results
	OR afline OR agiolan OR (alcovit a) OR (alfa monovite) OR (alfa sir) OR alfaergin OR alfaergine OR alfamin OR alfarmine OR alfamonovit OR alfasir OR alfasole OR alfasterolo OR alfatar OR alfavena OR alfavene OR alfavitina OR alfavitine OR alfe ne OR alphalin OR alphaline OR alphasterol OR amulsal OR amuls OR amulsine OR amulvit OR anatola OR anatole OR anavit OR (anti infective vitamin) OR (anti xerophthalmic vitamin) OR aoral OR apexol OR apostavit OR (aqua sol a) OR (arca vit A) OR asol OR asteril OR atav OR aterapion OR avibon OR avibon theraplix O R avimin OR (avimine) OR avipel OR avipur OR avit OR avitabiol OR (avitadit) O R avital OR (avitaminum kolin) OR avitan OR avitana OR avitane OR avite OR avi til OR avitina OR avitol OR avogina OR avogine OR avoleum OR axerodina OR ax erodine OR axerol OR (axerophthol) OR axerophthylum OR (bentavit a) OR (ben tavite a) OR (bio tan) OR biosterol OR biotan OR (chivibit) OR (cytobiase) OR (da gravit a) OR (davitamom a) OR (difvitamin a) OR (dohyfral a) OR (elageno a) OR (endo a) OR (envit a) OR epiteliol OR (evitol zambeletti) OR fletase OR gadeol OR gadol OR halivitan OR (halivitane) OR (homagenets aoral) OR hydrosol OR (ido a) OR (ido a 50) OR idratene OR (inovitan a) OR (lord facto r) OR meditalfa OR (mulsal a) OR multamine OR (nio a let) OR (oleovit a) OR (ol eovitamin a) OR ophthalmalin OR panvita OR (plivit a) OR prepalin OR prepaline OR (preparato a) OR primavit OR quotivit OR (retinyl alcohol) OR (ro a vit) OR (super a) OR testavol OR (ucemine a) OR vaconex OR vafol OR veroftal OR (vi al pha) OR (vi dom a) OR viadenin OR vialpha OR viatate OR vidoma OR vitadone OR vitadral OR (vitale a) OR vialpha OR vitama OR (vitamin A) OR (vitaplex a) O R (vitapur a) OR (vitasan a) OR (vitavel a) OR vitpex OR vogan OR (vogan neu) O R (wandervit a) OR xerophthol)	
8	(Death OR deaths OR died OR mortality OR mortality OR mortalities OR fatal OR dying OR deceased OR (life threatening) OR (severe reaction) OR ICU OR (intensive care) OR emergency OR urgent OR fatalities OR casualty OR casualties OR lethality OR necrosis OR heterologous OR (non specific) OR nonspecific)	3,369,761
9	((tetanus toxoid) OR anatetall OR (anatoxal tetanica berna) OR (anti tetanus toxoid) OR (antitetanus toxoid) OR (antitetanus vaccine) OR clostet OR (plain tetanus vaccine) OR (tanrix) OR (te anatoxal) OR (tet-tox) OR tetanol OR (tetanus anatoxin) OR (tetanus toxoid fluid) OR (tetanus toxoid vaccine) OR (tetanus vaccine) OR tetatox OR tetatoxoid OR tetavax OR (tetanus toxoid) OR (57425 69 1) OR (93384 51 1))	18,380
10	((pertussis vaccine) OR (acellular pertussis vaccine) OR acelluvax OR bordetella pertussis vaccin) OR (Bordetella pertussis vaccine) OR (jnih 6) OR (pertussis acellular vaccine) OR (pertussis vaccin) OR pertuvac OR (whooping cough vaccine))	7,746
11	Step 1 AND Step 3 AND Step 5	225
12	Step 1 AND Step 3 AND Step 8	
13	Step 1 AND Step 2 AND Step 7	100
14	Step 1 AND Step 4 AND Step 5	167
15	Step 1 AND Step 4 AND Step 8	896
16	Step 1 AND Step 4 AND Step 7	137

#	Searches	Results
1 7	Step 1 AND Step 4 AND Step 6	2536
1 8	Step 1 AND Step 2 AND Step 5	210
1 9	Step 1 AND Step 2 AND Step 8	1751
2 0	Step 1 AND Step 4 AND Step 8	
2 1	Step 1 AND Step 4 AND Step 7	206
2 2	Step 4 AND Step 6	
2 3	Step 10 AND Step 6	95

3 WHO International Clinical Trials Registry Platform Search Portal:

Includes the following databases: ClinicalTrials.gov, International Standard Randomized Controlled Trial Number Register (ISRCTN), and clinical trial registries of Australia, China, Germany, India, Iran, The Netherlands, New Zealand, Sri Lanka), GSK Clinical Study Register, Clinicalstudyresults.org (includes Wyeth trial listings), and listings of the European Medicines Agency (EMA). Searched in March 2013.

The searches generated 670 records that were manually inspected by two reviewers.

4 Contact with experts in the field

The following groups of experts were consulted and provided information on published and unpublished relevant research in the field:

- The Bandim Health Project coordinated by Professor Peter Aaby (Copenhagen, Denmark)
- Professor Frank Shann (University of Melbourne, Australia)
- Dr Chris Karp (Bill & Melinda Gates Foundation, USA)
- Dr Mihai Netea (Radboud University of Nijmegen, Holland)

Members of the Department of Immunization, Vaccines and Biologicals of the World Health Organization were asked for any studies (published and unpublished) regarding the potential non-specific effects of vaccines.

A list of 809 references was added to the screening process as a result of consultation with experts.