Healthier diets reduce COVID-19 risk: real-time meta analysis of 30 studies

@CovidAnalysis, July 2025, Version 36
https://c19early.org/dtmeta.html

Abstract

Significantly lower risk is seen for ICU admission, hospitalization, progression, recovery, cases, and viral clearance. 26 studies from 25 independent teams in 10 countries show significant benefit.

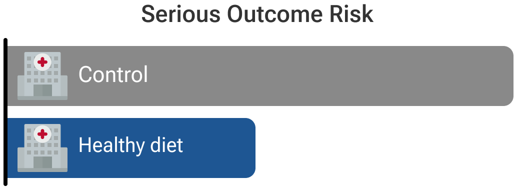
Meta analysis using the most serious outcome reported shows 51% [42-58%] lower risk. Results are similar for higher quality studies.

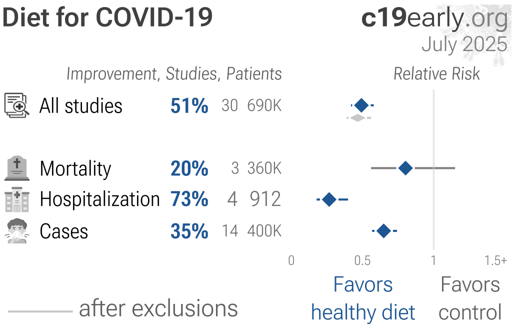
Results are very robust — in exclusion sensitivity analysis 28 of 30 studies must be excluded to avoid finding statistically significant efficacy in pooled analysis.

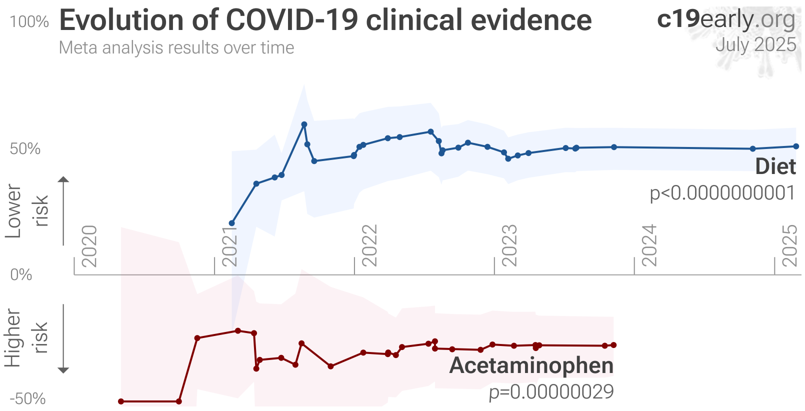
Studies analyze diet quality before infection, and use different definitions of diet quality.

No treatment is 100% effective. Protocols combine safe and effective options with individual risk/benefit analysis and monitoring. All data and sources to reproduce this analysis are in the appendix.

Other meta analyses show significant improvements with diet for hospitalization[1], severity[2], and cases[1,2].





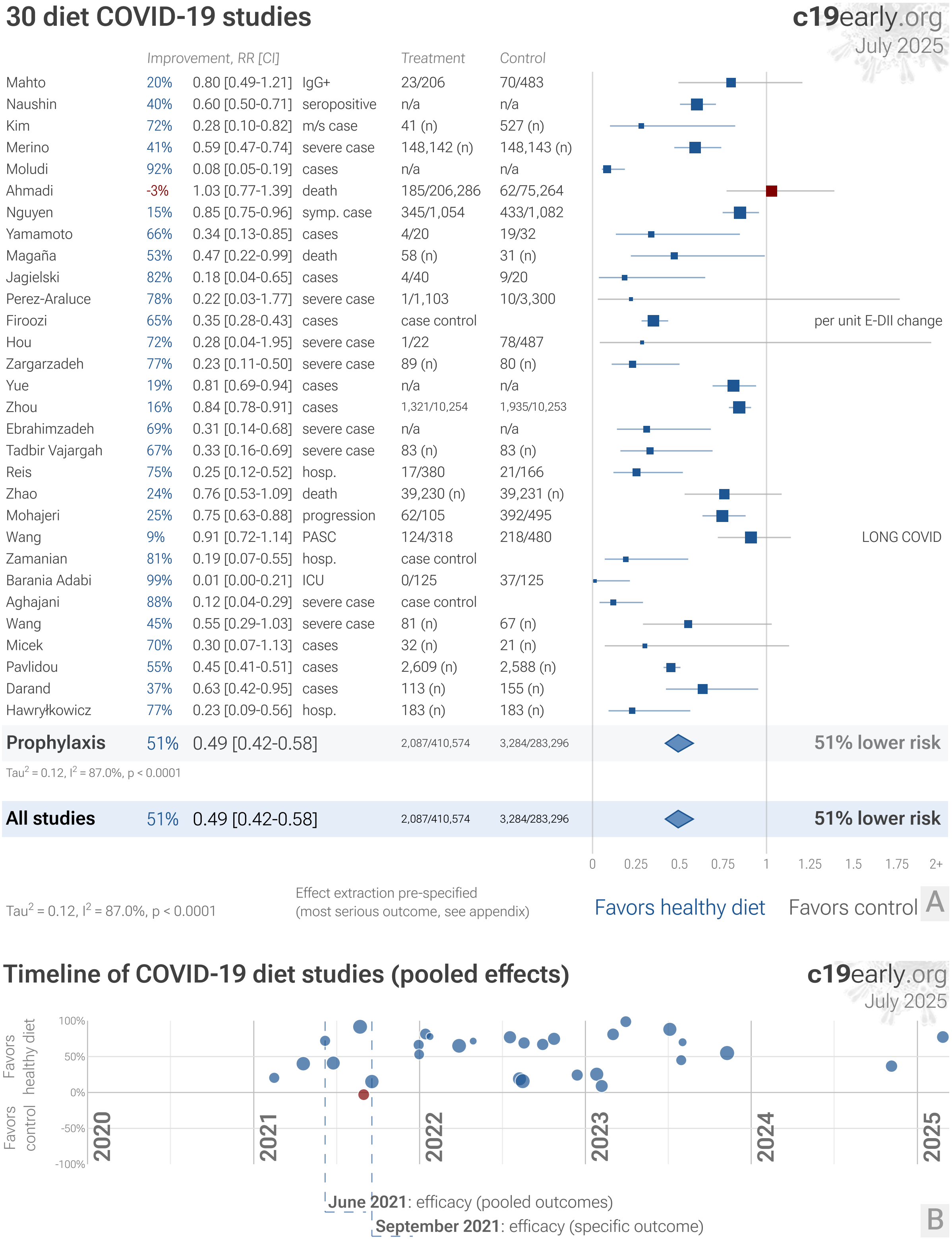


DIET FOR COVID-19 — HIGHLIGHTS

A healthier diet reduces risk with very high confidence for hospitalization, cases, and in pooled analysis, low confidence for ICU admission, progression, recovery, and viral clearance, and very low confidence for mortality.

26th treatment shown effective in June 2021, now with $p < 0.00000000001$ from 30 studies, recognized in 4 countries.

Real-time updates and corrections with a consistent protocol for 172 treatments. Outcome specific analysis and combined evidence from all studies including treatment delay, a primary confounding factor.



	Improvement, RR [CI]			Treatment	Control	
Mahto	20%	0.80 [0.49-1.21]	IgG+	23/206	70/483	
Naushin	40%	0.60 [0.50-0.71]	seropositive	n/a	n/a	
Kim	72%	0.28 [0.10-0.82]	m/s case	41 (n)	527 (n)	
Merino	41%	0.59 [0.47-0.74]	severe case	148,142 (n)	148,143 (n)	
Moludi	92%	0.08 [0.05-0.19]	cases	n/a	n/a	
Ahmadi	-3%	1.03 [0.77-1.39]	death	185/206,286	62/75,264	
Nguyen	15%	0.85 [0.75-0.96]	symp. case	345/1,054	433/1,082	
Yamamoto	66%	0.34 [0.13-0.85]	cases	4/20	19/32	
Magaña	53%	0.47 [0.22-0.99]	death	58 (n)	31 (n)	
Jagielski	82%	0.18 [0.04-0.65]	cases	4/40	9/20	
Perez-Araluce	78%	0.22 [0.03-1.77]	severe case	1/1,103	10/3,300	
Firoozi	65%	0.35 [0.28-0.43]	cases	case control		per unit E-DII change
Hou	72%	0.28 [0.04-1.95]	severe case	1/22	78/487	
Zargarzadeh	77%	0.23 [0.11-0.50]	severe case	89 (n)	80 (n)	
Yue	19%	0.81 [0.69-0.94]	cases	n/a	n/a	
Zhou	16%	0.84 [0.78-0.91]	cases	1,321/10,254	1,935/10,253	
Ebrahimzadeh	69%	0.31 [0.14-0.68]	severe case	n/a	n/a	
Tadbir Vajargah	67%	0.33 [0.16-0.69]	severe case	83 (n)	83 (n)	
Reis	75%	0.25 [0.12-0.52]	hosp.	17/380	21/166	
Zhao	24%	0.76 [0.53-1.09]	death	39,230 (n)	39,231 (n)	
Mohajeri	25%	0.75 [0.63-0.88]	progression	62/105	392/495	
Wang	9%	0.91 [0.72-1.14]	PASC	124/318	218/480	LONG COVID
Zamanian	81%	0.19 [0.07-0.55]	hosp.	case control		
Barania Adabi	99%	0.01 [0.00-0.21]	ICU	0/125	37/125	
Aghajani	88%	0.12 [0.04-0.29]	severe case	case control		
Wang	45%	0.55 [0.29-1.03]	severe case	81 (n)	67 (n)	
Micek	70%	0.30 [0.07-1.13]	cases	32 (n)	21 (n)	
Pavlidou	55%	0.45 [0.41-0.51]	cases	2,609 (n)	2,588 (n)	
Darand	37%	0.63 [0.42-0.95]	cases	113 (n)	155 (n)	
Hawryłkowicz	77%	0.23 [0.09-0.56]	hosp.	183 (n)	183 (n)	
Prophylaxis	51%	0.49 [0.42-0.58]		2,087/410,574	3,284/283,296	51% lower risk
All studies	51%	0.49 [0.42-0.58]		2,087/410,574	3,284/283,296	51% lower risk

Prophylaxis: $Tau^2 = 0.12$, $I^2 = 87.0\%$, $p < 0.0001$

$Tau^2 = 0.12$, $I^2 = 87.0\%$, $p < 0.0001$

Effect extraction pre-specified
(most serious outcome, see appendix)

Figure 1. **A. Random effects meta-analysis.** This plot shows pooled effects, see the specific outcome analyses for individual outcomes. Analysis validating pooled outcomes for COVID-19 can be found below. Effect extraction is pre-specified, using the most serious outcome reported. For details see the appendix. **B. Timeline of results in diet studies.** The marked dates indicate the time when efficacy was known with a statistically significant improvement of ≥10% from ≥3 studies for pooled outcomes and one or more specific outcome. Efficacy based on specific outcomes was delayed by 3.4 months, compared to using pooled outcomes.

Introduction

Diet

Improved diets contains many nutrients shown to be beneficial, enhance immune function, support a healthy gut microbiome, help regulate energy levels and metabolism, and reduce the risk of chronic diseases.

Analysis

We analyze all significant studies reporting COVID-19 outcomes as a function of diet quality and providing adjusted results. Search methods, inclusion criteria, effect extraction criteria (more serious outcomes have priority), all individual study data, PRISMA answers, and statistical methods are detailed in Appendix 1. We present random effects meta-analysis results for all studies, individual outcomes, and higher quality studies.

Results

Table 1 summarizes the results for all studies, after exclusions, and for specific outcomes. Figure 2, 3, 4, 5, 6, 7, 8, 9, and 10 show forest plots for random effects meta-analysis of all studies with pooled effects, mortality results, ICU admission, hospitalization, progression, recovery, cases, viral clearance, and long COVID.

	Relative Risk	Studies	Patients
All studies	0.49 [0.42-0.58] ****	30	690K
After exclusions	0.47 [0.39-0.56] ****	26	690K
Mortality	0.80 [0.56-1.15]	3	360K
Hospitalization	0.27 [0.18-0.40] ****	4	912
Cases	0.65 [0.57-0.74] ****	14	400K

Table 1. **Random effects meta-analysis for all studies, after exclusions, and for specific outcomes.** Results show the relative risk with higher quality diets and the 95% confidence interval. **** *p*<0.0001.

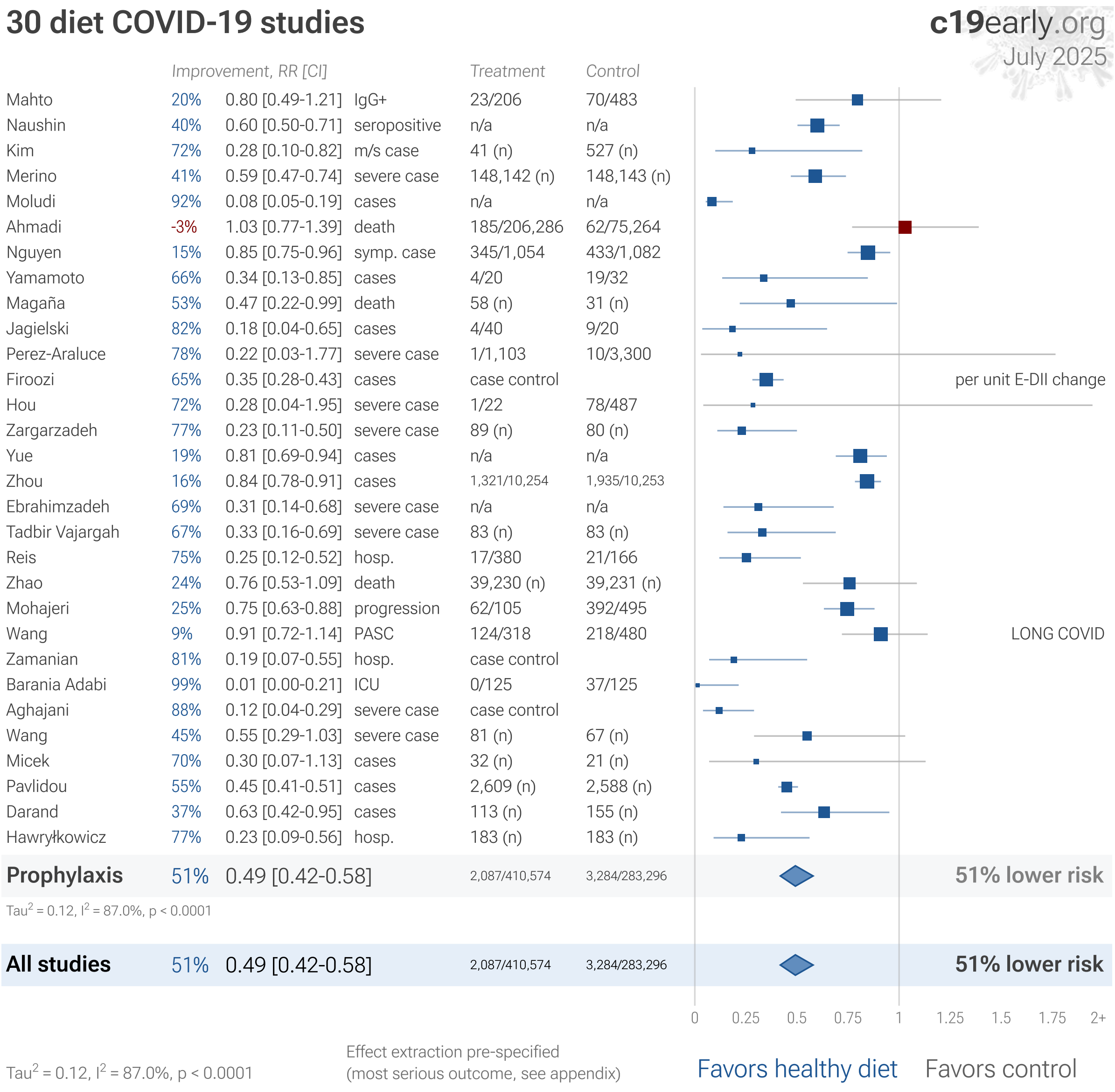


Figure 2. **Random effects meta-analysis for all studies.** This plot shows pooled effects, see the specific outcome analyses for individual outcomes. Analysis validating pooled outcomes for COVID-19 can be found below. Effect extraction is pre-specified, using the most serious outcome reported. For details see the appendix.

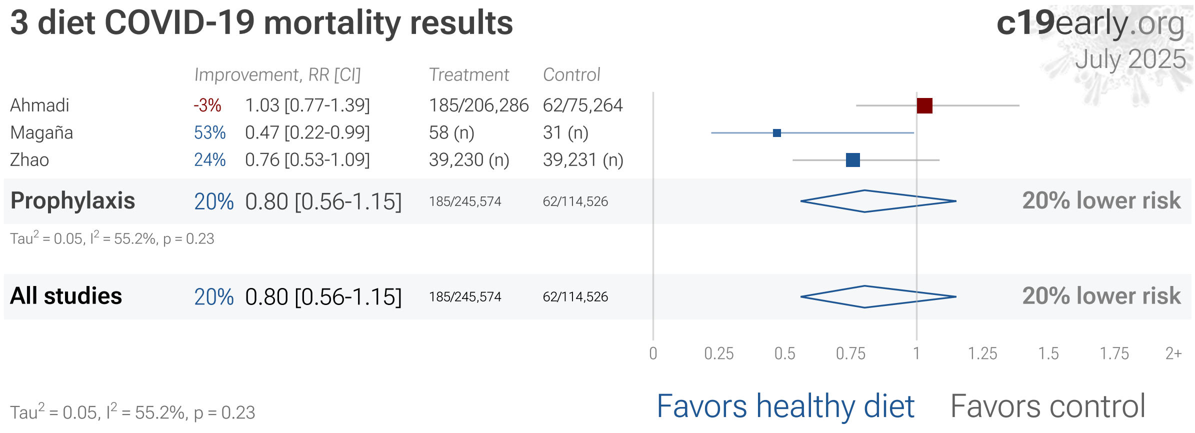


Figure 3. **Random effects meta-analysis for mortality results.**

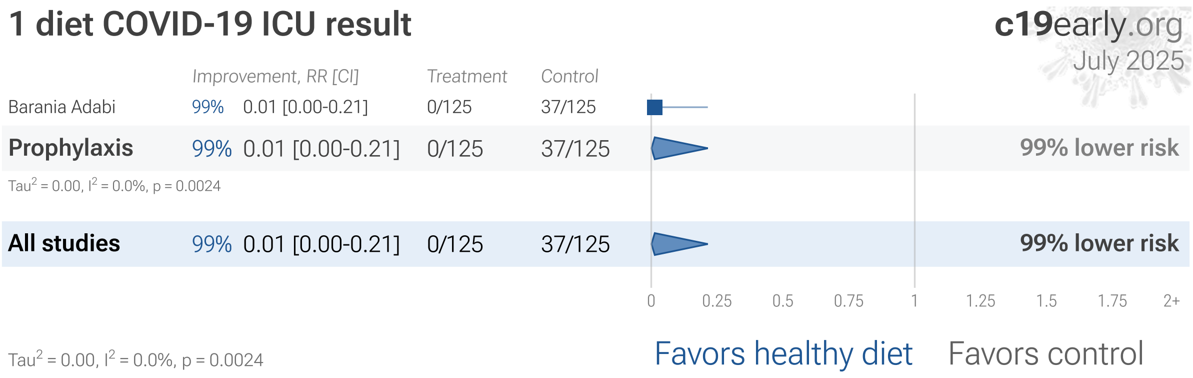


Figure 4. Random effects meta-analysis for ICU admission.

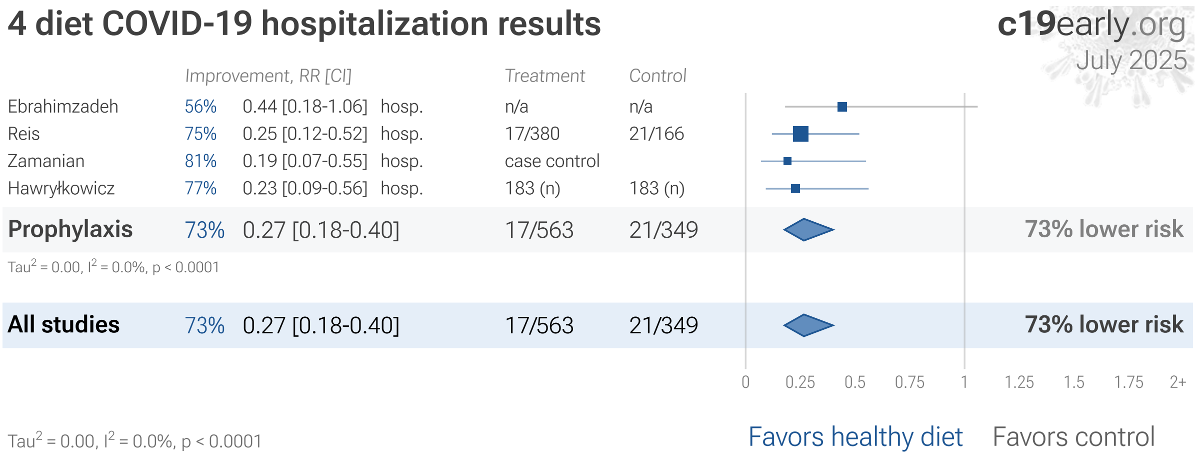


Figure 5. Random effects meta-analysis for hospitalization.

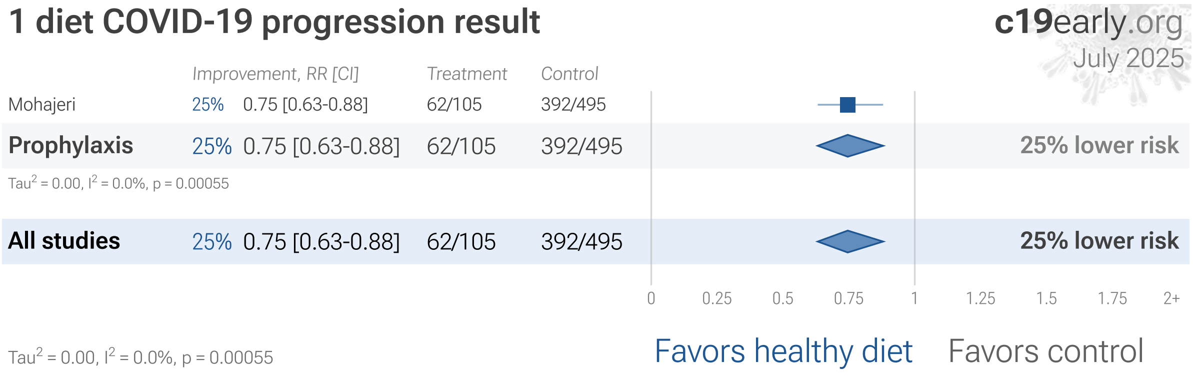
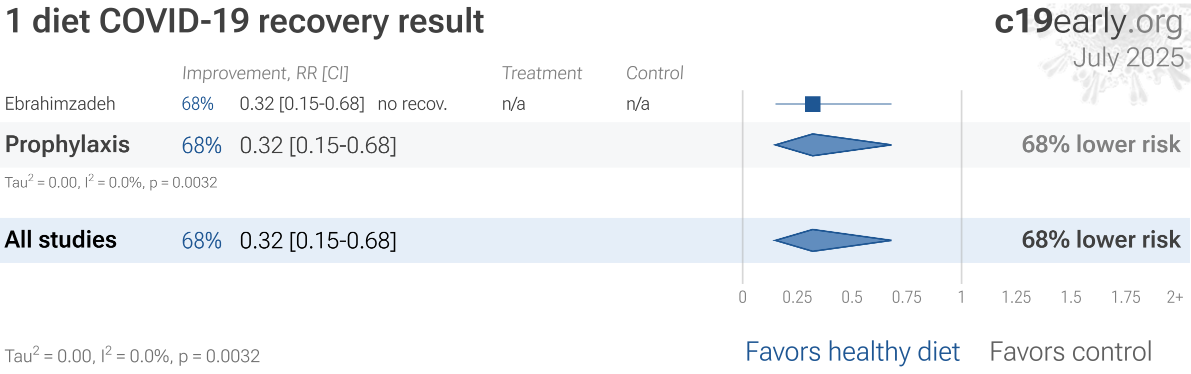


Figure 6. Random effects meta-analysis for progression.



	Improvement, RR [CI]			Treatment	Control	
Ebrahimzadeh	68%	0.32 [0.15-0.68]	no recov.	n/a	n/a	
Prophylaxis	68%	0.32 [0.15-0.68]				**68% lower risk**
Tau^2 = 0.00, I^2 = 0.0%, p = 0.0032						
All studies	68%	0.32 [0.15-0.68]				**68% lower risk**

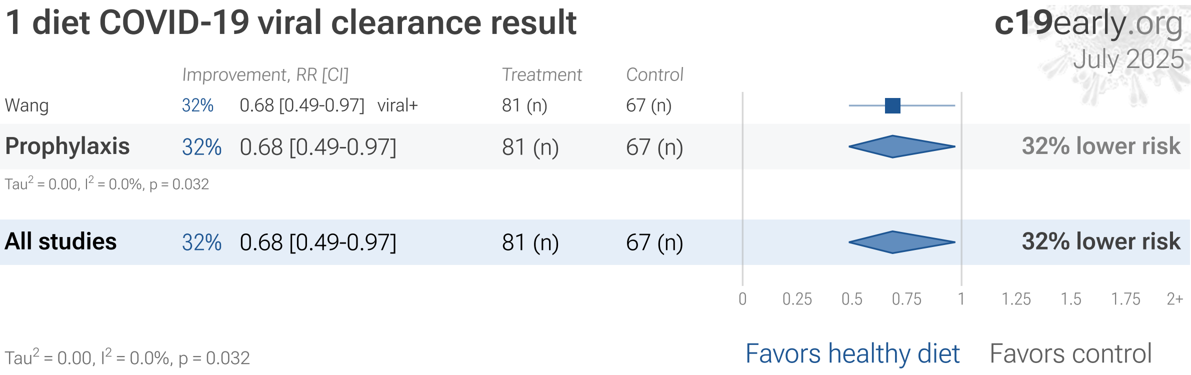
Tau^2 = 0.00, I^2 = 0.0%, p = 0.0032

Figure 7. Random effects meta-analysis for recovery.

	Improvement, RR [CI]			Treatment	Control	
Kim	19%	0.81 [0.56-1.15]	cases	41 (n)	527 (n)	
Merino	18%	0.82 [0.78-0.86]	cases	148,142 (n)	148,143 (n)	
Moludi	92%	0.08 [0.05-0.19]	cases	n/a	n/a	
Nguyen	15%	0.85 [0.75-0.96]	symp. case	345/1,054	433/1,082	
Yamamoto	66%	0.34 [0.13-0.85]	cases	4/20	19/32	
Jagielski	82%	0.18 [0.04-0.65]	cases	4/40	9/20	
Perez-Araluce	15%	0.85 [0.62-1.15]	symp. case	52/1,103	214/3,300	
Firoozi	65%	0.35 [0.28-0.43]	cases	case control		per unit E-DII change
Yue	19%	0.81 [0.69-0.94]	cases	n/a	n/a	
Zhou	16%	0.84 [0.78-0.91]	cases	1,321/10,254	1,935/10,253	
Zhao	15%	0.85 [0.81-0.91]	cases	39,230 (n)	39,231 (n)	
Micek	70%	0.30 [0.07-1.13]	cases	32 (n)	21 (n)	
Pavlidou	55%	0.45 [0.41-0.51]	cases	2,609 (n)	2,588 (n)	
Darand	37%	0.63 [0.42-0.95]	cases	113 (n)	155 (n)	
Prophylaxis	35%	0.65 [0.57-0.74]		1,726/202,638	2,610/205,352	**35% lower risk**
Tau^2 = 0.04, I^2 = 90.3%, p < 0.0001						
All studies	35%	0.65 [0.57-0.74]		1,726/202,638	2,610/205,352	**35% lower risk**

Tau^2 = 0.04, I^2 = 90.3%, p < 0.0001

Figure 8. Random effects meta-analysis for cases.



	Improvement, RR [CI]			Treatment	Control	
Wang	32%	0.68 [0.49-0.97]	viral+	81 (n)	67 (n)	
Prophylaxis	32%	0.68 [0.49-0.97]		81 (n)	67 (n)	**32% lower risk**
Tau^2 = 0.00, I^2 = 0.0%, p = 0.032						
All studies	32%	0.68 [0.49-0.97]		81 (n)	67 (n)	**32% lower risk**

Tau^2 = 0.00, I^2 = 0.0%, p = 0.032

Figure 9. Random effects meta-analysis for viral clearance.

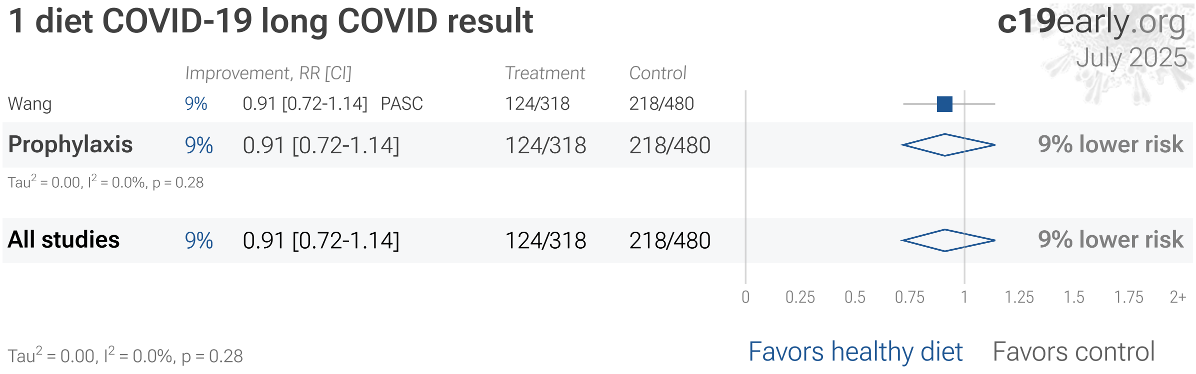


Figure 10. **Random effects meta-analysis for long COVID.** Effect extraction is pre-specified, using the most serious outcome reported, see the appendix for details. Analysis validating pooled outcomes for COVID-19 can be found below.

Exclusions

To avoid bias in the selection of studies, we analyze all non-retracted studies. Here we show the results after excluding studies with major issues likely to alter results, non-standard studies, and studies where very minimal detail is currently available. Our bias evaluation is based on analysis of each study and identifying when there is a significant chance that limitations will substantially change the outcome of the study. We believe this can be more valuable than checklist-based approaches such as Cochrane GRADE, which can be easily influenced by potential bias, may ignore or underemphasize serious issues not captured in the checklists, and may overemphasize issues unlikely to alter outcomes in specific cases (for example certain specifics of randomization with a very large effect size and well-matched baseline characteristics).

The studies excluded are as below. Figure 11 shows a forest plot for random effects meta-analysis of all studies after exclusions.

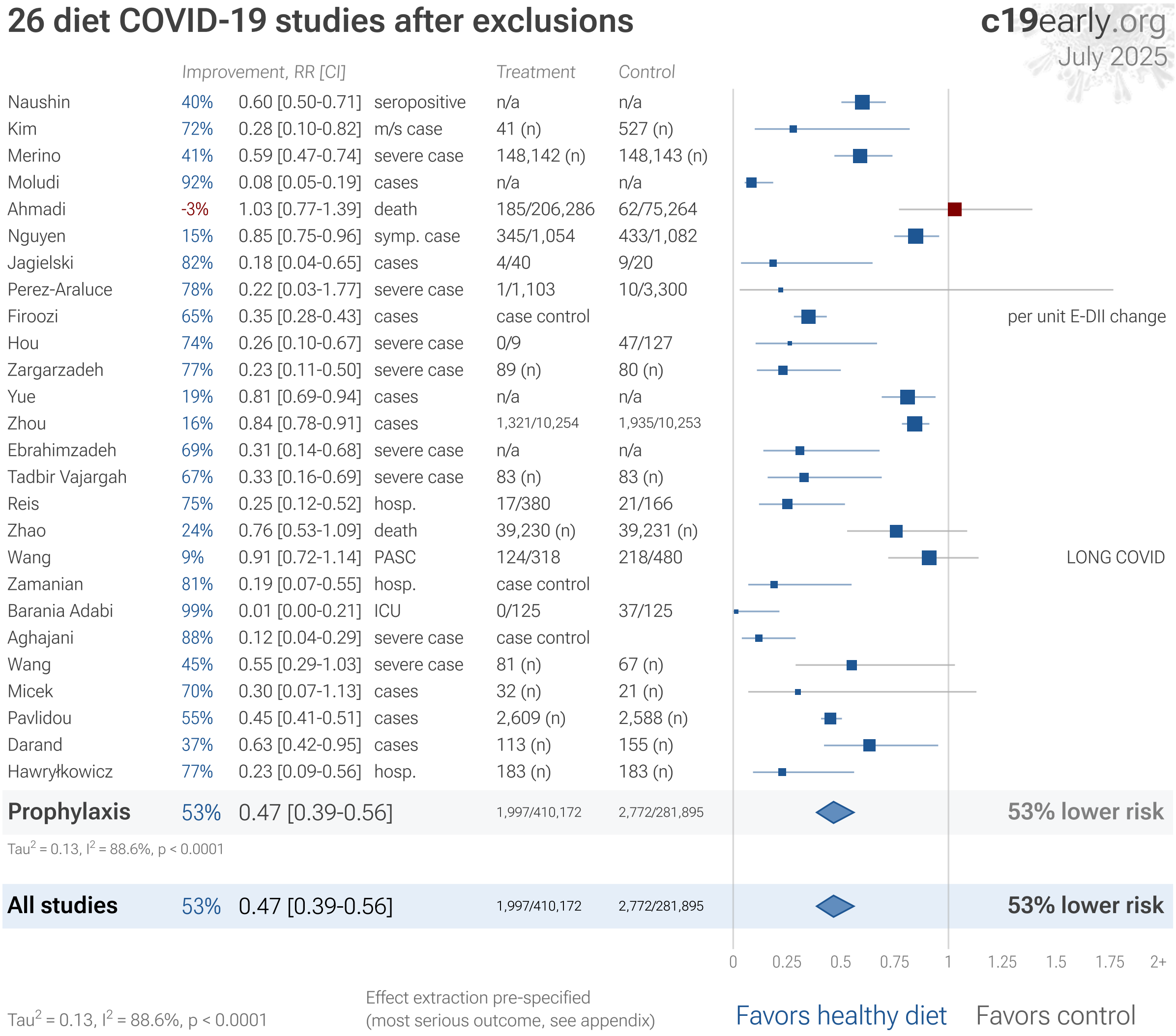
Hou, unadjusted results with no group details. Excluded results: severe case, moderate/severe case.

Magaña, unadjusted results with no group details.

Mahto, unadjusted results with no group details.

Mohajeri, unadjusted results with no group details.

Yamamoto, unadjusted results with no group details.



26 diet COVID-19 studies after exclusions

c19early.org
July 2025

	Improvement, RR [CI]			Treatment	Control	
Naushin	40%	0.60 [0.50-0.71]	seropositive	n/a	n/a	
Kim	72%	0.28 [0.10-0.82]	m/s case	41 (n)	527 (n)	
Merino	41%	0.59 [0.47-0.74]	severe case	148,142 (n)	148,143 (n)	
Moludi	92%	0.08 [0.05-0.19]	cases	n/a	n/a	
Ahmadi	-3%	1.03 [0.77-1.39]	death	185/206,286	62/75,264	
Nguyen	15%	0.85 [0.75-0.96]	symp. case	345/1,054	433/1,082	
Jagielski	82%	0.18 [0.04-0.65]	cases	4/40	9/20	
Perez-Araluce	78%	0.22 [0.03-1.77]	severe case	1/1,103	10/3,300	
Firoozi	65%	0.35 [0.28-0.43]	cases	case control		per unit E-DII change
Hou	74%	0.26 [0.10-0.67]	severe case	0/9	47/127	
Zargarzadeh	77%	0.23 [0.11-0.50]	severe case	89 (n)	80 (n)	
Yue	19%	0.81 [0.69-0.94]	cases	n/a	n/a	
Zhou	16%	0.84 [0.78-0.91]	cases	1,321/10,254	1,935/10,253	
Ebrahimzadeh	69%	0.31 [0.14-0.68]	severe case	n/a	n/a	
Tadbir Vajargah	67%	0.33 [0.16-0.69]	severe case	83 (n)	83 (n)	
Reis	75%	0.25 [0.12-0.52]	hosp.	17/380	21/166	
Zhao	24%	0.76 [0.53-1.09]	death	39,230 (n)	39,231 (n)	
Wang	9%	0.91 [0.72-1.14]	PASC	124/318	218/480	LONG COVID
Zamanian	81%	0.19 [0.07-0.55]	hosp.	case control		
Barania Adabi	99%	0.01 [0.00-0.21]	ICU	0/125	37/125	
Aghajani	88%	0.12 [0.04-0.29]	severe case	case control		
Wang	45%	0.55 [0.29-1.03]	severe case	81 (n)	67 (n)	
Micek	70%	0.30 [0.07-1.13]	cases	32 (n)	21 (n)	
Pavlidou	55%	0.45 [0.41-0.51]	cases	2,609 (n)	2,588 (n)	
Darand	37%	0.63 [0.42-0.95]	cases	113 (n)	155 (n)	
Hawryłkowicz	77%	0.23 [0.09-0.56]	hosp.	183 (n)	183 (n)	
Prophylaxis	53%	0.47 [0.39-0.56]		1,997/410,172	2,772/281,895	53% lower risk
All studies	53%	0.47 [0.39-0.56]		1,997/410,172	2,772/281,895	**53% lower risk**

Prophylaxis: $Tau^2 = 0.13$, $I^2 = 88.6\%$, $p < 0.0001$

$Tau^2 = 0.13$, $I^2 = 88.6\%$, $p < 0.0001$

Effect extraction pre-specified
(most serious outcome, see appendix)

Figure 11. **Random effects meta-analysis for all studies after exclusions.** This plot shows pooled effects, see the specific outcome analyses for individual outcomes. Analysis validating pooled outcomes for COVID-19 can be found below. Effect extraction is pre-specified, using the most serious outcome reported. For details see the appendix.

Pooled Effects

Pooled effects are no longer required to show efficacy as of September 2021

This section validates the use of pooled effects for COVID-19, which enables earlier detection of efficacy, however pooled effects are no longer required for diet as of September 2021. Efficacy is now known based on specific outcomes. Efficacy based on specific outcomes was delayed by 3.4 months compared to using pooled outcomes.

Combining studies is required

For COVID-19, delay in clinical results translates into additional death and morbidity, as well as additional economic and societal damage. Combining the results of studies reporting different outcomes is required. There may be no mortality in a trial with low-risk patients, however a reduction in severity or improved viral clearance may translate into lower mortality in a high-risk population. Different studies may report lower severity, improved recovery, and lower mortality, and the significance may be very high when combining the results. *"The studies reported different outcomes"* is not a good reason for disregarding results. Pooling the results of studies reporting different outcomes allows us to use more of the available information. Logically we should, and do, use additional information when evaluating treatments—for example dose-response and treatment delay-response relationships provide additional evidence of efficacy that is considered when reviewing the evidence for a treatment.

Specific outcome and pooled analyses

We present both specific outcome and pooled analyses. In order to combine the results of studies reporting different outcomes we use the most serious outcome reported in each study, based on the thesis that improvement in the most serious outcome provides comparable measures of efficacy for a treatment. A critical advantage of this approach is simplicity and transparency. There are many other ways to combine evidence for different outcomes, along with additional evidence such as dose-response relationships, however these increase complexity.

Ethical and practical issues limit high-risk trials

Trials with high-risk patients may be restricted due to ethics for treatments that are known or expected to be effective, and they increase difficulty for recruiting. Using less severe outcomes as a proxy for more serious outcomes allows faster and safer collection of evidence.

Validating pooled outcome analysis for COVID-19

For many COVID-19 treatments, a reduction in mortality logically follows from a reduction in hospitalization, which follows from a reduction in symptomatic cases, which follows from a reduction in PCR positivity. We can directly test this for COVID-19.

Analysis of the the association between different outcomes across studies from all 172 treatments we cover confirms the validity of pooled outcome analysis for COVID-19. Figure 12 shows that lower hospitalization is very strongly associated with lower mortality ($p < 0.000000000001$). Similarly, Figure 13 shows that improved recovery is very strongly associated with lower mortality ($p < 0.000000000001$). Considering the extremes, *Singh et al.* show an association between viral clearance and hospitalization or death, with $p = 0.003$ after excluding one large outlier from a mutagenic treatment, and based on 44 RCTs including 52,384 patients. Figure 14 shows that improved viral clearance is strongly associated with fewer serious outcomes. The association is very similar to *Singh et al.*, with higher confidence due to the larger number of studies. As with *Singh et al.*, the confidence increases when excluding the outlier treatment, from $p = 0.000000082$ to $p = 0.0000000033$.

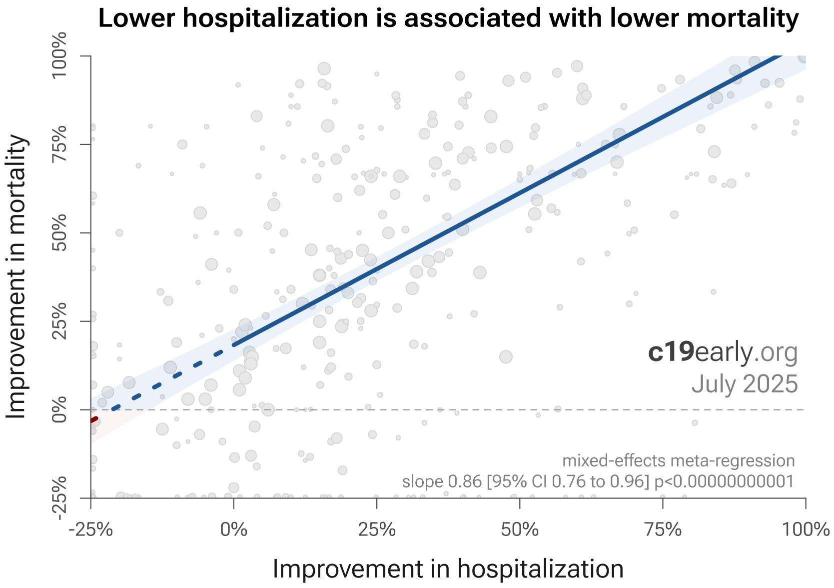


Figure 12. **Lower hospitalization is associated with lower mortality, supporting pooled outcome analysis.**

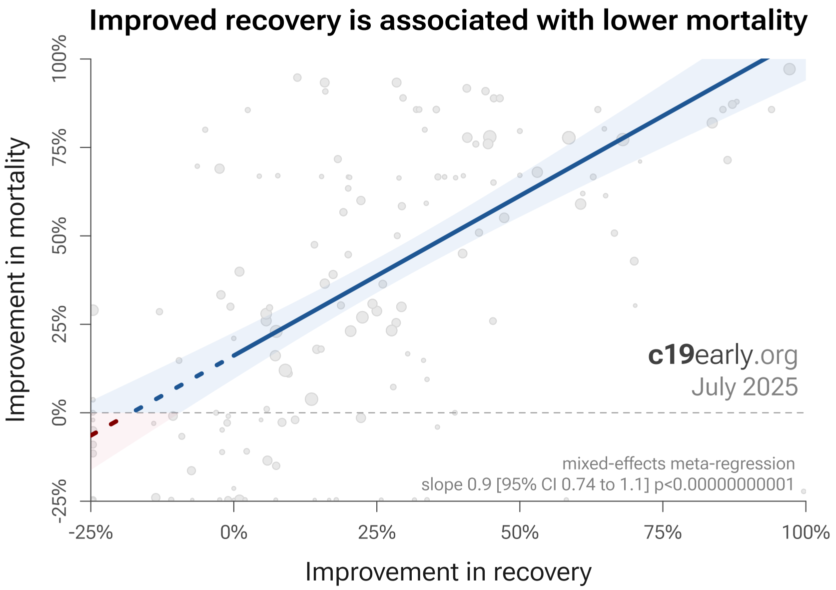


Figure 13. **Improved recovery is associated with lower mortality, supporting pooled outcome analysis.**

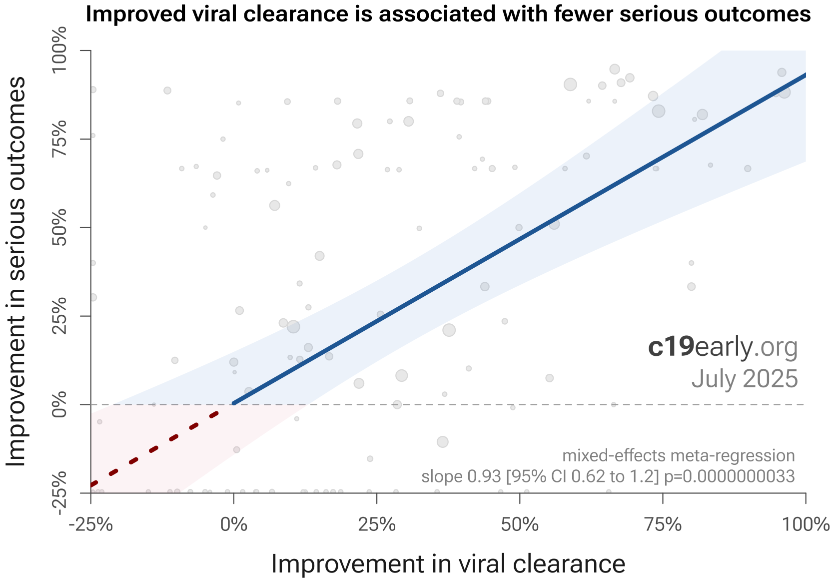


Figure 12. **Improved viral clearance is associated with fewer serious outcomes, supporting pooled outcome analysis.**

Pooled outcomes identify efficacy 5 months faster (7 months for RCTs)

Currently, 55 of the treatments we analyze show statistically significant efficacy or harm, defined as ≥10% decreased risk or >0% increased risk from ≥3 studies. 88% of these have been confirmed with one or more specific outcomes, with a mean delay of 4.9 months. When restricting to RCTs only, 57% of treatments showing statistically significant efficacy/harm with pooled effects have been confirmed with one or more specific outcomes, with a mean delay of 7.3 months. Figure 15 shows when treatments were found effective during the pandemic. Pooled outcomes often resulted in earlier detection of efficacy.

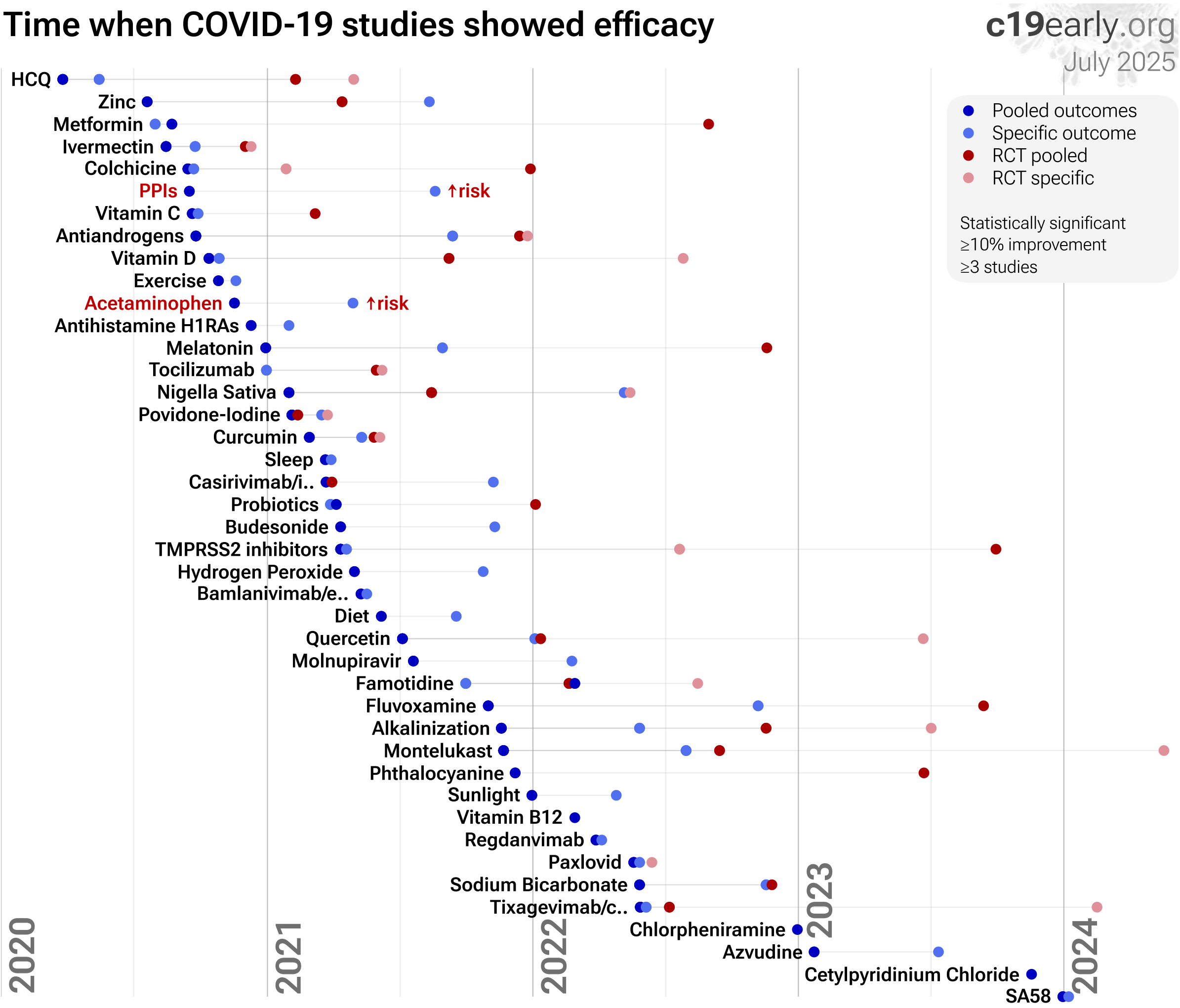


Figure 15. **The time when studies showed that treatments were effective, defined as statistically significant improvement of ≥10% from ≥3 studies.** Pooled results typically show efficacy earlier than specific outcome results. Results from all studies often shows efficacy much earlier than when restricting to RCTs. Results reflect conditions as used in trials to date, these depend on the population treated, treatment delay, and treatment regimen.

Limitations

Pooled analysis could hide efficacy, for example a treatment that is beneficial for late stage patients but has no effect on viral clearance may show no efficacy if most studies only examine viral clearance. In practice, it is rare for a non-antiviral treatment to report viral clearance and to not report clinical outcomes; and in practice other sources of heterogeneity such as difference in treatment delay is more likely to hide efficacy.

Summary

Analysis validates the use of pooled effects and shows significantly faster detection of efficacy on average. However, as with all meta analyses, it is important to review the different studies included. We also present individual outcome analyses, which may be more informative for specific use cases.

Discussion

Notes

Currently all studies are peer-reviewed. Other meta analyses show significant improvements with diet for hospitalization[1], severity[2], and cases[1,2].

Reviews

Many reviews cover diet for COVID-19, presenting additional background on mechanisms and related results, including[9-14].

Perspective

Results compared with other treatments

SARS-CoV-2 infection and replication involves a complex interplay of 100+ host and viral proteins and other factors[15-22], providing many therapeutic targets. Over 9,000 compounds have been predicted to reduce COVID-19 risk[23], either by directly minimizing infection or replication, by supporting immune system function, or by minimizing secondary complications. Improved diets contains many nutrients shown to be beneficial, enhance immune function, support a healthy gut microbiome, help regulate energy levels and metabolism, and reduce the risk of chronic diseases. Figure 16 shows an overview of the results for diet in the context of multiple COVID-19 treatments, and Figure 17 shows a plot of efficacy vs. cost for COVID-19 treatments.

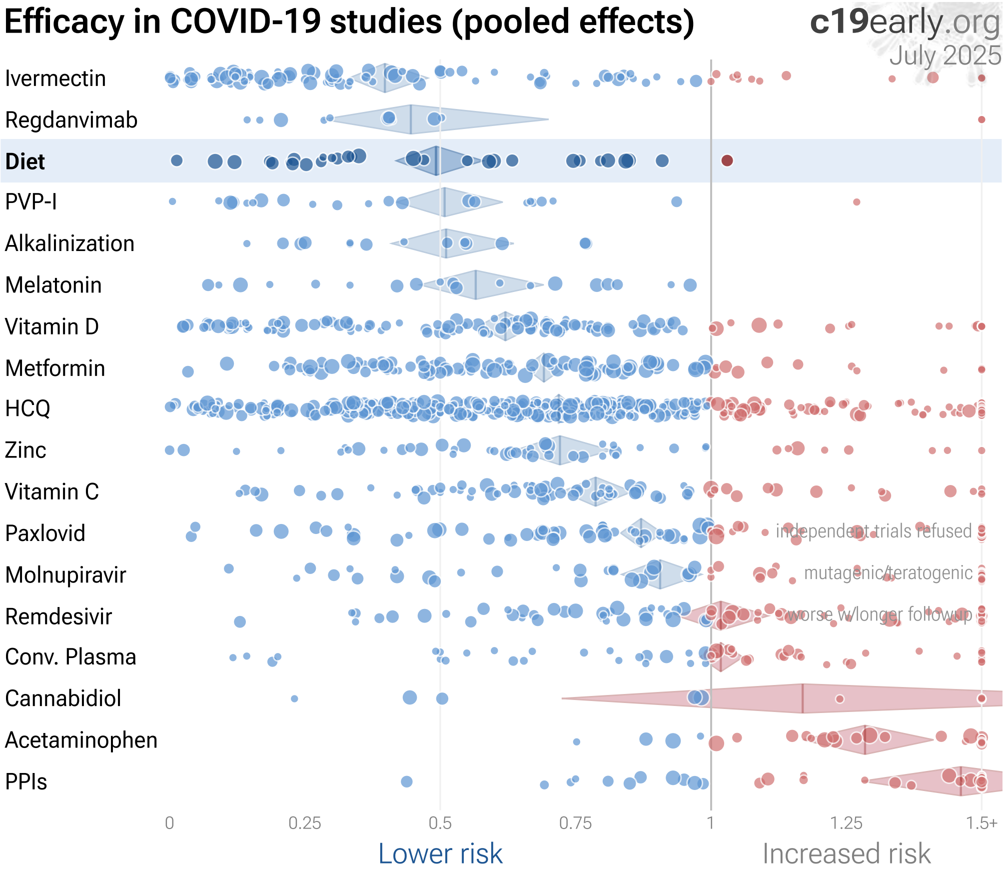


***Figure 16.* Scatter plot showing results within the context of multiple COVID-19 treatments.** Diamonds shows the results of random effects meta-analysis. 0.6% of 9,000+ proposed treatments show efficacy[24].

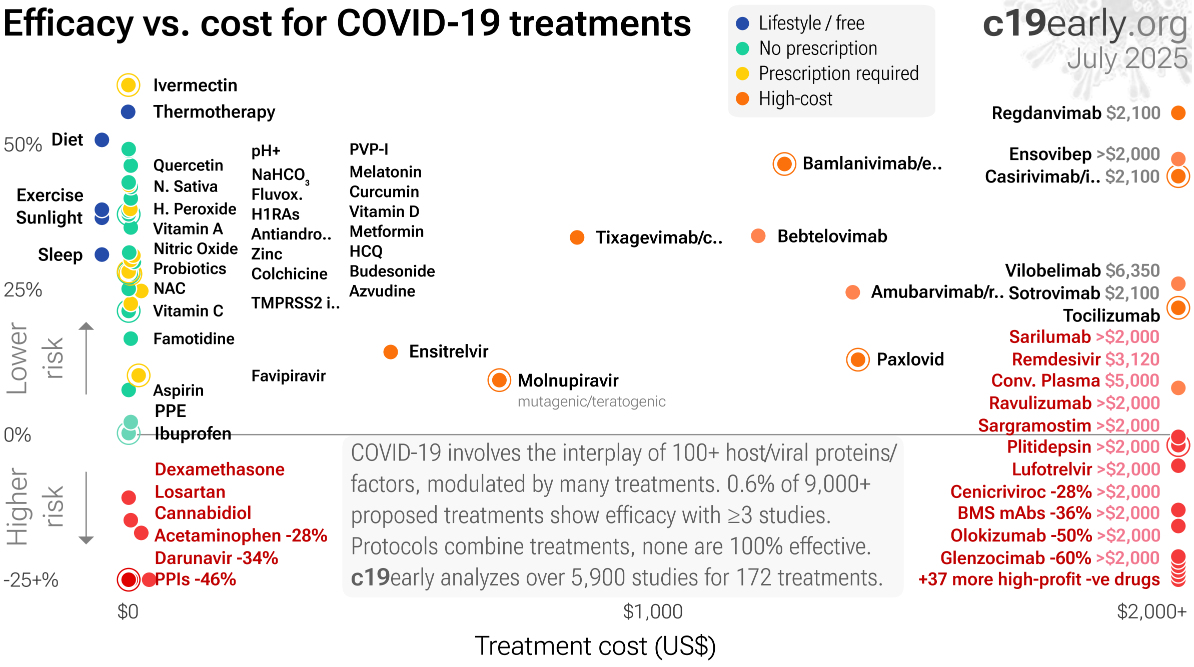


Figure 17. Efficacy vs. cost for COVID-19 treatments.

Conclusion

Improved diets contains many nutrients shown to be beneficial, enhance immune function, support a healthy gut microbiome, help regulate energy levels and metabolism, and reduce the risk of chronic diseases.

People with healthier diets have reduced risk for COVID-19. Significantly lower risk is seen for ICU admission, hospitalization, progression, recovery, cases, and viral clearance. 26 studies from 25 independent teams in 10 countries show significant benefit. Meta analysis using the most serious outcome reported shows 51% [42-58%] lower risk. Results are similar for higher quality studies. Results are very robust — in exclusion sensitivity analysis 28 of 30 studies must be excluded to avoid finding statistically significant efficacy in pooled analysis.

Studies analyze diet quality before infection, and use different definitions of diet quality.

Other meta analyses show significant improvements with diet for hospitalization[1], severity[2], and cases[1,2].

Study Notes

Aghajani

Is a healthy diet beneficial for COVID-19?

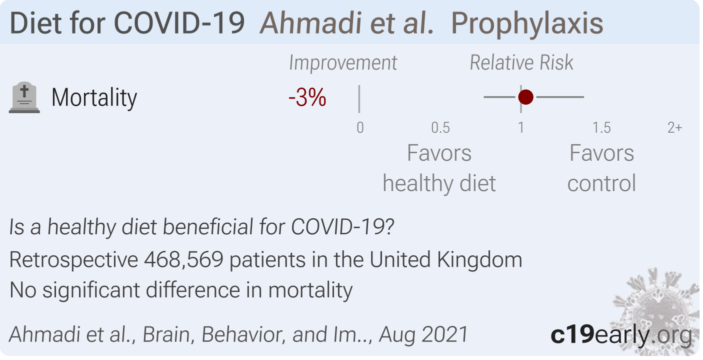
Retrospective 295 patients in Iran (April - August 2022)

Lower severe cases with healthier diets (p=0.000033)

Aghajani et al., Frontiers in Nutrition, Jul 2023

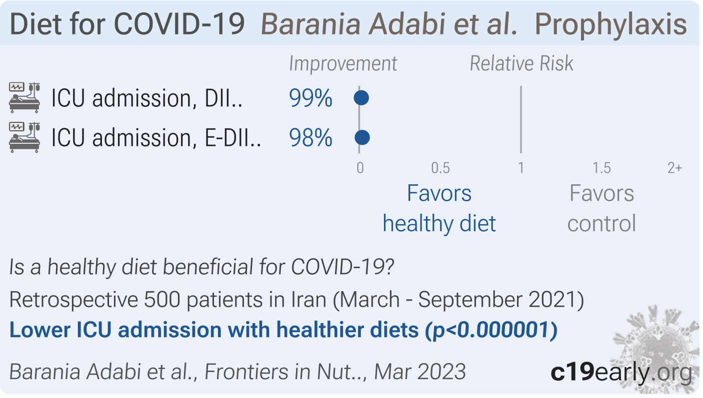
Case control study of 295 COVID-19 patients in Iran, showing lower risk of severe cases with higher dietary antioxidant quality scores, and with higher intake of vitamin D.

Ahmadi



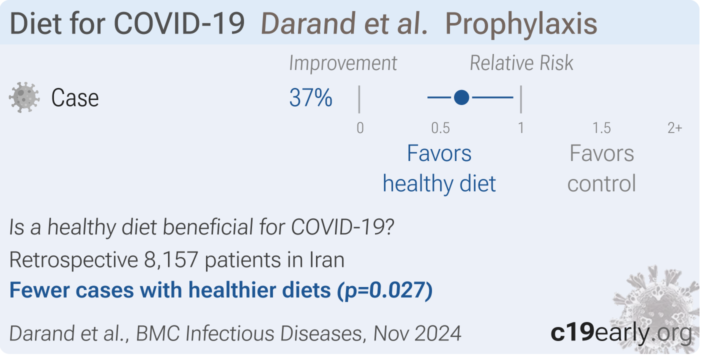
Retrospective 468,569 adults in the UK, showing no significant difference in COVID-19 mortality based on diet quality, however significantly lower mortality was seen with higher diet quality for pneumonia and infectious diseases.

Barania Adabi



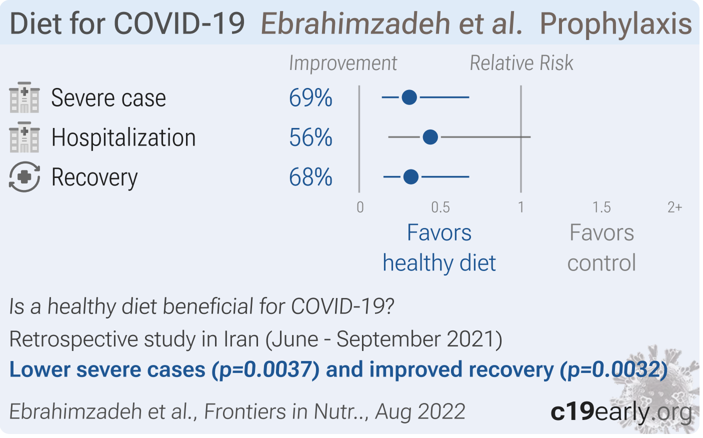
Retrospective 500 COVID-19 patients, showing dietary inflammatory index (DII) and energy-adjusted dietary inflammatory index (E-DII) associated with COVID-19 severity.

Darand



Analysis of 8,157 adults showing significantly higher risk of COVID-19 with higher adherence to an unhealthy diet, characterized by higher intake of less healthy foods such as fruit juices, refined grains, potatoes, and sugar-sweetened beverages. The association was independent of socio-demographic status and BMI.

Ebrahimzadeh



Is a healthy diet beneficial for COVID-19?

Retrospective study in Iran (June - September 2021)

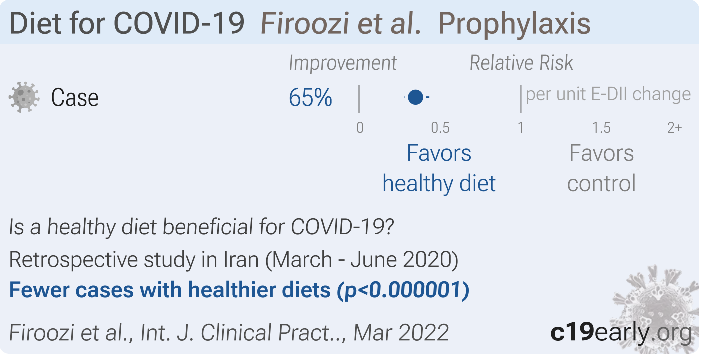
Lower severe cases (p=0.0037) and improved recovery (p=0.0032)

Ebrahimzadeh et al., Frontiers in Nutr.., Aug 2022

Retrospective 250 recovered COVID-19 patients, showing lower risk of severe cases and shorter recovery and hospitalization times with a healthy diet.

Notably, all individual symptoms show lower incidence with a healthy diet with the exception of fever and chills. Fever and chills help the immune system fight infections (shivering helps to raise the body temperature).

Firoozi



Is a healthy diet beneficial for COVID-19?

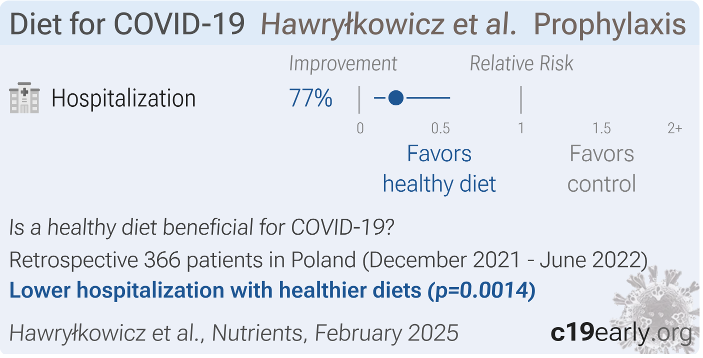
Retrospective study in Iran (March - June 2020)

Fewer cases with healthier diets (p<0.000001)

Firoozi et al., Int. J. Clinical Pract.., Mar 2022

Retrospective 133 COVID-19 patients and 322 controls, showing higher risk of COVID-19 for diets that have a higher inflammatory index (E-DII).

Hawryłkowicz



Is a healthy diet beneficial for COVID-19?

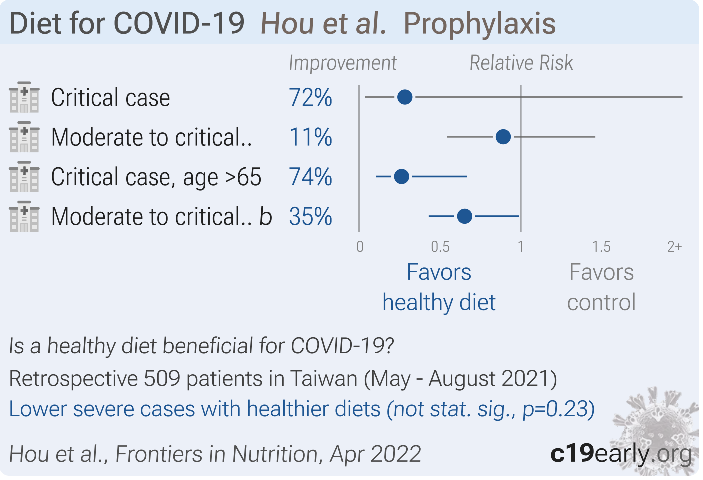
Retrospective 366 patients in Poland (December 2021 - June 2022)

Lower hospitalization with healthier diets (p=0.0014)

Hawryłkowicz et al., Nutrients, February 2025

Retrospective 550 COVID-19 patients in Poland showing that higher adherence to a processed food dietary pattern was associated with 4.4 times higher odds of hospitalization.

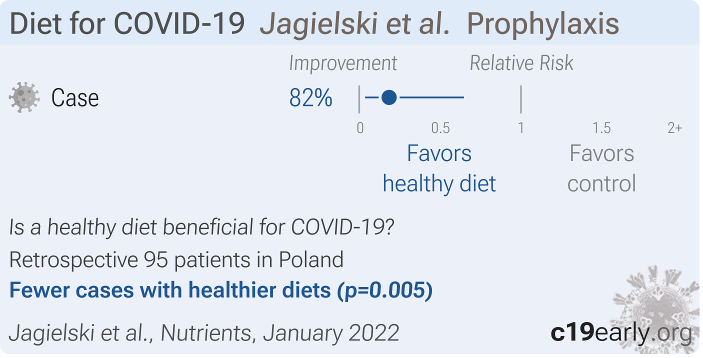
Hou


Diet for COVID-19 *Hou et al.* Prophylaxis

Is a healthy diet beneficial for COVID-19?
Retrospective 509 patients in Taiwan (May - August 2021)
Lower severe cases with healthier diets (not stat. sig., p=0.23)
Hou et al., Frontiers in Nutrition, Apr 2022

Retrospective 509 COVID-19 patients in Taiwan, showing higher risk of critical COVID-19 cases with non-vegetarian diets.

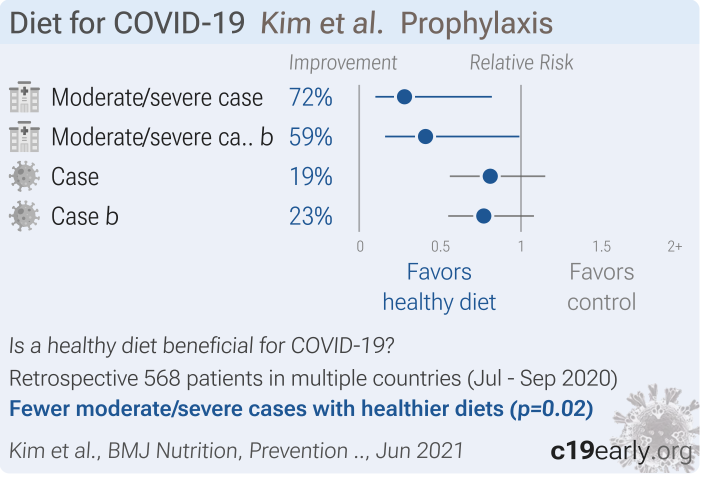
Jagielski


Diet for COVID-19 *Jagielski et al.* Prophylaxis

Is a healthy diet beneficial for COVID-19?
Retrospective 95 patients in Poland
Fewer cases with healthier diets (p=0.005)
Jagielski et al., Nutrients, January 2022

Retrospective 95 people in Poland, showing significantly lower risk of COVID-19 with higher consumption of fruits, vegetables, and nuts. Diets with higher consumption of fruits, vegetables, and nuts had a significantly lower dietary inflammatory index.

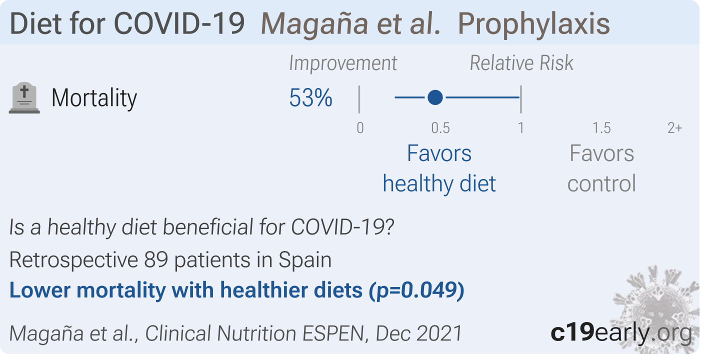
Kim


Diet for COVID-19 *Kim et al.* Prophylaxis

Is a healthy diet beneficial for COVID-19?
Retrospective 568 patients in multiple countries (Jul - Sep 2020)
Fewer moderate/severe cases with healthier diets (p=0.02)
Kim et al., BMJ Nutrition, Prevention .., Jun 2021

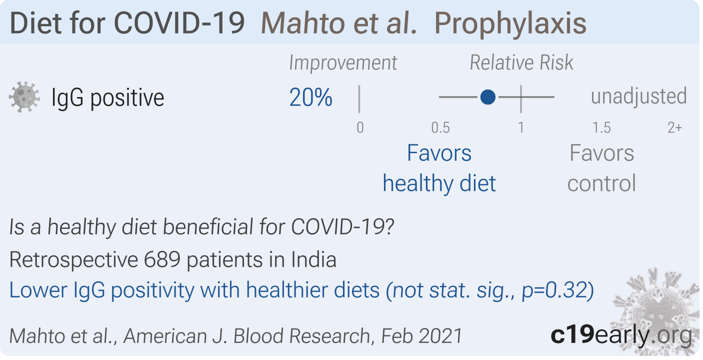
Retrospective healthcare workers in six countries with exposure to COVID-19 patients, showing lower risk of moderate/severe COVID-19 with plant-based diets.

Magaña



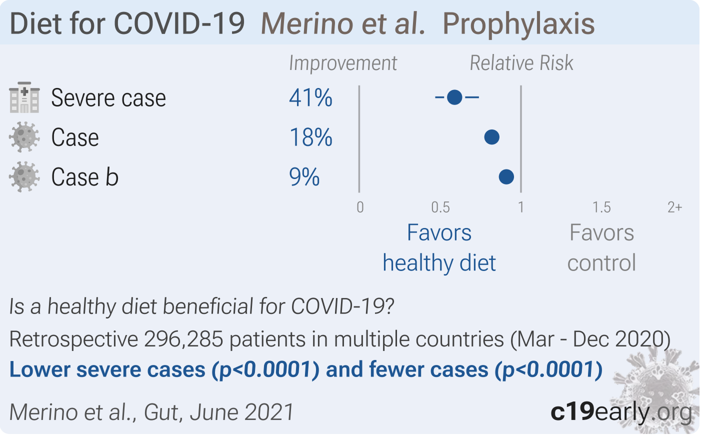
Retrospective 89 COVID-19 patients in Spain, showing lower mortality with adherence to the Mediterranean diet.

Mahto



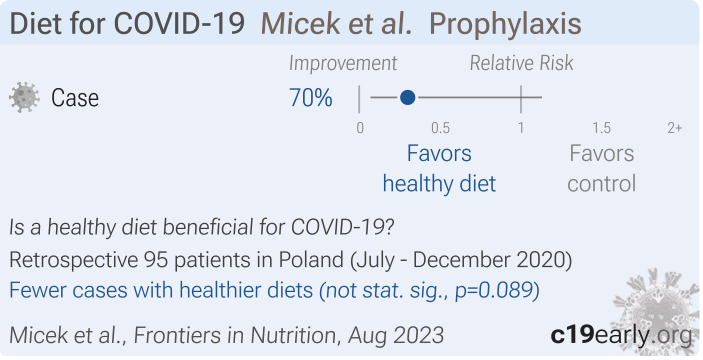
Retrospective 689 healthcare workers in India, showing non-statistically significant lower risk of IgG positivity with a vegetarian diet in unadjusted results.

Merino



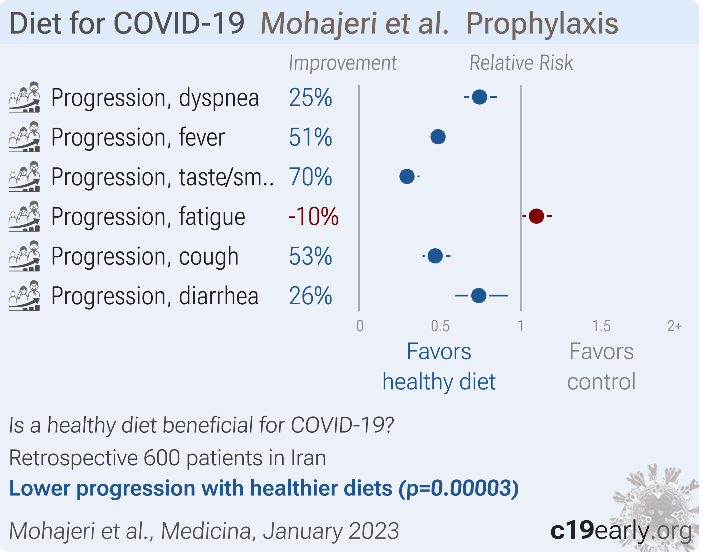
Retrospective 592,571 participants in the UK and USA with 31,815 COVID-19 cases, showing lower risk or COVID-19 cases and severity for higher healthful plant-based diet scores. Notably, the assocation was less evident with higher levels of physical activity.

Micek



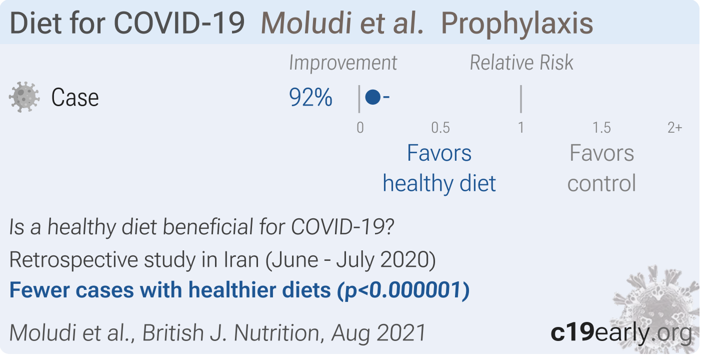
Dietary analysis of 95 adults in Poland, showing lower risk of COVID-19 with higher intake of polyphenols, lignans, and phytosterols. Results were statistically significant for total phytosterols, secoisolariciresinol, β-sitosterol, matairesinol, and stigmasterol. Authors suggest that beneficial effects on gut microbiota and immune function may contribute to the lower risk.

Mohajeri



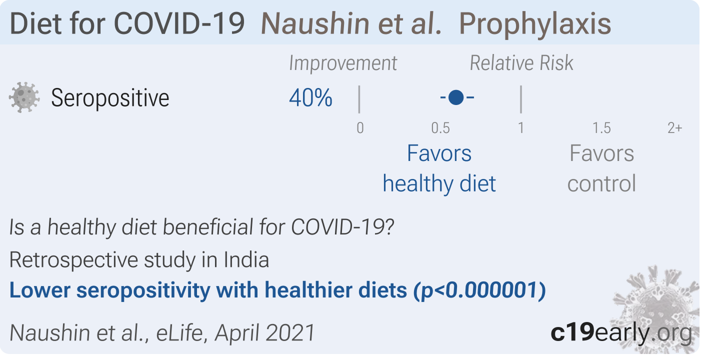
Retrospective 600 COVID-19 patients in Iran with moderate/severe CT scans, showing lower prevalence of dyspnea, fever, taste/smell abnormalities, and cough with high adherence to the Mediterranean diet in unadjusted results.

Moludi



Retrospective 60 COVID-19 hospitalized patients and 60 controls in Iran, showing pro-inflammatory diets associated with COVID-19 cases and severity. IR.KUMS.REC.1399·444, IR.TBZMED.REC.1399·225.

Naushin



Is a healthy diet beneficial for COVID-19?

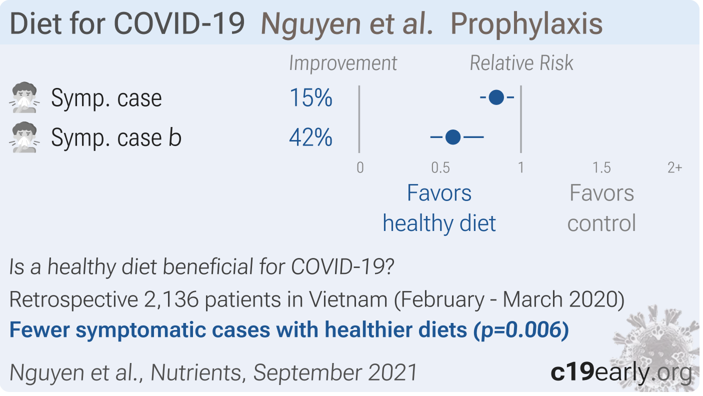
Retrospective study in India

Lower seropositivity with healthier diets (p<0.000001)

Naushin et al., eLife, April 2021

Retrospective 10,427 volunteers in India, 1,058 anti-nucleocapsid antibody positive, showing lower risk of seropositivity with a vegetarian diet.

Nguyen



Is a healthy diet beneficial for COVID-19?

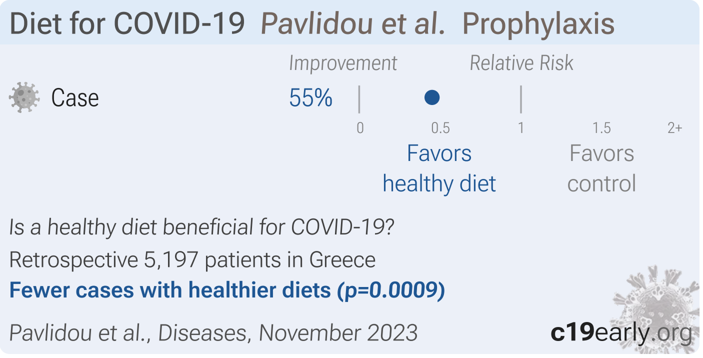
Retrospective 2,136 patients in Vietnam (February - March 2020)

Fewer symptomatic cases with healthier diets (p=0.006)

Nguyen et al., Nutrients, September 2021

Analysis of 3,947 participants in Vietnam, showing significantly lower risk of COVID-19-like symptoms with physical activity and with a healthy diet. The combination of being physically active and eating healthy reduced risk further compared to either alone. The analyzed period was Feb 14 to Mar 2, 2020, which may have been before testing was widely available.

Pavlidou



Is a healthy diet beneficial for COVID-19?

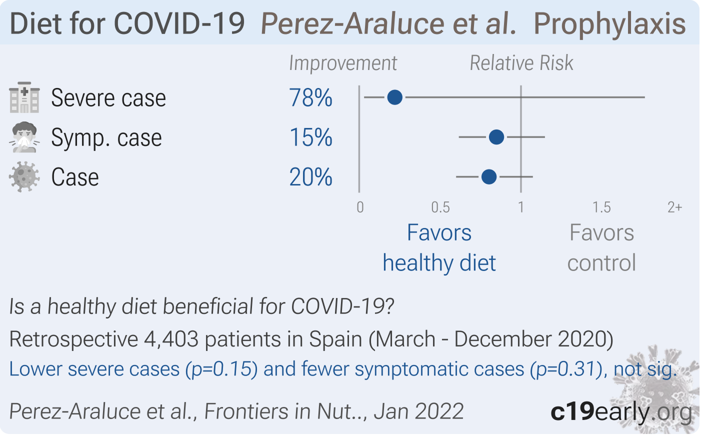
Retrospective 5,197 patients in Greece

Fewer cases with healthier diets (p=0.0009)

Pavlidou et al., Diseases, November 2023

Retrospective 5,197 Greek adults over 65. After adjustment for confounders, COVID-19 infection was independently associated with poor sleep, low physical activity, low Mediterranean diet adherence, living in urban areas, smoking, obesity, depression, anxiety, stress, and poor health-related quality of life.

Perez-Araluce



Is a healthy diet beneficial for COVID-19?

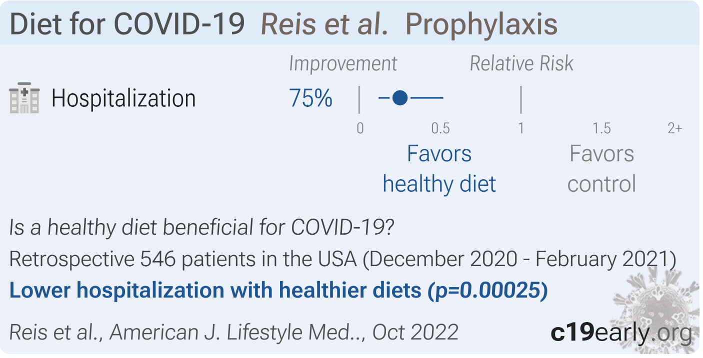
Retrospective 4,403 patients in Spain (March - December 2020)

Lower severe cases (p=0.15) and fewer symptomatic cases (p=0.31), not sig.

Perez-Araluce et al., Frontiers in Nut.., Jan 2022

Retrospective 5,194 participants in Spain with 382 COVID-19 cases, showing lower risk of COVID-19 with high adherence to a Mediterranean diet, with statistical significance only when excluding healthcare professionals.

Reis



Is a healthy diet beneficial for COVID-19?

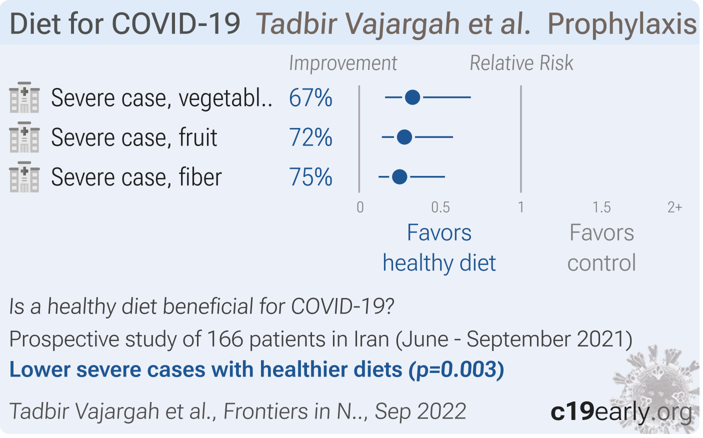
Retrospective 546 patients in the USA (December 2020 - February 2021)

Lower hospitalization with healthier diets (p=0.00025)

Reis et al., American J. Lifestyle Med.., Oct 2022

Retrospective 546 COVID+ patients in the USA, showing lower risk of hospitalization with higher consumption of vegetables.

Tadbir Vajargah



Is a healthy diet beneficial for COVID-19?

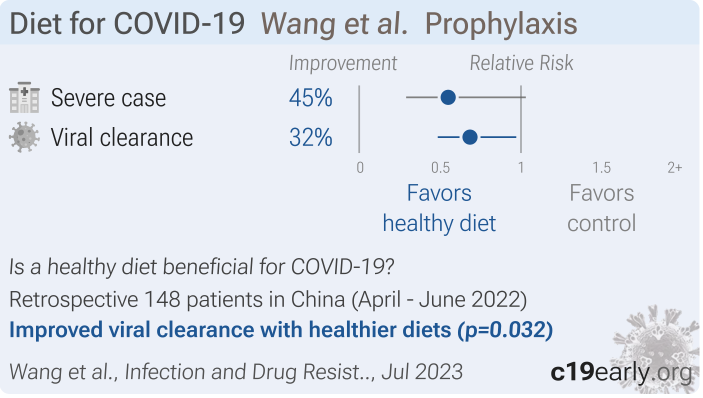
Prospective study of 166 patients in Iran (June - September 2021)

Lower severe cases with healthier diets (p=0.003)

Tadbir Vajargah et al., Frontiers in N.., Sep 2022

Retrospective 250 hospitalized patients in Iran, showing higher consumption of fruits, vegetables, and fiber associated with lower COVID-19 severity.

Wang



Is a healthy diet beneficial for COVID-19?

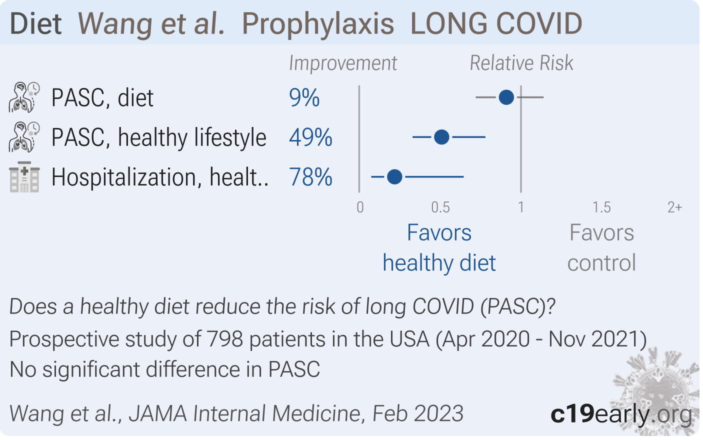
Retrospective 148 patients in China (April - June 2022)

Improved viral clearance with healthier diets (p=0.032)

Wang et al., Infection and Drug Resist.., Jul 2023

Retrospective 148 hospitalized COVID-19 patients in China, showing lower severity and faster viral clearance with improved nutrition.

Wang



Does a healthy diet reduce the risk of long COVID (PASC)?

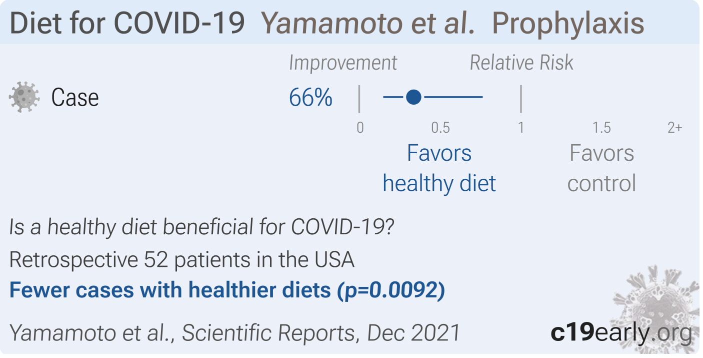
Prospective study of 798 patients in the USA (Apr 2020 - Nov 2021)

No significant difference in PASC

Wang et al., JAMA Internal Medicine, Feb 2023

Prospective analysis of 32,249 women from the Nurses' Health Study II in the USA, showing lower risk of PASC with a healthy lifestyle, and in a dose-dependent manner. Participants with 5 or 6 healthy lifestyle factors had significantly lower COVID-19 hospitalization and PASC. BMI and sleep were independently associated with risk of PASC.

Yamamoto



Is a healthy diet beneficial for COVID-19?

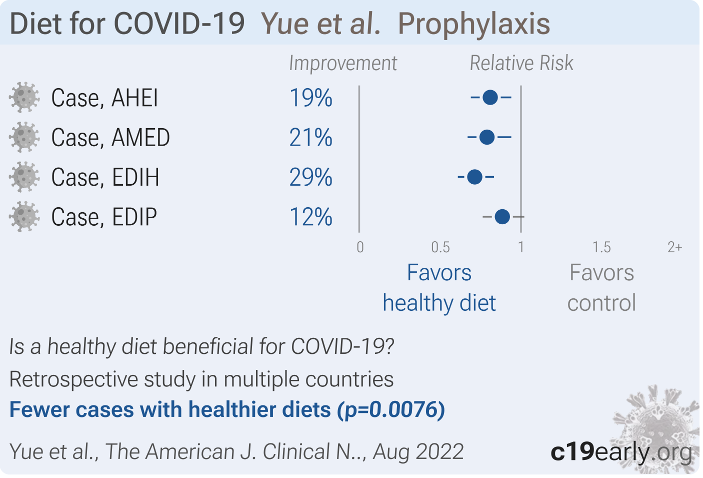
Retrospective 52 patients in the USA

Fewer cases with healthier diets (p=0.0092)

Yamamoto et al., Scientific Reports, Dec 2021

Retrospective 84 flight attendants, 52 reporting COVID-19 status and diet quality, showing higher risk of COVID-19 with lower self-reported diet quality.

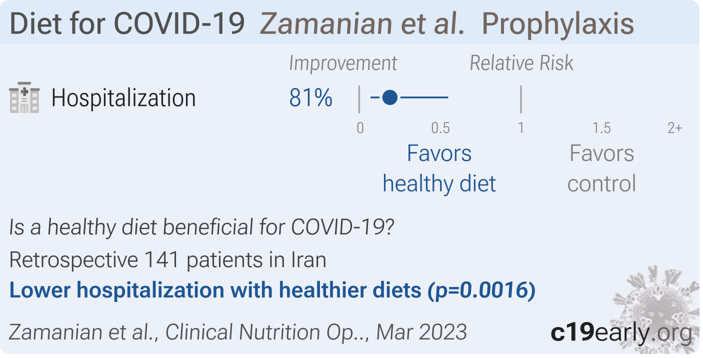
Yue



Is a healthy diet beneficial for COVID-19?
Retrospective study in multiple countries
Fewer cases with healthier diets (p=0.0076)
Yue et al., The American J. Clinical N.., Aug 2022

Analysis of 42,935 participants showing lower risk of COVID-19 with healthier diets. Risk of severe cases was also lower with healthier diets, while not reaching statistical significance. Severity results are only provided with diet indices as a continuous variable.

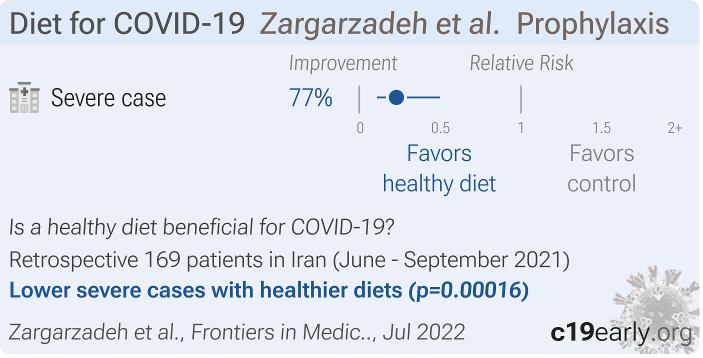
Zamanian



Is a healthy diet beneficial for COVID-19?
Retrospective 141 patients in Iran
Lower hospitalization with healthier diets (p=0.0016)
Zamanian et al., Clinical Nutrition Op.., Mar 2023

Case control study with 53 inpatients and 88 outpatients in Iran, showing lower risk of hospitalization with increased adherence to the DASH (Dietary Approach to Stop Hypertension) diet. Increased intake of fruits, vegetables and low-fat dairy products, and lower intake of sodium and processed/red meat were significantly associated with reduced risk of hospitalization due to COVID-19.

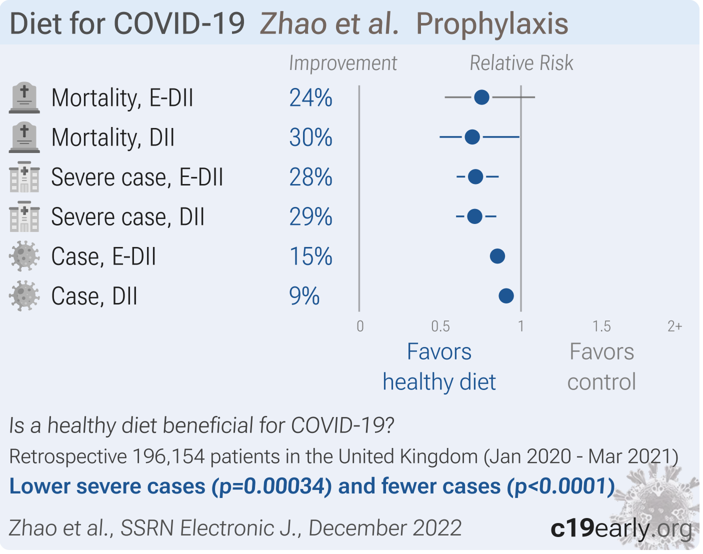
Zargarzadeh



Is a healthy diet beneficial for COVID-19?
Retrospective 169 patients in Iran (June - September 2021)
Lower severe cases with healthier diets (p=0.00016)
Zargarzadeh et al., Frontiers in Medic.., Jul 2022

Retrospective 250 COVID-19 patients in Iran, showing lower risk of severe disease with greater adherence to a Mediterranean diet.

Zhao



Is a healthy diet beneficial for COVID-19?

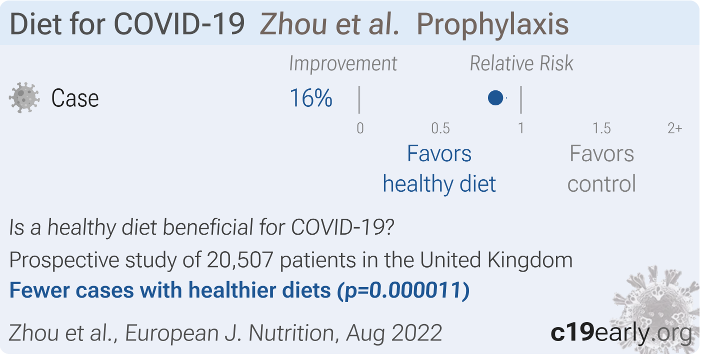
Retrospective 196,154 patients in the United Kingdom (Jan 2020 - Mar 2021)

Lower severe cases (p=0.00034) and fewer cases (p<0.0001)

Zhao et al., SSRN Electronic J., December 2022

UK Biobank retrospective 196,154 participants with 11,288 COVID-19 cases, showing lower COVID-19 mortality, severity, and incidence for lower dietary inflammatory scores.

Zhou



Is a healthy diet beneficial for COVID-19?

Prospective study of 20,507 patients in the United Kingdom

Fewer cases with healthier diets (p=0.000011)

Zhou et al., European J. Nutrition, Aug 2022

Prospective study of 41,012 UK Biobank participants, showing higher risk of COVID-19 cases with ultra-processed food consumption.

Appendix 1. Methods and Data

We perform ongoing searches of PubMed, medRxiv, Europe PMC, ClinicalTrials.gov, The Cochrane Library, Google Scholar, Research Square, ScienceDirect, Oxford University Press, the reference lists of other studies and meta-analyses, and submissions to the site c19early.org. Search terms are diet AND COVID-19. Automated searches are performed twice daily, with all matches reviewed for inclusion. All studies regarding the use of diet for COVID-19 that report a comparison with a control group are included in the main analysis. Sensitivity analysis is performed, excluding studies with major issues, epidemiological studies, and studies with minimal available information. Studies with major unexplained data issues, for example major outcome data that is impossible to be correct with no response from the authors, are excluded. This is a living analysis and is updated regularly.

We extracted effect sizes and associated data from all studies. If studies report multiple kinds of effects then the most serious outcome is used in pooled analysis, while other outcomes are included in the outcome specific analyses. For example, if effects for mortality and cases are reported then they are both used in specific outcome analyses, while mortality is used for pooled analysis. If symptomatic results are reported at multiple times, we use the latest time, for example if mortality results are provided at 14 days and 28 days, the results at 28 days have preference. Mortality

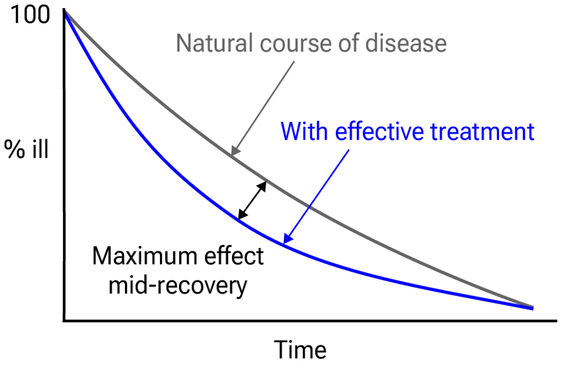


Figure 18. **Mid-recovery results can more accurately reflect efficacy when almost all patients recover.** Mateja et al. **confirm that intermediate viral load results more accurately reflect hospitalization/death.**

alone is preferred over combined outcomes. Outcomes with zero events in both arms are not used, the next most serious outcome with one or more events is used. For example, in low-risk populations with no mortality, a reduction in mortality with treatment is not possible, however a reduction in hospitalization, for example, is still valuable. Clinical outcomes are considered more important than viral outcomes. When basically all patients recover in both treatment and control groups, preference for viral clearance and recovery is given to results mid-recovery where available. After most or all patients have recovered there is little or no room for an effective treatment to do better, however faster recovery is valuable. An IPD meta-analysis confirms that intermediate viral load reduction is more closely associated with hospitalization/death than later viral load reduction[25]. If only individual symptom data is available, the most serious symptom has priority, for example difficulty breathing or low SpO_2 is more important than cough. When results provide an odds ratio, we compute the relative risk when possible, or convert to a relative risk according to Zhang et al. Reported confidence intervals and *p*-values are used when available, and adjusted values are used when provided. If multiple types of adjustments are reported propensity score matching and multivariable regression has preference over propensity score matching or weighting, which has preference over multivariable regression. Adjusted results have preference over unadjusted results for a more serious outcome when the adjustments significantly alter results. When needed, conversion between reported *p*-values and confidence intervals followed Altman, Altman (B), and Fisher's exact test was used to calculate *p*-values for event data. If continuity correction for zero values is required, we use the reciprocal of the opposite arm with the sum of the correction factors equal to 1[29]. Results are expressed with RR < 1.0 favoring treatment, and using the risk of a negative outcome when applicable (for example, the risk of death rather than the risk of survival). If studies only report relative continuous values such as relative times, the ratio of the time for the treatment group versus the time for the control group is used. Calculations are done in Python (3.13.5) with scipy (1.16.0), pythonmeta (1.26), numpy (2.3.1), statsmodels (0.14.4), and plotly (6.2.0).

Forest plots are computed using PythonMeta[30] with the DerSimonian and Laird random effects model (the fixed effect assumption is not plausible in this case) and inverse variance weighting. Results are presented with 95% confidence intervals. Heterogeneity among studies was assessed using the I^2 statistic. Mixed-effects meta-regression results are computed with R (4.4.0) using the metafor (4.6-0) and rms (6.8-0) packages, and using the most serious sufficiently powered outcome. For all statistical tests, a *p*-value less than 0.05 was considered statistically significant. Grobid 0.8.2 is used to parse PDF documents.

We have classified studies as early treatment if most patients are not already at a severe stage at the time of treatment (for example based on oxygen status or lung involvement), and treatment started within 5 days of the onset of symptoms. If studies contain a mix of early treatment and late treatment patients, we consider the treatment time of patients contributing most to the events (for example, consider a study where most patients are treated early but late treatment patients are included, and all mortality events were observed with late treatment patients). We note that a shorter time may be preferable. Antivirals are typically only considered effective when used within a shorter timeframe, for example 0-36 or 0-48 hours for oseltamivir, with longer delays not being effective[31,32].

We received no funding, this research is done in our spare time. We have no affiliations with any pharmaceutical companies or political parties.

A summary of study results is below. Please submit updates and corrections at https://c19early.org/dtmeta.html.

Prophylaxis

Effect extraction follows pre-specified rules as detailed above and gives priority to more serious outcomes. For pooled analyses, the first (most serious) outcome is used, which may differ from the effect a paper focuses on. Other outcomes are used in outcome specific analyses.

Aghajani, 7/6/2023, retrospective, Iran, peer-reviewed, 4 authors, study period April 2022 - August 2022.	**risk of severe case, 88.0% lower, OR 0.12, *p* < 0.001**, higher quality diet 96, lower quality diet 85, adjusted per study, case control OR, DAQS tertile 3 vs. tertile 1, multivariable, model 3.
Ahmadi, 8/31/2021, retrospective, United Kingdom, peer-reviewed, 5 authors.	**risk of death, 3.0% higher, RR 1.03, *p* = 0.85**, adjusted per study, good vs. poor, model 2, multivariable.
Barania Adabi, 3/31/2023, retrospective, Iran, peer-reviewed, survey, mean age 40.3, 5 authors, study period March 2021 - September 2021.	**risk of ICU admission, 98.7% lower, RR 0.01, *p* < 0.001**, higher quality diet 0 of 125 (0.0%), lower quality diet 37 of 125 (29.6%), NNT 3.4, relative risk is not 0 because of continuity correction due to zero events (with reciprocal of the contrasting arm), DII, quartile I vs. quartile IV.
	risk of ICU admission, 98.1% lower, RR 0.02, *p* < 0.001, higher quality diet 0 of 125 (0.0%), lower quality diet 26 of 125 (20.8%), NNT 4.8, relative risk is not 0 because of continuity correction due to zero events (with reciprocal of the contrasting arm), E-DII, quartile I vs. quartile IV.
Darand, 11/5/2024, retrospective, Iran, peer-reviewed, 8 authors.	**risk of case, 36.7% lower, OR 0.63, *p* = 0.03**, higher quality diet 113, lower quality diet 155, inverted to make OR<1 favor higher quality diet, Q1 vs. Q5, RR approximated with OR.
Ebrahimzadeh, 8/19/2022, retrospective, Iran, peer-reviewed, survey, 3 authors, study period June 2021 - September 2021.	**risk of severe case, 69.0% lower, OR 0.31, *p* = 0.004**, healthy diet, T3 vs. T1, model 3, RR approximated with OR.
	risk of hospitalization, 56.0% lower, OR 0.44, *p* = 0.07, hospitalization time, healthy diet, T3 vs. T1, model 3, RR approximated with OR.
	risk of no recovery, 68.0% lower, OR 0.32, *p* = 0.003, recovery duration, healthy diet, T3 vs. T1, model 3, RR approximated with OR.
Firoozi, 3/29/2022, retrospective, Iran, peer-reviewed, survey, 8 authors, study period March 2020 - June 2020.	**risk of case, 65.0% lower, OR 0.35, *p* < 0.001**, adjusted per study, inverted to make OR<1 favor higher quality diet, case control OR, multivariable, per unit E-DII change.
Hawryłkowicz, 2/26/2025, retrospective, Poland, peer-reviewed, mean age 41.2, 7 authors, study period December 2021 - June 2022.	**risk of hospitalization, 77.3% lower, OR 0.23, *p* = 0.001**, higher quality diet 183, lower quality diet 183, inverted to make OR<1 favor higher quality diet, lower vs. upper tertile processed high fat, sugar, salt, meat, dairy, and potatoes, RR approximated with OR.
Hou, 4/29/2022, retrospective, Taiwan, peer-reviewed, survey, 3 authors, study period May 2021 - August 2021.	**risk of critical case, 71.6% lower, RR 0.28, *p* = 0.23**, higher quality diet 1 of 22 (4.5%), lower quality diet 78 of 487 (16.0%), NNT 8.7, excluded in exclusion analyses: unadjusted results with no group details.
	risk of moderate to critical case, 10.8% lower, RR 0.89, *p* = 0.66, higher quality diet 11 of 22 (50.0%), lower quality diet 273 of 487 (56.1%), NNT 17, excluded in exclusion analyses: unadjusted results with no group details.
	risk of critical case, 73.6% lower, RR 0.26, *p* = 0.005, higher quality diet 0 of 9 (0.0%), lower quality diet 47 of 127 (37.0%), NNT 2.7, adjusted per study, inverted to make RR<1 favor higher quality diet, odds ratio converted to relative risk, multivariable, age >65.
	risk of moderate to critical case, 34.7% lower, RR 0.65, *p* = 0.04, higher quality diet 5 of 9 (55.6%), lower quality diet 108 of 127 (85.0%), NNT 3.4, age >65, excluded in exclusion analyses:

	unadjusted results with no group details.
Jagielski, 1/14/2022, retrospective, Poland, peer-reviewed, 7 authors.	**risk of case, 81.5% lower, RR 0.18, *p* = 0.005**, higher quality diet 4 of 40 (10.0%), lower quality diet 9 of 20 (45.0%), NNT 2.9, adjusted per study, inverted to make RR<1 favor higher quality diet, odds ratio converted to relative risk, model 2, FV ≥ 500g and nuts ≥ 10g vs. FV < 500g and nuts < 10g, multivariable.
Kim, 6/7/2021, retrospective, multiple countries, peer-reviewed, survey, 8 authors, study period 17 July, 2020 - 25 September, 2020.	**risk of moderate/severe case, 72.0% lower, OR 0.28, *p* = 0.02**, higher quality diet 41, lower quality diet 527, adjusted per study, plant-based diets, multivariable, RR approximated with OR.
	risk of moderate/severe case, 59.0% lower, OR 0.41, *p* = 0.05, higher quality diet 46, lower quality diet 522, adjusted per study, plant-based or pescatarian diets, multivariable, RR approximated with OR.
	risk of case, 19.0% lower, OR 0.81, *p* = 0.24, higher quality diet 41, lower quality diet 527, adjusted per study, plant-based diets, multivariable, RR approximated with OR.
	risk of case, 23.0% lower, OR 0.77, *p* = 0.14, higher quality diet 46, lower quality diet 522, adjusted per study, plant-based or pescatarian diets, multivariable, RR approximated with OR.
Magaña, 12/31/2021, retrospective, Spain, peer-reviewed, 6 authors, excluded in exclusion analyses: unadjusted results with no group details.	**risk of death, 53.0% lower, HR 0.47, *p* = 0.049**, higher quality diet 58, lower quality diet 31.
Mahto, 2/15/2021, retrospective, India, peer-reviewed, 6 authors, excluded in exclusion analyses: unadjusted results with no group details.	**risk of IgG positive, 20.4% lower, RR 0.80, *p* = 0.32**, higher quality diet 23 of 206 (11.2%), lower quality diet 70 of 483 (14.5%), NNT 30, unadjusted, inverted to make RR<1 favor higher quality diet, odds ratio converted to relative risk.
Merino, 6/25/2021, retrospective, multiple countries, peer-reviewed, survey, 30 authors, study period 24 March, 2020 - 2 December, 2020.	**risk of severe case, 41.0% lower, HR 0.59, *p* < 0.001**, higher quality diet 148,142, lower quality diet 148,143, adjusted per study, model 3, high vs. low hPDI, multivariable, Cox proportional hazards.
	risk of case, 18.0% lower, HR 0.82, *p* < 0.001, higher quality diet 148,142, lower quality diet 148,143, adjusted per study, model 3, high vs. low hPDI, PCR+, multivariable, Cox proportional hazards.
	risk of case, 9.0% lower, HR 0.91, *p* < 0.001, higher quality diet 148,142, lower quality diet 148,143, adjusted per study, model 3, high vs. low hPDI, multivariable, Cox proportional hazards.
Micek, 8/3/2023, retrospective, Poland, peer-reviewed, survey, 8 authors, study period July 2020 - December 2020.	**risk of case, 70.0% lower, OR 0.30, *p* = 0.09**, higher quality diet 32, lower quality diet 21, adjusted per study, total polyphenols, T3 vs. T1, multivariable, RR approximated with OR.
Mohajeri, 1/26/2023, retrospective, Iran, peer-reviewed, survey, 3 authors, excluded in exclusion analyses: unadjusted results with no group details.	**risk of progression, 25.4% lower, RR 0.75, *p* < 0.001**, higher quality diet 62 of 105 (59.0%), lower quality diet 392 of 495 (79.2%), NNT 5.0, dyspnea.
	risk of progression, 51.1% lower, RR 0.49, *p* < 0.001, higher quality diet 50 of 105 (47.6%), lower quality diet 482 of 495 (97.4%), NNT 2.0, fever.
	risk of progression, 70.3% lower, RR 0.30, *p* < 0.001, higher quality diet 23 of 105 (21.9%), lower quality diet 365 of 495 (73.7%), NNT 1.9, taste/smell.

	risk of progression, 9.7% higher, RR 1.10, $p = 0.03$, higher quality diet 98 of 105 (93.3%), lower quality diet 421 of 495 (85.1%), fatigue.
	risk of progression, 52.9% lower, RR 0.47, $p < 0.001$, higher quality diet 38 of 105 (36.2%), lower quality diet 380 of 495 (76.8%), NNT 2.5, cough.
	risk of progression, 25.9% lower, RR 0.74, $p = 0.007$, higher quality diet 44 of 105 (41.9%), lower quality diet 280 of 495 (56.6%), NNT 6.8, diarrhea.
Moludi, 8/23/2021, retrospective, Iran, peer-reviewed, 7 authors, study period June 2020 - July 2020.	**risk of case, 91.6% lower, OR 0.08, $p < 0.001$**, inverted to make OR<1 favor higher quality diet, case control OR, model 3, E-DII tertile 1 vs. tertile 3.
Naushin, 4/20/2021, retrospective, India, peer-reviewed, survey, 136 authors.	**risk of seropositive, 40.1% lower, OR 0.60, $p < 0.001$**, inverted to make OR<1 favor higher quality diet, RR approximated with OR.
Nguyen, 9/18/2021, retrospective, Vietnam, peer-reviewed, survey, 17 authors, study period 14 February, 2020 - 2 March, 2020.	**risk of symptomatic case, 15.2% lower, RR 0.85, $p = 0.006$**, higher quality diet 345 of 1,054 (32.7%), lower quality diet 433 of 1,082 (40.0%), NNT 14, adjusted per study, odds ratio converted to relative risk, high vs. low HES, COVID-19-like symptoms, multivariable.
Pavlidou, 11/9/2023, retrospective, Greece, peer-reviewed, 14 authors.	**risk of case, 55.0% lower, OR 0.45, $p < 0.001$**, higher quality diet 2,609, lower quality diet 2,588, adjusted per study, inverted to make OR<1 favor higher quality diet, moderate/high vs. very low/low Mediterranean diet adherence, multivariable, RR approximated with OR.
Perez-Araluce, 1/24/2022, retrospective, Spain, peer-reviewed, survey, 4 authors, study period March 2020 - December 2020.	**risk of severe case, 77.9% lower, RR 0.22, $p = 0.15$**, higher quality diet 1 of 1,103 (0.1%), lower quality diet 10 of 3,300 (0.3%), NNT 471, odds ratio converted to relative risk, high vs. low adherence.
	risk of symptomatic case, 15.1% lower, RR 0.85, $p = 0.31$, higher quality diet 52 of 1,103 (4.7%), lower quality diet 214 of 3,300 (6.5%), odds ratio converted to relative risk, high vs. low adherence.
	risk of case, 19.7% lower, RR 0.80, $p = 0.14$, higher quality diet 58 of 1,103 (5.3%), lower quality diet 248 of 3,300 (7.5%), odds ratio converted to relative risk, high vs. low adherence.
Reis, 10/24/2022, retrospective, USA, peer-reviewed, survey, 6 authors, study period December 2020 - February 2021.	**risk of hospitalization, 74.8% lower, RR 0.25, $p < 0.001$**, higher quality diet 17 of 380 (4.5%), lower quality diet 21 of 166 (12.7%), adjusted per study, inverted to make RR<1 favor higher quality diet, odds ratio converted to relative risk, 3+ vegetable servings/day vs. <3, multivariable.
Tadbir Vajargah, 9/29/2022, prospective, Iran, peer-reviewed, survey, mean age 44.2, 11 authors, study period June 2021 - September 2021.	**risk of severe case, 67.0% lower, OR 0.33, $p = 0.003$**, higher quality diet 83, lower quality diet 83, vegetables, highest vs. lowest tertile, RR approximated with OR.
	risk of severe case, 72.0% lower, OR 0.28, $p < 0.001$, higher quality diet 83, lower quality diet 83, fruit, highest vs. lowest tertile, RR approximated with OR.
	risk of severe case, 75.0% lower, OR 0.25, $p < 0.001$, higher quality diet 83, lower quality diet 83, fiber, highest vs. lowest tertile, RR approximated with OR.

Wang, 7/31/2023, retrospective, China, peer-reviewed, 9 authors, study period April 2022 - June 2022.	**risk of severe case, 45.0% lower, OR 0.55, *p* = 0.06**, higher quality diet 81, lower quality diet 67, adjusted per study, MNA-SF >11 vs. ≤11, multivariable, RR approximated with OR.
	risk of no viral clearance, 31.5% lower, HR 0.68, *p* = 0.03, higher quality diet 81, lower quality diet 67, inverted to make HR<1 favor higher quality diet, MNA-SF >11 vs. ≤11, Cox proportional hazards.
Wang (B), 2/6/2023, prospective, USA, peer-reviewed, survey, mean age 64.7, 8 authors, study period April 2020 - November 2021.	**risk of PASC, 9.0% lower, RR 0.91, *p* = 0.43**, higher quality diet 124 of 318 (39.0%), lower quality diet 218 of 480 (45.4%), NNT 16, adjusted per study, Q5 vs. Q1, multivariable, model 2.
	risk of PASC, 49.0% lower, RR 0.51, *p* = 0.002, higher quality diet 188, lower quality diet 66, 5 or 6 healthy lifestyle factors vs. 0.
Yamamoto, 12/30/2021, retrospective, USA, peer-reviewed, survey, mean age 35.0, 3 authors, excluded in exclusion analyses: unadjusted results with no group details.	**risk of case, 66.3% lower, RR 0.34, *p* = 0.009**, higher quality diet 4 of 20 (20.0%), lower quality diet 19 of 32 (59.4%), NNT 2.5, good, very good, excellent vs. fair, poor.
Yue, 8/9/2022, retrospective, multiple countries, peer-reviewed, survey, 11 authors.	**risk of case, 19.0% lower, OR 0.81, *p* = 0.008**, Q4 vs. Q1, model 3 + IPW, AHEI, RR approximated with OR.
	risk of case, 21.0% lower, OR 0.79, *p* = 0.006, Q4 vs. Q1, model 3 + IPW, AMED, RR approximated with OR.
	risk of case, 28.6% lower, OR 0.71, *p* < 0.001, inverted to make OR<1 favor higher quality diet, Q1 vs. Q4, model 3 + IPW, EDIH, RR approximated with OR.
	risk of case, 11.5% lower, OR 0.88, *p* = 0.10, inverted to make OR<1 favor higher quality diet, Q1 vs. Q4, model 3 + IPW, EDIP, RR approximated with OR.
Zamanian, 3/3/2023, retrospective, Iran, peer-reviewed, mean age 46.2, 10 authors.	**risk of hospitalization, 81.0% lower, OR 0.19, *p* = 0.002**, higher quality diet 41, lower quality diet 53, adjusted per study, case control OR, DASH ≥27 vs. ≤22, multivariable, model 3.
Zargarzadeh, 7/19/2022, retrospective, Iran, peer-reviewed, mean age 44.1, 11 authors, study period June 2021 - September 2021.	**risk of severe case, 77.0% lower, OR 0.23, *p* < 0.001**, higher quality diet 89, lower quality diet 80, adjusted per study, top tertile vs. lowest tertile, MD score, model 3, multivariable, RR approximated with OR.
Zhao, 12/14/2022, retrospective, United Kingdom, peer-reviewed, survey, 9 authors, study period January 2020 - March 2021.	**risk of death, 24.2% lower, RR 0.76, *p* = 0.13**, higher quality diet 39,230, lower quality diet 39,231, adjusted per study, inverted to make RR<1 favor higher quality diet, E-DII, quintile 1 vs. quintile 5, multivariable, model 4.
	risk of death, 30.1% lower, RR 0.70, *p* = 0.04, higher quality diet 39,230, lower quality diet 39,231, adjusted per study, inverted to make RR<1 favor higher quality diet, DII, quintile 1 vs. quintile 5, multivariable, model 4.
	risk of severe case, 28.1% lower, RR 0.72, *p* < 0.001, higher quality diet 39,230, lower quality diet 39,231, adjusted per study, inverted to make RR<1 favor higher quality diet, E-DII, quintile 1 vs. quintile 5, multivariable, model 4.
	risk of severe case, 28.6% lower, RR 0.71, *p* < 0.001, higher quality diet 39,230, lower quality diet 39,231, adjusted per study, inverted to make RR<1 favor higher quality diet, DII, quintile 1 vs. quintile 5, multivariable, model 4.

	risk of case, 14.5% lower, RR 0.85, $p < 0.001$, higher quality diet 39,230, lower quality diet 39,231, adjusted per study, inverted to make RR<1 favor higher quality diet, E-DII, quintile 1 vs. quintile 5, multivariable, model 4.
	risk of case, 9.1% lower, RR 0.91, $p = 0.002$, higher quality diet 39,230, lower quality diet 39,231, adjusted per study, inverted to make RR<1 favor higher quality diet, DII, quintile 1 vs. quintile 5, multivariable, model 4.
Zhou, 8/16/2022, prospective, United Kingdom, peer-reviewed, 6 authors.	**risk of case, 15.7% lower, RR 0.84, $p < 0.001$**, higher quality diet 1,321 of 10,254 (12.9%), lower quality diet 1,935 of 10,253 (18.9%), inverted to make RR<1 favor higher quality diet, odds ratio converted to relative risk, Q4 vs. Q1, model 3 (before healthy diet score adjustment).

Supplementary Data

Supplementary Data

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