

Online Supplemental Material

Supplementary Table 1. Search strategy

Database	Databases	Hits
PubMed	"Respiratory Tract Infections"[Mesh] AND ("Nutrients"[Mesh] OR "Vitamin A"[Mesh] OR "Vitamin B 6"[Mesh] OR "Vitamin B 12"[Mesh] OR "Ascorbic Acid"[Mesh] OR "Vitamin D"[Mesh] OR "Vitamin E"[Mesh] OR "Dietary Supplements"[Mesh] OR "Zinc"[Mesh])	2,975
Embase	('respiratory tract infection'/exp/mj OR 'influenza'/exp/mj) AND ('trace element'/exp/mj OR 'nutritional deficiency'/exp/mj OR 'micronutrient intake'/exp/mj OR 'retinol'/exp/mj OR 'pyridoxine'/exp/mj OR 'cyanocobalamin'/exp/mj OR 'ascorbic acid'/exp/mj OR 'alpha tocopherol'/exp/mj OR 'vitamin d'/exp/mj OR 'vitamin supplementation'/exp/mj OR 'zinc'/exp/mj)	1,911
Web of Science	(TOPIC: (influenza) OR TOPIC: (acute respiratory tract infection)) AND (TOPIC: (micronutrient) OR TOPIC: (vitamin a) OR TOPIC: (vitamin b6) OR TOPIC: (vitamin b12) OR TOPIC: (vitamin c) OR TOPIC: (vitamin d) OR TOPIC: (vitamin e) OR TOPIC: (dietary supplement))	818
Total		5,706

Supplementary Table 2. Risk of Bias Assessment of randomized controlled trials

Author (year of publication)	Randomization	Deviation from intended interventions	Missing outcome data	Measurement of outcome	Selective reporting	Overall risk of bias
Abott 1968	Low	Low	Low	Some concerns	Low	Some concerns
al-Nakib 1987	Some concerns	Some concerns	Low	Low	Low	High
Aloia 2007	Low	Low	Some concerns	Some concerns	Low	High
Aloia 2019	Low	Low	High	Some concerns	Low	High
Anderson 1972	Low	Low	Low	Some concerns	Low	Some concerns
Anderson 1974	Low	Low	Low	Some concerns	Low	Some concerns
Anderson 1975	Low	Low	Low	Some concerns	Low	Some concerns
Arihiro 2019	Low	Low	Some concerns	Low	Low	Some concerns
Asfora 1977	Some concerns	Low	Low	Some concerns	Low	High
Audera 2001	Low	Low	Low	Some concerns	Low	Some concerns
Bergman 2015	Low	Low	Some concerns	Some concerns	Low	High
Bernal-Orozco 2015	Low	Low	Low	Low	Low	Low
Briggs 1974	Low	Low	Low	Some concerns	Low	Some concerns
Brown 1945	Some concerns	Some concerns	Low	Some concerns	Low	High
Camargo 2019	Low	Low	Low	Some concerns	Low	Some concerns
Carr 1981	Low	Low	Low	Some concerns	Low	Some concerns
Carson 1975	Low	Low	Low	Some concerns	Low	Some concerns
Charleston 1972	Some concerns	Some concerns	Low	Some concerns	Low	High
Clegg 1975	Low	Low	Low	Some concerns	Low	Some concerns
Cowan 1942	Some concerns	Some concerns	Low	Some concerns	Low	High
Cowan 1950	Some concerns	Low	Low	Some concerns	Low	High
Dahlberg 1944	Low	Low	Low	Some concerns	Low	Some concerns
Dangour 2011	Low	Low	Some concerns	Some concerns	Low	High
De Gruijl 2012	Low	Some concerns	Low	Some concerns	Low	High
Denlinger 2016	Low	Low	Low	Some concerns	Low	Some concerns
Douglas 1987	Low	Low	Some concerns	Low	Low	Some concerns
Eby 1984	Low	Low	High	Some concerns	Low	High
Elwood 1976	Low	Low	Low	Some concerns	Low	Some concerns
Elwood 1977	Low	Low	Low	Some concerns	Low	Some concerns
Farr 1987	Low	Some concerns	Low	Low	Some concerns	High
Franz 1956	Some concerns	Low	Low	Some concerns	Low	High
Ginde 2017	Low	Low	Some concerns	Low	Low	Some concerns
Gironon 1999	Low	Low	Some concerns	Low	Low	Some concerns
Godfrey 1992	Low	Low	Some concerns	Some concerns	Low	High
Goodall 2014	Low	Low	Low	Low	Low	Low
Graat 2002	Low	Low	High	Low	Low	High
Hemila 2004	Low	Low	Low	Low	Low	Low
Hemila 2016 ¹	Low	Low	High	Low	Low	High
Himmelstein 1998	Low	Low	Low	Some concerns	Low	Some concerns

Author (year of publication)	Randomization	Deviation from intended interventions	Missing outcome data	Measurement of outcome	Selective reporting	Overall risk of bias
Hirt 2000	Low	Low	Low	Some concerns	Low	Some concerns
Jain 2002	Some concerns	Low	Low	Low	Low	Some concerns
Johnson 1997	Low	Low	Low	Low	Low	Low
Johnston, 2014	Low	Low	Low	Some concerns	Low	Some concerns
Karlowski 1975	Low	Low	Low	Some concerns	Low	Some concerns
Laaksi 2010	Low	Some concerns	High	Some concerns	High	High
Lewis 1975	Low	High	Low	Some concerns	Low	High
Li-Ng 2009	Low	Low	Low	Some concerns	Low	Some concerns
Martineau 2015, ViDiAs	Low	Low	Low	Some concerns	Low	Some concerns
Martineau 2015, ViDiCO	Low	Low	Some concerns	Some concerns	Low	High
Martineau 2015, ViDiFlu	Low	Low	Some concerns	Some concerns	Low	High
Meydani 2004	Low	Low	High	Low	Low	High
Moolla 1997	Low	Low	Low	Some concerns	Low	Some concerns
Mossad 1996	Low	Low	Low	Some concerns	Low	Some concerns
Mossad 2003	Low	Low	Low	Low	Low	Low
Murdoch 2012	Low	Low	Low	Low	Low	Low
Peters 1993	Low	Low	Low	Some concerns	Low	Some concerns
Peters 1996	Low	Low	Low	Some concerns	Low	Some concerns
Petrus 1998	Some concerns	Some concerns	Low	Some concerns	Low	High
Pitt 1979	Low	Low	Low	Some concerns	Low	Some concerns
Prasad 2000	Low	Low	Low	Some concerns	Low	Some concerns
Prasad 2008	Low	Low	Low	Some concerns	Low	Some concerns
Rees 2013	Low	Low	Low	Some concerns	Some concerns	High
Regnier 1968	Some concerns	Low	Low	Some concerns	Some concerns	High
Sabiston 1974	Low	Low	Low	Some concerns	Low	Some concerns
Sasazuki 2006	Low	Low	Low	Some concerns	Low	Some concerns
Schwartz 1973	Some concerns	Low	Low	Some concerns	Low	High
Shimizu 2018	Low	Low	Low	Some concerns	Low	Some concerns
Simpson 2015	Low	Low	Low	Low	Low	Low
Slow 2018	Low	Low	Some concerns	Low	Low	Some concerns
Smith 1989	Some concerns	Some concerns	High	Some concerns	High	High
Tebrock 1956	Some concerns	Low	Low	Some concerns	Low	High
Tran 2014	Low	Low	Low	Some concerns	Low	Some concerns
Turner 2000	Some concerns	Some concerns	Low	Low	Low	High
Turner 2001	Some concerns	Some concerns	Low	Low	Low	High
Tyrrell 1977	Low	Low	Low	Some concerns	Low	Some concerns
Van Straten 2002	Low	Low	Low	Some concerns	Low	Some concerns
Veverka 2009	Low	Low	Low	Low	Low	Low
Weismann 1990	Some concerns	Some concerns	High	Some concerns	High	High

Supplementary Table 3. Vitamin D supplementation among adults

Author, year	Country; Population characteristics	Sample size; Duration of follow-up, weeks	Female (%)	Mean age, y; Age range	Type of intervention	Dose	Control intervention	Condition	Outcome	Outcome ascertainment	Findings (estimate, 95% CI)
Aloia 2007	USA; Postmenopausal African American women	208; 3 y	100%	60 y	Prevention	2,000 IU/d + Calcium 1,200-1,500 mg	Calcium 1,200-1,500 mg	ARI	Occurrence of illness	Self-report	RR (95% CI): 0.31 (0.15, 0.65)
Aloia 2019	USA; African American women	260; 3 y	100%	NA; 60+ y	Prevention	2,000 IU/d	Placebo	ARI	Occurrence of illness	Self-report	RR (95% CI): 0.96 (0.58, 1.59)
Arihiro 2019	Japan; IBD patients	223; 24 w	61%	44.7 (18, 80)	Prevention	500 IU/d	Placebo	Influenza	Occurrence of illness	Rapid influenza diagnostic test (RIDT)	HR (95% CI): 1.25 (0.45, 3.49)
								URTI	Occurrence of illness	Clinical diagnosis	HR (95% CI): 0.59 (0.35, 0.98)
Bergman 2015	Sweden; Adults with high burden of ARI	124; 52 w	73%	NA	Prevention	4,000 IU/d	Placebo	ARI	Occurrence of illness	Self-report	RR (95% CI): 0.64 (0.43, 0.94)
Camargo 2019	New Zealand; Community dwelling elderly	5,112; 83 w	42%	66 y (50, 84)	Prevention	200,000 IU, 100,000 IU/mo	Placebo	ARI	Occurrence of illness	Self-report	Overall: HR (95% CI): 1.01 (0.94, 1.07)
											<50 nmol/L: 1.08 (0.95, 1.23)
											≥50 nmol/L: 0.99 (0.92, 1.06)
								URTI			1.01 (0.94, 1.07)
								LRTI			1.03 (0.90, 1.17)
De Gruijl 2012	Netherlands	70; 8 w	91%	22 y;	Prevention	1,000 IU/d	No treatment	Colds	Occurrence of illness	Self-report	RR (95% CI): 0.86 (0.58, 1.28)
Denlinger 2016	USA; adults with asthma Subset of African Americans	408; 28 w	0.6813725	39.2 (18, 85)	Prevention	100,000 IU, 4,000 IU/d	Placebo	Colds	Occurrence of illness	Self-report	IRR (95% CI): 1.2 (0.9, 1.5)
									Occurrence of illness		1.7 (1.1, 2.7)
Ginde 2017	USA; Nursing home residents	107; 1y	58%	81 y; 60 – 95 y	Prevention	100,000 IU/mo	Placebo	ARI	Occurrence of illness	Clinical diagnosis	IRR (95% CI): 0.60 (0.38, 0.94)

Author, year	Country; Population characteristics	Sample size; Duration of follow-up, weeks	Female (%)	Mean age, y; Age range	Type of intervention	Dose	Control intervention	Condition	Outcome	Outcome ascertainment	Findings (estimate, 95% CI)
Goodall 2014	Canada; University students	600; 8 w	64%	19 y (18, 21)	Prevention	10,000 IU/w	Placebo	URTI	Occurrence of illness	Clinical diagnosis	RR (95% CI): 0.79 (0.61, 1.03)
									Duration of illness, days		Mean (SD): Ctrl: 6.2 (1.3) Test: 6.0 (1.6)
									Occurrence of illness	PCR	0.54 (0.34, 0.84)
									Duration of illness, days		Mean (SD): Ctrl: 6.2 (1.2) Test: 5.8 (1.5)
Laaksi 2010	Finland; Military conscripts	164; 26 w	0%	18 – 25 y	Prevention	400 IU/d	Placebo	Common cold	Occurrence of illness	Self-report	RR (95% CI): 0.76 (0.58, 0.99)
Li-Ng 2009	USA	162;	80%	59 y; 18+ y	Prevention	2,000 IU/d	Placebo	URTI	Occurrence of illness	Self-report	RR (95% CI): 0.89 (0.70, 1.14)
									Duration of symptoms, days		Mean (SD): Ctrl: 5.3 (3.1) Test: 5.4 (4.8)
									Duration of symptoms per episode		Median (p25) Ctrl: 12 (7) Test: 12 (8) p-value = 0.76
Martineau 2015, ViDiCO	UK; Adults with COPD	240; 1 y	40%	65 y; 40 – 85 y	Prevention	120,000 IU every 2 mo	Placebo	URTI	Occurrence of illness	Self-report	RR (95% CI): 0.99 (0.87, 1.12)
Martineau 2015, ViDiAs	UK; Adults with asthma	250; 1 y	56%	48 y; 16 – 78 y	Prevention	120,000 IU every 2 mo	Placebo	ARI	Occurrence of illness	Self-report	RR (95% CI): 1.13 (0.93, 1.38)
								URTI			RR (95% CI): 1.83 (0.99, 3.41)
								LRTI			RR (95% CI): 1.11 (0.64, 1.92)
Martineau 2015, ViDiFlu	UK; Older adults and their carers	240; 1 y	66%	67 y; 21 – 94 y	Prevention	Resident: 96,000 IU every 2 mo, 400 IU/d Carer: 120,000 IU every 2 mo, 400 IU/d	Placebo	ARI	Occurrence of illness	Self-report	HR (95% CI): 0.96 (0.78, 1.18)
									Duration of symptoms, days		Median (IQR): Ctrl: 5 (3, 11) Test: 6 (3, 13)

Author, year	Country; Population characteristics	Sample size; Duration of follow-up, weeks	Female (%)	Mean age, y; Age range	Type of intervention	Dose	Control intervention	Condition	Outcome	Outcome ascertainment	Findings (estimate, 95% CI)
Murdoch 2012	New Zealand	322; 1.5 y	73%	47 y; ≥18 y	Prevention	200,000 IU; 200,000 IU a month later; 100,000 IU monthly	Placebo	URTI	Occurrence of illness Duration of symptoms, days	PCR	RR (95% CI): 0.99 (0.95, 1.04) Mean: Ctrl: 12 Test: 12 P-value=0.76
Rees 2013	USA; adults with previous colorectal adenoma	759; 1 y	42%	61; (45, 75)	Prevention	1,000 IU/d	Placebo	Winter episodes, URTI	Occurrence of illness	Self-report	HR (95% CI): 0.93 (0.79, 1.09)
								Winter episodes, Colds	Occurrence of illness	Self-report	HR (95% CI): 0.93 (0.78, 1.10)
								Winter episodes, ILI	Occurrence of illness	Self-report	HR (95% CI): 0.95 (0.62, 1.46)
								All seasons episodes, URTI	Occurrence of illness	Self-report	HR (95% CI): 0.94 (0.79, 1.11)
								All seasons episodes, Colds	Occurrence of illness	Self-report	HR (95% CI): 0.94 (0.79, 1.12)
Season episodes, ILI	Occurrence of illness	Self-report	HR (95% CI): 0.99 (0.68, 1.43)								
Shimizu 2018	Japan; Vitamin D deficient adults	215; 16 w	44%	45 – 74 y	Treatment	400 IU/d	Placebo	URTI	Occurrence of illness	Self-report	RR (95% CI): 0.96 (0.85, 1.10)
									Duration of symptoms		Median (95% CI): Ctrl: 13 (10, 19) Test: 10 (7, 12)
Simpson 2015	Australia	34;	59%	32 y; 18 – 52 y	Prevention	20,000 IU weekly	Placebo	ARI	Occurrence of illness	Clinical diagnosis	HR (95% CI): 0.98 (0.59, 1.63)
	Vitamin D deficient subset										HR (95% CI): 0.56 (0.32, 0.96)

Author, year	Country; Population characteristics	Sample size; Duration of follow-up, weeks	Female (%)	Mean age, y; Age range	Type of intervention	Dose	Control intervention	Condition	Outcome	Outcome ascertainment	Findings (estimate, 95% CI)
Slow 2018	New Zealand; On hospital admission	117; 6 w	37%	64 y; ≥ 18 y	Treatment	200,000 IU stat	Placebo	ICU admission for pneumonia	Occurrence of illness	Clinical diagnosis	RR (95% CI): 0.95 (0.89, 1.01)
									Duration of stay		Mean (SD): Ctrl: 4.8 (6.5) Test: 3.8 (3.1)
								Death during follow-up	Occurrence		RR (95% CI): 1.01 (0.94, 1.10)
Tran 2014	Australia	644; 52 w	46%	NA; 60 – 84 y	Prevention	Either 30,000 IU/mo, 60,000 IU/mo	Placebo	Antibiotic use for URTI	Use vs non-use	Self-report	HR (95% CI): 0.84 (0.57, 1.25); 0.72 (0.48, 1.07)
	Subset, age ≥70 y					Either 30,000 IU/mo, 60,000 IU/mo					HR (95% CI) 0.93 (0.55, 1.55) 0.53 (0.32, 0.90)

Supplementary Table 4. Vitamin C supplementation in adults

Author, year	Country; Population characteristics	Sample size; Duration of follow-up, weeks	Female (%)	Mean age, y; Age range	Type of intervention	Condition	Outcome	Outcome ascertainment	Control intervention	Dose of Vitamin C	Findings (estimate, 95% CI)
Abott 1968	UK; Families	270; 28 weeks	50%	All ages	Prevention	Common cold	Symptom relief by 4 th day 7 th day	Self-report	Placebo	1,000 mg/d	Proportions, %: Test: 14% Ctrl: 13% Proportions, %: Test: 67% Ctrl: 63%
Anderson 1972	Canada; Individuals with cold in the previous winter	818	56%	NA; adults	Prevention	Common cold	Occurrence of illness Duration of symptoms	Self-report	Placebo	1,000 mg/d	RR (95% CI): 0.91 (0.85, 0.98) Mean (SE): Ctrl: 6.0 (0.3) Test: 5.3 (0.3)
Anderson 1974	Canada; Staff of large hospitals	2,349	53%	34.4; Adults	Prevention	Common cold	Occurrence of illness	Self-report	Placebo	2,000 mg/d 1,000 mg/d, 4,000 mg stat if ill 1,000 mg/d 250 mg/d	RR (95% CI) 0.97 (0.89, 1.05) 0.94 (0.62, 1.41) 0.93 (0.62, 1.41) 0.95 (0.64, 1.41)
					Treatment		Duration of symptoms, days		Placebo when ill	4,000 mg when ill 8,000 mg when ill	1.02 (0.70, 1.50) 1.02 (0.70, 1.47)
									Placebo	2,000 mg/d 1,000 mg/d, 4,000 mg stat if ill 1,000 mg/d 250 mg/d	Mean (\pm SE): 5.40 (\pm 0.36) 4.87 (\pm 0.31) 5.48 (\pm 0.39) 5.04 (\pm 0.42) 4.77 (\pm 0.29)
									Placebo when ill	4,000 mg when ill	4.16 (0.27) 4.82 (\pm 0.32)

Author, year	Country; Population characteristics	Sample size; Duration of follow-up, weeks	Female (%)	Mean age, y; Age range	Type of intervention	Condition	Outcome	Outcome ascertainment	Control intervention	Dose of Vitamin C	Findings (estimate, 95% CI)
										8,000 mg when ill	4.52 (\pm 0.30)
Anderson 1975	Canada; Staff of large hospitals	622; NA	50%	32.7; (14, 67)	Treatment	Common cold	Duration of symptoms, days	Self-report	Placebo	1,500 mg, Then 1,000 mg/d for 4 days	Mean (\pm SE): Ctrl: 5.38 (\pm 0.42) Capsule: 4.97 (0.51) Tablets: 5.05 (0.38)
Asfora 1977	Brazil; Students, physicians and patients	133; 5 d	59%	NA	Treatment	Common cold	Duration of symptoms, days	Self-report	Placebo	6,000 mg/d	Mean (SD) Ctrl: 7 (4.4) Test: 3.7 (5.6)
Audera 2001	Australia	400; 4 w	44%	39.6; (NA)	Treatment	Common cold	Duration of symptoms, days	Self-report	300mg/d	1,000 mg/d	Mean (95% CI): Ctrl: 8.5 (6.6, 10.5) Trt1: 10.1 (8.1, 12.1) Trt2: 10.4 (8.5, 12.2)
Brown 1945	USA	298; 5 d	NA	NA	Treatment	Common cold	Occurrence of illness	Self-report	Placebo	1,000 mg/d	RR (95% CI): 0.61 (0.34, 1.08)
Briggs 1974	Australia; Working adults	61; 9 w	61%	NA; 19 – 38 y	Prevention	Common cold	Occurrence of illness	Self-report	50 mg/d	1,000 mg/d	RR (95% CI): 1.24 (0.45, 3.42)
							Duration of symptoms, days				Mean: Ctrl: 3.2 Test: 3.3
Carr 1981	Australia; Monozygotic twins	95;	60%	25; (14, 64)	Prevention	Common cold	Occurrence of illness	Self-report	Placebo	1,000 mg/d	IRR (95% CI): 1.11 (0.78, 1.56)
							Duration of symptoms, days				Mean (95% CI) Ctrl: 6.39 Test: 5.18
Carson 1975	UK	244; 40 d	NA	18 – 60 y	Prevention	Common cold	Occurrence of illness	NA	Placebo	1,000 mg/d	RR (95% CI): 1.03 (0.87, 1.22)

Author, year	Country; Population characteristics	Sample size; Duration of follow-up, weeks	Female (%)	Mean age, y; Age range	Type of intervention	Condition	Outcome	Outcome ascertainment	Control intervention	Dose of Vitamin C	Findings (estimate, 95% CI)
Charleston 1972	UK; Staff and students of a university	90;	NA	NA; NA	Prevention	Common cold	Occurrence of illness	Self-report	Placebo	1,000 mg/d	IRR (95% CI): 0.51 (0.33, 0.78)) Mean (SD): Ctrl: 4.2 (0.8) Test: 3.5 (1.9)
Clegg 1975	UK; Staff and students of a university	141; 15 w	36%	NA; NA	Prevention	Common cold	Occurrence of illness Duration of symptoms	Self-report	Placebo	1,000 mg/d, L-ascorbic acid	RR (95% CI): 0.99 (0.47, 2.07) Mean (SD): Ctrl: 7.6 (3) Test: 7.2 (3.1)
Cowan 1942	US; University students	427	NA	NA	Prevention	Common cold	Occurrence of illness Duration of symptoms, days	Self-report	Placebo	200 mg/d	RR (95% CI): 0.97 (0.51, 1.84) Mean: Ctrl: 1.6 Test: 1.1
Cowan 1950	US; Students	153; Till symptoms resolve	NA	NA; NA	Treatment	Common cold	Duration of symptoms, days	Self-report	Placebo	667 mg/d	Trt: 5.6 Ctrl: 5.1
Dahlberg 1944	Sweden; Soldiers	2,525; 30 d	0%	NA	Prevention	Common cold	Occurrence of illness	Self-report	Citric acid	200 mg/d for 25 d, then titrated with 300 mg/d	RR (95% CI): 0.90 (0.71, 1.14)
Elwood 1976	U.K.	688	100%	NA; adults	Prevention	Common cold	Occurrence of illness Duration of symptoms	Self-report	Placebo	1,000 mg/d	HR (95% CI): 1.18 (0.76, 1.82) Mean (Var): Ctrl: 6.4 (40.1) Test: 6.0 (32.8)
Elwood 1977	U.K.	129	50%	NA	Treatment	Common cold	Occurrence of illness	Self-report	Placebo	3,000 mg	Mean (SD) Men: Ctrl: 5.7 (2.5) Test: 4.0 (1.9) Women Ctrl: 5.0 (2.0) Test: 6.1 (3.0)

Author, year	Country; Population characteristics	Sample size; Duration of follow-up, weeks	Female (%)	Mean age, y; Age range	Type of intervention	Condition	Outcome	Outcome ascertainment	Control intervention	Dose of Vitamin C	Findings (estimate, 95% CI)
Franz 1956	US; Students	89; 13 w	50%	NA; NA	Prevention	Common cold	Occurrence of illness	Self-report	Placebo	65 mg/d	RR (95% CI): 1.19 (0.34, 4.14)
Himmelstein 1998	USA; Marathoners and sedentary subjects	92; 8 w	30%	43 y; 22 – 65 y	Prevention	URTI	Occurrence of illness	Self-report	Placebo	1,000 mg/d	RR (95% CI): 0.91 (0.39, 2.14)
							Duration of symptoms, days				Mean (SD): Runners – Ctrl: 5.4 (3.5) Test: 2.7 (2.1)
											Non-runners Ctrl: 2.5 (1.1) Test: 4.2 (3.5)
Johnston, 2014	USA	28; 8 w	0%	NA; (18, 35)	Prevention	Common cold	Occurrence of illness	Self-report	Placebo	1,000 mg/d	RR (95% CI): 0.55 (0.33, 0.94)
							Duration of symptoms, days				MD (95% CI): -3.2 (-7.0, 0.6)
Karlowski 1975	USA; Employees of the NIH	311; 36 w	NA	NA; NA	Prevention	Common cold	2 or more episodes	Self-report	Placebo	1,000 mg/d, 3,000 mg/d at onset of illness	RR (95% CI): 0.87 (0.52, 1.44)
Lewis 1975	USA	311; 36 w	NA	NA; NA	Prevention	Common cold	Duration of symptoms, days	Self-report	Placebo	3,000 mg/d	Mean ±SE: Ctrl: 7.14 ±0.46 Test: 5.92 ±0.40
Moolla 1997	South Africa; Ultra-marathoners	32; 8 w	57%	36 y;	Prevention	URTI	Occurrence of illness	Self-report	Placebo	250 mg/d	RR (95% CI): 0.45 (0.19, 1.07)
	Non-runners										0.72 (0.16, 3.26)
Peters 1993	South Africa; Ultra-marathoners	157; 5 w	2%	≥18 y	Prevention	URTI	Occurrence of illness	Self-report	Placebo	600 mg/d	IRR (95% CI): 0.96 (0.74, 1.33)
							Duration of symptoms				Mean (SD): Ctrl: 5.8 (2.5) Test: 6 (1.0)
	Age-matched non-runners						Occurrence of illness				IRR (95% CI): 0.94 (0.74, 1.20)
							Duration of symptoms				Mean (SD): Ctrl: 5.6 (3.2)

Author, year	Country; Population characteristics	Sample size; Duration of follow-up, weeks	Female (%)	Mean age, y; Age range	Type of intervention	Condition	Outcome	Outcome ascertainment	Control intervention	Dose of Vitamin C	Findings (estimate, 95% CI)
											Test: 4.2 (2.1)
Peters 1996	South Africa; Ultra-marathoners Age-matched non-runners	340; 5 w	41%	36 y;	Prevention	URTI	Occurrence of illness	Self-report	Placebo	500 mg/d	RR (95% CI): 0.50 (0.16, 1.59) 0.39 (0.15, 1.07)
Pitt 1979	USA; Marine recruits	674; 6 w	0%	19 y; (NA)	Prevention	Common cold	Occurrence of illness Duration of symptoms, days	Self-report Self-report	Placebo	2,000 mg/d	RR (95% CI): 0.96 (0.40, 2.35) Mean ±SE: Ctrl: 20.7 ±0.8 Test: 20.3 ±0.9
Regnier 1968	US; Patients with early onset cold	22; Till symptoms resolve, over 3 – 5 y	NA	<12 – 73 y	Treatment	Common cold	Suppression of cold	Self-report	Lactose capsules	600 mg every 3 hrs then titrated	Colds suppressed in 45 out of 50 colds; Colds “untempered” in 22 out of 24 instances
Sabiston 1974	Canada; Soldiers	112	0%	25 y; 19 – 47 y	Prevention	Common cold	Occurrence of illness	Self-report	Placebo	1,000 mg/d	RR (95% CI): 0.43 (0.18, 1.04)
Sasazuki 2006	Japan; Residents of a village with high gastric cancer mortality	305; 5 y	52%	57 y; (NA)	Prevention and treatment	Common cold	Occurrence of illness Duration of symptoms, days	Self-report Self-report	50mg/d	500 mg/d	RR (95% CI): 0.34 (0.12, 0.97) Mean ±SE: Ctrl: 5.9 ±1.5 Test: 7.9 ±2.0
Schwartz 1973	USA; Experimental challenge	21; 2 w	0%	28 y; 22 – 51 y	Prevention	Common cold	Occurrence of illness	Cell culture	Placebo	3,000 mg/d	All participants developed illness
Tebrock 1956	USA	2,000;	46%	33 y	Prevention	Common cold	Occurrence of cough	Self-report	Placebo	50 mg/d	RR (95% CI): 1.00 (0.83, 1.19)
Van Straten 2002	U.K.	168; 8.6 w	84%	48 y; (NA)	Treatment	Common cold Common cold	Duration of symptoms, days Number of episodes	Self-report Self-report	Placebo	1,000 mg/d	Mean ±var: Ctrl: 3.1 ±23.8 Test: 1.8 ±6.7 Mean Ctrl: 50 (2.5) Test: 37 (2.3)
Tyrrell 1977	U.K.	217; NA 265	100% 0%	NA; adults	Treatment	Common cold	Duration of symptoms, days Duration of symptoms, days	Self-report Self-report	Placebo	1,000 mg/d	Mean (SD): Test: 8.2 (4.8) Ctrl: 9.0 (5.3) Ctrl: 7.6 (3.8) Test: 7.4 (3.6)

NIH: National Institutes of Health

Supplementary Table 5. Zinc supplementation to prevent or treat the ARIs among adults

Author, year	Country; Population characteristics	Sample size; Duration	Female (%)	Mean age, y; Range	Type of intervention	Compound; Dose	Control intervention	Condition	Outcome	Outcome ascertainment	Findings (estimate, 95% CI)
al-Nakib 1987	U.K.; experimental challenge study	57; 5 days	47%	31 y; NA	Prevention	23 mg Zinc in gluconate lozenges every 2 h	Placebo	Common cold	Occurrence of illness	Cell culture	RR (95% CI): 0.92 (0.74, 1.16)
Douglas 1987	Australia; Families	55;	54%	33 y;	Treatment	Zinc acetate 10mg, ≥4 times daily	Placebo	URTI	Duration of symptoms	Cell culture	Mean Ctrl: 7.7 Test: 12.1 P-value=0.08
Eby 1984	USA	65; 7 days	46%	37 y (11, 62)	Treatment	23 mg Zinc in gluconate lozenges every 2 h	Placebo	Common cold	Half-life, Duration of symptoms, days	Self-report	MD (SE): -4.8 (-1.38)
Farr 1987	USA; experimental challenge study	39; 5 days	56%	21 y; NA	Treatment	23 mg Zinc in gluconate lozenges	Placebo	Common cold	No of virus positive days	Cell culture and antibody test	MD (SE): 0.6 (1.82)
									Occurrence of illness	Cell culture and antibody test	RR (95% CI): 1.06 (0.95, 1.20)
Godfrey 1992	USA; Recent onset symptoms	73; Till symptoms resolve	40%	21 y;	Treatment	23.7 mg zinc in gluconate lozenges every 2 h	Placebo	Common cold	Duration of symptoms, days	Self-report	Mean: Ctrl: 6.1 Test: 4.9 P-value <0.05
Hirt 2000	USA	213	NA	NA; NA	Treatment	Zinc nasal gel; NA	Placebo	Common cold	Duration of symptoms, days	Self-report	Mean (SD): Ctrl: 9 (2.5) Test: 2.3 (0.9)
Mossad 1996	USA	99; Till symptoms resolve	81%	38 y; NA	Treatment	13.3 mg zinc in gluconate lozenges; every 2 h	Placebo	Common cold	Duration of symptoms, days	Self-report	MD (SE): -3.1 (0.97)
Mossad 2003	USA; Adults with recent (<48h) onset symptoms	80; Till symptoms resolve	63%	28 y; 18 – 55 y	Treatment	Zinc gluconate nasal gel spray	Placebo	Common cold	Duration of symptoms	PCR	Median (IQR): Ctrl: 6 (5, 8.5) Test: 4.3 (2.5, 5.5)
Petrus 1998	USA	100;	53%	27 y; 18 – 54 y	Treatment	9 mg elemental	Placebo	Common cold	Duration of	Self-report	Mean (SE): Ctrl: 5.1 (0.4) Test: 3.8 (0.2)

Author, year	Country; Population characteristics	Sample size; Duration	Female (%)	Mean age, y; Range	Type of intervention	Compound; Dose	Control intervention	Condition	Outcome	Outcome ascertainment	Findings (estimate, 95% CI)
		Till symptoms resolve				zinc in lozenges			symptoms, days		
Prasad 2000	USA; Recent onset symptoms <24h	50; 1 d after symptoms resolve	63%	37 y	Treatment	Zinc acetate, 12.8 mg every 2 – 3 h	Placebo	Common cold	Duration of symptoms, days	Self-report	Mean (SD): Ctrl: 8.1 (1.8) Test: 4.5 (1.6)
Prasad 2008	USA; Volunteers with recent onset cold <24h	50; Till symptoms resolve	68%	35 y; 29 – 41 y	Treatment	Zinc acetate, 13.3 mg every 2 – 3 h	Placebo	Common cold	Duration of symptoms, days	Self-report	Mean (95% CI): Ctrl: 7.1 (6.6, 7.6) Test: 4.0 (3.6, 4.4)
Smith 1989	USA	174; 7 d or until symptoms resolve	NA	NA	Treatment	46 mg zinc stat in gluconate lozenge, 23 mg every 2h	Placebo	URI	Proportion with symptoms on day 7	Self-report	MD (95% CI): 12.6% (-6%, -31.2%)
Turner 2001	USA; Experimental challenge study	91; 3 w	NA	NA; 18+	Prevention	Intranasal Zinc gluconate; 33 mM	Placebo	Common cold	Occurrence of illness	Cell culture and antibody test	RR (95% CI): 1.04 (0.87, 1.24)
Turner 2000	USA; Experimental challenge study	273; 2 w	NA	NA	Treatment	13 mg Zinc in gluconate lozenges, every 2 – 3 hrs	Placebo	Common cold	Duration of symptoms, days	Cell culture	Mean: Ctrl: 3.5 Test: 2.5 Pvalue=0.035
Veverka 2009	USA; Air Force cadets	40; 7 mo	20%	19 y	Prevention	Zinc gluconate 15 mg/d	Placebo	URTI	Occurrence of illness	Clinical diagnosis	RR (95% CI): 1.00 (0.76, 1.31)
Weismann 1990	Denmark	145; 10 d or till symptoms resolve	NA	18 – 65 y	Prevention	Zinc gluconate, 4.5 mg every 1 – 1.5h	Placebo	Common cold	Occurrence of illness	Self-report	RR (95% CI) 1.01 (0.91, 1.13)

IV: Intravenous

Supplementary Table 6. Multiple Micronutrient Supplementation (MMS) to prevent or treat ARI

Author, year	Country; Population characteristics	Sample size; Duration of follow-up	Female (%)	Mean age, y; Age range	Type of intervention	Constituents; Dose	Control intervention	Condition	Outcome	Outcome ascertainment	Findings (estimate, 95% CI)
Bernal-Orozco 2015	Mexico;	59; 13 w	56%	27 y	Prevention	Above RDA for some nutrients, below for others	Placebo	RTI	Occurrence of illness	Clinical diagnosis	IRR (95% CI): 0.60 (0.41, 0.92)
Dangour 2011	Chile;	2,799; 2 y	66%	66 y; 65 – 68 y	Prevention	50% RDA + PA	PA only	Pneumonia	Occurrence of illness	Self-report	RR (95% CI): 0.91 (0.65, 1.26)
Girodon 1999	France; Nursing home residents	725; 1 y	74%	84 y; 65 – 103 y	Prevention	Beta carotene, Vitamin C and Vitamin E at RDA	Placebo	RTI	Occurrence of illness	Clinical diagnosis	RR (95% CI): 0.93 (0.62, 1.41)
Graat 2002	Netherlands; Older people living in community	652; 2 y	50%	73 y; ≥60 y	Prevention	RDA	Placebo	RTI	Occurrence of illness	Clinical diagnosis	IRR (95% CI): 0.95 (0.75, 1.15)
Jain 2002	India	36; 1 y	NA	51 – 78 y	Prevention	RDA	Placebo	RTI	Duration of symptoms, days	Clinical diagnosis	Mean (SD) Ctrl: 29 (4) Test: 14 (2)
									Antibiotic usage		Mean (SD): Ctrl: 58 (5) Test: 27 (4)
									Occurrence of illness	Clinical diagnosis	IRR (95% CI): 0.81 (0.48, 1.38)
Johnson 1997	USA; Nursing home residents	61; 2 y	NA	≥65 y	Prevention	Vitamins, RDA	Placebo	RTI and urogenital infections	Number of episodes	Clinical diagnosis	IRR (95% CI): 0.63 (0.34, 1.18)
						Vitamins, RDA + trace elements					IRR (95% CI): 0.61 (0.33, 1.13)
Peters 1996	South Africa; Ultra-marathoners	178; 5 w	41%	36 y;	Prevention	Vitamin A 30,000 IU, Vitamin E 400 IU/d and Vitamin C 500 mg	Placebo	URTI	Occurrence of illness	Self-report	RR (95% CI): 0.79 (0.69, 0.90)

PA: Physical activity; RDA: Recommended dietary allowance

Supplementary Table 7. Supplementation with other micronutrients

Micronutrient	Author, year	Country; Population characteristics	Sample size; Duration of follow-up	Female (%)	Mean age, y; Age range	Type of intervention	Compound; Dose	Control intervention	Condition	Outcome	Outcome ascertainment	Findings (estimate, 95% CI)
Vitamin A	Hemila 2004	Finland; Smokers in a cancer prevention trial	29,133; 6 y	0%	50 – 69 y	Prevention	20 mg/d	Placebo	Hospital-treated pneumonia	Occurrence of illness	Clinical diagnosis	RR (95% CI): 0.98 (0.85, 1.11)
	Moolla 1997	South Africa; Ultra-marathoners	32; 8 w	57%	36 y;	Prevention	Beta-carotene 4.5 mg/d	Placebo	URTI	Occurrence of illness	Self-report	RR (95% CI): 0.77 (0.54, 1.08)
	Peters 1996	Matched non-runners South Africa; Ultra-marathoners	178; 5 w	41%	36 y;	Prevention	Beta-carotene 18 mg/d, Vitamin E 400 IU/d and Vitamin C 500 mg/d	Vitamin E 400 IU/d and Vitamin C 500 mg/d	URTI	Occurrence of illness	Self-report	RR (95% CI): 0.84 (0.58, 1.21) RR (95% CI): 0.91 (0.81, 1.03)
Vitamin E	Graat 2002	Netherlands; Older people living in community	652; 2 y	50%	73 y; ≥60 y	Prevention	200 mg/d	Placebo	RTI	Occurrence of illness	Clinical diagnosis	IRR (95% CI): 1.12 (0.88, 1.25) Median (IQR): Ctrl: 14 (6, 29) Test: 19 (9, 37)
	Hemila 2004	Finland; Smokers in a cancer prevention trial	29,133; 6 y	0%	50 – 69 y	Prevention	50 mg/d	Placebo	Hospital-treated pneumonia	Occurrence of illness	Clinical diagnosis	RR (95% CI): 1.00 (0.88, 1.14)
	Hemila 2016 ¹	Finland; Smokers in a cancer prevention trial who started smoking age ≥21 y	2,216; 6 y	0%	50 – 69 y	Prevention	50 mg/d	Placebo	Hospital-treated pneumonia	Occurrence of illness	Clinical diagnosis	IRR (95% CI): 0.31 (0.17, 0.57)
		Heavy smokers, ≥20 cigarettes/d	5,253							Occurrence of illness		0.28 (0.11, 0.69)
	Meydani 2004	USA;	617; 52 w	73%	85 y; 65, 103	Prevention	200 IU	Placebo	RTI	Occurrence of illness	Clinical diagnosis	HR (95% CI): 0.92 (0.80, 1.26)

Elderly residents of
33 long-term care
facilities

Duration of
symptoms

Mean:
Ctrl: 15.37
Test: 13.7
P-value=0.27

Colds

Occurrence
of illness

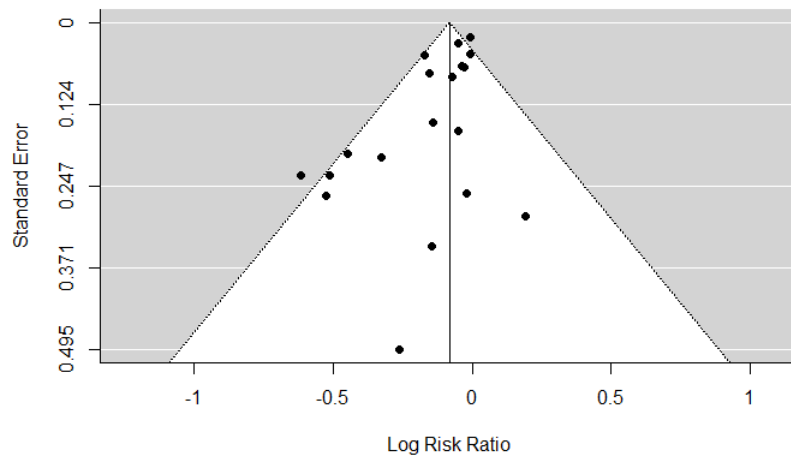
Duration of
symptoms,
days

HR (95% CI):
0.83 (0.68, 1.01)

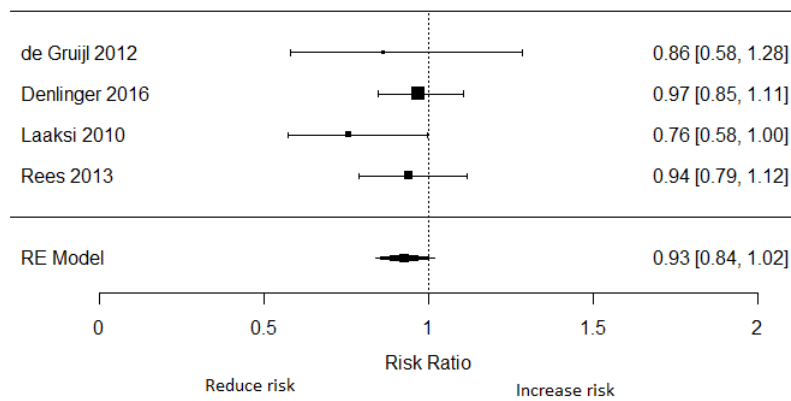
Mean:
Ctrl: 6.2
Test: 7.8
P-value=0.11

PA: Physical activity; RDA: Recommended dietary allowance

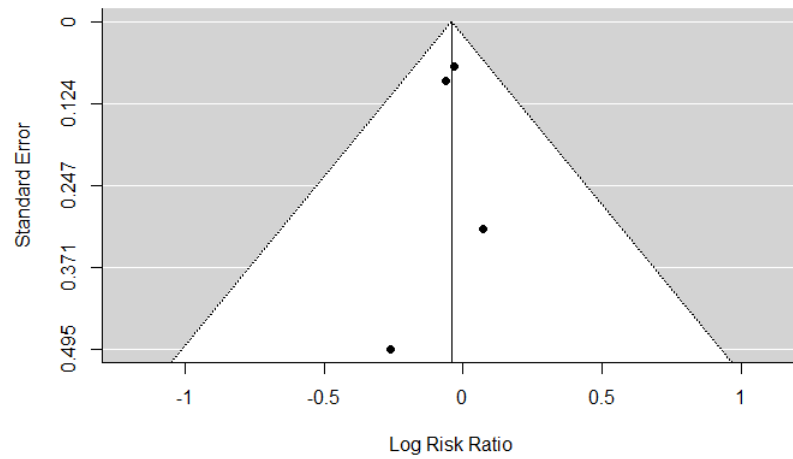
Supplementary Figure 1. Vitamin D to reduce the risk of ARI among adults



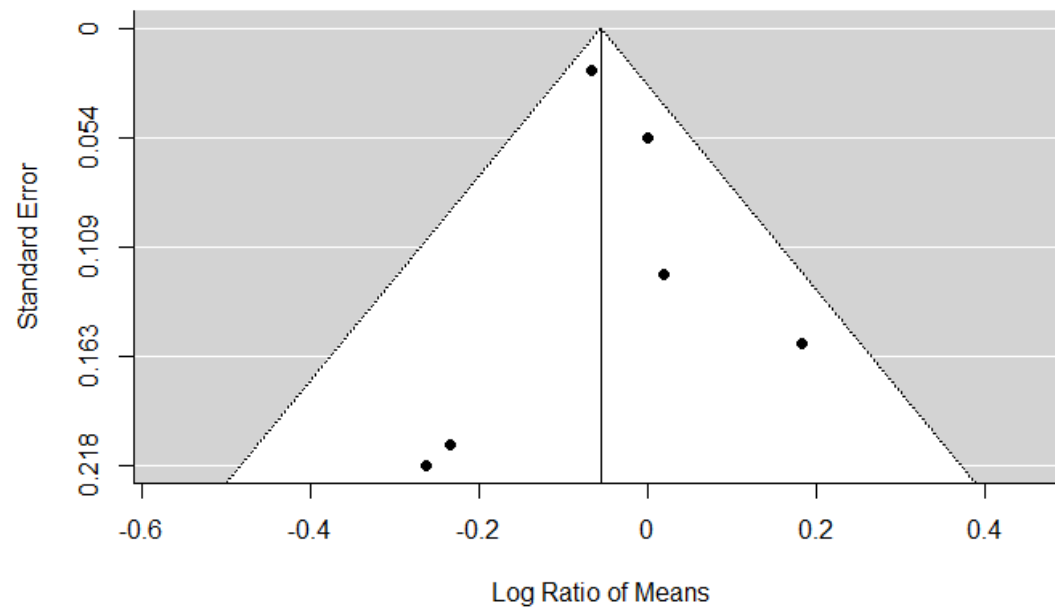
Supplementary Figure 2. Vitamin D to reduce the risk of common cold among adults



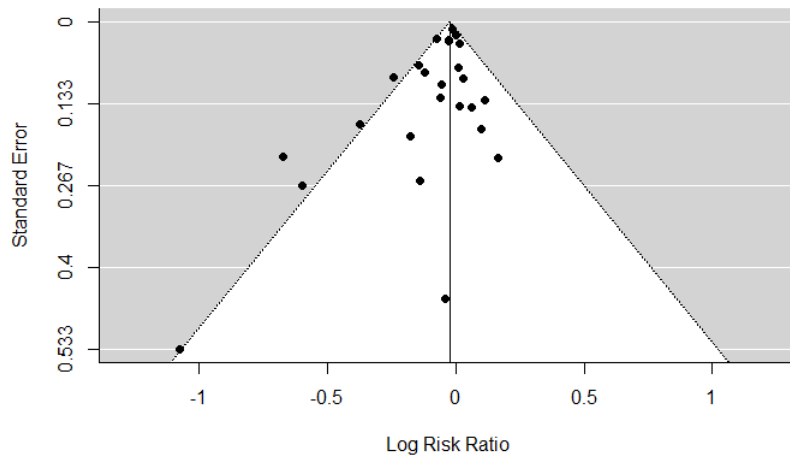
Supplementary Figure 3. Vitamin D to reduce the risk of common cold among adults



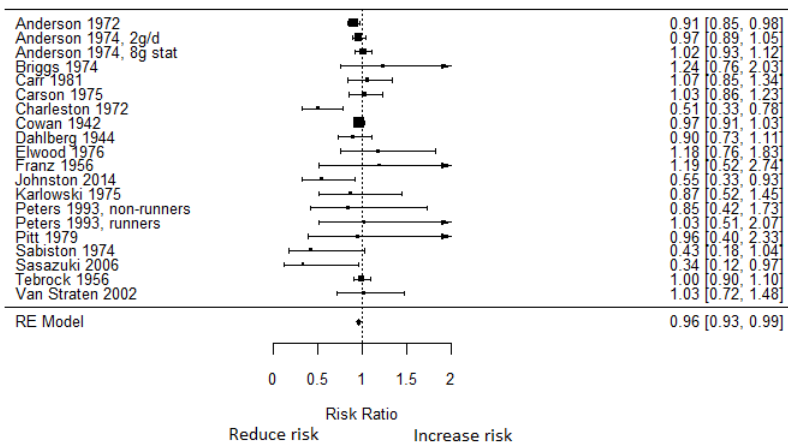
Supplementary Figure 4. Vitamin D to shorten the duration of symptoms of ARI



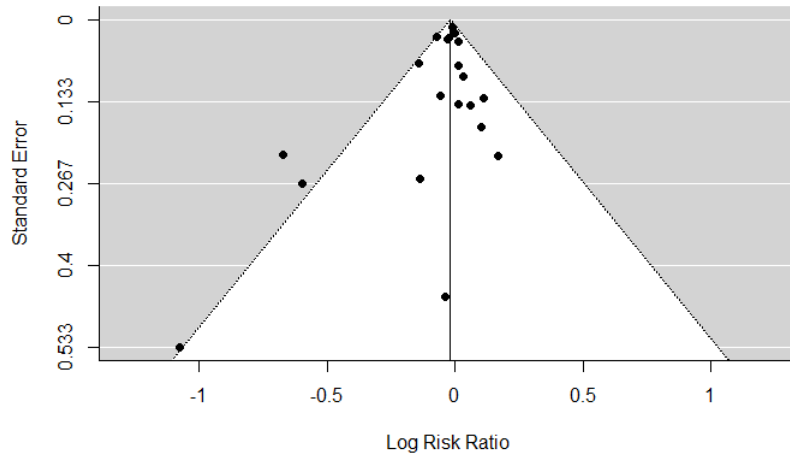
Supplementary Figure 5. Vitamin C and the risk of ARI among adults



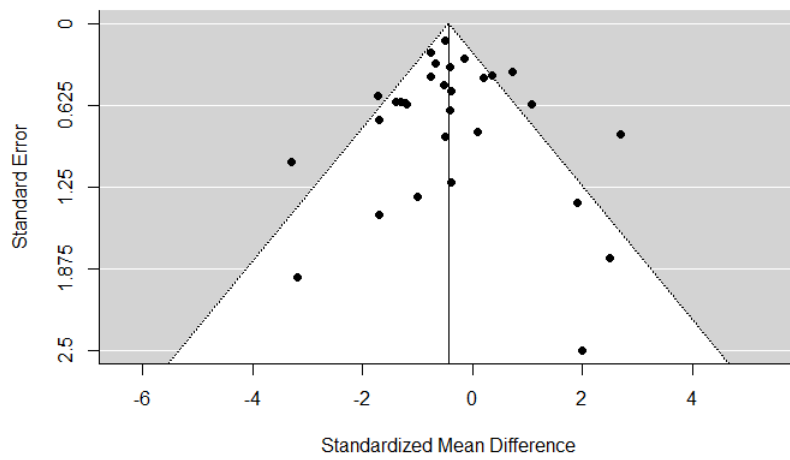
Supplementary Figure 6. Vitamin C and the risk of common cold among adults



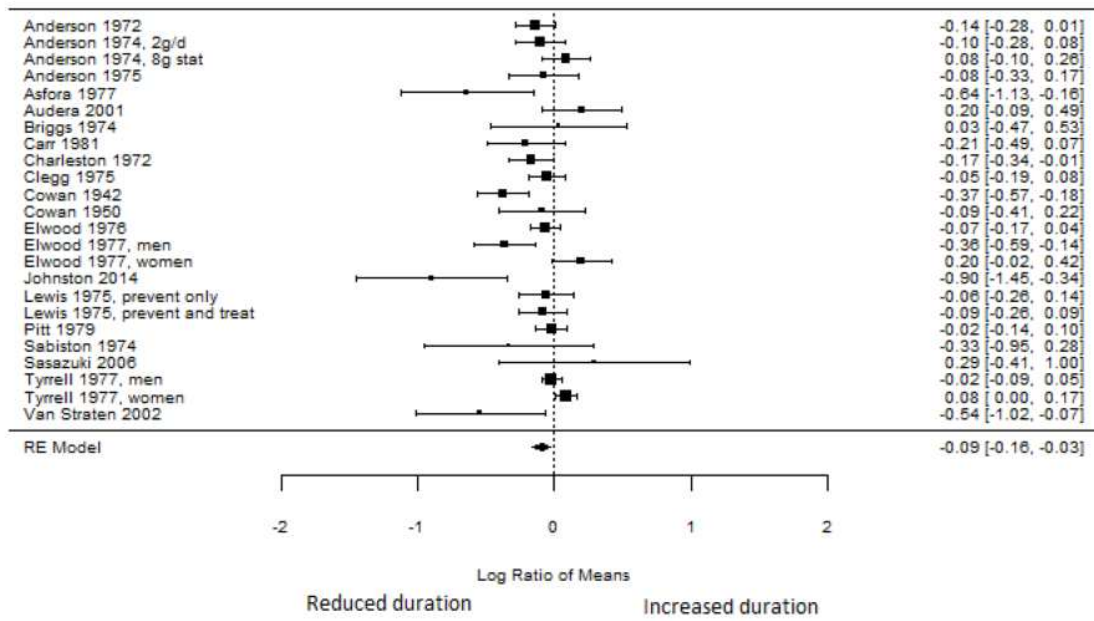
Supplementary Figure 7. Vitamin C and the risk of common cold among adults



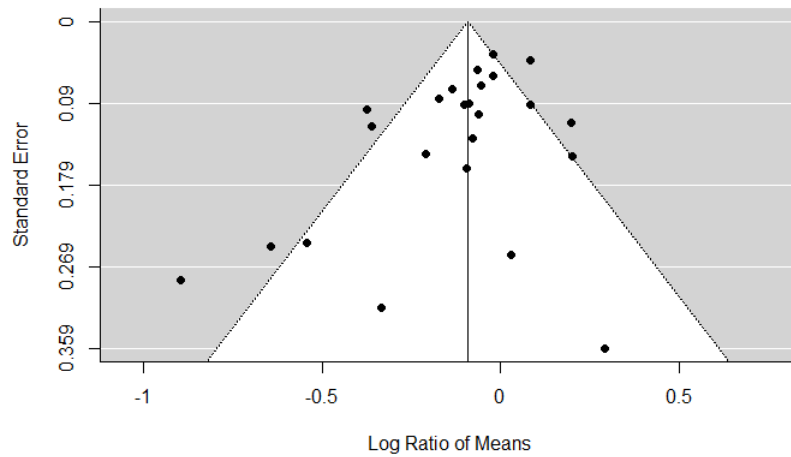
Supplementary Figure 8. Vitamin C to shorten the duration of ARI symptoms



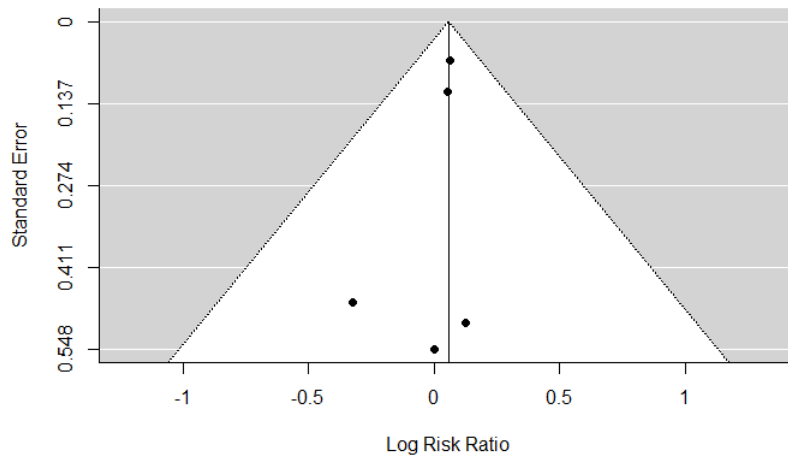
Supplementary Figure 9. Vitamin C to shorten the duration of common cold symptoms



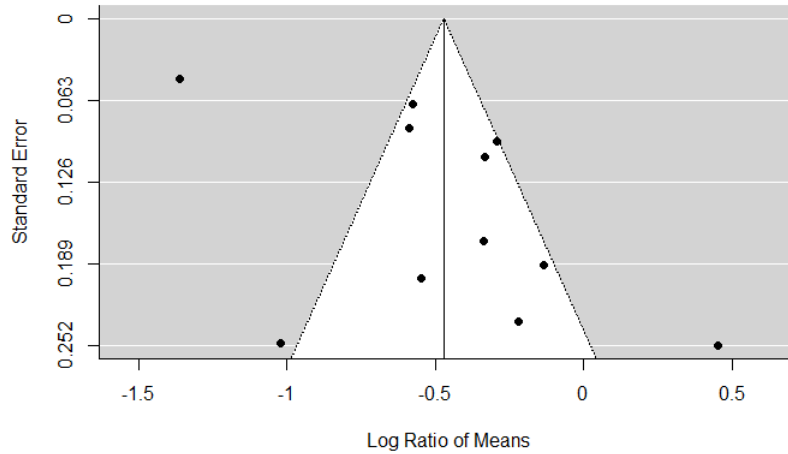
Supplementary Figure 10. Vitamin C to shorten the duration of common cold symptoms



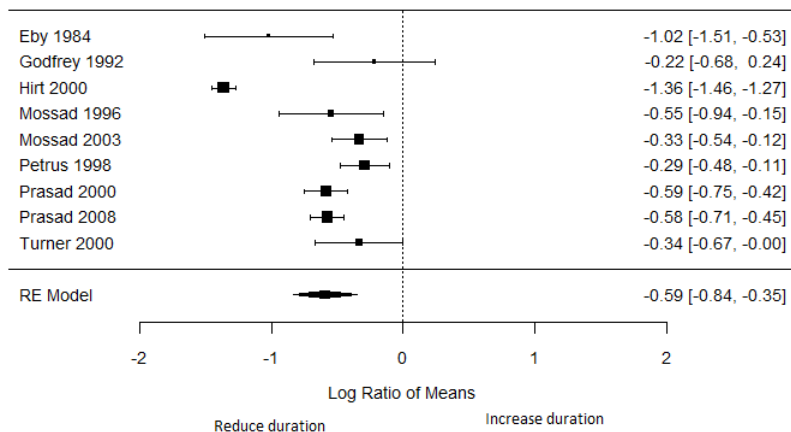
Supplementary Figure 11. Zinc to reduce the risk of ARI



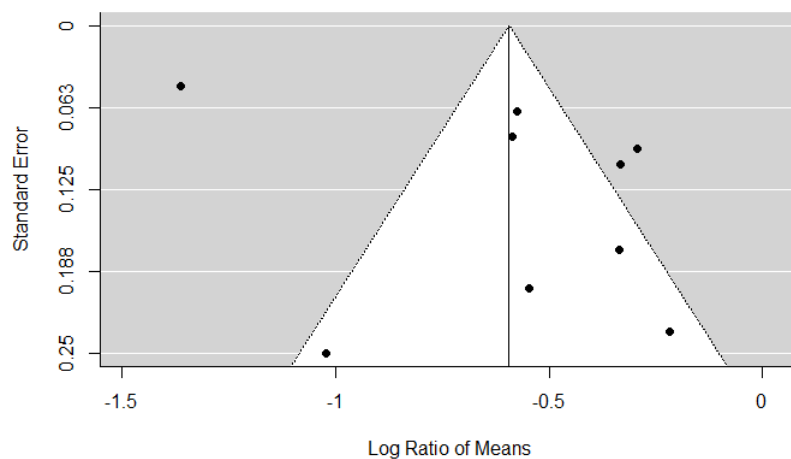
Supplementary Figure 12. Zinc to shorten the duration of symptoms of ARI



Supplementary Figure 13. Zinc supplementation to shorten the duration of common cold symptoms



Supplementary Figure 14. Zinc to shorten the duration of symptoms of common cold



Supplementary Figure 15. Multiple micronutrient supplementation to reduce the risk of ARI

