| Search   | Query                                                                 | Results |
|----------|-----------------------------------------------------------------------|---------|
| **PubMed** |                                                                        |         |
| #1       | "Dermatitis, Atopic"[Mesh]                                           | 19,244  |
| #2       | Atopic dermatiti[Title/Abstract]                                     | 19,937  |
| #3       | "Eczema"[Mesh]                                                       | 11,011  |
| #4       | Eczema[Title/Abstract]                                               | 17,014  |
| #5       | #1 OR #2 OR #3 OR #4                                                | 41,880  |
| #6       | "Bone Density"[Mesh]                                                | 51,908  |
| #7       | Bone mineral density[Title/Abstract]                                | 39,312  |
| #8       | "Bone Diseases, Metabolic"[Mesh]                                     | 74,848  |
| #9       | Osteopenia[Title/Abstract]                                           | 9,298   |
| #10      | "Osteoporosis"[Mesh]                                                | 54,425  |
| #11      | Osteoporosis[Title/Abstract]                                         | 66,883  |
| #12      | "Fractures, Bone"[Mesh]                                             | 179,463 |
| #13      | Fracture[Title/Abstract]                                            | 167,622 |
| #14      | #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13                   | 358,541 |
| #15      | #5 AND #14                                                           | 135     |
| **Cochrane** |                                                                    |         |
| #1       | MeSH descriptor: [Dermatitis, Atopic] explode all trees             | 1,650   |
| #2       | (Atopic dermatitis):ti,ab,kw                                       | 4,211   |
| #3       | MeSH descriptor: [Eczema] explode all trees                         | 951     |
| #4       | (Eczema):ti,ab,kw                                                  | 3,545   |
| #5       | #1 or #2 or #3 or #4                                                | 6,174   |
| #6       | MeSH descriptor: [Bone Density] explode all trees                   | 4,526   |
| #7       | (Bone mineral density):ti,ab,kw                                     | 8,041   |
| #8       | MeSH descriptor: [Bone Diseases, Metabolic] explode all trees       | 4,329   |
| #9       | (Osteopenia):ti,ab,kw                                              | 1,132   |
| #10      | MeSH descriptor: [Osteoporosis] explode all trees                   | 3,824   |
| #11      | (Osteoporosis):ti,ab,kw                                            | 10,093  |
| #12      | MeSH descriptor: [Fractures, Bone] explode all trees                | 5,577   |
| #13      | (Fracture):ti,ab,kw                                                | 21,383  |
| #14      | #6 or #7 or #8 or #9 or #10 or #11 or #12 or #13                    | 31,074  |
| #15      | #5 and #14                                                          | 51      |
| **Embase** |                                                                    |         |
| #1       | 'atopic dermatitis'/exp                                             | 43,424  |
| #2       | 'eczema'/exp                                                        | 33,908  |
| #3       | 'atopic dermatitis':ti,ab,kw                                       | 32,821  |
| #4       | eczema:ti,ab,kw                                                    | 29,957  |
| #5       | #1 OR #2 OR #3 OR #4                                                | 80,612  |
| #6       | 'bone density'/exp                                                  | 89,969  |
| #7       | 'osteopenia'/exp                                                    | 18,656  |
| #8       | 'osteoporosis'/exp                                                  | 130,081 |
| #9       | 'fracture'/exp                                                      | 330,381 |
| #10      | 'bone mineral density':ti,ab,kw                                    | 56,625  |
| #11      | osteopenia:ti,ab,kw                                                | 15,712  |
| #12      | osteoporosis:ti,ab,kw                                              | 110,324 |
| #13      | fracture:ti,ab,kw                                                  | 220,411 |
| #14      | #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13                   | 522,926 |
| #15      | #5 AND #14                                                          | 923     |
Table S2 Additional details of the included studies

| Endpoint | Author | Year | Region | Outcomes | Crude HR/OR/β (95% CI) | Multivariate OR/HR/adjusted β (95% CI) | Covariates in a fully adjusted model |
|----------|--------|------|--------|----------|------------------------|--------------------------------------|-----------------------------------|
| Fracture | Garg et al. (11) | 2015 | USA | Any fracture | OR 1.49 (1.12–1.96) | OR 1.48 (1.10–1.99) | Not available |
|          | Lowe et al. (13) | 2019 | UK | Any fracture | HR 1.13 (1.11–1.14) | HR 1.07 (1.05–1.09) | Age, sex, general practice, and date of cohort entry, time-updated asthma, index of multiple deprivations, calendar time, BMI, smoking status, harmful alcohol use, oral glucocorticoid exposure |
|          | Garg et al. (10) | 2015 | USA | Fracture and bone or joint injury | – | OR 2.32 (1.71–3.15) | Age, sex, race/ethnicity, Hispanic origin, household income, highest level of household education, family structure, birthplace in the United States, health insurance coverage |
|          | Lowe et al. (11) | 2015 | USA | Hip or spine fracture | OR 1.80 (1.00–3.24) | OR 1.87 (1.02–3.43) | Not available |
|          | Lowe et al. (13) | 2019 | UK | Hip fractures | HR 1.11 (1.07–1.16) | HR 1.06 (1.02–1.11) | Age, sex, race/ethnicity, Hispanic origin, household income, highest level of household education, family structure, birthplace in the United States, health insurance coverage |
|          | Lowe et al. (13) | 2019 | UK | Spine fractures | HR 1.22 (1.14–1.33) | HR 1.14 (1.06–1.23) | Age, sex, race/ethnicity, Hispanic origin, household income, highest level of household education, family structure, birthplace in the United States, health insurance coverage |
|          | Lowe et al. (13) | 2019 | UK | Pelvic fractures | HR 1.12 (1.04–1.21) | HR 1.06 (0.97–1.16) | Age, sex, race/ethnicity, Hispanic origin, household income, highest level of household education, family structure, birthplace in the United States, health insurance coverage |
|          | Lowe et al. (13) | 2019 | UK | Wrist fractures | HR 1.09 (1.05–1.13) | HR 1.06 (1.01–1.10) | Age, sex, race/ethnicity, Hispanic origin, household income, highest level of household education, family structure, birthplace in the United States, health insurance coverage |
|          | Lowe et al. (13) | 2019 | UK | Proximal humeral fractures | HR 1.08 (0.99–1.17) | HR 1.03 (0.94–1.13) | Age, sex, race/ethnicity, Hispanic origin, household income, highest level of household education, family structure, birthplace in the United States, health insurance coverage |
| Osteoporosis | Shaheen et al. (14) (NEDS) | 2019 | USA | Other fracture | OR 1.42 (1.07–1.89) | OR 1.40 (1.04–1.88) | Not available |
|          | Shaheen et al. (14) (NIS) | 2019 | USA | Osteoporosis | – | OR 1.31 (1.12–1.54) | Age, sex, race/ethnicity (white, nonwhite), insurance (private, government, self-pay, no charge, other), and household income quintile |
|          | Wu et al. (12) | 2017 | Taiwan | Osteoporosis | HR 8.01 (6.32–10.16) | HR 4.72 (3.68–6.05) | Age, sex, comorbidities (hypertension, diabetes mellitus, hyperlipidaemia, chronic kidney disease, chronic liver disease, chronic obstructive pulmonary disease, depression), and use of systemic corticosteroids |
| Osteopenia | Shaheen et al. (14) (NEDS) | 2019 | USA | Trochanter | OR 1.86 (1.10–3.15) | OR 1.77 (1.43–2.19) | Not available |
|          | Shaheen et al. (14) (NIS) | 2019 | USA | Osteopenia | – | OR 1.86 (1.36–2.55) | Age, sex, race/ethnicity (white, nonwhite), insurance (private, government, self-pay, no charge, other), and household income quintile |
| Bone mineral density | Garg et al. (11) | 2015 | USA | Total femur | β −0.29 (−0.49 to −0.10) | Adjusted β −0.27 (−0.46 to −0.08) | Not available |
|          | Silverberg et al. (7) | 2015 | USA | Total femur | β −0.50 (−0.80 to −0.20) | Adjusted β −0.42 (−0.68 to −0.16) | Age, gender, race/ethnicity, household income, birthplace in the United States, the highest level of education in the household, body mass index percenttile (ordinal), and milk consumption in the past 30 days (binary) |
|          | Garg et al. (11) | 2015 | USA | Trochanter | β −0.26 (−0.43 to −0.09) | Adjusted β −0.25 (−0.42 to −0.08) | Not available |
|          | Silverberg et al. (7) | 2015 | USA | Trochanter | β −0.31 (−0.57 to −0.05) | Adjusted β −0.29 (−0.54 to −0.05) | Age, gender, race/ethnicity, household income, birthplace in the United States, the highest level of education in the household, body mass index percenttile (ordinal), and milk consumption in the past 30 days (binary) |
|          | Garg et al. (11) | 2015 | USA | Femoral neck | β −0.18 (−0.37 to 0.01) | Adjusted β −0.13 (−0.31 to 0.04) | Not available |
|          | Silverberg et al. (7) | 2015 | USA | Femoral neck | β −0.31 (−0.60 to −0.02) | Adjusted β −0.29 (−0.53 to −0.05) | Age, gender, race/ethnicity, household income, birthplace in the United States, the highest level of education in the household, body mass index percenttile (ordinal), and milk consumption in the past 30 days (binary) |
|          | Garg et al. (11) | 2015 | USA | Total lumbar spine | β −0.18 (−0.37 to 0.01) | Adjusted β −0.22 (−0.41 to −0.03) | Not available |
|          | Silverberg et al. (7) | 2015 | USA | Total lumbar spine | β −0.51 (−0.86 to −0.17) | Adjusted β −0.31 (−0.52 to −0.11) | Age, gender, race/ethnicity, household income, birthplace in the United States, the highest level of education in the household, body mass index percenttile (ordinal), and milk consumption in the past 30 days (binary) |

CI, confidence interval; HR, hazard ratio; OR, odds ratio; RR, relative risk.
Table S3 Methodological quality assessment (risk of bias) of included studies by Newcastle-Ottawa Scales (NOS)

| Study                  | Selection | Comparability | Outcome |
|------------------------|-----------|---------------|---------|
|                        | Case definition | Representativeness | Control selection | Control definition | Assessment of outcome | Length of follow-up | Adequacy of follow-up | Total score |
| Wu et al. (12), 2017   | *         | *             | *       | *       | *                   | *                   | –                   | 8           |
| Lowe et al. (13), 2019 | *         | *             | *       | *       | *                   | *                   | –                   | 8           |
| Shaheen et al. (14), 2019 (NEDS) | *       | *             | *       | *       | *                   | *                   | –                   | 7           |
| Shaheen et al. (14), 2019 (NIS) | *       | *             | *       | *       | *                   | *                   | –                   | 7           |

The asterisks represent a score, each asterisk represents one star.

Table S4 Quality assessment (risk of bias) of included studies by the Agency for Healthcare Research and Quality (AHRQ) checklist

| Item | Pedreira et al. (5), 2007 | Penterich et al. (6), 2012 | Silverberg et al. (7), 2015 | Leung et al. (8), 2017 | Aalto-Korte et al. (9), 1997 | Garg et al. (10), 2015 | Garg et al. (11), 2015 |
|------|---------------------------|-----------------------------|-----------------------------|------------------------|-----------------------------|------------------------|------------------------|
| 1) Define the source of information (survey, record review) | R | R | R | R | R | R | R |
| 2) List inclusion and exclusion criteria for exposed and unexposed subjects (cases and controls) or refer to previous publications | R | U | R | R | R | R | R |
| 3) Indicate time period used for identifying patients | R | U | R | R | Q | R | R |
| 4) Indicate whether or not subjects were consecutive if not population-based | U | U | R | U | U | R | R |
| 5) Indicate if evaluators of subjective components of study were masked to other aspects of the status of the participants | Q | Q | Q | Q | U | R | R |
| 6) Describe any assessments undertaken for quality assurance purposes (e.g., test/retest of primary outcome measurements) | R | U | R | R | Q | R | R |
| 7) Explain any patient exclusions from analysis | R | U | R | R | Q | R | R |
| 8) Describe how confounding was assessed and/or controlled | Q | U | R | R | U | R | R |
| 9) If applicable, explain how missing data were handled in the analysis | Q | U | R | Q | Q | R | R |
| 10) Summarize patient response rates and completeness of data collection | Q | Q | R | Q | Q | R | Q |
| 11) Clarify what follow-up, if any, was expected and the percentage of patients for which incomplete data or follow-up was obtained | Q | Q | Q | Q | Q | Q | Q |

AHRQ methodology checklist for cross-sectional study (http://www.ncbi.nlm.nih.gov/books/NBK35156/). R, yes; Q, no; U, unclear.

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