Vitamin D and Respiratory Tract Infections: Does the sun’s vitamin chase the cold?

Clinical Question: Can regular vitamin D supplementation reduce the frequency, duration, or severity of respiratory tract infection (RTI)?

Bottom-line: Regular use of vitamin D does not reduce the frequency, duration, or severity of RTI in western populations. Infrequent benefits seen in a few studies are at high risk of bias and/or involved children with profound deficiency (example 17.5 nmol/L) in developing countries.

Evidence:
- Three systematic reviews1-3 with 4-11 Randomized Controlled Trials (RCTs) with 1,668-5,660 patients. Vitamin D supplementation:
  - Statistically significantly reduced RTI in two meta-analyses [Odds Ratio 0.64 (0.49-0.84)4 and 0.58 (0.42-0.81)5] but not another [Relative Risk 0.98 (0.93-1.03)].3
    - Why the difference? Numerous large biases, especially the former two: Using odds ratios for common problems exaggerates effects, including selectively reported outcomes, combining unrelated studies, including secondary analyses, inconsistent results, and publication bias.1,2
  - Examining individual RCTs:
    - Any RTI:
      - 162 US adults: No difference.4
      - 164 Finnish military recruits: No difference.5
      - 140 Immuno-compromised patients: Improved non-validated RTI score (not clinically interpretable).6
      - 247 Mongolian children with profound vitamin D deficiency (level=17.5 nmol/L): 0.35 less RTI over three months.7
    - Cold and Flu (mostly cold):
      - 322 New Zealander adults: No effect in any outcome.8
        - This is the highest quality study.
    - Flu:
      - 430 Japanese children mean age 10: No difference.9
453 Afghanistan children age <3 years: Reduced risk of one repeat pneumonia but not multiple pneumonias.10
3,060 Afghanistan children age <1 year: No difference (suggesting earlier results spurious).11

Three RCTs of other conditions looked at RTI secondarily:
Two found no difference,12,13 but the weakest (smallest RCT with grossly under-reported RTI examined retrospectively) found possible reduced cold/flu frequency.14

Context:
Cohort studies suggest patients with low vitamin D levels get more RTI.15
However, low vitamin D status is associated with many ills from weight gain to mortality but vitamin D RCTs rarely find clinical improvements.16,17
Vitamin D is likely a surrogate marker for ill health.16
Cold prevention likely lies with physical interventions like hand-washing.18

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References:

Tools for Practice is a biweekly article summarizing medical evidence with a focus on topical issues and practice modifying information. It is coordinated by G. Michael Allan, MD, CCFP and the content is written by practicing family physicians who are joined occasionally by a health professional from another medical specialty or health discipline. Each article is peer-reviewed, ensuring it maintains a high standard of quality, accuracy, and academic integrity.

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