

Supplementary Figure S1. A comparison cloud of the top 200 most unique words in cluster 1 to 9. Light blue, cluster 1; dark blue, cluster 2; light green, cluster 3; dark green, cluster 4; pink, cluster 5; red, cluster 6; light orange, cluster 7; orange, cluster 8; purple, cluster 9.

Supplementary Table S1. Topic 1:140 publications, Vitamin D in vulnerable populations and its impact on child development

| Citation network | | Word cloud | |
|---|--|------------|---|
| | | | |
| Sub-topics and number of publications | Indicative publication | Word cloud | Top 5 most unique topic terms |
| 1a: (n=44) Vitamin D deficiency in Australians and migrants | Nowson CA, Margerison C. Vitamin D intake and vitamin D status of Australians. <i>Med J Aust.</i> 2002;177(3):149-152. doi: 10.5694/j.1326-5377.2002.tb04702.x. (1) | | defici* risk high migrant* popul* |
| 1aa: (n=27) Vitamin D deficiency in women and child migrants | Grover SR, Morley R. Vitamin D deficiency in veiled or dark-skinned pregnant women. <i>Med J Aust.</i> 2001;175(5):251-252. doi: 10.5694/j.1326-5377.2001.tb143558.x. (2) | | defici* risk health children migrant* |
| 1aaa: (n=16) Vitamin D deficiency in adult migrant women | Skull SA, Ngeow JY, Biggs BA, Street A, Ebeling PR. Vitamin D deficiency is common and unrecognized among recently arrived adult immigrants from The Horn of Africa. <i>Intern Med J.</i> 2003;33(1-2):47-51. doi: 10.1046/j.1445-5994.2003.00344.x. (3) | | health risk migrant* among Australia |

| | | | |
|--|--|--|---|
| 1aab: (n=11) Vitamin D deficiency in children and infants | Nozza JM, Rodda CP. Vitamin D deficiency in mothers of infants with rickets. <i>Med J Aust.</i> 2001;175(5):253-255. doi: 10.5694/j.1326-5377.2001.tb143559.x. (4) | A word cloud with words like 'defici', 'infant', 'children', 'ricket', 'screen', 'high', 'popul', 'mother', 'present', 'determin', 'risk', 'pregnant', 'supplement', 'found', 'outpat', 'R'. | defici* infant children women ricket |
| 1ab: (n=9) Testing for Vitamin D deficiency in older adults | Joshi D, Center JR, Eisman JA. Vitamin D deficiency in adults. <i>Aust Prescr.</i> 2010;33:103-106. doi:10.18773/austprescr.2010.053. (5) | A word cloud with words like 'defici', 'age', 'men', 'bone', 'patient', 'vitamin', 'standard', 'older', 'femor', 'health', 'australian', 'fractur', 'predictor', 'diseas', 'measur', 'lower', 'zinc', 'hospit', 'men', 'mass', 'optim', 'risk', 'patient', 'bmd', 'effect', 'biomark', 'concentr', 'covid', 'azm', 'total', 'sever', 'without', 'day', 'spine', 'weight', 'rang'. | men bone patient age vitamin |
| 1ac: (n=8) Vitamin D deficiency in Australian women | Brock K, Wilkinson M, Cook R, Lee S, Bermingham M. Associations with Vitamin D deficiency in "at risk" Australians. <i>J Steroid Biochem Mol Biol.</i> 2004;89-90(1-5):581-588. doi: 10.1016/j.jsbmb.2004.03.073. (6) | A word cloud with words like 'intak', 'defici', 'exposur', 'sun', 'Australian', 'thiamin', 'function', 'food', 'popul', 'older', 'australia', 'australian', 'dietari', 'sun', 'skin', 'high', 'fish', 'women', 'nutrient', 'day', 'margin', 'elder', 'immun', 'increase', 'live', 'east', 'prevai', 'risk', 'student', 'found', 'investig', 'cognit', 'vietnames', 'exercis', 'calcium'. | intak* women exposur* sun Australian |
| 1b: (n=43) Vitamin D deficiency in pregnant women | Paxton GA, Teale GR, Nowson CA, Mason RS, McGrath JJ, Thompson MJ, Siafarikas A, Rodda CP, Munns CF; Australian and New Zealand Bone and Mineral Society; Osteoporosis Australia. Vitamin D and health in pregnancy, infants, children and adolescents in Australia and New Zealand: a position statement. <i>Med J Aust.</i> 2013;198(3):142-143. doi: 10.5694/mja11.11592. (7) | A word cloud with words like 'pregnant', 'defici', 'infant', 'age', 'australia', 'screen', 'increas', 'matern', 'supplement', 'neonat', 'week', 'australian', 'high', 'recommend'. | pregnant women matern* age concentr* |
| 1ba: (n=18) Vitamin D deficiency in pregnancy | Bowyer L, Catling-Paull C, Diamond T, Homer C, Davis G, Craig ME. Vitamin D, PTH and calcium levels in pregnant women and their neonates. <i>Clin Endocrinol (Oxf).</i> 2009;70(3):372-377. doi: | A word cloud with words like 'pregnant', 'defici', 'risk', 'matern', 'measur', 'insuffici', 'concentr', 'antenatal', 'high', 'screen', 'australia', 'high', 'recommend'. | pregnant women defici* concentr* risk |

10.1111/j.1365-
2265.2008.03316.x. (8)

1baa:
(n=11)
Testing
for
vitamin D
status in
pregnant
women

Teale GR, Cunningham CE.
Vitamin D deficiency is
common among pregnant
women in rural Victoria. Aust
N Z J Obstet Gynaecol.
2010;50(3):259-261. doi:
10.1111/j.1479-
828X.2010.01147.x. (9)



Keywords include: pregnant, women, defici*, risk, screen*

1bab:
(n=7)
Associati
on
between
maternal
and
newborn
vitamin D
status

Thomas SD, Fudge AN,
Whiting M, Coates PS. The
correlation between third-
trimester maternal and
newborn-serum 25-hydroxy-
vitamin D in a selected South
Australian group of newborn
samples. BMJ Open.
2011;1(2):e000236. doi:
10.1136/bmjopen-2011-
000236. (10)



Keywords include: matern*, concentr*, newborn, measur*, correl*

1bb: (n=15)
Vitamin D
deficiency
and milk
intake in
children

Munns CF, Simm PJ, Rodda
CP, Garnett SP, Zacharin MR,
Ward LM, Geddes J, Cherian S,
Zurynski Y, Cowell CT; APSU
Vitamin D Study Group.
Incidence of vitamin D
deficiency rickets among
Australian children: an
Australian Paediatric
Surveillance Unit study. Med J
Aust. 2012;196(7):466-468.
doi: 10.5694/mja11.10662. (11)



Keywords include: children, defici, therap*, milk, insuffici*, gum, (Growing up milk)

1bba:
(n=8)
Vitamin
D status
and
growing
up milk
for
children

Matsuyama M, Harb T, David
M, Davies PS, Hill RJ. Effect
of fortified milk on growth and
nutritional status in young
children: a systematic review
and meta-analysis. Public
Health Nutr. 2017;20(7):1214-
1225. doi:
10.1017/S1368980016003189.
(12)



Keywords include: milk, gum, (Growing up milk), age, recommen d, risk

| | | | |
|---|--|--|---|
| 1bbb: (n=7) Treatment for children with vitamin D deficiency | Rigterink T, Appleton L, Day AS. Vitamin D therapy in children with inflammatory bowel disease: A systematic review. <i>World J Clin Pediatr.</i> 2019;8(1):1-14. doi: 10.5409/wjcp.v8.i1.1. (13) |  | children defici* therapi* insuffici* daili* |
| 1bc: (n=7) Maternal vitamin D and child development | Whitehouse AJ, Holt BJ, Serralha M, Holt PG, Kusel MM, Hart PH. Maternal serum vitamin D levels during pregnancy and offspring neurocognitive development. <i>Pediatrics.</i> 2012;129(3):485-493. doi: 10.1542/peds.2011-2644. (14) |  | matern* offspr* age mother infant |
| 1c: (n=26) Vitamin D deficiency and bone health in children | Pasco JA, Henry MJ, Nicholson GC, Sanders KM, Kotowicz MA. Vitamin D status of women in the Geelong Osteoporosis Study: association with diet and casual exposure to sunlight. <i>Med J Aust.</i> 2001;175(8):401-405. doi: 10.5694/j.1326-5377.2001.tb143643.x. (15) |  | bone supplement intak* effect offspr* |
| 1ca: (n=12) Vitamin D supplement intake and bone health in children | Jones G, Dwyer T, Hynes KL, Parameswaran V, Greenaway TM. Vitamin D insufficiency in adolescent males in Southern Tasmania: prevalence, determinants, and relationship to bone turnover markers. <i>Osteoporos Int.</i> 2005;16(6):636-641. doi: 10.1007/s00198-004-1733-z. (16) |  | bone children supplement defici* effect |
| 1cb: (n=8) Vitamin D intake during gestation and bone health of children | Pasco JA, Wark JD, Carlin JB, Ponsonby AL, Vuillermin PJ, Morley R. Maternal vitamin D in pregnancy may influence not only offspring bone mass but other aspects of musculoskeletal health and adiposity. <i>Med Hypotheses.</i> 2008;71(2):266-269. doi: |  | matern* offspr* pregnanc* intak* gestation |

10.1016/j.mehy.2008.01.033.

(17)

1d: (n=17)
Vitamin D
deficiency in
child refugees

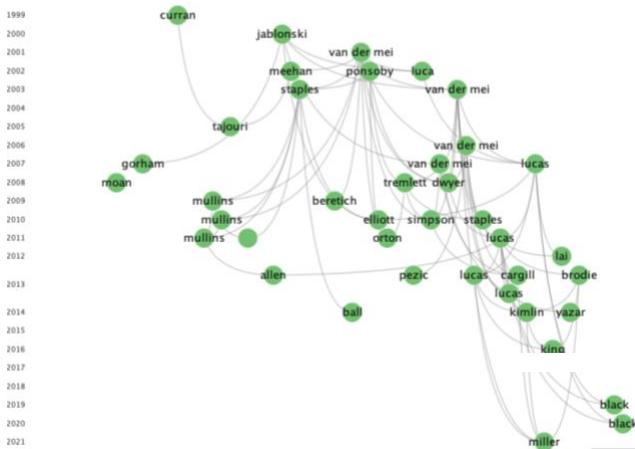
Tiong AC, Patel MS, Gardiner J, Ryan R, Linton KS, Walker KA, Scopel J, Biggs BA.
Health issues in newly arrived African refugees attending general practice clinics in Melbourne. Med J Aust. 2006;185(11-12):602-606. doi: 10.5694/j.1326-5377.2006.tb00724.x. (18)



refuge*
health
children
diseas*
screen*

Note: The citation network provides an overview of the top 40 citation links within the topic. The nodes indicate the first author of the publication, and the lines linking the nodes represents the citation links. The publication year is plotted on the left. The word cloud shows the frequency words within the topic and sub-topics, where words with a higher frequency have a larger size and opacity.

Supplementary Table S2. Topic 2: 116 publications, Impact of sun exposure and UVB radiation on various health conditions

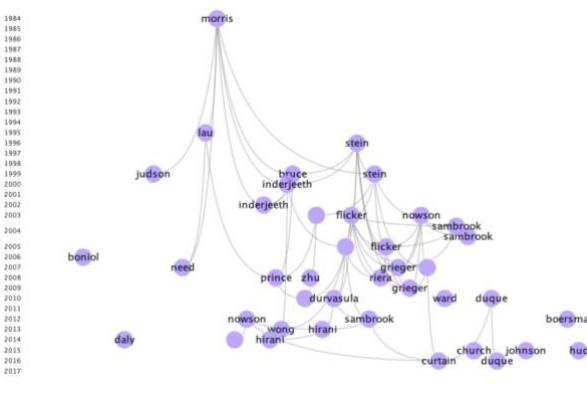
| | Citation network | Word cloud | |
|---|---|--|---|
| |  |  | |
| Sub-topics and number of publications | Indicative publication | Word cloud | Top 5 most unique topic terms |
| 2a: (n=34) Vitamin D and multiple sclerosis | van der Mei IA, Ponsonby AL, Dwyer T, Blizzard L, Taylor BV, Kilpatrick T, Butzkueven H, McMichael AJ. Vitamin D levels in people with multiple sclerosis and community controls in Tasmania, Australia. <i>J Neurol.</i> 2007;254(5):581-590. doi: 10.1007/s00415-006-0315-8. (19) |  | multipl* sclerosi* risk relaps* birth |
| 2b: (n=34) Impact of the environment on vitamin D status and CNS demyelination | Lucas RM, Ponsonby AL, Dear K, Valery PC, Pender MP, Taylor BV, Kilpatrick TJ, Dwyer T, Coulthard A, Chapman C, van der Mei I, Williams D, McMichael AJ. Sun exposure and vitamin D are independent risk factors for CNS demyelination. <i>Neurology.</i> 2011;76(6):540-548. doi: 10.1212/WNL.0b013e31820af93d. (20) |  | time day Australian physic* fractur* |

| | | | |
|---|--|--|---|
| 2ba: (n=16) Latitude gradient and vitamin D status | Lucas RM, Ponsonby AL, Dear K, Valery PC, Taylor B, van der Mei I, McMichael AJ, Pender MP, Chapman C, Coulthard A, Kilpatrick TJ, Stankovich J, Williams D, Dwyer T. Vitamin D status: multifactorial contribution of environment, genes and other factors in healthy Australian adults across a latitude gradient. <i>J Steroid Biochem Mol Biol.</i> 2013;136:300-308. doi: 10.1016/j.jsbmb.2013.01.011. (21) |  | exposur* uvr sun physic* use |
| 2bb: (n=12) Vitamin D status and CNS demyelination | Lucas R, Ponsonby AL, McMichael A, van der Mei I, Chapman C, Coulthard A, Dear K, Dwyer T, Kilpatrick T, Pender M, Taylor B, Valery P, Williams D. Observational analytic studies in multiple sclerosis: controlling bias through study design and conduct. The Australian Multicentre Study of Environment and Immune Function. <i>Mult Scler.</i> 2007;13(7):827-839. doi: 10.1177/1352458507077174. (22) |  | risk case fcd (CNS demyelination) demyelin* first |
| 2c: (n=19) Vitamin D and food allergies | Staples JA, Ponsonby AL, Lim LL, McMichael AJ. Ecologic analysis of some immune-related disorders, including type 1 diabetes, in Australia: latitude, regional ultraviolet radiation, and disease prevalence. <i>Environ Health Perspect.</i> 2003;111(4):518-523. doi: 10.1289/ehp.5941. (23) |  | food allergi* rate age region |

| | | | |
|---|--|--|--|
| 2d: (n=13) Vitamin D status and melanoma | Jablonski NG, Chaplin G. The evolution of human skin coloration. <i>J Hum Evol.</i> 2000;39(1):57-106. doi: 10.1006/jhev.2000.0403. (24) | A word cloud centered around the word 'Skin'. Other prominent words include 'melanoma', 'latitud', 'incid', 'cmm', 'folat*', 'may', 'cmm', '(cutaneous malignant melanoma)', 'norway', 'australia', 'degre', 'increas', 'individu', 'rate', 'measur', 'pigment', 'odd', 'hiv', 'role', 'risk', 'exposur', 'vulvar', 'human', 'person', 'popul', 'cmmin', 'use', 'ratio', 'daili'. | skin melanoma folat* may cmm (cutaneous malignant melanoma) |
| 2e: (n=9) Vitamin D status and myopia risk | van der Mei IA, Blizzard L, Ponsonby AL, Dwyer T. Validity and reliability of adult recall of past sun exposure in a case-control study of multiple sclerosis. <i>Cancer Epidemiol Biomarkers Prev.</i> 2006;15(8):1538-1544. doi: 10.1158/1055-9965.EPI-05-0969. (25) | A word cloud centered around the word 'Sun'. Other prominent words include 'myopia', 'exposur', 'concentr', 'measur*', 'age', 'adult', 'relat', 'use', 'skin', 'concentr', 'pigment', 'determin'. | sun exposur* myopia concentr* measur* |
| 2f: (n=7) Vitamin D status and type 1 diabetes | Elliott JC, Lucas RM, Clements MS, Bambrick HJ. Population density determines the direction of the association between ambient ultraviolet radiation and type 1 diabetes incidence. <i>Pediatr Diabetes.</i> 2010;11(6):394-402. doi: 10.1111/j.1399-5448.2009.00620.x. (26) | A word cloud centered around the word 'uvr'. Other prominent words include 'preval', 'case', 'incid*', 'diabet*', 'estim', 'determin', 'increas', 'higher', 'exposur', 'pcbc', 'type', 'ibd', 'risk', 'lower', 'sun', 'case', 'diabet', 'incid', 'use', 'latitud', 'ambient', 'diseas', 'australia', 'gradient', 'popul', 'vanuatu', 'per', 'patholog', 'time', 'defici', 'latitud', 'victoria', 'differ', 'vanuatu', 'latitud', 'dose'. | uvr prevail* case incid* diabet* |

Note: The citation network provides an overview of the top 40 citation links within the topic. Each node is labelled with the surname of the first author of the citation, and the lines linking the nodes represents the citation links. The publication year is plotted on the left. The word cloud shows the frequency words within the topic and sub-topics, where words with a higher frequency have a larger size and opacity.

Supplementary Table S3. Topic 3: 115 publications, Vitamin D and falls and fractures in older adults.

| Citation network | | Word cloud | |
|--|--|--|--|
| | | | |
| Sub-topics and number of publications | Indicative publication | Word cloud | Top 5 most unique topic terms |
| 3a: (n=29) Vitamin D deficiency and fractures in RACFs | Flicker L, Mead K, MacInnis RJ, Nowson C, Scherer S, Stein MS, Thomasx J, Hopper JL, Wark JD. Serum vitamin D and falls in older women in residential care in Australia. <i>J Am Geriatr Soc.</i> 2003;51(11):1533-1538. doi: 10.1046/j.1532-5415.2003.51510.x. (27) |  |  |
| 3aa: (n=10) Hyperparathyroidism and fractures in RACFs | Stein MS, Scherer SC, Walton SL, Gilbert RE, Ebeling PR, Flicker L, Wark JD. Risk factors for secondary hyperparathyroidism in a nursing home population. <i>Clin Endocrinol (Oxf).</i> 1996;44(4):375-383. doi: 10.1046/j.1365-2265.1996.701521.x. (28) |  | defici* fractur* patient resid* hyperparathyroi d |

| | | | |
|--|---|--|--|
| 3ab: (n=9) Sun exposure and hip fracture risk in RACFs | <p>Sambrook PN, Cameron ID, Chen JS, Cumming RG, Durvasula S, Herrmann M, Kok C, Lord SR, Macara M, March LM, Mason RS, Seibel MJ, Wilson N, Simpson JM. Does increased sunlight exposure work as a strategy to improve vitamin D status in the elderly: a cluster randomised controlled trial. <i>Osteoporos Int.</i> 2012;23(2):615-624. doi: 10.1007/s00198-011-1590-5. (29)</p> | | <p>care age exposur* sunlight facil*</p> |
| 3ac: (n=8) Vitamin D intake in RACFs | <p>Nowson CA, Sherwin AJ, McPhee JG, Wark JD, Flicker L. Energy, protein, calcium, vitamin D and fibre intakes from meals in residential care establishments in Australia. <i>Asia Pac J Clin Nutr.</i> 2003;12(2):172-177. (30)</p> | | <p>intak* energi* nutrit* nutrient low</p> |
| 3b: (n=18) Vitamin D status and hospitalised patients | <p>Quaggiotto P, Tran H, Bhanugopan M. Vitamin D deficiency remains prevalent despite increased laboratory testing in New South Wales, Australia. <i>Singapore Med J.</i> 2014;55(5):271-280. doi: 10.11622/smedj.2014071. (31)</p> | | <p>women patient amh pregnant prevail*</p> |

| | | | |
|--|--|--|---|
| 3c: (n=15) Vitamin D supplement intake in RACFs | <p>Flicker L, MacInnis RJ, Stein MS, Scherer SC, Mead KE, Nowson CA, Thomas J, Lowndes C, Hopper JL, Wark JD. Should older people in residential care receive vitamin D to prevent falls? Results of a randomized trial. <i>J Am Geriatr Soc.</i> 2005;53(11):1881-1888. doi: 10.1111/j.1532-5415.2005.00468.x. (32)</p> | <p>A word cloud visualization showing various terms related to the study. The most prominent words include 'supplement', 'use', 'resid', 'fall', 'fractur', 'calcium', 'facil', 'care', 'prevent', 'evidenc', 'australia', 'improv', 'osteoporosi', 'high', 'risk', 'intak', 'effect', 'treatment', 'australian', 'people', 'residenti', 'practic', 'strateg', 'calciu', 'strateg', 'calcium', 'facil', 'implement', 'nurs', 'patient', 'evidenc', 'identifi', 'home review', 'australia', 'improv'.</p> | facil* use supplement care resid* |
| 3d: (n=13) Serum parathyroid hormone and fall risk in older adults | <p>Sambrook PN, Chen JS, March LM, Cameron ID, Cumming RG, Lord SR, Zochling J, Sitoh YY, Lau TC, Schwarz J, Seibel MJ. Serum parathyroid hormone predicts time to fall independent of vitamin D status in a frail elderly population. <i>J Clin Endocrinol Metab.</i> 2004;89(4):1572-1576. doi: 10.1210/jc.2003-031782. (33)</p> | <p>A word cloud visualization showing various terms related to the study. The most prominent words include 'fall', 'pth', 'older', 'balanc*', 'high', 'balance', 'train', 'hormon', 'subject', 'gait', 'popul', 'sarcopen', 'high', 'risk', 'use', 'fractur', 'patient', 'independ', 'clinic', 'increas', 'parathyroid', 'australia'.</p> | fall pth older balanc* high |
| 3e: (n=13) Vitamin D status and aging in men | <p>Hirani V, Naganathan V, Cumming RG, Blyth F, Le Couteur DG, Handelsman DJ, Waite LM, Seibel MJ. Associations between frailty and serum 25-hydroxyvitamin D and 1,25-dihydroxyvitamin D concentrations in older Australian men: the Concord Health and Ageing in Men Project. <i>J Gerontol A Biol Sci Med Sci.</i> 2013;68(9):1112-1121. doi:</p> | <p>A word cloud visualization showing various terms related to the study. The most prominent words include 'men', '25d', 'measur', 'health', 'depress*', 'measur*'. Other visible words include 'supplement', 'depress', 'concent', 'older', 'frailtiage', 'pain', 'may', 'chronic', 'communiti', 'cross', 'metabolit', 'baselin', 'mortal', 'diabet', 'fractur', 'pain', 'depress', 'depress*', 'measur*'</p> | men 25d health depress* measur* |

10.1093/gerona/glt059.
(34)

3f: (n=13) Association between low vitamin D status and falls and fracture risk in older adults

Latham NK, Anderson CS, Lee A, Bennett DA, Moseley A, Cameron ID; Fitness Collaborative Group. A randomized, controlled trial of quadriceps resistance exercise and vitamin D in frail older people: the Frailty Interventions Trial in Elderly Subjects (FITNESS). *J Am Geriatr Soc.* 2003;51(3):291-299. doi: 10.1046/j.1532-5415.2003.51101.x (35)



risk
fractur*
effect
dose
relat*

3g: (n=10) Vitamin D status and bone mineral density

Morris HA, Morrison GW, Burr M, Thomas DW, Nordin BE. Vitamin D and femoral neck fractures in elderly South Australian women. *Med J Aust.* 1984;140(9):519-521. doi: 10.5694/j.1326-5377.1984.tb108222.x. (36)



bone
miner*
alpaca
calcium
increas*

Note: The citation network provides an overview of the top 40 citation links within the topic. Each node is labelled with the surname of the first author of the citation, and the lines linking the nodes represents the citation links. The publication year is plotted on the left. The word cloud shows the frequency words within the topic and sub-topics, where words with a higher frequency have a larger size and opacity.

Supplementary Table S4. Topic 4: 110 publications, Vitamin D and its association with health outcomes

| Citation network | | Word cloud | |
|---|--|------------|---|
| | | | |
| Sub-topics and number of publications | Indicative publication | Word cloud | Top 5 most unique topic terms |
| 4a: (n=29) Vitamin D supplementation and health outcomes | Daly RM, Gagnon C, Lu ZX, Magliano DJ, Dunstan DW, Sikaris KA, Zimmet PZ, Ebeling PR, Shaw JE. Prevalence of vitamin D deficiency and its determinants in Australian adults aged 25 years and older: a national, population-based study. Clin Endocrinol (Oxf). 2012;77(1):26-35. doi: 10.1111/j.1365-2265.2011.04320.x. (37) | | age concentr* adult supplement higher |
| 4aa: (n=13) Vitamin D deficiency and metabolic syndrome | Gagnon C, Lu ZX, Magliano DJ, Dunstan DW, Shaw JE, Zimmet PZ, Sikaris K, Ebeling PR, Daly RM. Low serum 25-hydroxyvitamin D is associated with increased risk of the development of the metabolic syndrome at five years: results from a national, population-based prospective study (The Australian Diabetes, Obesity and Lifestyle Study: AusDiab). J | | defici* patient popul* met aor* |

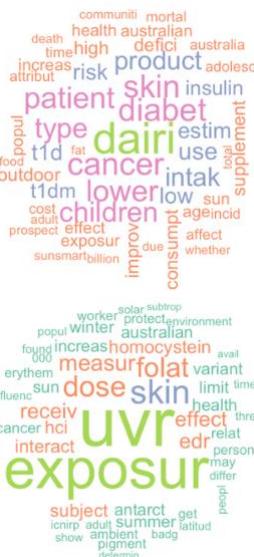
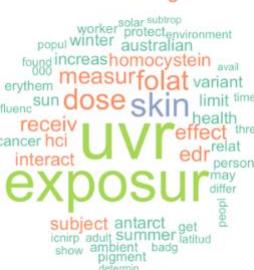
| | | |
|---|---|--|
| | Clin Endocrinol Metab. 2012;97(6):1953-1961. doi: 10.1210/jc.2011-3187. (38) |  |
| 4ab: (n=9) Vitamin D status and health outcomes of Australian adolescents | Black LJ, Burrows SA, Jacoby P, Oddy WH, Beilin LJ, Chan She Ping-Delfos W, Marshall CE, Holt PG, Hart PH, Mori TA. Vitamin D status and predictors of serum 25-hydroxyvitamin D concentrations in Western Australian adolescents. Br J Nutr. 2014;112(7):1154-1162. doi: 10.1017/S000711451400186X . (39) |  |
| 4b: (n=27) Vitamin D deficiency in the Australian population | Malacova E, Cheang PR, Dunlop E, Sherriff JL, Lucas RM, Daly RM, Nowson CA, Black LJ. Prevalence and predictors of vitamin D deficiency in a nationally representative sample of adults participating in the 2011-2013 Australian Health Survey. Br J Nutr. 2019;121(8):894-904. doi: 10.1017/S0007114519000151. (40) |  |
| 4ba: (n=9) Vitamin D deficiency in Aboriginal and Torres Strait Islander peoples | Vanlint SJ, Morris HA, Newbury JW, Crockett AJ. Vitamin D insufficiency in Aboriginal Australians. Med J Aust. 2011;194(3):131-4. doi: 10.5694/j.1326-5377.2011.tb04195.x. (41) |  |
| 4bb: (n=8) Vitamin D content in Australian foods | Dunlop E, Cunningham J, Sherriff JL, Lucas RM, Greenfield H, Arcot J, Strobel N, Black LJ. Vitamin D ₃ and 25-Hydroxyvitamin D ₃ Content of Retail White Fish and Eggs in Australia. Nutrients. 2017;9(7):647. doi: 10.3390/nu9070647. (42) |  |

| | | | |
|---|---|--|--|
| 4bc: (n=8) Vitamin D status and vitamin D intake from food and supplements | <p>Black LJ, Jacoby P, Nowson CA, Daly RM, Lucas RM. Predictors of Vitamin D-Containing Supplement Use in the Australian Population and Associations between Dose and Serum 25-Hydroxyvitamin D Concentrations. <i>Nutrients.</i> 2016;8(6):356. doi: 10.3390/nu8060356. (43)</p> | | |
| 4c: (n=16) Sun exposure and cancer risk | <p>Hughes AM, Armstrong BK, Vajdic CM, Turner J, Grulich AE, Fritschi L, Milliken S, Kaldor J, Benke G, Kricker A. Sun exposure may protect against non-Hodgkin lymphoma: a case-control study. <i>Int J Cancer.</i> 2004;112(5):865-871. doi: 10.1002/ijc.20470. (44)</p> | | |
| 4d: (n=16) Vitamin D deficiency and the lifecycle | <p>van der Mei IA, Ponsonby AL, Engelsen O, Pasco JA, McGrath JJ, Eyles DW, Blizzard L, Dwyer T, Lucas R, Jones G. The high prevalence of vitamin D insufficiency across Australian populations is only partly explained by season and latitude. <i>Environ Health Perspect.</i> 2007;115(8):1132-1139. doi: 10.1289/ehp.9937. (45)</p> | | |
| 4e: (n=13) Vitamin D status and UVB radiation from sun exposure | <p>Bogh MK, Schmedes AV, Philipsen PA, Thieden E, Wulf HC. Vitamin D production after UVB exposure depends on baseline vitamin D and total cholesterol but not on skin pigmentation. <i>J Invest Dermatol.</i> 2010;130(2):546-553. doi: 10.1038/jid.2009.323. (46)</p> | | |

Note: The citation network provides an overview of the top 40 citation links within the topic. Each node is labelled with the surname of the first author of the citation, and the lines linking the nodes represents the citation links. The publication year is plotted on the left. The word cloud shows the frequency words within the topic and sub-topics, where words with a higher frequency have a larger size and opacity.

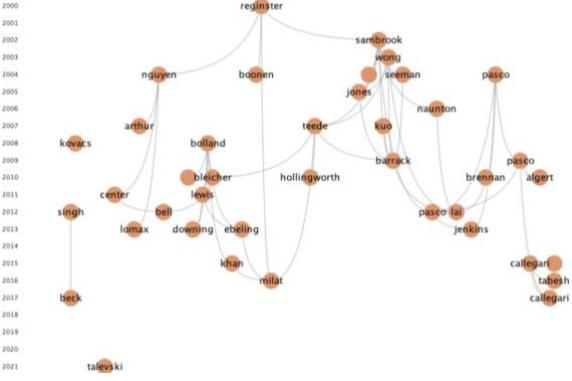
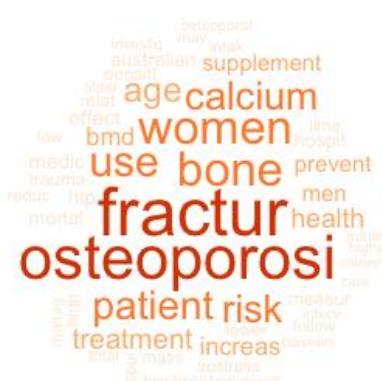
Supplementary Table S5. Topic 5: 71 publications, Vitamin D from sun exposure

| Citation network | Word cloud | | |
|---|--|------------|--|
| | | | |
| Sub-topics and number of publications | Indicative publication | Word cloud | Top 5 most unique topic terms |
| 5a: (n=20) Knowledge and attitudes of Australians towards sun protection | Youl PH, Janda M, Kimlin M. Vitamin D and sun protection: the impact of mixed public health messages in Australia. <i>Int J Cancer.</i> 2009;124(8):1963-1970. doi: 10.1002/ijc.24154. (47) | | sun protect skin cancer knowledge |
| 5b: (n=18) Vitamin D status and sunscreen use in Australia | Marks R, Foley PA, Jolley D, Knight KR, Harrison J, Thompson SC. The effect of regular sunscreen use on vitamin D levels in an Australian population. Results of a randomized controlled trial. <i>Arch Dermatol.</i> 1995;131(4):415-421. doi: 10.1001/archderm.1995.01690160043006. (48) | | sunscreen use Australia solar time |
| 5c: (n=12) Vitamin D status and seasons in Australia | Kimlin M, Harrison S, Nowak M, Moore M, Brodie A, Lang C. Does a high UV environment ensure adequate vitamin D status? <i>J Photochem Photobiol B.</i> 2007;89(2-3):139-147. doi: 10.1016/j.jphotobiol.2007.09.008. (49) | | patient defici* winter high risk |

| | | | |
|--|---|--|--|
| 5d: (n=10) Lower vitamin D status with limited sun exposure | Jayaratne N, Russell A, van der Pols JC. Sun protection and vitamin D status in an Australian subtropical community. Prev Med. 2012;55(2):146-150. doi: 10.1016/j.ypmed.2012.05.011. (50) |  | dairi* diabet* lower children type |
| 5e: (n=8) Measuremen t of UVB radiation exposure in Australia | Godar DE. UV doses worldwide. Photochem Photobiol. 2005;81(4):736-749. doi: 10.1562/2004-09-07-ir- 308r.1. (51) |  | uvr exposur* dose folat* measur* |

Note: The citation network provides an overview of the top 40 citation links within the topic. Each node is labelled with the surname of the first author of the citation, and the lines linking the nodes represents the citation links. The publication year is plotted on the left. The word cloud shows the frequency words within the topic and sub-topics, where words with a higher frequency have a larger size and opacity.

Supplementary Table S6. Topic 6: 62 publications, Vitamin D, calcium, and musculoskeletal health

| | Citation network | Word cloud | |
|--|--|--|---|
| |  |  | |
| Sub-topics and number of publications | Indicative publication | Word cloud | Most unique topic terms |
| 6a: (n=17) Vitamin D and bone health in women | Pasco JA, Henry MJ, Kotowicz MA, Sanders KM, Seeman E, Pasco JR, Schneider HG, Nicholson GC. Seasonal periodicity of serum vitamin D and parathyroid hormone, bone resorption, and fractures: the Geelong Osteoporosis Study. <i>J Bone Miner Res</i> . 2004;19(5):752-758. doi: 10.1359/JBMR.040125. (52) |  | bone age women health bmd (bone mineral density) |
| 6aa: (n=10) Association between age, vitamin D and bone mineral density | Pasco JA, Henry MJ, Nicholson GC, Brennan SL, Kotowicz MA. Behavioural and physical characteristics associated with vitamin D status in women. <i>Bone</i> . 2009;44(6):1085-1091. doi: 10.1016/j.bone.2009.02.020. (53) |  | age bmd (bone mineral density) interv* men increas* |
| 6ab: (n=7) Vitamin D status and bone mineral density in | Callegari ET, Reavley N, Garland SM, Gorelik A, Wark JD. Vitamin D Status, Bone Mineral Density and Mental Health in Young Australian Women: The Safe-D Study. <i>J Public</i> |  | bone health women young densiti* |

| | | | |
|---|---|--|--|
| young women | Health Res. 2015;4(3):594. doi: 10.4081/jphr.2015.594. (54) | A word cloud centered around the word 'patient'. Other prominent words include 'osteoporosi*', 'prevent', 'trauma', 'minim*', 'screen', 'fractur', 'osteoporosi', 'rural', 'bisphosphon', and 'therapi'. | osteoporosi* patient prevent trauma minim* |
| 6b: (n=15) Prevention and treatment of osteoporosis in patients with minimal trauma fracture | Sambrook PN, Seeman E, Phillips SR, Ebeling PR; Osteoporosis Australia; National Prescribing Service. Preventing osteoporosis: outcomes of the Australian Fracture Prevention Summit. Med J Aust. 2002;176(S8):S1-16. doi: 10.5694/j.1326-5377.2002.tb04475.x. (55) | A word cloud centered around the word 'fractur'. Other prominent words include 'osteoporosi', 'rural', 'bisphosphon', and 'therapi'. | |
| 6c: (n=13) Calcium supplement and bone health | Ebeling PR, Daly RM, Kerr DA, Kimlin MG. Building healthy bones throughout life: an evidence-informed strategy to prevent osteoporosis in Australia. Med J Aust. 2013;199(S7):S1-S46. doi: 10.5694/j.1326-5377.2013.tb04225.x. (56) | A word cloud centered around the word 'calcium'. Other prominent words include 'risk', 'time', 'supplement', and 'increas*'. | calcium risk time supplement increas* |
| 6d: (n=9) Preventing osteoporotic fractures with vitamin D and calcium supplement | Nguyen TV, Center JR, Eisman JA. Osteoporosis: underrated, underdiagnosed and undertreated. Med J Aust. 2004;180(S5):S18-22. doi: 10.5694/j.1326-5377.2004.tb05908.x. (57) | A word cloud centered around the word 'fractur'. Other prominent words include 'osteoporosi', 'osteoporot', 'servic*', and 'riseridron'. | fractur* use hip osteoporot* servic* |
| 6e: (n=8) Treatment of osteoporosis | Bleicher K, Naganathan V, Cumming RG, Seibel MJ, Sambrook PN, Blyth FM, Le Couteur DG, Handelsman DJ, Waite LM, Creasey HM. Prevalence and treatment of osteoporosis in older Australian men: findings from the CHAMP study. Med J Aust. 2010;193(7):387-391. doi: 10.5694/j.1326-5377.2010.tb03964.x. (58) | A word cloud centered around the word 'osteoporosi'. Other prominent words include 'treatment', 'mortal*', 'men', 'manag*', and 'exercis*'. | treatment mortal* men manag* exercis* |

Note: The citation network provides an overview of the top 40 citation links within the topic. Each node is labelled with the surname of the first author of the citation, and the lines linking

the nodes represents the citation links. The publication year is plotted on the left. The word cloud shows the frequency words within the topic and sub-topics, where words with a higher frequency have a larger size and opacity.

Supplementary Table S7. Topic 7: 40 publications, Testing of vitamin D status in Australia

| Citation network | Word cloud | | |
|--|---|------------|---|
| | | | |
| Sub-topics and number of publications | Indicative publication | Word cloud | Most unique topic terms |
| 7a: (n=14) Clinical practice guidelines for vitamin D testing | Bilinski K, Boyages S Evidence of overtesting for vitamin D in Australia: an analysis of 4.5 years of Medicare Benefits Schedule (MBS) data. BMJ Open. 2013; 3:e002955. doi: 10.1136/bmjopen-2013-002955. (59) | | increas* patient general defici* practic* |
| 7b: (n=13) Testing Vitamin D status and incidence of type 2 diabetes | Gagnon C, Lu ZX, Magliano DJ, Dunstan DW, Shaw JE, Zimmet PZ, Sikaris K, Grantham N, Ebeling PR, Daly RM. Serum 25-hydroxyvitamin D, calcium intake, and risk of type 2 diabetes after 5 years: results from a national, population-based prospective study (the Australian Diabetes, Obesity and Lifestyle study). Diabetes Care. 2011;34(5):1133-1138. doi: | | concentr* risk diabet* cancer incid* |

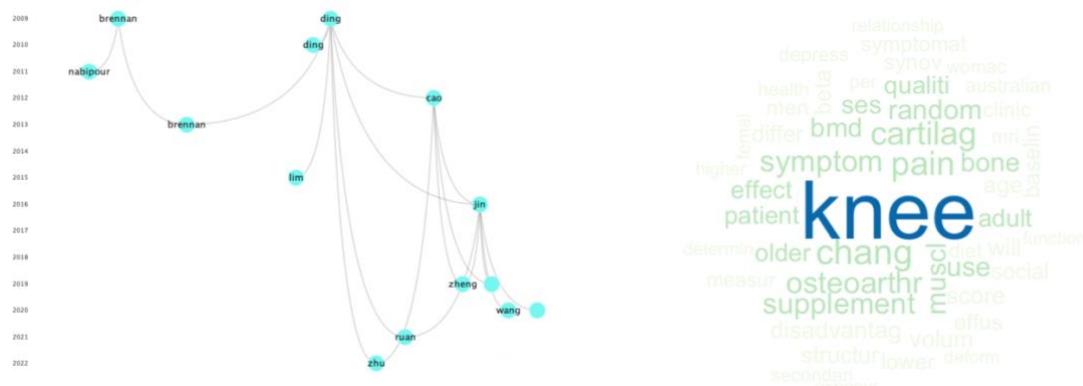
10.2337/dc10-2167.

(60)

Note: The citation network provides an overview of the top 40 citation links within the topic. Each node is labelled with the surname of the first author of the citation, and the lines linking the nodes represents the citation links. The publication year is plotted on the left. The word cloud shows the frequency words within the topic and sub-topics, where words with a higher frequency have a larger size and opacity.

Supplementary Table S8. Topic 8: 14 publications, Vitamin D status and knee osteoarthritis

| Citation Network | Word cloud |
|------------------|------------|
|------------------|------------|



| Indicative publication | Most unique topic terms |
|---|--|
| Ding C, Cicuttini F, Parameswaran V, Burgess J, Quinn S, Jones G. Serum levels of vitamin D, sunlight exposure, and knee cartilage loss in older adults: the Tasmanian older adult cohort study. <i>Arthritis Rheum.</i> 2009;60(5):1381-1389. doi: 10.1002/art.24486. (61) | knee chang* pain cartilag* osteoarthr* |

Note: The citation network provides an overview of the citation links within the topic. Each node is labelled with the surname of the first author of the citation, and the lines linking the nodes represents the citation links. The publication year is plotted on the left. The word cloud shows the frequency words within the topic and sub-topics, where words with a higher frequency have a larger size and opacity.

Supplementary Table S9. Topic 9: 7 publications, Vitamin D status and exercise performance in athletes

| Citation Network | Word cloud |
|---|---|
| <p>The citation network graph shows publication years on the y-axis (2008-2015) and author nodes on the x-axis. Lovell (2008) has the highest degree of connectivity, linking to wojan (2013), hamilton (2013), and desbrow (2014). Henry (2010) is also highly connected. Worman (2013) and tomlinson (2014) have fewer links.</p> | <p>The word cloud displays the frequency of various terms related to the topic. The most prominent terms are 'athlet*', 'intak*', 'lower', 'dietari*', and 'strength'. Other significant terms include 'intak', 'lower', 'athlet', 'intak*', 'lower', 'dietari*', and 'strength'.</p> |
| Indicative publication Lovell G. Vitamin D status of females in an elite gymnastics program. Clin J Sport Med. 2008;18(2):159-161. doi: 10.1097/JSM.0b013e3181650eee. (62) | Most unique topic terms athlet* intak* lower dietari* strength |

Note: The citation network provides an overview of the citation links within the topic. Each node is labelled with the surname of the first author of the citation, and the lines linking the nodes represents the citation links. The publication year is plotted on the left. The word cloud shows the frequency words within the topic and sub-topics, where words with a higher frequency have a larger size and opacity.

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