Literature Review

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9/29/2021

1. There is a higher risk of hospital admission or emergency care attendance risk for patients with COVID-19 infected with the delta variant compared with the alpha variant - 5.7% of pts  vs 4.2% of pts
2. mRNA COVID vaccine was NOT associated with increased risk of spontaneous abortion
3. COVID variants with properties of increased transmissibility may lead to higher number of infected children despite mitigation strategies such as social distancing or masking. Vaccines for children will be important for curving the spread of COVID variants.
4. There is poor immunogenicity at 28 days following a single dose of mRNA vaccine in the hemodialysis population.  Avoid delaying the second dose in these at-risk individuals
5. No clinical benefit was observed from the use of Remdesivir in patients who were admitted to hospital for COVID-19
6. IgG seropositivity was lower after CoronaVac than after Pfizer vaccination and declined over time
7. rates of confirmed Covid-19 and severe illness were substantially lower among those who received a booster (third) dose of Pfizer vaccine
8. Vaccine efficacy of Pfizer against Covid-19 was 91.3% at 6 months with a range of 86% - 100% efficacy in populations with diverse ages, sexes, race or ethnic groups
9. mRNA vaccines effectiveness were 89% against infection leading to hospitalization, 90% against infection leading to ICU admission, and 91% against infection leading to ER or urgent care visit.
	1. AstraZeneca effectiveness was 68% against infection leading to hospitalization and 73% against infection leading to ER or urgent care visit
10. evidence suggests that vaccination may reduce transmission by showing that vaccination of health care workers is associated with a decrease in documented cases of Covid-19 among members of their households
11. MIS-A is a serious hyper inflammatory condition that presents approximately 4 weeks after onset of acute COVID-19 with extra pulmonary multi-organ dysfunction
12. COVID-specific immune memory response persists in most patients approximately 1 year after infection
13. All 3 vaccines offered in the US offer substantial protection against COVID 19 during the most current Delta wave - Moderna vaccine (93%)  - Pfizer-BioNTech vaccine (88%) and the Janssen vaccine (71%)

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| LANCET - 9/5/2021 - Hospitalization and ED visit risk for COVID due to Delta vs Alpha Variant  | * Individual-level data on 43 338 COVID-19-positive patients (8682 with the delta variant, 34 656 with the alpha variant; median age 31 years [IQR 17–43]) were included in our analysis.
* 196 (2·3%) patients with the delta variant versus 764 (2·2%) patients with the alpha variant were admitted to hospital within 14 days after the specimen was taken (adjusted hazard ratio [HR] 2·26 [95% CI 1·32–3·89]).
* 498 (5·7%) patients with the delta variant versus 1448 (4·2%) patients with the alpha variant were admitted to hospital or attended emergency care within 14 days (adjusted HR 1·45 [1·08–1·95]). Most patients were unvaccinated (32 078 [74·0%] across both groups). The HRs for vaccinated patients with the delta variant versus the alpha variant (adjusted HR for hospital admission **1·94** [95% CI 0·47–8·05] and for hospital admission or emergency care attendance **1·58 [**0·69–3·61]) were similar to the HRs for unvaccinated patients (2·32 [1·29–4·16] and 1·43 [1·04–1·97]; p=0·82 for both) but the precision for the vaccinated subgroup was low.
* higher hospital admission or emergency care attendance risk for patients with COVID-19 infected with the delta variant compared with the alpha variant
* [https://www.thelancet.com/journals/laninf/article/PIIS1473-3099(21)00475-8/fulltext](https://urldefense.com/v3/__https%3A/www.thelancet.com/journals/laninf/article/PIIS1473-3099%2821%2900475-8/fulltext__;!!ECp5tQ!0uCuzn7Y403CTFwidP5PMvfTZvt93GfTQW_rNScHt_kRx-zBP7tVGHcictZ1ygKAQg$)

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| Lancet - 9/1/2021 - Risk factors and disease profile of Post-vaccination COVID infections  | * Between Dec 8, 2020, and July 4, 2021, 1 240 009 COVID Symptom Study app users reported a first vaccine dose, of whom 6030 (0·5%) subsequently tested positive for SARS-CoV-2 (cases 1), and 971 504 reported a second dose, of whom 2370 (0·2%) subsequently tested positive for SARS-CoV-2 (cases 2). In the risk factor analysis, frailty was associated with post-vaccination infection in older adults (≥60 years) after their first vaccine dose (odds ratio [OR] 1·93, 95% CI 1·50–2·48; p<0·0001), and individuals living in highly deprived areas had increased odds of post-vaccination infection following their first vaccine dose (OR 1·11, 95% CI 1·01–1·23; p=0·039). Individuals without obesity (BMI <30 kg/m2) had lower odds of infection following their first vaccine dose (OR 0·84, 95% CI 0·75–0·94; p=0·0030). For the disease profile analysis, 3825 users from cases 1 were included in cases 3 and 906 users from cases 2 were included in cases 4.
* Vaccination (compared with no vaccination) was associated with reduced odds of hospitalization or having more than five symptoms in the first week of illness following the first or second dose, and long-duration (≥28 days) symptoms following the second dose. Almost all symptoms were reported less frequently in infected vaccinated individuals than in infected unvaccinated individuals, and vaccinated participants were more likely to be completely asymptomatic, especially if they were 60 years or older.
* [https://www.thelancet.com/journals/laninf/article/PIIS1473-3099(21)00460-6/fulltext](https://urldefense.com/v3/__https%3A/www.thelancet.com/journals/laninf/article/PIIS1473-3099%2821%2900460-6/fulltext__;!!ECp5tQ!0uCuzn7Y403CTFwidP5PMvfTZvt93GfTQW_rNScHt_kRx-zBP7tVGHcictbVSSYfWg$)

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| JAMA - 9/8/2021 - Spontaneous abortion following mRNA COVID vaccine during pregnancy.  | * Of 105 446 unique pregnancies, 13 160 spontaneous abortions and 92 286 ongoing pregnancies were identified.
* Overall, 7.8% of women received 1 or more BNT162b2 (Pfizer-BioNTech) vaccines; 6.0% received 1 or more mRNA-1273 (Moderna) vaccines; and 0.5% received an Ad26.COV.2.S (Janssen) vaccine during pregnancy and before 20 weeks’ gestation.
* The proportion of women aged 35 through 49 years with spontaneous abortions was higher (38.7%) than with ongoing pregnancies (22.3%).
* A COVID-19 vaccine was received within 28 days prior to an index date among 8.0% of ongoing pregnancy periods vs 8.6% of spontaneous abortions ([Table 1](https://urldefense.com/v3/__https%3A/jamanetwork.com/journals/jama/fullarticle/2784193%2Ajld210061t1__;Iw!!ECp5tQ!0uCuzn7Y403CTFwidP5PMvfTZvt93GfTQW_rNScHt_kRx-zBP7tVGHcictansPxjyA$)).
* Spontaneous abortions did not have an increased odds of exposure to a COVID-19 vaccination in the prior 28 days compared with ongoing pregnancies (adjusted odds ratio, 1.02; 95% CI, 0.96-1.08). Results were consistent for mRNA-1273 and BNT162b2 and by gestational age group
* mRNA COVID vaccine was NOT associated with increased risk of spontaneous abortion
* [https://jamanetwork.com/journals/jama/fullarticle/2784193](https://urldefense.com/v3/__https%3A/jamanetwork.com/journals/jama/fullarticle/2784193__;!!ECp5tQ!0uCuzn7Y403CTFwidP5PMvfTZvt93GfTQW_rNScHt_kRx-zBP7tVGHcictbnbvi3IQ$)
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| JAMA - 9/8/2021 - characteristics of SARS-CoV2 circulation in in Israeli children with different variants  | * Data were analyzed for 21 615 children aged 0 to 9 years (50.9% male children) who had positive SARS-CoV-2 polymerase chain reaction tests between August 1 to October 2, 2020, and for 50 811 children aged 0 to 9 years (51.5% male children) who tested positive between December 3, 2020, and February 3, 2021.
* The slopes of weekly adjusted incidence curves for children aged 0 to 9 years during December to February 2021 (84.4; 95% CI, 71.1- 97.7) were significantly higher than those in August to October 2020 (39.1; 95% CI, 23.9-54.3). Rate ratio of highest to lowest weekly-adjusted incidence was higher during December 2020 to February 2021 (6.75 [95% CI, 6.3-7.2]) compared with August to October 2020 (3.62 [95% CI, 3.4-3.8]) ([Figure](https://urldefense.com/v3/__https%3A/jamanetwork.com/journals/jamanetworkopen/fullarticle/2783851%2Azld210178f1__;Iw!!ECp5tQ!0uCuzn7Y403CTFwidP5PMvfTZvt93GfTQW_rNScHt_kRx-zBP7tVGHcictYsvyZKqA$)). Likewise, the difference between the 2 periods was statistically significant following Poisson regression analysis (*P* < .001).
* Analysis of contact tracing found that during February to November 2020, 7.5% of traced secondary cases (11 770 of 156 521) were related to children aged 0 to 9 years. This rate increased significantly to 15.7% (49 257 of 313 871) during December 2020 to April 2021 (rate ratio [RR], 2.24; 95% CI, 2.20-2.29; *P* < .001).
* During August to October 2020, there were 261 hospitalizations among 26 689 individuals aged 0 to 9 years diagnosed with SARS-CoV-2 (0.98%) compared with 379 hospitalizations among 72 796 new cases during December to February 2021 (0.52%). Hospitalization rates were significantly lower in the latter period (RR, 0.53; 95% CI, 0.46-0.63; *P* < .001). The percentage of hospitalized children with unfavorable outcomes (severe condition and death) out of total number of hospitalizations was not different between the 2 periods (6.9% vs 6.5% in the late and early periods respectively (early period: 6.5% [17 of 261] vs late period: 6.9% [26 of 379]; RR, 0.99; 95% CI, 0.96- 1.04)
* These results demonstrate that SARS-CoV-2 spread more effectively and more rapidly among young children during the time of B.1.1.7 variant circulation in Israel. Transmission rates from children aged 0 to 9 years to other contacts were doubled during the time of B.1.1.7 circulation in Israel. However, hospitalization rates among children decreased. The latter finding is supported by studies in adults reporting increased contagiousness of the B.1.1.7 strain but not necessarily with increased severity
* COVID variants with properties of increased transmissibility may lead to higher number of infected children  despite mitigation strategies such as social distancing or masking. Vaccines for children will be important for curving the spread of COVID variants.
* [https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2783851](https://urldefense.com/v3/__https%3A/jamanetwork.com/journals/jamanetworkopen/fullarticle/2783851__;!!ECp5tQ!0uCuzn7Y403CTFwidP5PMvfTZvt93GfTQW_rNScHt_kRx-zBP7tVGHcictZfGiS5lA$)
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| JAMA - vaccine related antibody response to mRNA vaccines in dialysis pts.   | * Among the 142 participants undergoing maintenance hemodialysis, 94 (66%) were men; median age was 72 (interquartile range, 62-79) years.
* SARS-CoV-2 IgG antibodies were measured in 66 patients receiving 1 vaccine dose following a public health policy change, 76 patients receiving 2 vaccine doses, and 35 health care workers receiving 2 vaccine doses. Detectable anti-NP suggestive of natural SARS-CoV-2 infection was detected in 15 of 142 (11%) patients at baseline, and only 3 patients had prior COVID-19 confirmed by reverse transcriptase polymerase chain reaction testing. Two additional patients contracted COVID-19 after receiving 2 doses of vaccine.
* In 66 patients receiving a single BNT162b2 dose, seroconversion occurred in 53 (80%) for anti-spike and 36 (55%) for anti-RBD by 28 days post dose, but a robust response, defined by reaching the median levels of antibodies in convalescent serum from COVID-19 survivors, was noted in only 15 patients (23%) for anti-spike and 4 (6%) for anti-RBD in convalescent serum from COVID-19 survivors.
* In patients receiving 2 doses of BNT162b2 vaccine, seroconversion occurred in 69 of 72 (96%) for anti-spike and 63 of 72 (88%) for anti-RBD by 2 weeks following the second dose and median convalescent serum levels were reached in 52 of 72 patients (72%) for anti-spike and 43 of 72 (60%) for anti-RBD. In contrast, all 35 health care workers exceeded the median level of anti-spike and anti-RBD found in convalescent serum 2 to 4 weeks after the second dose
* There is poor immunogenicity 28 days following a single dose of BNT162b2 vaccine in the hemodialysis population, supporting adherence to recommended vaccination schedules and avoiding delay of the second dose in these at-risk individuals
* [https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2783679](https://urldefense.com/v3/__https%3A/jamanetwork.com/journals/jamanetworkopen/fullarticle/2783679__;!!ECp5tQ!0uCuzn7Y403CTFwidP5PMvfTZvt93GfTQW_rNScHt_kRx-zBP7tVGHcictZYXRYKrA$)
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| The Lancet - 9/14/2021 - Remdesivir and standard of care vs standard of care alone  | * Between March 22, 2020, and Jan 21, 2021,
* 857 participants were enrolled and randomly assigned to Remdesivir plus standard of care (n=429) or standard of care only (n=428). 15 participants were excluded from analysis in the Remdesivir group, and ten in the control group.
* At day 15, the distribution of the WHO ordinal scale was:
	+ (1) not hospitalized, no limitations on activities (61 [15%] of 414 in the Remdesivir group *vs* 73 [17%] of 418 in the control group);
	+ (2) not hospitalized, limitation on activities (129 [31%] *vs* 132 [32%]);
	+ (3) hospitalized, not requiring supplemental oxygen (50 [12%] *vs* 29 [7%]);
	+ (4) hospitalized, requiring supplemental oxygen (76 [18%] *vs*67 [16%]);
	+ (5) hospitalized, on non-invasive ventilation or high flow oxygen devices (15 [4%] *vs* 14 [3%]); (
	+ (6) hospitalized, on invasive mechanical ventilation or extracorporeal membrane oxygenation (62 [15%] *vs* 79 [19%]);
	+ (7) death (21 [5%] *vs* 24 [6%]).
* The difference between treatment groups was not significant (odds ratio 0·98 [95% CI 0·77–1·25]; p=0·85). There was no significant difference in the occurrence of serious adverse events between treatment groups (Remdesivir, 135 [33%] of 406 *vs* control, 130 [31%] of 418; p=0·48). Three deaths (acute respiratory distress syndrome, bacterial infection, and hepatorenal syndrome) were considered related to Remdesivir by the investigators, but only one by the sponsor's safety team (hepatorenal syndrome)
* No clinical benefit was observed from the use of Remdesivir in patients who were admitted to hospital for COVID-19
* [https://www.thelancet.com/journals/laninf/article/PIIS1473-3099(21)00485-0/fulltext](https://urldefense.com/v3/__https%3A/www.thelancet.com/journals/laninf/article/PIIS1473-3099%2821%2900485-0/fulltext__;!!ECp5tQ!0uCuzn7Y403CTFwidP5PMvfTZvt93GfTQW_rNScHt_kRx-zBP7tVGHcictYF8A2fAw$)
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| The Lancet - 9/9/2021 - IgG seropositive after CoronaVac (Sinovac) and Pfizer vaccination in Chile  | * Of 64 813 individuals enrolled,
* 56 261 were included in the final analysis, of whom 33 533 (59·6%) had received at least one dose of the CoronaVac vaccine, 8947 (15·9%) had received at least one dose of the BNT162b2 vaccine, and 13 781 (24·5%) had not received a vaccine.
* SARS-CoV-2 IgG positivity during week 4 after the first dose of CoronaVac was 28·1% (95% CI 25·0–31·2; 220 of 783 individuals), reaching a peak of 77·4% (75·5–79·3; 1473 of 1902 individuals) during week 3 after the second dose.
* SARS-CoV-2 IgG positivity during week 4 after the first dose of the BNT162b2 vaccine was 79·4% (75·7–83·1; 367 of 462 individuals), increasing to 96·5% (94·9–98·1; 497 of 515 individuals) during week 3 after the second dose and remaining above 92% until the end of the study.
* For unvaccinated individuals, IgG seropositivity ranged from 6·0% (4·4–7·6; 49 of 810 individuals) to 18·7% (12·5–24·9; 28 of 150 individuals) during the 5 month period. Regression analyses showed that IgG seropositivity was significantly lower in men than women and in people with diabetes or chronic diseases for CoronaVac vaccine recipients (p<0·0001), and for individuals aged 60 years and older compared with people aged 18–39 years for both vaccines (p<0·0001), 3–16 weeks after the second dose
* IgG seropositivity was lower after CoronaVac than after BNT162b2 and declined over time since vaccination for CoronaVac recipients but not BNT162b2 recipients
* [https://www.thelancet.com/journals/laninf/article/PIIS1473-3099(21)00479-5/fulltext](https://urldefense.com/v3/__https%3A/www.thelancet.com/journals/laninf/article/PIIS1473-3099%2821%2900479-5/fulltext__;!!ECp5tQ!0uCuzn7Y403CTFwidP5PMvfTZvt93GfTQW_rNScHt_kRx-zBP7tVGHcictbrfRvURA$)
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| NEJM - 9/15/2021 - result of third dose of Pfizer booster vaccine against COVID in Israel  | * At least 12 days after the booster dose, the rate of confirmed infection was lower in the booster group than in the nonbooster group by a factor of 11.3 (95% confidence interval [CI], 10.4 to 12.3); the
* rate of severe illness was lower by a factor of 19.5 (95% CI, 12.9 to 29.5). In a secondary analysis, the rate of confirmed infection at least 12 days after vaccination was lower than the rate after 4 to 6 days by a factor of 5.4 (95% CI, 4.8 to 6.1)
* [https://www.nejm.org/doi/full/10.1056/NEJMoa2114255?query=featured\_coronavirus](https://urldefense.com/v3/__https%3A/www.nejm.org/doi/full/10.1056/NEJMoa2114255?query=featured_coronavirus__;!!ECp5tQ!0uCuzn7Y403CTFwidP5PMvfTZvt93GfTQW_rNScHt_kRx-zBP7tVGHcictaUCpZDPA$)
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| NEJM - 9/15/2021 - safety and efficacy of Pfizer at 6 months   | * Pfizer continued to be safe and have an acceptable adverse-event profile.
* Few participants had adverse events leading to withdrawal from the trial.
* Vaccine efficacy against Covid-19 was 91.3% (95% confidence interval [CI], 89.0 to 93.2) through 6 months of follow-up among the participants without evidence of previous SARS-CoV-2 infection who could be evaluated.
* There was a gradual decline in vaccine efficacy.
* Vaccine efficacy of 86 to 100% was seen across countries and in populations with diverse ages, sexes, race or ethnic groups, and risk factors for Covid-19 among participants without evidence of previous infection with SARS-CoV-2.
* Vaccine efficacy against severe disease was 96.7% (95% CI, 80.3 to 99.9).
* In South Africa, where the SARS-CoV-2 variant of concern B.1.351 (or beta) was predominant, a vaccine efficacy of 100% (95% CI, 53.5 to 100) was observed
* [https://www.nejm.org/doi/full/10.1056/NEJMoa2110345?query=featured\_coronavirus](https://urldefense.com/v3/__https%3A/www.nejm.org/doi/full/10.1056/NEJMoa2110345?query=featured_coronavirus__;!!ECp5tQ!0uCuzn7Y403CTFwidP5PMvfTZvt93GfTQW_rNScHt_kRx-zBP7tVGHcictad9wvi0w$)
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| NEJM - 9/8/2021 - vaccine effectiveness in ambulatory and inpatient care centers  | * The effectiveness of full messenger RNA (mRNA) vaccination (≥14 days after the second dose) was 89% (95% confidence interval [CI], 87 to 91) against laboratory-confirmed SARS-CoV-2 infection leading to hospitalization,
* 90% (95% CI, 86 to 93) against infection leading to an ICU admission, and
* 91% (95% CI, 89 to 93) against infection leading to an emergency department or urgent care clinic visit.
* The effectiveness of full vaccination with respect to a Covid-19–associated hospitalization or emergency department or urgent care clinic visit was similar with the BNT162b2 and mRNA-1273 vaccines and ranged from 81% to 95% among adults 85 years of age or older, persons with chronic medical conditions, and Black or Hispanic adults.
* The effectiveness of the Ad26.COV2.S vaccine was 68% (95% CI, 50 to 79) against laboratory-confirmed SARS-CoV-2 infection leading to hospitalization and 73% (95% CI, 59 to 82) against infection leading to an emergency department or urgent care clinic visit
* [https://www.nejm.org/doi/full/10.1056/NEJMoa2110362?query=featured\_coronavirus](https://urldefense.com/v3/__https%3A/www.nejm.org/doi/full/10.1056/NEJMoa2110362?query=featured_coronavirus__;!!ECp5tQ!0uCuzn7Y403CTFwidP5PMvfTZvt93GfTQW_rNScHt_kRx-zBP7tVGHcictZTTox5pQ$)
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| NEJM - 9/8/2021 - effect of vaccination in COVID transmission  | * Cases of Covid-19 were less common among household members of vaccinated health care workers during the period beginning 14 days after the first dose than during the unvaccinated period before the first dose (event rate per 100 person-years, 9.40 before the first dose and 5.93 beginning 14 days after the first dose).
* After the health care worker’s second dose, the rate in household members was lower still (2.98 cases per 100 person-years). These differences persisted after fitting extended Cox models that were adjusted for calendar time, geographic region, age, sex, occupational and socioeconomic factors, and underlying conditions. Relative to the period before each health care worker was vaccinated, the hazard ratio for a household member to become infected was 0.70 (95% confidence interval [CI], 0.63 to 0.78) for the period beginning 14 days after the first dose and 0.46 (95% CI, 0.30 to 0.70) for the period beginning 14 days after the second dose ([Table 1](https://urldefense.com/v3/__https%3A/www.nejm.org/doi/full/10.1056/NEJMc2106757?query=featured_coronavirus*__;Iw!!ECp5tQ!0uCuzn7Y403CTFwidP5PMvfTZvt93GfTQW_rNScHt_kRx-zBP7tVGHcictb1fAHfHA$) and the [Supplementary Appendix](https://urldefense.com/v3/__https%3A/www.nejm.org/doi/suppl/10.1056/NEJMc2106757/suppl_file/nejmc2106757_appendix.pdf__;!!ECp5tQ!0uCuzn7Y403CTFwidP5PMvfTZvt93GfTQW_rNScHt_kRx-zBP7tVGHcictYMzDD5AQ$)). Not all the cases of Covid-19 in the household members were transmitted from the health care worker; therefore, the effect of vaccination may be larger.[**1**](https://urldefense.com/v3/__https%3A/www.nejm.org/doi/full/10.1056/NEJMc2106757?query=featured_coronavirus*__;Iw!!ECp5tQ!0uCuzn7Y403CTFwidP5PMvfTZvt93GfTQW_rNScHt_kRx-zBP7tVGHcictb1fAHfHA$) For example, if half the cases in the household members were transmitted from the health care worker, a 60% decrease in cases transmitted from health care workers would need to occur to elicit the association we observed (see the [Supplementary Appendix](https://urldefense.com/v3/__https%3A/www.nejm.org/doi/suppl/10.1056/NEJMc2106757/suppl_file/nejmc2106757_appendix.pdf__;!!ECp5tQ!0uCuzn7Y403CTFwidP5PMvfTZvt93GfTQW_rNScHt_kRx-zBP7tVGHcictYMzDD5AQ$)). Vaccination was associated with a reduction in both the number of cases and the number of Covid-19–related hospitalizations in health care workers between the unvaccinated period and the period beginning 14 days after the first dose
* We provide empirical evidence suggesting that vaccination may reduce transmission by showing that vaccination of health care workers is associated with a decrease in documented cases of Covid-19 among members of their households
* [https://www.nejm.org/doi/full/10.1056/NEJMc2106757?query=featured\_coronavirus](https://urldefense.com/v3/__https%3A/www.nejm.org/doi/full/10.1056/NEJMc2106757?query=featured_coronavirus__;!!ECp5tQ!0uCuzn7Y403CTFwidP5PMvfTZvt93GfTQW_rNScHt_kRx-zBP7tVGHcictbmXBqO6w$)
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| JAMA  - 9/22/2021 - multisystem inflammatory syndrome in adults  | * Of 221 patients with MIS-A, the median age was 21 (interquartile range [IQR], 19-34) years, and 154 of 219 (70%) with data available were men.
* Sixty of 169 patients (36%) were non-Hispanic Black individuals, and
* 122 of 209 (58%) had no underlying comorbidity. One hundred two of 149 patients (68%) noted a previous symptomatic COVID-19–like illness (median, 28 [IQR, 20-36] days previously).
* Most patients with MIS-A presented with fever (197 of 205 [96%]), hypotension (133 of 220 [60%]), cardiac dysfunction (114 of 210 [54%]), shortness of breath (102 of 198 [52%]), and/or diarrhea (102 of 197 [52%]).
* The median number of organ systems involved was 5 (IQR, 4-6). Median hospital stay was 8 (IQR, 5-12) days;
* 115 of 201 patients (57%) were admitted to the intensive care unit; 101 of 213 (47%) required respiratory support, and 15 of 220 (7%) died. Most patients (176 of 195 [90%]) had elevated markers of coagulopathy and/or inflammation and a positive SARS-CoV-2 serologic finding (139 of 194 [72%]). Ten patients with MIS-A presented with Kawasaki disease
* MIS-A is a serious hyper inflammatory condition that presents approximately 4 weeks after onset of acute COVID-19 with extra pulmonary multi-organ dysfunction
* [https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2784427](https://urldefense.com/v3/__https%3A/jamanetwork.com/journals/jamanetworkopen/fullarticle/2784427__;!!ECp5tQ!0uCuzn7Y403CTFwidP5PMvfTZvt93GfTQW_rNScHt_kRx-zBP7tVGHcictaXfyblyw$)
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| JID - 8/2021 - Ab and cellular immune response to COVID after 9 months.   | * We enrolled 59 patients with COVID-19, including 38 moderate, 16 mild, and 5 asymptomatic patients; 31 (52.5%) were men and 28 (47.5%) were women. The median age was 41 years (interquartile range, 30-55). T
* The median day from symptom onset to enrollment was 317 days (range 257 to 343 days).
* We found that approximately 90% of patients still have detectable immunoglobulin (Ig)G antibodies against spike and nucleocapsid proteins and neutralizing antibodies against pseudo virus, whereas ~60% of patients had detectable IgG antibodies against receptor-binding domain and surrogate virus-neutralizing antibodies.
* The SARS-CoV-2-specific IgG+ memory B cell and interferon-γ-secreting T cell responses were detectable in more than 70% of patients
* COVID-specific immune memory response persists in most patients approximately 1 year after infection
* [https://pubmed.ncbi.nlm.nih.gov/33978754/](https://urldefense.com/v3/__https%3A/pubmed.ncbi.nlm.nih.gov/33978754/__;!!ECp5tQ!0uCuzn7Y403CTFwidP5PMvfTZvt93GfTQW_rNScHt_kRx-zBP7tVGHcictZBmRrifg$)
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| CDC - 9/24/2021 - effectiveness of vaccines offered in US  | * Among U.S. adults without immunocompromising conditions, vaccine effectiveness against COVID-19 hospitalization during March 11–August 15, 2021, was
	+ Moderna vaccine (93%) t
	+ Pfizer-BioNTech vaccine (88%)
	+ Janssen vaccine (71%)
* Although these real-world data suggest some variation in levels of protection by vaccine, all FDA-approved or authorized COVID-19 vaccines provide substantial protection against COVID-19 hospitalization
* [https://www.cdc.gov/mmwr/volumes/70/wr/mm7038e1.htm?s\_cid=mm7038e1\_x](https://urldefense.com/v3/__https%3A/www.cdc.gov/mmwr/volumes/70/wr/mm7038e1.htm?s_cid=mm7038e1_x__;!!ECp5tQ!0uCuzn7Y403CTFwidP5PMvfTZvt93GfTQW_rNScHt_kRx-zBP7tVGHcictZ0yHAudA$)
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