



Public Health
England

Protecting and improving the nation's health

COVID-19 & Children

To Vaccinate or Not To Vaccinate?

Dr Shamez Ladhani

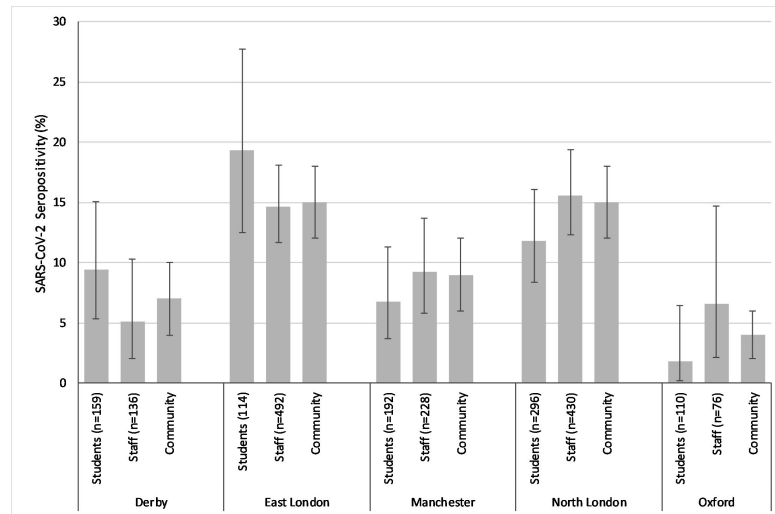
Paediatric Infectious Diseases Consultant

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Arguments for Vaccinating children against COVID-19

1. Children do get infected with SARS-CoV-2 (same as adults)



SARS-CoV-2 antibody prevalence in primary school children & staff

Ladhani et al. *Lancet CAH* 2021: [https://doi.org/10.1016/S2352-4642\(21\)00061-4](https://doi.org/10.1016/S2352-4642(21)00061-4)

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Risk factors for PICU admission and death among children and young people hospitalized with COVID-19 and PIMS-TS in England during the first pandemic year

Joseph L. Ward¹, Rachel Harwood^{2,3}, Peter J. Davis^{4,5}, Elizabeth S. Draper⁶, Dr Karen Luyt¹⁰, Steve Turner^{11,12}, Elizabeth



Deaths in children and young people in England after SARS-CoV-2 infection during the first pandemic year

Clare Smith^{1,2}, David Odd^{3,4}, Rachel Harwood^{5,6}, Joseph Ward⁷, Mike Linney^{8,9}, Matthew Clark¹, Dougal Hargreaves¹⁰, Shamez N. Ladhani^{11,12}, Elizabeth Draper¹³, Peter J. Davis^{1,2}, Simon E. Kenny^{1,5,6}, Elizabeth Whittaker^{14,15}, Karen Luyt⁴, Russell Viner⁷ and Lorna K. Fraser¹⁶

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Journal of Infection
Available online 20 November 2021
In Press, Journal Pre-proof



Persistent symptoms following SARS-CoV-2 infection among children and young people: a meta-analysis of controlled and uncontrolled studies

SA Behnood (Concept)¹, R Shafran (Concept)², SD Bennett², AXD Zhang², LL O'Mahoney³, TJ Stephenson (Concept)², SN Ladhani^{4,5}, BL DeStavola², RM Viner^{2*}, OV Swann (Concept)^{6,7*}  

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<https://doi.org/10.1016/j.jinf.2021.11.011>

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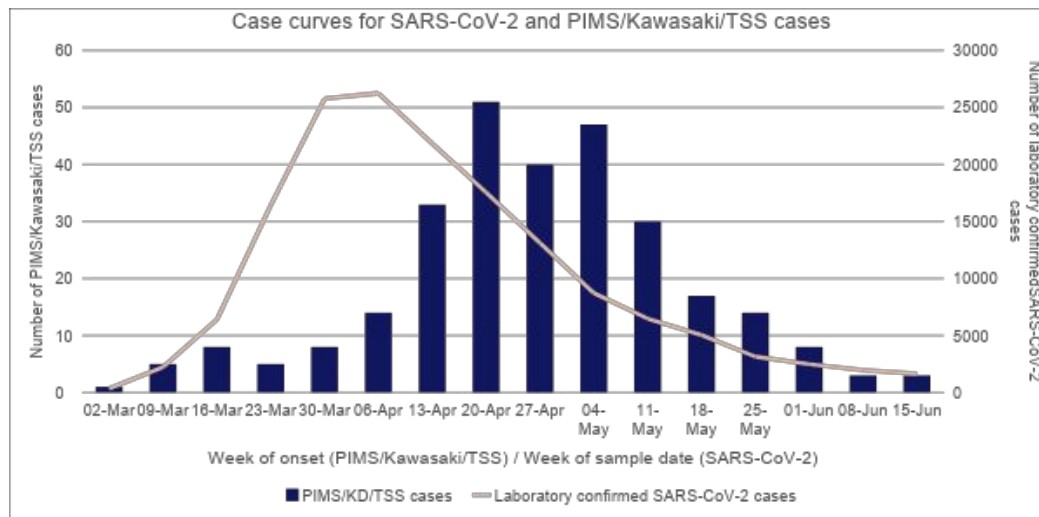
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Hyperinflammatory syndrome (MIS-C/PIMS-TS) – rare but potentially severe, fatal



Ladhani et al. *Lancet Reg Health*

Europe. 2021; <https://doi.org/10.1016/j.lanepe.2021.100075>

Morbidity and Mortality Weekly Report

Effectiveness of BNT162b2 (Pfizer-BioNTech) mRNA Vaccination Against Multisystem Inflammatory Syndrome in Children Among Persons Aged 12–18 Years — United States, July–December 2021

Laura D. Zambrano, PhD^{1*}; Margaret M. Newhams, MPH^{2,*}; Samantha M. Olson, MPH¹; Natasha B. Halasa, MD³; Ashley M. Price, MPH¹; Julie A. Boom, MD⁴; Leila C. Sahni, PhD⁴; Satoshi Kamidani, MD⁵; Keiko M. Tarquinio, MD⁶; Aline B. Maddux, MD⁷; Sabrina M. Heidemann, MD⁸; Samina S. Bhumbra, MD⁹; Katherine E. Blinc, MD¹⁰; Ryan A. Nofziger, MD¹¹; Charlotte V. Hobbs, MD¹²; Tamara T. Bradford, MD¹³; Natalie Z. Cvijanovich, MD¹⁴; Katherine Irby, MD¹⁵; Elizabeth H. Mack, MD¹⁶; Melissa L. Cullimore, MD¹⁷; Pia S. Pannaraj, MD¹⁸; Michele Kong, MD¹⁹; Tracie C. Walker, MD²⁰; Shira J. Gertz, MD²¹; Kelly N. Michelson, MD²²; Melissa A. Cameron, MD²³; Kathleen Chiotos, MD²⁴; Mia Maamari, MD²⁵; Jennifer E. Schuster, MD²⁶; Amber O. Orzel, MPH²; Manish M. Patel, MD¹; Angela P. Campbell, MD^{1,†}; Adrienne G. Randolph, MD^{2,27,†}; Overcoming COVID-19 Investigators

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2. Children can transmit SARS-CoV-2 to others

Most infections in children are asymptomatic or mild & transient □ difficult to identify, test or isolate

Difficult to maintain physical distancing from young children in school & at home

Some evidence of short-term reduction in transmission by vaccinated vs unvaccinated adults & DELTA variant

RAPID COMMUNICATION

Vaccine effectiveness against SARS-CoV-2 transmission to household contacts during dominance of Delta variant (B.1.617.2), the Netherlands, August to September 2021

Brechje de Gier¹, Stijn Andeweg¹, Jantien A Backer¹, RIVM COVID-19 surveillance and epidemiology team², Susan JM Hahné¹, Susan van den Hof¹, Hester E de Melker¹, Mirjam J Knol¹

1. Center for Infectious Disease Control, National Institute for Public Health and the Environment (RIVM), Bilthoven, the Netherlands

2. The members of this group (in addition to the named authors) are listed under Investigators

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Investigators: The Investigators are listed at the end of the article.

Citation style for this article:

de Gier Brechje, Andeweg Stijn, Backer Jantien A, RIVM COVID-19 surveillance and epidemiology team, Hahné Susan JM, van den Hof Susan, de Melker Hester E, Knol Mirjam J. Vaccine effectiveness against SARS-CoV-2 transmission to household contacts during dominance of Delta variant (B.1.617.2), the Netherlands, August to September 2021. Euro Surveill. 2021;26(44):pii=2100977. <https://doi.org/10.2807/1560-7917.ES.2021.26.44.2100977>

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3. Vaccines are effective in preventing severe COVID-19 in adolescents

Morbidity and Mortality Weekly Report

Effectiveness of Pfizer-BioNTech mRNA Vaccination Against COVID-19 Hospitalization Among Persons Aged 12–18 Years — United States, June–September 2021

Samantha M. Olson, MPH^{1*}; Margaret M. Newhams, MPH^{2*}; Natasha B. Halasa, MD³; Ashley M. Price, MPH¹; Julie A. Boom, MD⁴; Leila C. Sabni, PhD⁴; Katherine Irby, MD⁵; Tracie C. Walker, MD⁶; Stephanie P. Schwartz, MD⁶; Pia S. Pannaraj, MD⁷; Aline B. Maddux, MD⁸; Tamara T. Bradford, MD⁹; Ryan A. Nofziger, MD¹⁰; Benjamin J. Boutselis²; Melissa L. Cullimore, MD¹¹; Elizabeth H. Mack, MD¹²; Jennifer E. Schuster, MD¹³; Shira J. Gertz, MD¹⁴; Natalie Z. Cvijanovich, MD¹⁵; Michele Kong, MD¹⁶; Melissa A. Cameron, MD¹⁷; Mary A. Staat, MD¹⁸; Emily R. Levy, MD¹⁹; Brandon M. Chatani, MD²⁰; Kathleen Chiotos, MD²¹; Laura D. Zambrano, PhD¹; Angela P. Campbell, MD¹; Manish M. Patel, MD^{1*}; Adrienne G. Randolph, MD^{22*};
Overcoming COVID-19 Investigators

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Effectiveness of BNT162b2 Vaccine against Critical Covid-19 in Adolescents

S.M. Olson, M.M. Newhams, N.B. Halasa, A.M. Price, J.A. Boom, L.C. Sabni, P.S. Pannaraj, K. Irby, T.C. Walker, S.P. Schwartz, A.B. Maddux, E.H. Mack, T.T. Bradford, J.E. Schuster, R.A. Nofziger, M.A. Cameron, K. Chiotos, M.L. Cullimore, S.J. Gertz, E.R. Levy, M. Kong, N.Z. Cvijanovich, M.A. Staat, S. Kamidani, B.M. Chatani, S.S. Bhumbra, K.E. Bline, M.G. Gaspers, C.V. Hobbs, S.M. Heidemann, M. Maamari, H.R. Flori, J.R. Hume, M.S. Zinter, K.N. Michelson, L.D. Zambrano, A.P. Campbell, M.M. Patel, and A.G. Randolph, for the Overcoming Covid-19 Investigators*

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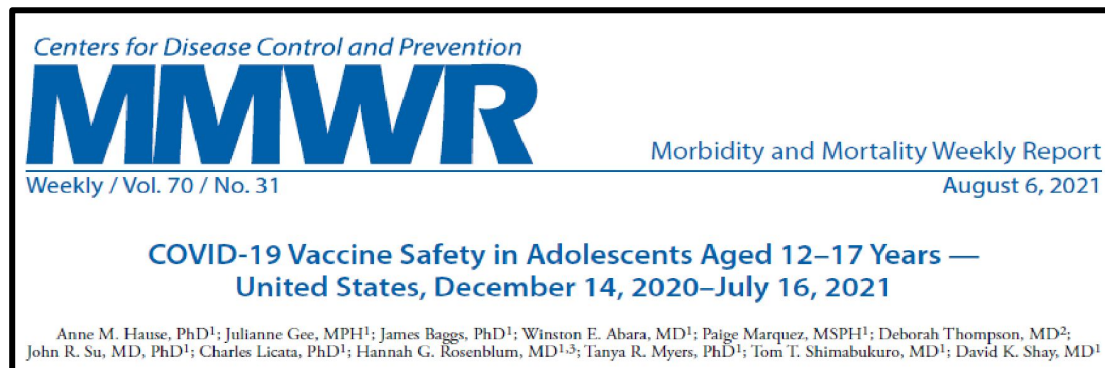
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Difficult to maintain physical distancing from young children in school & at home

Some evidence of short-term reduction in transmission by vaccinated vs unvaccinated adults & DELTA variant

3. Vaccines are effective in preventing severe COVID-19 in adolescents

4. mRNA vaccines reported to be safe in adolescents (low risk of myocarditis)



Arguments against Vaccinating children against COVID-19

1. Children rarely develop severe disease or die of COVID-19

Even children with underlying comorbidities have a very low risk

Vast majority of children have mild, transient self-limiting illness

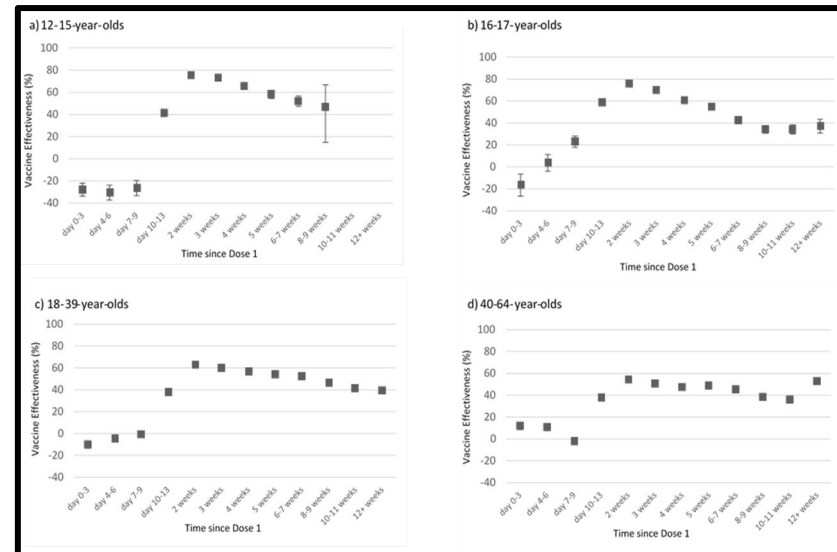
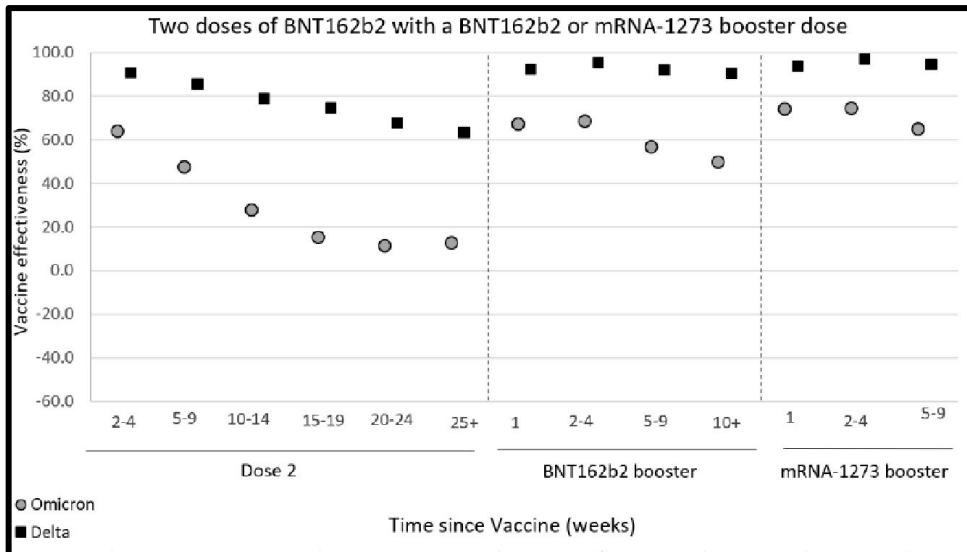
Effective treatments available for Hyperinflammatory syndrome (MIS-C/PIMS-TS)

2. Myocarditis after second dose in adolescent & young adult males

Mild, transient illness vs. potential rare adverse events (? Is myocarditis ever mild)

3. Limited protection against symptomatic COVID-19 or transmissions, esp. with Omicron

? Vaccinating children to protect adults (household, school, community)



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4. Opportunity Costs of vaccinating children against COVID-19

Diversion of services from essential healthcare: routine immunisations for teenagers in secondary schools

Establishment of new services for younger children (no injected vaccine programme in primary schools)

5. Transient infections in children

Natural boosting of immunity in children & adults longer-term protection

6. Vaccines for those who need it most

Global pandemic vaccines for high-risk populations in other countries: elderly, healthcare workers

Summary & Caveats

1. Benefits of vaccinating children = marginal
2. Decision to vaccinate children = personal
3. Balance between very low risks of infection vs. very low risks of vaccination
4. Current discussions mainly around mRNA vaccines for adolescents
5. Lower dose of mRNA vaccines in 5-11 year-olds may be safer, but severe disease risk = lower
6. Benefit-risks become more complicated with younger children (2-4 year-olds, infants)
7. Benefit-risk likely to be different for other vaccine platforms (conjugate vaccines, nasal vaccine)



THIS IS TO CERTIFY THAT

LITTLE HERO

FRANKIE
WARRIOR NAME

Sweet Peas
DOCTOR

IS A

COVID-19 WARRIOR