MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

Please wear masks

Sherry Squires <squirescabin@msn.com> Tue, Aug 10, 2021 at 11:28 AM
To: publiccomment@mcpsmt.org

I am writing today in support of wearing masks to protect our student, teachers and staff. Covid is unfortunately on an uprise and the Delta variant is more contagious. A large population of our schools are unable to be vaccinated at this time and as a society we are responsible to protect everyone. Please help our community and help our students learn how to help their community.
Thank you
Sherry Squires
413 Evans Avenue

Sent from my iPhone

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

Covid Reopening Plan

David Chisholm <drchisholm@mac.com> Tue, Aug 10, 2021 at 11:29 AM
To: publiccomment@mcpsmt.org

Although I no longer have children in MCPS, the reopening plan is important to our community generally. In light of the incomplete, and seemingly ever-changing, information on Covid, uncertain risks to children and lack of availability of vaccine to younger children, the administration has done an admirable job of recommending a process for addressing health and safety while achieving full opening of the schools. The administration has also recommended a solid process for evaluating and responding to changing information and circumstances. I support the reopening plan.

There will be political and social pressure brought to bear on the decision and the district. I expect legal challenges as well, perhaps from elected state officials. Unanimous support from the board of trustees will be important to place MCPS in the best position to support the administration, staff and students. I hope all trustees will vote to approve the administration's plan.

David Chisholm
329 E Central Avenue
406-239-2342

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

Masks

Karen Rincker <karenrincker@gmail.com> Tue, Aug 10, 2021 at 11:41 AM
To: publiccomment@mcpsmt.org

It is always the responsibility of the school district to protect the health and safety of the children in your care. Masks are a simple and effective method to help protect our children from a potentially deadly disease. Those under 12 are unable to protect themselves, or those around them, through vaccinations. Please, mask up all students and adults. The Delta variant of Covid-19 does affect children as well as their parents, grandparents, siblings, playmates, and others with whom they may come into contact.
Thank you for your consideration.

Karen Rincker

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

Mask mandate

Gary Kulaski <Garythepole@outlook.com> Tue, Aug 10, 2021 at 11:47 AM
To: "publiccomment@mcpsmt.org" <publiccomment@mcpsmt.org>

I do not believe in this mandate. There is absolutely no science to back up this mandate. Kids need to be in school without masks. This is bull. The masks do not slow spread and it does not protect the wearer either. I am totally against this mandate. Even the vaccine does not guarantee you will get it or spread it. That has been proven.

Sent from my iPhone

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

Masks

Amy Ratzlaf <aratzlaf@msn.com> Tue, Aug 10, 2021 at 11:48 AM
To: "publiccomment@mcpsmt.org" <publiccomment@mcpsmt.org>

I have a fully vaccinated daughter who will be starting Hellgate High School in the Fall. I fully support a mask mandate for the safety of all of the children.

Thank you
Amy Ratzlaf

Sent from my iPhone

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

Public Comment - Face Covering Recommendation

Alanna Smith <alannasmith406@gmail.com> Tue, Aug 10, 2021 at 12:24 PM
To: publiccomment@mcpsmt.org

Hello,

I am a parent of children at CS Porter and Sentinel.

I am writing to express my SUPPORT for the mask guidelines recommended by the district administration and COVID task force for the first 6 weeks of school. We need to continue to provide a safe learning environment and protect our children and the larger community from Covid-19 transmission.

Thank you for your time and consideration.

Alanna Smith

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

Masks

Jessica Farseth <jfarseth@gmail.com> Tue, Aug 10, 2021 at 12:26 PM
To: publiccomment@mcpsmt.org

Please mandate masking in the schools. At least until everyone is eligible for vaccinations. We k ow that masks help. Let's do everything we are able to protect everyone.

Thank you,
Jessica Farseth
Lewis and Clark parent

Sent from my iPhone

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

Masks In School

gsell@aol.com <gsell@aol.com> Tue, Aug 10, 2021 at 12:38 PM
Reply-To: gsell@aol.com
To: "publiccomment@mcpsmt.org" <publiccomment@mcpsmt.org>

August 10, 2021

Yesterday, there was a news report that over 94,000 children had been infected with Covid-19, in the United States.

This alarming report confirms my belief that children are and will be extremely vulnerable to this insidious disease until they and the adults with whom they contact are vaccinated.

Therefore, for the foreseeable future all children and school staff (and anyone entering the school building) must wear a mask!

If only one student or school staff member is saved from Covid-19 a little inconvenience is certainly justified.

Sincerely,

Joseph R Gsell
3636 Brandon Way
Missoula, Montana 59803

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

Support for Masks in School

Ashton Squires <ashton.squires@gmail.com> Tue, Aug 10, 2021 at 12:44 PM
To: publiccomment@mcpsmt.org

Hello,

I'm writing in support of a mask mandate in Missoula County Public Schools for the beginning of the 2021-2022 school year.

The CDC's current recommendation for schools is for all teachers, staff, students, and visitors to be masked, regardless of vaccination status. The CDC has the best and most up to date scientific information possible.
Missoula County currently has a high level of transmission of Covid-19. The CDC recommends all persons, regardless of vaccination status, to wear masks indoors in communities with high transmission. Schools are no exception.
As a school board and members of the public, we are not scientists or public health officials. Following the recommendation of professionals in the medical and public health fields is crucial. We need to make safety decisions based on current medical fact, not personal belief, political belief, or misinformation.
Our teachers and staff in particular deserve a healthy and safe working environment. Allowing parents to determine the health and safety of our teachers and staff is irresponsible. Workplaces across the country have responded to the pandemic with the safety of their staff as their highest priority. A school district has the responsibility to keep their staff safe and healthy, just like any private business. As a family member of a licensed teacher, the safety of my family is not less important than the belief of a student's parent.
Students have learned to wear masks and did a good job following the rules. Continuing to wear masks will not hinder their learning or ability to socialize. Kids being in school is important for their mental health and education, but a mask can be part of that.
MCPS is the leader in our county for all school districts. Putting the safety of all teachers, staff, and students first should be the top priority of MCPS. By doing this, other smaller school districts will follow and our community will be safer.

Thank you for your time and consideration on this matter. I encourage you to require masks in schools until it is safe to remove them.

Ashton Jacobsen

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

Mask Mandate

Monica C <monicaanneh@gmail.com> Tue, Aug 10, 2021 at 1:14 PM
To: publiccomment@mcpsmt.org

This is getting out of control. Actually, it's all about control. It's a FACT the the mask don't work! The liberal agenda is sickening and wrong! Wake up people. We will not stand for this!

Sent from my iPhone

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

school masks

loren pinski <lppinski@gmail.com>
To: publiccomment@mcpsmt.org

Tue, Aug 10, 2021 at 2:24 PM

Greetings

My name is Loren Pinski and I live at 807 Pattee Creek Drive #A, Missoula, MT. 59801. My kids are grown up but I still have connections to the local schools. I am an afternoon tutor for Soft Landing, Pre covid, I was a volunteer with Writing Coaches, and I have been an ESL tutor at CM Russell school.

I support a mask mandate for Missoula Public schools. We need to believe and follow the advice of scientists, not politicians. We need to protect the students and our teachers. If we error, let us error on the side of caring, protecting, and providing a safe environment for our children.

Thanks
Loren Pinski

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

August 10, 2021 School Board Meeting, Public Comment, Mask Choice, SB400, SB157, HB501

Erick Prather <erickprather@gmail.com> Tue, Aug 10, 2021 at 2:34 PM
To: Publiccomment@mcpsmt.org

Mr. Watson and School Board Trustees,

I want to bring to your attention legislation that passed and signed into law by Governor Gianforte during the 2021 session;

(1-) SB400 -AN ACT RESTRICTING A GOVERNMENTAL ENTITY'S ABILITY TO INTERFERE WITH FUNDAMENTAL PARENTAL RIGHTS; ESTABLISHING A CAUSE OF ACTION FOR INTERFERENCE WITH PARENTAL RIGHTS. As you'll note, a government entity MAY NOT interfere with the fundamental right of parents to direct the upbringing, education, health care and mental health of their children.

The FDA regulates face masks, including cloth face coverings, and surgical masks as medical devices when they are marketed for medical purposes. Medical purposes include uses related to COVID-19, such as face masks to help stop the spread of disease, surgical masks, and surgical masks with antimicrobial/antiviral agents. Face masks marketed to the general public for general non-medical purposes, such as for use in construction and other industrial applications, are not medical devices

If the school board votes to require students to wear a medical device, I believe you will violate SB400 and the parents will have no other option but to challenge your decision in court. Thankfully we have attorneys who have reviewed the language and feel we have a very strong argument.

(2-) SB157 - AN ACT REVISING LAWS RELATED TO THE ABILITY OF A STUDENT ATTENDING A NONPUBLIC SCHOOL OR HOME SCHOOL TO PARTICIPATE IN EXTRACURRICULAR ACTIVITIES OFFERED BY THE STUDENT'S RESIDENT SCHOOL DISTRICT; AND PROVIDING AN EFFECTIVE DATE.

Many parents I have spoken with are considering pulling their children from MCPS. In the past 40 years there has been no better opportunity to home school children than now with more parents working remotely from home. Parents and students got to experience remote learning last year. Some loved it, some didn't. What I can say is it exposed how much time is actually spent in the classroom. Many parents and students reported they spent less time remote learning, approximately 3 hours daily, than traditional in person learning. One complaint I heard was teachers not loading assignments during normal school hours. Another complaint was difficulty in obtaining help when an assignment was unclear. If you add all of this along with the ridiculous bell schedule change that has put MCPS parents in a difficult scheduling position now, it makes more and more sense to home school and remove students from MCPS. Thankfully, home school students are now afforded the opportunity to participate extracurricular activities. I suspect you will see parents exercise this option, ultimately affecting MCPS funding.

(3-) HB501 A BILL FOR AN ACT ENTITLED: "AN ACT REVISING CRIMINAL LAWS RELATED TO TRESPASS; 5 PROVIDING THAT FAILURE TO WEAR A FACE COVERING OR CARRY PROOF OF VACCINATION MAY 6 NOT BE CONSIDERED IN THE CRIME OF CRIMINAL TRESPASS; AND AMENDING SECTION 45-6-203, 7 MCA." Pay special attention to MCA 45-6-203, section (4);

It does not constitute criminal trespass when a person who lacks proof of vaccination or vaccination status or fails to wear a specific medical device, such as masks or other facial coverings, enters or remains in a PUBLIC place PAID FOR IN WHOLE OR IN PART WITH TAXPAYER FUNDS where proof of vaccination or use of medical devices, such as masks or other facial coverings, is required."

In the event masking requirements are in place, and our children decide not to comply, please inform your staff the parents are not required to mask up when we enter or remain in the building.

The proposed mask requirement along with the ridiculous bell schedule change has not only frustrated parents and students, but many in the administration. If the mask requirement is enforced, you will not only pit the students and parents vs. MCPS, you could create a hostile environment for those students who do not wish to wear a face covering. You already have a student base that has proclaimed they will not comply. If you take disciplinary action against the maskless students, you will most certainly lose them.

In the draft letter I noticed in the first bullet point you identify staff as required to be masked. What if the staff decides not to mask, are you going to take disciplinary action? Are you going to hire a substitute teacher to teach class?

Just curious, does anyone know what size the covid-19 aerosol particle is? NONE of the face coverings you are requiring offer protection against the virus. In fact, this type of masking is conducive to bacterial infections in the covered areas.

In closing, the correct action here is personal responsibility and personal choice. If a student feels a need to wear a mask, by all means, allow that student to wear a mask. If a student decides not to wear a mask, respect their decision.

Regards,

Erick M. Prather

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

yes to Masks in Schools

Rickie van Berkum <vanberkumfiberart@gmail.com> Tue, Aug 10, 2021 at 2:35 PM
To: publiccomment@mcpsmt.org

Please help keep our schools open and the community safe by requiring masks in schools this fall.
Rickie van Berkum
Huson, MT 59846

Rickie van Berkum
vanberkumfiberart.com

VAN BERKUM
FIBER ART

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

Public comment re: masks as mitigation strategy

Carissa Benjamin <carissabenjamin406@gmail.com> Tue, Aug 10, 2021 at 2:38 PM
To: publiccomment@mcpsmt.org

Hello

I sent this link in the Spring along w my personal experience of masking in schools. I will share those thoughts/experiences again. Also, at a previous meeting board members acknowledged that there would be a plan to collect data/asses the cost/benefit of student masking in school. As far as I know, this has still yet to be done? If it has been done, can that data be shared?

Please read: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7680614/?fbclid=IwAR1HNsX5Rqs7d8R4iDRdNc9UGaUpS9JMpFR9BX0V3vgnx230b9A6UscPUP0

Many are saying that masks are supported by “science”. If that is true, please share the science. As far as I can tell, masks have limited effectiveness on reducing/stopping the spread of respiratory viruses.

Masks in school have done the following, per some of my observations, working as a district PT:

Kept students who are unable to mask properly in isolation - utilizing excessive resources including, but not limited to, dedicated 1:1 para support and taking up an entire classroom. The student I’m thinking of has his own para, his own classroom and has limited social interaction w peers.

Some of the children I work w in special education, have significant balance impairments and are fall risks, obstructing their vision w masks increased that risk and makes it more difficult for them to work on certain skills and motor activities. I imagine that it would also have the potential to impair those students who already are struggling w reading. Has the district examined this???

I have seen a lot of children w wet and chewed through masks. I have seen children’s masks left on the dirt at recess and then put back me on their face when the bell rings. I have seen children throw up in their masks. I’ve seen children frequently touch the inside of their mask before putting it back on. I wonder what parents would think if they saw these behaviors. Would they still think masks are protecting their children from illness???

As a PT for the district, I often observe PE at various schools. Some schools offer mask breaks between vigorous exercise and some do not. When not offered breaks, I see children struggling to breathe, following exertion, sucking their masks into their mouths, complaining of nausea and dizziness.

With an open mind, I implore you to consider a different narrative. Please watch this video from an Indiana school board meeting.
https://youtu.be/G7tjqgV7e44

Thank you for your time and consideration.

Sent from my iPhone

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

Mask mandates for students

1 message

Cameron Richmond <riceraider8080@yahoo.com> Tue, Aug 10, 2021 at 2:56 PM
Reply-To: Cameron Richmond <riceraider8080@yahoo.com>
To: "publiccomment@mcpsmt.org" <publiccomment@mcpsmt.org>

Listen to the actual science. Keep the masks off our kids and stop abusing them and your authority.

Sent from Yahoo Mail on Android

VID_20210809_113702_038.mp4
8033K

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

Masks

Aaron Gingerelli <a.gingerelli@gmail.com> Tue, Aug 10, 2021 at 3:05 PM
To: publiccomment@mcpsmt.org

Good afternoon,

I am the parent of two school aged children who attend Missoula schools.

I would like to speak in strong support of a mask requirement for all students, teachers, administrators and others who are present in our public school buildings this fall.

The science, math and reality of this situation is crystal clear. Masks make a difference and are a small inconvenience in comparison to the illness of Covid and the continuation of this pandemic. Failing to take action on masking serves only to lengthen the duration of this pandemic and cause more needless suffering in our community.

I strongly urge the school board to continue with a universal mask requirement in all public schools in Missoula until the pandemic is much more under control.

Thank you,

Aaron Gingerelli

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

MCPS Reopening Guidelines

Brian McDonald <brian.mcdonald.1976@gmail.com> Tue, Aug 10, 2021 at 3:13 PM
To: publiccomment@mcpsmt.org

Dear MCPS Board of Trustees,

I am writing in support of the August 16, 2021 recommended guidelines for face coverings in Missoula County Public Schools.

Given the recent increase in COVID cases and COVID variants in Missoula County as well as the lack of vaccine for children under 12, I think approaching the new school year with a measure of caution is more than reasonable. In addition, I feel re-evaluating face covering guidelines in 6 weeks is also rational.

In my opinion, Missoula County Public Schools did an excellent job of operating in-person learning under extremely difficult circumstances during the 2020-2021 school year. The safety measures were effective and kept schools open. In the long run, I feel my children are far better off in school, with peers, and learning from professionals than they are at home, with me trying to provide them an education while working a full time job.

Thank you for your time and consideration.

Brian McDonald
253 Strand Ave, Missoula, MT 59801

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

No Masks

ANGELA SUSOTT <ARSUSOTT@msn.com> Tue, Aug 10, 2021 at 3:18 PM
To: "publiccomment@mcpsmt.org" <publiccomment@mcpsmt.org>

Please accept this email as my public comment! I vote no masks in school!

Angela Susott

Get Outlook for iOS

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

Masks for schools please

Deb Bergman Fassnacht <debfassnacht@gmail.com> Tue, Aug 10, 2021 at 3:19 PM
To: publiccomment@mcpsmt.org, Deb Bergman Fassnacht <debfassnacht@gmail.com>

Hello Missoula County Public School Board,

I am writing as a grandparent, former parent of MCPS students, and as an informal educator.

I would like to see MCPS require masks on K-12 students in school during the 2021-2022 school year. I think this is the safest response with consideration of the known COVID issues and new strains as well as the unknown COVID variants that may crop up. These COVID variants will likely be dangerous to our students and teachers.

Let's keep everyone safe as we can and require masks and any reasonable school protocols for safety and health of our students and school staff.

Thank you,
Deb Fassnacht
debfassnacht@gmail.com

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

Masks

Elizabeth Susott <esusott@gmail.com> Tue, Aug 10, 2021 at 3:30 PM
To: "publiccomment@mcpsmt.org" <publiccomment@mcpsmt.org>

Hello, I am a student in a public school here in Missoula. I understand the new thing in Missoula is to read emails and do nothing about it or make a decision before you even get votes in.. I believe that masks do not benefit schools and are definitely not helping this situation if anything it's hurting. Masks are not good for students or anybody for that matter. Kids need to show expression, kids need to breath. If these masks worked at all we wouldn't be in this situation and I think everybody can agree. I hope you take this email into consideration and take masks out of all schools.
-Elizabeth (8th grade student)

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

Masking Public Comment

Libby Catron-Gingerelli <lcatrongingerelli@gmail.com> Tue, Aug 10, 2021 at 3:35 PM
To: publiccomment@mcpsmt.org

Hello,
I am a mother of two children enrolled with MCPS. Our family is excited to get back into the classrooms this fall after a challenging year last year. I want to express my strong support for a mask requirement for all persons attending, working, and accessing Missoula Public Schools this fall.
It has been clear that the health professionals both locally and nationally agree that wearing a mask is critical in the prevention of not only contracting the virus, but also in the continued spread of COVID-19 and the variants that are causing further concern. I think we ALL want to see this pandemic come to an end. We all want our lives to be able to return to some normalcy. Allowing schools/classrooms of people to gather without masks right now is not the path we all seek. I urge you to consider the advice of the health community and the science that informs them above the opinions of politicians.

I am grateful for your service and I thank you for taking care of our children and families.

Warmly,

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

In support of masking

Gmail <leah.gordon@gmail.com> Tue, Aug 10, 2021 at 3:43 PM
To: publiccomment@mcpsmt.org

Hello,
I am a primary care physician and mother of incoming Kindergartener writing to support the required use of masks in Missoula public schools this year for all grades. As children under 12 are not yet able to be vaccinated, all we have to protect them from infection are mitigation strategies. I believe masking is the most important of these strategies and the best way to keep our children learning in person safely.
Thank you for considering this,
Leah Gordon
Missoula, MT

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

Support mask mandates MCPS

Malinda Lueck <malindallueck@yahoo.com> Tue, Aug 10, 2021 at 3:44 PM
To: publiccomment@mcpsmt.org

Dear MCPS school board,

Please support a mask mandate for all staff and students regardless of vaccination status while indoors at all MCPS schools. Masks protect those who are age ineligible for the vaccine. Additionally the vaccine rate as reported by the Missoula County Health Department is low at 34.9% for 12-14 and 55% for 15-19 year olds. The highly contagious Delta has been identified in Missoula. In the three weeks until the first day of school I hope the numbers do not elevate but universal masking indoors is forward thinking. Furthermore a mask mandate will help MCPS students to be high achieving as their learning will not be as disrupted. Thank you for keeping our students, staff as well as the Missoula community safe by supporting an indoor mask mandate.

Sincerely,
Malinda Gaudry

Sent from my iPad

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

masks in schools

Jaclyn Foster <jaclynfoster93@gmail.com> Tue, Aug 10, 2021 at 3:48 PM
To: publiccomment@mcpsmt.org

08/02/2021: A lack of mandates that leaves masking “up to parents” actually leaves the issue up to 5-year-olds. As a parent, I can send my kindergartener to school with a mask and talk to her all I want about the importance of wearing it, but at her maturity level it’s absurd to think she’ll keep it on all day if her friends aren’t or if her teacher can’t remind her to put it back on after lunch. It’s the job of adults to provide the structure and guidance needed to keep children safe. We need a mask mandate for the same reason I don’t offer my kid the “option” to have ice cream for dinner, or to play kickball in the street. Kids aren’t ready to carry the full responsibility for their safety and risk long-term complications they don’t understand, and parents need to know that their teachers are empowered to keep them as safe as possible according to AAP and CDC guidelines. Given Delta’s transmission rates, a recent study expects that without masks, 70% of all students will be infected within 3 months, a figure completely beyond the resources of our healthcare system — with mask mandates, that figure drops to 40%, reducing transmission by nearly half and buying time for the vaccine to be approved for ages 5-11.

08/03/2021: After yesterday’s meeting I watched a press conference by Dr. Mark Kline, Physician-in-Chief at Children's Hospital New Orleans. He dispelled the myth that only children with pre-existing conditions are getting sick, saying: "Half the children we are seeing [hospitalized] with COVID were perfectly healthy.” He goes on to say “This delta variant is every infectious disease specialist's worst nightmare.. There was a myth.. that children were somehow immune... It has become very clear that children are heavily impacted.” You know, during the best case/worst case exercise yesterday and today I heard a lot of worst case scenarios that boil down to “what if people get mad at us.” You want to know my worst case scenario? My kid brings covid home to my newborn and either one of them is hospitalized, or gets long covid. Or the pediatric ICUs fill up and my kid gets appendicitis or my newborn gets RSV. Or we lose our apartment during a housing crisis due to covid medical bills or tons of missed work due to repeated covid exposures. The CDC reports that over 200,000 children have been hospitalized with covid, pre-delta variant. Rates of hospitalization and disability affect children’s mental health, as does the fear of bringing covid home to at-risk family members. The British National Health Service says 7-8% of children experience long covid, and preliminary research suggests it’s caused by long-term neurological damage.* Yesterday some commenters referenced a study in Germany purporting to show elevated CO2 levels due to masks. I got curious and looked up the study, and found out that it has since been retracted. The equipment they used to measure the CO2 levels was used incorrectly. Pulse oximeter data while masking has consistently shown CO2 levels within acceptable limits. While some people do experience a sense of breathlessness while masking, it is psychological, not physiological. As someone who experienced an anxiety disorder myself as a teen, I have a lot of sympathy for that. But I also know from personal experience that we know how to treat anxiety in children and teens. We don’t know how to treat long covid, or even if we will be able to. Last year we had three cases per 100k at the end of August, and we saw a giant wave within months. Today we saw we’re at 18 per 100k and on on the rise, and delta is as contagious as chicken pox. We need masks. Nobody should have the right to expose my kid to a disease that’s only getting more dangerous for kids.

08/10/2021: Because we don’t have school transmission data on the delta variant, and news out of other states indicates it impacts kids worse, please keep the mask mandate for the first 6-8 weeks while we gather local data. We can reassess once we have a better picture of what delta looks like in our community. A leaked CDC internal document says the battle has changed against covid as a result of delta, and we don’t want to go in underprepared. Utah is hospitalizing a child under 12 every other day and expects the rate to increase. Louisiana and Arkansas pediatric hospitals are at capacity with children with tubes down their throats, half of whom had no pre-existing conditions. The Governor of Arkansas has been on the news regretting opposing masks and begging schools to implement mandates. Four Mississippi schools so far have already had to go online after only one or two weeks without masks. An intubated 11-month old couldn’t find a hospital bed at the largest children’s hospital in the nation in Houston and had to be airlifted 150 miles away. Child hospitalizations are at their highest rate in the whole pandemic. We’re incredibly lucky to not be the first state hit with this variant, and we should learn the lessons of other states while we still can. A study in the Lancet suggests 1 in 22 kids experience long covid — that’s one kid from every class acquiring a disability.

My family doesn’t have the option to do online learning — we can’t afford to have a parent lose work hours supervising that. We need our kid to be safe in school and not let cases build up to the point where we have to get back to phase 1 or 2. And let’s not pretend recommending masks means all parents who want kids masked can keep them masked. My kindergartner isn’t going to keep her mask on all day if her friends aren’t because she’s 5 and she isn’t capable of long-term reasoning yet. Young children benefit from 100% consistency, not a hodgepodge of different rules for different families, and at that age I don’t even have the choice to protect her via vaccination. Masks are her only line of defense and she deserves a school experience that supports that. It’s truly a difficult situation

that no matter what the policy is, there's no solution here where individual choice occurs in a consequence-free vacuum. The founding fathers understood that in a healthy society, freedom is more complicated than doing whatever we want. Even George Washington mandated inoculation at Valley Forge and advised the Virginia legislature to mandate childhood inoculation,* and some of the strongest local government measures in the revolutionary era were about preventing disease outbreaks. Public schools and public health is about the public good, and that's what the CDC and AAP guidelines are all about.

*George Washington wrote in 1777: "If I was a Member of that [Virginia] Assembly I would rather move for a Law to compell the Masters of Families to inoculate every Child born within a certain limitted time under severe Penalties."

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

Masks

susancrawfordart@gmail.com <susancrawfordart@gmail.com> Tue, Aug 10, 2021 at 4:32 PM
To: publiccomment@mcpsmt.org

PLEASE vote for Watkin's recommendation for masks!!!
Keep our kids and teachers safe!

Sent from my iPhone

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

For consideration about masks

Austin Pray <pandapray@aol.com> Tue, Aug 10, 2021 at 4:59 PM
To: publiccomment@mcpsmt.org

To whom,

I believe when given a chance to control, people can and will take advantage (not all, but some). These times are interesting and testing this thought by getting power to emplace “mandates”. That being said, it is up to you to decide what side of history you’re on. I’ve always been taught in the education system, terrible history is taught to be understood, to never repeat itself regardless of the circumstances. Some quick thoughts to keep in mind is, do you think Hitler was always a “bad” person? A leader who lies

You are trusted to have a choice and the power to implement it, to make a decision and back by that decision for generations to come. Masks were a form of torture and still is, this can be backed by my personal opinion to this matter if you need a reference.

https://youtu.be/_9KnhUu7Ba4

Please for the children do all your research from both sides of the spectrum, not just listen to the donors.

Austin P.

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

maskless masochism

Colleen <cmiller@cybernet1.com> Tue, Aug 10, 2021 at 5:16 PM
To: publiccomment@mcpsmt.org

You're all having a public meeting via Zoom about whether to allow kids to be exposed to more coronavirus that some might be able to live through, because the Republicans have an orange axe to grind? You'll protect yourselves from having to swap aerosols in person, but have no qualms about leaving kids defenseless? Irony isn't dead, but if it has to work this hard every day, it soon will be.

I'm sorry i won't be able to attend; i'm coughing like crazy while i await my COVID test results after being fully vaxxed and wearing my mask conscientiously. My parents' belief in smoking 7-8 packs of cigarettes per day left me with less than stellar lungs. Happily, because i'm not a science-eschewing Know-Nothing and don't belong to a cult, i'll live through this.

Kids under 12 don't have the choice yet to vax, to mitigate their chances of dying from adults arguing about their freedumbs. I urge you to give them a leg up on surviving this disease by mandating masks. It's literally the very least you can do for them.

Colleen Miller

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

In Support of Mask Mandate

Laurie Franklin <rabbilaurie@har-shalom.org> Tue, Aug 10, 2021 at 5:18 PM
To: "publiccomment@mcpsmt.org" <publiccomment@mcpsmt.org>

Dr. Watson and MCPS Trustees,
I write to give strong support to a mask **mandate** for all of our schools this fall and throughout the school year, as needed. Masks save lives. Vulnerable children who cannot yet be vaccinated need protection. Teachers, staff and administrators need protection. Vulnerable family members of school-aged children need protection.

Please read the essay below, published today—August 10, 2021—in the New York Times, which highlights a one-year-plus study in North Carolina, showing the efficacy of masking to control the spread of Covid in schools. This is additional, unequivocal evidence that mandated masking is a valuable tool for maintaining the good health of our students.

I reject uninformed arguments that discredit the CDC, the American Academy of Pediatrics, and studies such as the one below. Further, I reject elevation of individual choice over the common good. One of the highest values in Judaism is "*pikuach nefesh*", saving a life; it is morally unacceptable to threaten the lives of others because of notions of personal liberty. Even more so, I object to characterizing mask mandates as "Nazi". My family lost many members and beloved friends to Hitler's camps and Nazi-inspired executions. Let's not play around with poor analogies that insult our monumental loss. Mask mandates are the polar opposite of ethnic and religious extermination; mask mandates are universal life savers, not selective destroyers.

Please enact a mask mandate, as well measures for distancing and sanitizing, to protect our children and all who live, love, work, and play with them.

With appreciation,
Rabbi Laurie Franklin
Missoula, MT

We Studied One Million Students. This Is What We Learned About Masking.
Aug. 10, 2021
By Kanecia Zimmerman and Danny Benjamin Jr.
Dr. Zimmerman is an associate professor of pediatrics at the Duke University School of Medicine. Dr. Benjamin is a pediatric-infectious-disease specialist at Duke Health.

Big questions loom over the upcoming back-to-school season: Should children be required to wear masks? Should children go to in-person classes at all?

If we send children to school without masks, we increase their risk of acquiring Covid-19. Some could suffer illness or die. If we close schools, millions of children will suffer learning loss, and many of them may suffer lifelong effects on their physical and mental health.

For more than a year, we've worked with North Carolina school districts and charter schools, studying the rate of new Covid cases, the efficacy of mitigation measures such as masking and the increased risks of participating in school-sponsored sports. We have learned a few things for certain: Although vaccination is the best way to prevent Covid-19, universal masking is a close second, and with masking in place, in-school learning is safe and more effective than remote instruction, regardless of community rates of infection.

Vaccination is the strongest method for preventing the ill effects of Covid, but students under 12 years of age are ineligible for the vaccines. Masking, then, is one of the best, most readily available methods to protect them from the disease, with universal masking being one of the most effective and efficient strategies for preventing SARS-CoV-2 transmission in schools.

Universal masking in schools can save lives. Voluntary masking in schools will likely be much less effective and could lead to school closures and community transmission. This summer, we've seen that voluntary masking has failed in some schools in Missouri and North Carolina, which saw increases in Covid-19 cases and days missed because of quarantines, prompting several districts to reinstate mask mandates.

How do we know that masking helps prevent spread among unvaccinated people in schools? In July 2020, we and our colleagues developed the ABC Science Collaborative to pair scientists with school and community leaders to make sure that school leaders had the most up-to-date, scientific information pertaining to Covid-19 and K-12 schools. In conjunction with North Carolina, the ABC Science Collaborative collected data from more than one million students and staff members in the state's schools from March to June 2021. Certain school districts in North Carolina were required, by bipartisan legislation, to submit infection data to the ABC Science Collaborative as a trusted third party.

During that time, more than 7,000 children and adults acquired the coronavirus and attended school while infectious. Because of close contact with those cases, more than 40,000 people required quarantine. Through contact tracing and testing, however, we found only 363 additional children and adults acquired the coronavirus. We believe this low rate of transmission occurred because of the mask-on-mask school environment: Both the infected person and the close contact wore masks. Schools provided this protection without expensive screening tests for the coronavirus or massive overhauls in ventilation systems.

Because North Carolina had a mask mandate for all K-12 schools, we could not compare masked schools to unmasked schools. To understand the preventive impact masks can have, we looked outside North Carolina for comparisons. Data from our research and from studies conducted in Utah, Missouri and Wisconsin shows that school transmission rates of coronavirus were low when schools enforced mask mandates. By contrast, one school in Israel without a mask mandate or proper social distancing protocols reported an outbreak of Covid-19 involving 153 students and 25 staff members.

Recent outbreaks at youth camps in Texas, Illinois and Florida show how quickly Covid-19 can spread among adolescents and adults who are largely unmasked and mostly unvaccinated, with the possibility of spreading into surrounding communities. The potential for this kind of community spread was the reason schools closed their doors in March 2020.

With the evidence now clear that universal masking is linked to lower spread, why not require universal masking? Why seek to gather hundreds of unvaccinated, unmasked individuals in an enclosed space for several hours a day, five days a week?

Schools that do not require masks will have more coronavirus transmission. And while mortality from Covid was only two per 100,000 school-age children as of April, with more than 50 million public school children in the United States, that could still mean many avoidable deaths of children in a year.

Once vaccination is available for all children, districts can serve their students best by creating incentives to encourage masking and vaccination. For example, if universal masking is enforced or a student is vaccinated, it's reasonable for schools to decide not to require quarantining or testing after exposure for asymptomatic children and adults.

Similarly, schools may consider allowing vaccinated students who participate in extracurricular activities to continue even if they've been exposed to someone who tested positive. School districts that do not have

universal masking should keep using strategies like ventilation and social distancing and continue to perform routine testing for unvaccinated students.

In schools that choose to open without mask mandates and with limited vaccine uptakes, increased Covid is likely. Until all children can get vaccinated, masks remain a well-researched solution for lowering the risk of getting Covid. Children should be in school, and we should embrace the measures that can keep them safe.

Rabbi Laurie Franklin
she, her, hers
Har Shalom
PLEASE NOTE: I am offline sunset Friday to sunset Saturday.
Available for emergencies & regular contact at (406) 546-9368

Mail: PO Box 3715/Missoula, MT 59806
Street: 3035 South Russell
Business ph: (406) 549-9595, monitored weekly

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

Submission for Public Comment: COVID Protocols for the fall of 2021

Jessie Thomas <junglejess79@gmail.com> Tue, Aug 10, 2021 at 5:29 PM
To: publiccomment@mcpsmt.org

Dear Board of Trustees,
Thanks for listening to and reading the comments of everyone who has taken the time to add their input. Leading during this time has been a hard and lonesome place to be and I appreciate the challenges you all have faced in an effort to move our public schools forward. Even though we don't always agree with each other I hope we can model for our kids how we want to see conflict resolution exist in the world. In the last 18 months we are still in a place where we don't know a lot about what the future holds. That is not easy for anyone and yet life still has to go on and we have to function despite the many challenges in front of us.

What I am advocating for today is that we take what we do know into consideration with an open mind and a sense of common interests. I am going to dive into a few bits of information I have been exposed to this last year.

We know that currently our kids are expected to have a shorter life span than their parents. We know that 40% of our children have 1 form of chronic disease or more and we know that by 2025 we are projecting that 80% of our children are expected to have 1 or more forms of chronic disease. This is information straight from the CDC. I'll get to why this matters specifically in a minute.

We know that in the last 2 years mental health issues amongst children and teens have skyrocketed. Isolation being the primary driving factor. Colorado this year declared a state of emergency for the mental health of young people. We also know that MT ranks high in the nation for teen suicide rates.

18 months into a pandemic, we have to strategize our children's mental health in a way that is different than we ever have in the past.

Masks interfere with our ability to relate, communicate, and connect. In groups of children this is not only disruptive to learning but also challenging for developing socially and emotionally in places where reading facial expressions is key to developing empathy and our ability to relate to each other.

We know that mental health is tied to immune health down to the cellular level.

We also know that many of us witnessed an increase in atypical spring and summer time illnesses. There is speculation that this is caused by extended extreme precautions used during the winter months. Many scientists and physicians are referring to this as immune debt. Immune debt is Quickly defined as the unintended consequences associated with overuse of hand sanitizer, distancing, and masking. The outcomes were a significant uptick in cases of RSV, stomach bugs, and other pathogens that resulted from living in overly antiseptic environments. We just aren't meant to live in bubbles for very long.

I have to mention that out of the 42 billion dollars the NIH spent on research last year less than 2% went to covid clinical research and ZERO dollars of that went to studying masks on kids in school. That is NOT OK!

We can also be sure that when we look at any information about the effectiveness of masks that information is coming from studies done on adults in N95 masks. Anyone who has worked with kids in masks knows

adults in N95s is a far cry from the realities of elementary school aged kids in cloth masks. Cloth masks just don't offer the same protection and after spending a 5 hours a day in a cloth mask getting sucked on, slobbered on, coughed in and sneezed in, dropped on the floor of the bathroom (or wherever) then put back on the child's face we know that masks harbor many other pathogens even if the parent washes the mask everyday. Sterility is what is needed if masks are used as a source of prevention and that is just hard to achieve even with washing the mask daily.

I looked into the AAP's website when they came out with their new recommendation on masking in school this year. From this search I discovered, Pfizer funds a significant portion of the AAP's annual budget and until a week ago after receiving bad press the AAP had Pfizer's logo at the top of their website. Since receiving the negative attention, the AAP has since removed the logo and now claims their only source of funding comes from the Friends of Children Fund, only disclosing that this group is a non-profit.

I also wonder if the parents in favor of masking elementary school aged kids have ever worn a mask for the duration of time they are asking children to do this. I wonder if they have done this while trying to develop social and emotional skills or while trying to learn new academic material as children? I ask this because I am not sure that they have and I think that matters. I have heard numerous times that kids are resilient and they hardly notice the mask. I'd like to say kids don't have a choice or a voice in this matter. We will not know the psychological ramifications of extended masking or how this is imprinting on them until they are adults taking on different roles in the world. Political careers and election year decisions aside, the path we pick forward has to be judged by how it will affect our children and the society they create generations from now. We don't have any more time left on thinking about our ideals. Prioritizing children and their experience has to be a real focus not just words.

Personally, I have to add that I have sat thru HOURS of FDA public hearings and webinars on data gathered so far about what we know about covid, children, and risk factors. What I can say is that children carry very little to no risks when it comes to having poor outcomes with covid. 366 children is the exact number of children that have died WITH covid (that does not necessarily mean from covid). When we listen to the news we have to ask ourselves how does what I am hearing match my lived experience. We cannot, using good logic and following good science, require that elementary school children wear masks in order to control the spread of a virus when the rest of the community gets to function without these measures? And does universal masking provide the intended benefit for kids and teachers in their learning environment? More children die from the flu and drowning every year than from covid. The hospital and the healthcare system is taking care of adults who will not take responsibility for themselves. We cannot ask kids to keep holding the bag on this when the high risk adults won't even do what's necessary.

At the root of our long term success with COVID is resilience both mentally, emotionally, and physically. These are not separate entities. **We cannot allow our children to leave this pandemic sicker than when it started.**

Lastly, we are all tired and fragile in our own ways right now. Emotions are high on all sides of these issues and I am not here to over simplify anything. I don't know how we are going to move forward if not together. I am not asking that everyone sees this my way or agrees with me entirely. I am only asking that we listen to each other and be open to new information and the nuances of each of our expertises and our collective lived experiences. If you are in a leadership position and on facebook you have an obligation to understand your role and how your actions impact our ability to carry this conversation forward in a meaningful way. Social media was never designed to bring us together and if that is where you gather your information I encourage you to understand, social media is working on us all exactly how it's designed to work. Let us all strive to find better ways to engage the community in an effort to really benefit the youngest members.

Thank you for taking the time to read.

Sincerely,
Jessie Thomas

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Sincerely,
Jessie Thomas
www.sustainablewellness.net

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

Re: Masks and CRT in Schools 2021

Melina Pyron <melinapyron@gmail.com> Tue, Aug 10, 2021 at 6:00 PM
To: publiccomment@mcpsmt.org

Dear members of the board of trustees,
Thank you for hearing our public comments on these issues.
The Missoula community have all gone along with one choice for a year. It is time that we get another choice, to go without masks and have our children go without masks if they wish to in school.
This is a parental choice, no one else's.
For a year the only community opinions that have been respected in our town have been in favor of masks. There are just as many of people who are against masks, but our opinion is not being respected or given any weight.
We have done our best to be good neighbors. We expect the same.
I encourage you to seek out actual scientific evidence that masks make any difference whatsoever. There is plenty out there.
Thank you for hearing these comments.

Sincerely,

Melina Pyron
Business Consultant
https://us.nxgen.com/
https://www.payroc.com/
406.546.5041

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

(no subject)

Jason Hoffman <potatosausage10@gmail.com> Tue, Aug 10, 2021 at 6:05 PM
To: publiccomment@mcpsmt.org

You have no legal right to force our kids to wear a mask. It is ridiculous and should be a choice. I see a lawsuit in MCPS future if you pursue this idea...

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

Face Masks

J Croft <jcroft423@gmail.com> Tue, Aug 10, 2021 at 6:30 PM
To: publiccomment@mcpsmt.org

Hello!

Thank you very much for encouraging the use of face masks. At this point if you aren't vaccinated and refuse to take the simple advice to mask up- don't endanger others, kids younger than 12 or those who have a member fighting cancer. Which is the case in my family. If people in our community can't follow a simple request to wear a mask indoors, then like smokers they should go out. They can homeschool and do MOA- then they aren't required to wear masks… I school kids can wear masks. My kids do, and I wear one for 12 hours a day at work… have worn one for hours for the past seven years of my career.

It isn't an invasion of personal rights and freedoms… you have a choice to get a vaccine, if old enough, or wear a mask indoors. It is their choice to follow the rules the science is looking at to protect our community and keep it going. If the simple act of wearing a mask is too much for someone, then their priorities are not looking out for our community, keeping it healthy and running…it is selfish and narcissistic.

Thank you!

The Croft Family

Sent from my iPhone

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

Thank You/Masking

azkida@gmail.com <azkida@gmail.com> Tue, Aug 10, 2021 at 7:57 PM
To: publiccomment@mcpsmt.org

Dear Members of the Board of Trustees,
As the parent of an incoming first grader at Lewis and Clark Elementary, I am writing to thank you for requiring indoor masking during the upcoming school year. I know there are many opinions on this issue and wanted to voice my support for the current reopening plan. By now, there is much evidence to support the effectiveness of masking to protect our children from COVID. Not only does indoor masking keep our children safe, it also allows families/children the ability to protect themselves and not face the peer pressure of not mask up, which is so difficult at a young age.
In my opinion the district's current plan, as outlined in the email from Rob Watson, is the ideal plan that protects our children and allows for a routine school year. I sincere sincerely hope you stick with this plan.
Thank You,
Alison Schultz
Sent from my iPhone

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

Public Comment for August 10, 2021

Bethany O'Connell <gouluemoulin@gmail.com> Tue, Aug 10, 2021 at 8:33 PM
To: publiccomment@mcpsmt.org, rwatson@mcpsmt.org

Hello MCPS Board and Superintendent,

I am a parent of two MCPS students and I attended MCPS through graduation in 1991 at Hellgate High School. I have a master's degree from the University of Montana and have worked for MCPS in the past. I would like to add my voice to the growing number of parents I know who are vehemently against the proposed mask mandate at MCPS and believe it will do more harm than good to our kids and teachers.

The school board would be making a very big mistake to continue this harmful policy that is not backed irrefutably by science, despite what the CDC may say to the contrary. Masks and measures such as plexiglass barriers and zoom classrooms only help the panic-struck masses feel better, but they do nothing to prevent the spread of COVID or its variants. In fact, they only serve to make children feel isolated, vulnerable, invisible, and oxygen depleted, among other more detrimental physical and psychological harms, such as depression and suicide.

We need to bring awareness to the facts, not fear-driven attempts to appease a panicked public- that masks have not and cannot prevent the spread of COVID-19, that it is no more preventable than catching the seasonal flu, and that hand washing and basic education about preventative lifestyle choices are the best way to end this virulent cold virus. Many scientific studies uphold my point of view, although they are being repressed in order to push a different narrative. If the scientists and doctors cannot agree, we need to allow the differing viewpoints to be considered.

If these measures continue to disrupt my child's education in 2021, including any discussion of mandated vaccinations for teachers and students, I will be forced to find other ways to help my child receive an education.

Thank you for your consideration. Sincerely,

Bethany O'Connell

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

Masking children in schools lack a sound scientific basis and has no moral justification

Anna Shchemelinin <anna@bridger3d.com> Tue, Aug 10, 2021 at 8:40 PM
To: publiccomment@mcpsmt.org, trustees@bsd7.org, mafitzgerald@bsd44.org, dbatey@bsd44.org, BOHPublicComment <BOHPublicComment@gallatin.mt.gov>

To whom it may concern.

I'm writing you this letter not to convince you to keep masks optional in schools. Mandating masks and vaccinations for either students or school personnel is illegal in Montana. I don't think that it's necessary to remind you that breaking the law is illegal even if victims don't know that they are victims of a crime, or what should they do to seek justice .

I'm writing you this letter to urge you to do what your moral standards and professional obligations tell you to do - stop letting politics interfere with nature and start acting to protect children's health and well-being. When politicization and heavy censorship of covid-related information is a reality of the current state of affairs, it is your moral obligation to ensure that all parents, legal guardians, school administrators, teachers, and childcare providers can easily access all the information they need to make fully informed decisions regarding their students' and children's health.

Many studies and factual international data demonstrate that mandatory masks and social distancing are ineffective in preventing the spread of the COVID-19 virus. At the same time, prolonged mask use causes many serious physical and psychological damage among the otherwise healthy population, especially children and young adults. The documented evidence of severe adverse reactions on COVID-19 vaccine, including the reported deaths of children younger than 17-years old, is also available but, but due to censorship by the mainstream and social media, is difficult to find.

I strongly encourage you to read the information from the links below, but before this, please watch the video of Dr. Dan Stock addressing the Mt. Vernon School Board in Indiana "over the futility of mask mandates and Covid-19 protocols in most schools." In this 6-minutes presentation, Dr. Dan Stock summarized the most important facts that scientifically prove that masking and vaccinating healthy young adults and children cause serious harm to public health without providing any benefits for vulnerable high-risk populations:
https://rumble.com/vkwcb4-dr-dan-stock-specialist-in-immunology-and-inflammation-says-cdc-and-nih-is-.html?fbclid=IwAR2JV4EW1uDxtWeIcdqctqmGbnz8NZ-OSOIt-VRYJF7SQxxYP1dW67x8ZoE

According to CDC official data, "Among children, adolescents, and young adults with available data for these outcomes, 30,229 (2.5%) were hospitalized, 1,973 (0.8%) required ICU admission, and 654 (<0.1%) died."
https://www.cdc.gov/mmwr/volumes/70/wr/mm7003e1.htm

Jonh Hopkins report found a "mortality rate of zero among children without a pre-existing medical condition such as leukemia."
https://www.tigerdroppings.com/rant/o-t-lounge/john-hopkins---no-proof-any-child-has-died-of-covid/97357903/

The VAERS data from July 13 returned 21,035 rows of adverse reactions among ages 17 and younger, including 1685 severe and life-threatening conditions. Ten children under 17 years with no known medical conditions died after receiving the covid vaccine (this number includes a breast-fed 5-months old baby who died several days after his mother received a second dose of Pfizer vaccine) https://vaers.hhs.gov/data.html (attached are cases I downloaded from VAERS data)

An in-depth longitudinal study demonstrates the existence of long-lived immunity to SARS-CoV-2 after natural infection.
https://drive.google.com/file/d/1b_QN6uUOIDQDVf1hosPfO0MZLxhOhXC4/view

Israeli authorities have confirmed that mRNA vaccines may cause heart inflammation and heart attacks, especially among young people.
In both Israel and the US, in the wake of vaccinations, all-cause mortality has markedly increased in most age groups, including 20 to 29-year-olds with no known medical conditions,
https://swprs.org/israel-why-is-all-cause-mortality-increasing/
https://swprs.org/covid-the-big-picture-june-2021/#a-2-increase-in-us-all-cause-mortality

Delta variants of SARS-CoV-2 cause significantly increased vaccine breakthrough COVID-19 cases in Houston, Texas:
https://www.medrxiv.org/content/10.1101/2021.07.19.21260808v1

Israel data suggests that the vaccine is significantly less effective (only 39%) against Delta variant : https://medicalxpress.com/news/2021-07-israel-preliminary-delta-variant-bypass.html ; https://www.wsj.com/articles/pfizer-covid-19-vaccine-is-less-effective-against-delta-infections-but-still-prevents-serious-illness-israel-study-shows-11627059395

MedScape recently started a public comments for medical professionals regarding their concerns about adverse events related to the vaccines. Comments are limited to medical professionals only. According to the posts, the main concern of people who answered it is that adverse reactions are under-reported and doctors are being intimidated to silence: https://www.medscape.com/sites/public/covid-19/vaccine-insights/how-concerned-are-you-about-vaccine-related-adverse-events

Links:
Experimental Assessment of Carbon Dioxide Content in Inhaled Air With or Without Face Masks in Healthy Children: https://fos-sa.org/2021/07/01/experimental-assessment-of-carbon-dioxide-content-in-inhaled-air-with-or-without-face-masks-in-healthy-children/

Nonpharmaceutical Measures for Pandemic Influenza in Nonhealthcare Settings—Personal Protective and Environmental Measures: https://wwwnc.cdc.gov/eid/article/26/5/19-0994_article

Mask Facts from Assotiation of American Physicians and Surgeons: https://aapsonline.org/mask-facts/

Masking Children: Tragic, Unscientific, and Damaging: https://www.aier.org/article/masking-children-tragic-unscientific-and-damaging/

Facemasks in the COVID-19 era: A health hypothesis: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7680614/

Is a Mask That Covers the Mouth and Nose Free from Undesirable Side Effects in Everyday Use and Free of Potential Hazards? https://pubmed.ncbi.nlm.nih.gov/33923935/

COVID-19 and the Political Economy of Mass Hysteria: https://www.mdpi.com/1660-4601/18/4/1376/htm

Worse Than a the Diseases? Reviewing Some Possible Unintended Consequences of the mRNA Vaccines Against COVID-19: https://ijvtpr.com/index.php/IJVTPR/article/view/23

Sincerely,
Anna Shchemelinin
1544 Hunters Way,
Bozeman, Mt 59718
406-551-4405

7 attachments

VAERS 1166062-1.pdf
142K

VAERS 1199455-1.pdf
145K

VAERS 1225942-1.pdf
149K

VAERS 1261766-1.pdf
136K

VAERS 1420630-1.pdf
151K

VAERS 1382906-1.pdf
156K

VAERS 1431289-1.pdf
186K

VAERS Event Details

Details for VAERS ID: 1431289-1

Event Information			
Patient Age	13.00	**Sex**	Male
State / Territory	Minnesota	**Date Report Completed**	2021-06-28
Date Vaccinated	2021-06-02	**Date Report Received**	2021-06-28
Date of Onset	2021-06-19	**Date Died**	2021-06-20
Days to onset	17		
Vaccine Administered By	Other	**Vaccine Purchased By**	Not Applicable *
Mfr/Imm Project Number	NONE	**Report Form Version**	2
Recovered	Missing	**Serious**	Yes

* VAERS 2.0 Report Form Only
** VAERS-1 Report Form Only
"Not Applicable" will appear when information is not available on this report form version.

Event Categories	
Death	Yes
Life Threatening	No
Permanent Disability	No
Congenital Anomaly / Birth Defect *	No
Hospitalized	No
Days in Hospital	None
Existing Hospitalization Prolonged	No
Emergency Room / Office Visit **	N/A
Emergency Room *	No
Office Visit *	No

* VAERS 2.0 Report Form Only
** VAERS-1 Report Form Only
"N/A" will appear when information is not available on this report form version.

Vaccine Type	Vaccine	Manufacturer	Lot	Dose	Route	Site
COVID19 VACCINE	COVID19 (COVID19 (PFIZER-BIONTECH))	PFIZER\BIONTECH	EW0191	1	IM	

Symptom
ANGIOGRAM CEREBRAL ABNORMAL
APNOEA TEST ABNORMAL
ARTERIOVENOUS MALFORMATION
BLOOD SODIUM INCREASED
BRAIN DEATH
BRAIN HERNIATION
CARDIAC ARREST
CENTRAL NERVOUS SYSTEM LESION
CEREBELLAR HAEMORRHAGE
COVID-19
DEATH
ELECTROCARDIOGRAM ABNORMAL
ENDOTRACHEAL INTUBATION
HAEMORRHAGE INTRACRANIAL
HYPERNATRAEMIA
HYPOTENSION
INTENSIVE CARE
MECHANICAL VENTILATION
NEOPLASM
RESUSCITATION
SARS-COV-2 TEST POSITIVE
SCAN WITH CONTRAST
SINUS TACHYCARDIA

Adverse Event Description

"Date of Admission: 6/19/2021 Date of Death: 6/20/2021 Primary Care Physician: No primary care provider on file. REASON FOR ADMISSION: Patient is a 13-year-old previously healthy male who was admitted after out-of-hospital cardiac arrest with ROSC after CPR for 15 minutes in the field, found to be in the context of large cerebellar hemorrhage secondary to brain lesion (AVM vs tumor). BRIEF SUMMARY OF HOSPITALIZATION: Patient was intubated prior to arrival to the ED. Upon arrival he was started on epinephrine and norepinephrine drips to maintain perfusion and was administered bicarbonate x2. Head CTA was obtained and was notable for midbrain hemorrhage and tonsillar herniation, and no contrast enhanced blood flow in the brain. Brain death exams were completed at 09:59 and 14:20. APNEA test was performed at 13:30, which is the official time of brain death. Official cause of death was brainstem herniation from intracranial hemorrhage. Mechanical ventilation was continued to allow family time to grieve and perform last rites. Time of cardiac death after mechanical ventilation withdrawal was 18:36. HOSPITAL COURSE BY PROBLEM: FEN/Renal/Endo: #Central DI He received 1.5 L of normal saline bolus in the ED and an additional 3 L of ringers lactate bolus overnight in the ICU to maintain perfusion and decrease heart rate. His sodium was 141 upon presentation but reached a maximum of 160 due to central diabetes insipidus. He was started on 0.45% normal saline at 100 mL/hr to improve hypernatremia, which was monitored Q1h until normonatremic. He additionally required vasopressin drip to be started due to central DI, which was increased to a maximum of 20 mU/kg/hr. CV: At time of admission, epinephrine was running at 0.1 mcg/kg/min and norepinephrine was 0.1 mcg/kg/hr. Norepinephrine was increased shortly thereafter to 0.12 mcg/kg/min. In the morning after admission, he had tachycardia to the 190s, which appeared to be narrow complex. Epinephrine and norepinephrine were discontinued. Two doses of adenosine were administered (6 mg first dose, 12 mg second dose) due to suspected SVT. The rate decreased for ~4 seconds after the second dose however returned to ~180. EKG arrived which showed sinus tachycardia so no further medications or cardiac interventions were done. Fluid rates were increased to 2x MIVF rate and additional 500 mL bolus of LR was administered. Norepinephrine and epinephrine were restarted and escalated due to low blood pressures in the early afternoon.to allow family time with patient. Both titrated to effect. Pulm: Patient was mechanically ventilated to achieve normal pH, normocarbia, and high arterial oxygen tension per brain death protocol. He had no primary pulmonary disease during this admission. Neuro: #Intraparenchymal hemorrhage #Tonsillar herniation Neurosurgery was consulted. Mannitol x1 and hypertonic saline 23% x1 were administered to decrease intracranial pressures. Keppra 2g was administered for seizure prophylaxis. No sedation was needed during patient's hospitalization. PERTINENT STUDIES & CONSULTS: Pediatric neurology Neurosurgery PENDING TESTS RESULTS: None RECOMMENDATIONS AND FOLLOWUP: None No future appointments. PHYSICAL EXAMINATION: BP 108/78 | Pulse (!) 144 | Temp 36.5 ¦C (97.7 ¦F) | Resp (!) 15 | Ht 1.65 m (5' 4.96"") | Wt 46.5 kg (102 lb 8.2 oz) | SpO2 99% | BMI 17.08 kg/m¦ Estimated body mass index is 17.08 kg/m¦ as calculated from the following: Height as of this encounter: 1.65 m (5' 4.96""). Weight as of this encounter: 46.5 kg (102 lb 8.2 oz). ALLERGIES No Known Drug Allergies"

Lab Data	Current Illness	Adverse Events After Prior Vaccinations
see above. Was covid positive on admission 6/19. Family gave a history of previous covid infection earlier this year.	none	

Medications At Time Of Vaccination	History/Allergies
none	none,none

Note: Submitting a report to VAERS does not mean that healthcare personnel or the vaccine caused or contributed to the adverse event (possible side effect).

Notes:

Caveats: Data contains VAERS reports processed as of 07/09/2021. The VAERS data in WONDER are updated weekly, yet the VAERS system receives continuous updates including revisions and new reports for preceding time periods. Duplicate event reports and/or reports determined to be false are removed from VAERS. More information.

Help: See The Vaccine Adverse Event Reporting System (VAERS) Documentation for more information.

Query Date: Jul 21, 2021 6:50:03 PM

Suggested Citation:

United States Department of Health and Human Services (DHHS), Public Health Service (PHS), Centers for Disease Control (CDC) / Food and Drug Administration (FDA), Vaccine Adverse Event Reporting System (VAERS) 1990 - 07/09/2021, CDC WONDER On-line Database. Accessed at http://wonder.cdc.gov/vaers.html on Jul 21, 2021 6:50:03 PM

Content source: CDC WONDER

VAERS Event Details

Details for VAERS ID: 1420630-1

Event Information			
Patient Age	16.00	**Sex**	Female
State / Territory	Pennsylvania	**Date Report Completed**	2021-06-23
Date Vaccinated	2021-03-13	**Date Report Received**	2021-06-23
Date of Onset	2021-04-03	**Date Died**	2021-06-15
Days to onset	21		
Vaccine Administered By	Private	**Vaccine Purchased By**	Not Applicable *
Mfr/Imm Project Number	NONE	**Report Form Version**	2
Recovered	No	**Serious**	Yes

* VAERS 2.0 Report Form Only
** VAERS-1 Report Form Only
"Not Applicable" will appear when information is not available on this report form version.

Event Categories	
Death	Yes
Life Threatening	No
Permanent Disability	No
Congenital Anomaly / Birth Defect *	No
Hospitalized	Yes
Days in Hospital	32
Existing Hospitalization Prolonged	No
Emergency Room / Office Visit **	N/A
Emergency Room *	No
Office Visit *	No

* VAERS 2.0 Report Form Only
** VAERS-1 Report Form Only
"N/A" will appear when information is not available on this report form version.

Vaccine Type	Vaccine	Manufacturer	Lot	Dose	Route	Site
COVID19 VACCINE	COVID19 (COVID19 (PFIZER-BIONTECH))	PFIZER\BIONTECH	NONE	1	IM	UN

Symptom
CHEST PAIN
DEATH
GENERAL PHYSICAL HEALTH DETERIORATION
HAEMOPHAGOCYTIC LYMPHOHISTIOCYTOSIS
PERICARDIAL EFFUSION

Adverse Event Description
~4 weeks after the 2nd dose of Pfizer, patient presented to the hospital with chest pain; had pericardial effusion. Initially improved but then had decompensation, prolonged hospitalization. Diagnosed with hemophagocytic lymphohistocytosis (HLH) and ultimately died.

Lab Data	Current Illness	Adverse Events After Prior Vaccinations
	disseminated mycobacterium chelonae infection	

Medications At Time Of Vaccination	History/Allergies
Artane, azithromycin, calcium carbonate, dicyclomine, doxycycline, escitalopram, flovent, gabapentin, lansoprazole, melatonin, ondansetron, tedizolid,	ataxia telangiectasia; EBV-associated lymphoma,none

Note: Submitting a report to VAERS does not mean that healthcare personnel or the vaccine caused or contributed to the adverse event (possible side effect).

Notes:

Caveats:

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Query Date: Jul 21, 2021 6:46:11 PM

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United States Department of Health and Human Services (DHHS), Public Health Service (PHS), Centers for Disease Control (CDC) / Food and Drug Administration (FDA), Vaccine Adverse Event Reporting System (VAERS) 1990 - 07/09/2021, CDC WONDER On-line Database. Accessed at http://wonder.cdc.gov/vaers.html on Jul 21, 2021 6:46:11 PM

VAERS Event Details

Details for VAERS ID: 1382906-1

Event Information			
Patient Age	15.00	**Sex**	Male
State / Territory	California	**Date Report Completed**	2021-06-08
Date Vaccinated	2021-05-15	**Date Report Received**	2021-06-08
Date of Onset	2021-06-07	**Date Died**	2021-06-07
Days to onset	23		
Vaccine Administered By	Other	**Vaccine Purchased By**	Not Applicable *
Mfr/Imm Project Number	NONE	**Report Form Version**	2
Recovered	No	**Serious**	Yes

* VAERS 2.0 Report Form Only
** VAERS-1 Report Form Only
"Not Applicable" will appear when information is not available on this report form version.

Event Categories	
Death	Yes
Life Threatening	No
Permanent Disability	No
Congenital Anomaly / Birth Defect *	No
Hospitalized	No
Days in Hospital	None
Existing Hospitalization Prolonged	No
Emergency Room / Office Visit **	N/A
Emergency Room *	No
Office Visit *	No

* VAERS 2.0 Report Form Only
** VAERS-1 Report Form Only
"N/A" will appear when information is not available on this report form version.

Vaccine Type	Vaccine	Manufacturer	Lot	Dose	Route	Site
COVID19 VACCINE	COVID19 (COVID19 (PFIZER-BIONTECH))	PFIZER\BIONTECH	EW0187	2	IM	LA

Symptom
DEATH

Adverse Event Description
Unexplained death within 48 hours

Lab Data	Current Illness	Adverse Events After Prior Vaccinations
	none noted	

Medications At Time Of Vaccination	History/Allergies
None known	Acne, no other conditions noted,None noted

Note: Submitting a report to VAERS does not mean that healthcare personnel or the vaccine caused or contributed to the adverse event (possible side effect).

Top | New Report | Notes | Citation

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Top | New Report | Notes | Citation

Suggested Citation:

United States Department of Health and Human Services (DHHS), Public Health Service (PHS), Centers for Disease Control (CDC) / Food and Drug Administration (FDA), Vaccine Adverse Event Reporting System (VAERS) 1990 - 07/09/2021, CDC WONDER On-line Database. Accessed at http://wonder.cdc.gov/vaers.html on Jul 21, 2021 6:47:07 PM

VAERS Event Details

Details for VAERS ID: 1261766-1

Event Information			
Patient Age	1.00	**Sex**	Male
State / Territory	Florida	**Date Report Completed**	2021-04-27
Date Vaccinated	2021-04-08	**Date Report Received**	2021-04-27
Date of Onset	2021-04-10	**Date Died**	2021-04-10
Days to onset	2		
Vaccine Administered By	Unknown	**Vaccine Purchased By**	Not Applicable *
Mfr/Imm Project Number	NONE	**Report Form Version**	2
Recovered	No	**Serious**	Yes

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Event Categories	
Death	Yes
Life Threatening	No
Permanent Disability	No
Congenital Anomaly / Birth Defect *	No
Hospitalized	No
Days in Hospital	None
Existing Hospitalization Prolonged	No
Emergency Room / Office Visit **	N/A
Emergency Room *	Yes
Office Visit *	No

* VAERS 2.0 Report Form Only
** VAERS-1 Report Form Only
"N/A" will appear when information is not available on this report form version.

Vaccine Type	Vaccine	Manufacturer	Lot	Dose	Route	Site
COVID19 VACCINE	COVID19 (COVID19 (MODERNA))	MODERNA	NONE	1	IM	LA

Symptom
BODY TEMPERATURE INCREASED
DEATH
SEIZURE

Adverse Event Description
increased body temperature, seizure, death

Lab Data	Current Illness	Adverse Events After Prior Vaccinations

Medications At Time Of Vaccination	History/Allergies
	,

Note: Submitting a report to VAERS does not mean that healthcare personnel or the vaccine caused or contributed to the adverse event (possible side effect).

Notes:

Caveats:

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Query Date: Jul 21, 2021 6:45:24 PM

Suggested Citation:

United States Department of Health and Human Services (DHHS), Public Health Service (PHS), Centers for Disease Control (CDC) / Food and Drug Administration (FDA), Vaccine Adverse Event Reporting System (VAERS) 1990 - 07/09/2021, CDC WONDER On-line Database. Accessed at http://wonder.cdc.gov/vaers.html on Jul 21, 2021 6:45:24 PM

VAERS Event Details

Details for VAERS ID: 1225942-1

Event Information			
Patient Age	16.00	**Sex**	Female
State / Territory	Wisconsin	**Date Report Completed**	2021-04-18
Date Vaccinated	2021-03-19	**Date Report Received**	2021-04-18
Date of Onset	2021-03-28	**Date Died**	2021-03-30
Days to onset	9		
Vaccine Administered By	Unknown	**Vaccine Purchased By**	Not Applicable *
Mfr/Imm Project Number	NONE	**Report Form Version**	2
Recovered	No	**Serious**	Yes

* VAERS 2.0 Report Form Only
** VAERS-1 Report Form Only
"Not Applicable" will appear when information is not available on this report form version.

Event Categories	
Death	Yes
Life Threatening	No
Permanent Disability	No
Congenital Anomaly / Birth Defect *	No
Hospitalized	No
Days in Hospital	None
Existing Hospitalization Prolonged	No
Emergency Room / Office Visit **	N/A
Emergency Room *	No
Office Visit *	No

* VAERS 2.0 Report Form Only
** VAERS-1 Report Form Only
"N/A" will appear when information is not available on this report form version.

Vaccine Type	Vaccine	Manufacturer	Lot	Dose	Route	Site
COVID19 VACCINE	COVID19 (COVID19 (PFIZER-BIONTECH))	PFIZER\BIONTECH	Unknown	1		

Symptom
CARDIAC ARREST
DEATH
LABORATORY TEST
LUNG ASSIST DEVICE THERAPY
ORAL CONTRACEPTION
PULMONARY EMBOLISM
RESUSCITATION

Adverse Event Description
Patient was a 16yr female who received Pfizer vaccine 3/19/21 at vaccine clinic and presented with ongoing CPR to the ED 3/28/21 after cardiac arrest at home. Patient placed on ECMO and imaging revealed bilateral large pulmonary embolism as likely etiology of arrest. Risk factors included oral contraceptive use. Labs have since confirmed absence of Factor V leiden or prothrombin gene mutation. Patient declared dead by neurologic criteria 3/30/21.

Lab Data	Current Illness	Adverse Events After Prior Vaccinations

Medications At Time Of Vaccination	History/Allergies
Reported to be on Drospirenone-Ethinyl Estradiol 3-0.02 MG per tab	,

Note: Submitting a report to VAERS does not mean that healthcare personnel or the vaccine caused or contributed to the adverse event (possible side effect).

Notes:

Caveats:

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Suggested Citation:

United States Department of Health and Human Services (DHHS), Public Health Service (PHS), Centers for Disease Control (CDC) / Food and Drug Administration (FDA), Vaccine Adverse Event Reporting System (VAERS) 1990 - 07/09/2021, CDC WONDER On-line Database. Accessed at http://wonder.cdc.gov/vaers.html on Jul 21, 2021 6:44:31 PM

Content source: CDC WONDER

VAERS Event Details

Details for VAERS ID: 1199455-1

Event Information			
Patient Age	17.00	**Sex**	Female
State / Territory	Wisconsin	**Date Report Completed**	2021-04-12
Date Vaccinated	2021-04-02	**Date Report Received**	2021-04-12
Date of Onset	2021-04-10	**Date Died**	2021-04-10
Days to onset	8		
Vaccine Administered By	Private	**Vaccine Purchased By**	Not Applicable *
Mfr/Imm Project Number	NONE	**Report Form Version**	2
Recovered	No	**Serious**	Yes

* VAERS 2.0 Report Form Only
** VAERS-1 Report Form Only
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Event Categories	
Death	Yes
Life Threatening	No
Permanent Disability	No
Congenital Anomaly / Birth Defect *	No
Hospitalized	No
Days in Hospital	None
Existing Hospitalization Prolonged	No
Emergency Room / Office Visit **	N/A
Emergency Room *	Yes
Office Visit *	No

* VAERS 2.0 Report Form Only
** VAERS-1 Report Form Only
"N/A" will appear when information is not available on this report form version.

Vaccine Type	Vaccine	Manufacturer	Lot	Dose	Route	Site
COVID19 VACCINE	COVID19 (COVID19 (PFIZER-BIONTECH))	PFIZER\BIONTECH	NONE	UNK		

Symptom
CARDIAC ARREST
CHEST PAIN
DEATH
DYSPNOEA

Adverse Event Description
Patient reported difficulty breathing and chest pain; suffered cardiac arrest and death

Lab Data	Current Illness	Adverse Events After Prior Vaccinations
	NA	

Medications At Time Of Vaccination	History/Allergies
fluoxetine, fesoterodine, ortho-tricyclen, oxybutynin	spina bifida, spinal meningocele, VP shunt, scoliosis, neurogenic bladder, constipation,bananas, cephalexin, kiwi, mango, pineapple, latex

Note: Submitting a report to VAERS does not mean that healthcare personnel or the vaccine caused or contributed to the adverse event (possible side effect).

Top | New Report | Notes | Citation

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Top | New Report | Notes | Citation

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VAERS Event Details

Details for VAERS ID: 1166062-1

Event Information			
Patient Age	0.42	**Sex**	Male
State / Territory	Unknown	**Date Report Completed**	2021-04-04
Date Vaccinated	2021-03-17	**Date Report Received**	2021-04-04
Date of Onset	2021-03-18	**Date Died**	2021-03-20
Days to onset	1		
Vaccine Administered By	Work *	**Vaccine Purchased By**	Not Applicable *
Mfr/Imm Project Number	NONE	**Report Form Version**	2
Recovered	No	**Serious**	Yes

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Event Categories	
Death	Yes
Life Threatening	No
Permanent Disability	No
Congenital Anomaly / Birth Defect *	No
Hospitalized	Yes
Days in Hospital	2
Existing Hospitalization Prolonged	No
Emergency Room / Office Visit **	N/A
Emergency Room *	Yes
Office Visit *	No

* VAERS 2.0 Report Form Only
** VAERS-1 Report Form Only
"N/A" will appear when information is not available on this report form version.

Vaccine Type	Vaccine	Manufacturer	Lot	Dose	Route	Site
COVID19 VACCINE	COVID19 (COVID19 (PFIZER-BIONTECH))	PFIZER\BIONTECH	NONE	2	SYR	LA

Symptom
DEATH
DIET REFUSAL
EMOTIONAL DISTRESS
EXPOSURE VIA BREAST MILK
FAILURE TO THRIVE
HEPATIC ENZYME INCREASED
PYREXIA
RASH
THROMBOTIC THROMBOCYTOPENIC PURPURA

Adverse Event Description
Patient received second dose of Pfizer vaccine on March 17, 2020 while at work. March 18, 2020 her 5 month old breastfed infant developed a rash and within 24 hours was inconsolable, refusing to eat, and developed a fever. Patient brought baby to local ER where assessments were performed, blood analysis revealed elevated liver enzymes. Infant was hospitalized but continued to decline and passed away. Diagnosis of TTP. No known allergies. No new exposures aside from the mother's vaccination the previous day.

Lab Data	Current Illness	Adverse Events After Prior Vaccinations

Medications At Time Of Vaccination	History/Allergies
	,

Note: Submitting a report to VAERS does not mean that healthcare personnel or the vaccine caused or contributed to the adverse event (possible side effect).

Top | New Report | Notes | Citation

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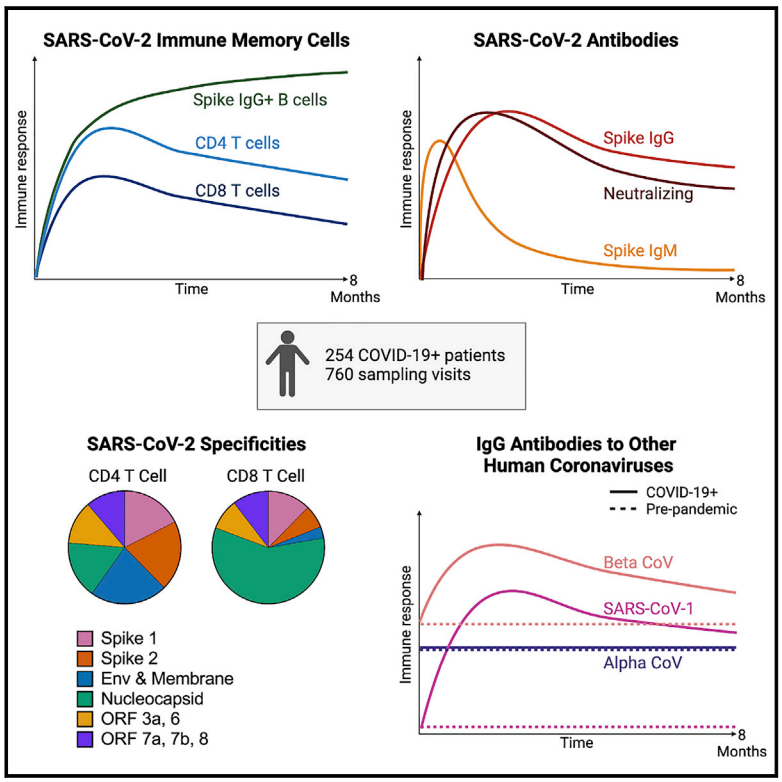
Content source: CDC WONDER

Cell Reports
Medicine

Article

Longitudinal analysis shows durable and broad immune memory after SARS-CoV-2 infection with persisting antibody responses and memory B and T cells

Graphical abstract



Highlights

- Most recovered COVID-19 patients mount broad, durable immunity after infection
- Neutralizing antibodies show a bi-phasic decay with half-lives >200 days
- Spike IgG+ memory B cells increase and persist post-infection
- Durable polyfunctional CD4 and CD8 T cells recognize distinct viral epitope regions

Authors

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In brief

Cohen et al. evaluate immune responses longitudinally in 254 COVID-19 patients over 8 months. SARS-CoV-2-specific binding and neutralizing antibodies exhibit biphasic decay, suggesting long-lived plasma cell generation. Memory B cells remain stable; CD4 and CD8 memory T cells are polyfunctional. Thus, broad and effective immunity may persist long-term following COVID-19.

Cohen et al., 2021, Cell Reports Medicine 2, 100354
July 20, 2021
https://doi.org/10.1016/j.xcrm.2021.100354

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Article

Longitudinal analysis shows durable and broad immune memory after SARS-CoV-2 infection with persisting antibody responses and memory B and T cells

Kristen W. Cohen,[1,10] Susanne L. Linderman,[2,3,10] Zoe Moodie,[1] Julie Czartoski,[1] Lilin Lai,[2,4,5] Grace Mantus,[2,4,6] Carson Norwood,[2,4,6] Lindsay E. Nyhoff,[2,4] Venkata Viswanadh Edara,[2,4,5] Katharine Floyd,[2,4,5] Stephen C. De Rosa,[1,7] Hasan Ahmed,[8] Rachael Whaley,[1] Shivan N. Patel,[6] Brittany Prigmore,[1] Maria P. Lemos,[1] Carl W. Davis,[2,3] Sarah Furth,[1] James B. O'Keefe,[6] Mohini P. Gharpure,[2,3] Sivaram Gunisetty,[2,3] Kathy Stephens,[4] Rustom Antia,[8] Veronika I. Zarnitsyna,[2,3] David S. Stephens,[6] Srilatha Edupuganti,[6,9] Nadine Rouphael,[6,9] Evan J. Anderson,[4] Aneesh K. Mehta,[6] Jens Wrammert,[2,4,11] Mehul S. Suthar,[2,4,5,11] Rafi Ahmed,[2,3,11,*] and M. Juliana McElrath[1,7,11,12,*]

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SUMMARY

Ending the COVID-19 pandemic will require long-lived immunity to SARS-CoV-2. Here, we evaluate 254 COVID-19 patients longitudinally up to 8 months and find durable broad-based immune responses. SARS-CoV-2 spike binding and neutralizing antibodies exhibit a bi-phasic decay with an extended half-life of >200 days suggesting the generation of longer-lived plasma cells. SARS-CoV-2 infection also boosts antibody titers to SARS-CoV-1 and common betacoronaviruses. In addition, spike-specific IgG+ memory B cells persist, which bodes well for a rapid antibody response upon virus re-exposure or vaccination. Virus-specific CD4+ and CD8+ T cells are polyfunctional and maintained with an estimated half-life of 200 days. Interestingly, CD4+ T cell responses equally target several SARS-CoV-2 proteins, whereas the CD8+ T cell responses preferentially target the nucleoprotein, highlighting the potential importance of including the nucleoprotein in future vaccines. Taken together, these results suggest that broad and effective immunity may persist long-term in recovered COVID-19 patients.

INTRODUCTION

The COVID-19 pandemic caused by the rapid spread of SARS-CoV-2, a novel betacoronavirus, continues to cause significant morbidity and mortality. The induction of effective early immune control of SARS-CoV-2 and durable immune memory is critical to prevent severe disease and to protect upon re-exposure. SARS-CoV-2 infection induces polyclonal humoral and cellular responses targeting multiple viral proteins described in cross-sectional and longitudinal studies.[1] More comprehensive, quantitative analyses with extensive serial sampling in larger numbers of COVID-19 patients are limited and could resolve some conflicting views about the durability of humoral immunity. Importantly, defining the frequency, immune function, and specificity of the antibodies; memory B and T cell responses among COVID-19 patients; and identifying when they appear and how long they persist can provide understanding of the integral components for long-lived immunity to SARS-CoV-2 and potentially other human coronaviruses that emerge in the future.[2]

We initiated two prospective COVID-19 patient cohorts in Seattle and Atlanta during the first surge of the pandemic to investigate long-term immunity to SARS-CoV-2. Among 254 COVID-19 patients enrolled and frequently sampled, we identify binding and neutralizing antibodies to SARS-CoV-2 as well as antigen-specific B and T cells elicited early after infection, define their specificities, quantify the extent of antibody boosting of cross-reactive

responses to other coronaviruses, and further characterize the decay rate and durability of these immune parameters over 250 days. We employ highly standardized or validated assays that are also being used to evaluate immunity in recent and ongoing clinical vaccine trials.[3-5] This in-depth longitudinal study demonstrates that durable immune memory persists in most COVID-19 patients, including those with mild disease, and serves as a framework to define and predict long-lived immunity to SARS-CoV-2 after natural infection. This investigation will also serve as a benchmark for immune memory induced in humans by SARS-CoV-2 vaccines.

RESULTS

COVID-19 study population

COVID-19-confirmed patients were recruited into our longitudinal study of SARS-CoV-2 specific B and T cell memory after infection. A total of 254 patients were enrolled at two sites, Atlanta and Seattle, starting in April 2020 and returned for follow up visits over a period of 250 days. We were able to collect blood samples at 2–3 time points from 165 patients and at 4–7 time points from another 80 patients, which allowed us to perform a longitudinal analysis of SARS-CoV-2-specific B and T cell responses on a large number of infected patients. The demographics and baseline characteristics of this cohort are described in Table S1. The study group was 55% female and 45% male and between 18 and 82 years old (median, 48.5 years). Based on World Health Organization (WHO) guidelines of disease severity, 71% of study participants exhibited mild disease, 24% had moderate disease, and 5% experienced severe disease.

Antibody responses to SARS-CoV-2 spike protein show a bi-phasic decay with an extended half-life

Binding antibodies to the SARS-CoV-2 full-length spike protein, to the receptor binding domain (RBD), and to the N-terminal domain (NTD) of the spike protein were assessed in COVID-19 patients (n = 222) over a period of 8 months post symptom onset. We included healthy individuals age 18–42 years as negative controls whose longitudinal blood samples were collected before the emergence of the COVID-19 pandemic. These pre-pandemic samples (n = 51) were from recipients of either the seasonal inactivated influenza vaccine (n = 27, collected from 2014-2018) or the live yellow fever virus (YFV-17D) vaccine (n = 24, collected from 2005–2007). The Mesoscale multiplex assay was used to measure IgG, IgA, and IgM antibody responses to SARS-CoV-2 proteins in the COVID-19 patients and in the pre-pandemic healthy controls.

The magnitude of serum IgG antibodies binding to the SARS-CoV-2 spike protein increased in 92% of COVID-19 convalescent participants (n = 222) relative to pre-pandemic controls (Figure 1A). The IgG responses to SARS-CoV-2 spike, RBD, and NTD declined over time with half-lives of 126 (95% confidence interval [95% CI] [107, 154]), 116 (95% CI [97, 144]), and 130 (95% CI [110, 158]) days, respectively, as estimated by an exponential decay model (Figures 1A–1C and S1A). We also estimated antibody waning using a power law model, which models a scenario in which the rate of antibody decay slows over time. The power law model produced a better fit for the decay of the SARS-CoV-2 spike, RBD, and NTD binding IgG antibodies (DAICs > 10), suggesting that spike-specific antibodies plateau over time. Because the decay rate changes over time, the half-life is predicted to change over time as well; therefore, we used the power law model to estimate the half-lives at 120 days after symptom onset. The power law estimated half-lives for the IgG antibody responses to spike ($t_{1/2}$ = 238 days), RBD ($t_{1/2}$ = 209 days), and NTD ($t_{1/2}$ = 244 days) were longer than those estimated by the exponential decay model (Figures S1A and S1C), indicating that the concentration of these IgG antibodies may be starting to stabilize. IgA (Figures 1D–1F) and IgM (Figures 1G–1I) antibodies reactive to the SARS-CoV-2 spike also increased after SARS-CoV-2 infection but were detected at lower levels and declined faster than the SARS-CoV-2-reactive IgG antibodies. As expected, spike-binding IgM decayed more rapidly than spike-binding IgA and IgG. Taken together, these results show that antibody responses, especially IgG antibody, were not only durable in the vast majority of patients in the 250 day period, but also that the bi-phasic decay curve suggests the generation of longer lived plasma cells producing antibody to the SARS-CoV-2 spike protein.

We also examined the antibody response to the SARS-CoV-2 nucleocapsid protein in these infected patients. As expected, the COVID-19 patients showed higher levels of antibody to the nucleocapsid protein compared to the pre-pandemic healthy controls (Figure S2). However, the nucleocapsid-specific antibodies declined with a much shorter half-life of 63 days (95% CI [58, 70]) compared to the spike protein antibodies (Figures S1A–S1C). Also, the nucleocapsid reactive IgG decay rate was best fit by the exponential model and not the power law model in contrast to what we observed with the spike IgG antibody decay rate (Figure S1A). Thus, the nucleocapsid reactive IgG not only declined much faster but also showed less evidence of stabilizing antibody levels, consistent with a response driven disproportionately by short-lived antibody secreting cells – at least at this stage of the immune response.

Stable and long-lived antibody responses to common human alpha- and betacoronaviruses in pre-pandemic healthy controls

We were interested in determining if SARS-CoV-2 infection had any effect on the levels of antibody to the circulating human alpha- and betacoronaviruses. As a prelude to this question, we first examined antibody levels to the spike protein of the two circulating alphacoronaviruses (229E and NL63) and the two betacoronaviruses (HKU1 and OC43) in our pre-pandemic samples. As shown in Figure 2, all 51 pre-pandemic samples had clearly detectable levels of IgG and IgA antibodies to the spike proteins of the four human coronaviruses. This is the expected result since seropositivity to these coronaviruses is very high in the adult population, but what was quite interesting was the remarkable stability of these antibody responses over a 200-day period in the pre-pandemic serum samples (shown as red lines in Figure 2). These were essentially flat lines with no decline in the antibody levels and question the prevailing belief that antibody responses to the endemic coronaviruses are short-lived.[6-8] While some occasional boosting of these childhood-acquired coronavirus infections cannot be ruled out, these data showing such stable antibody titers are best explained by

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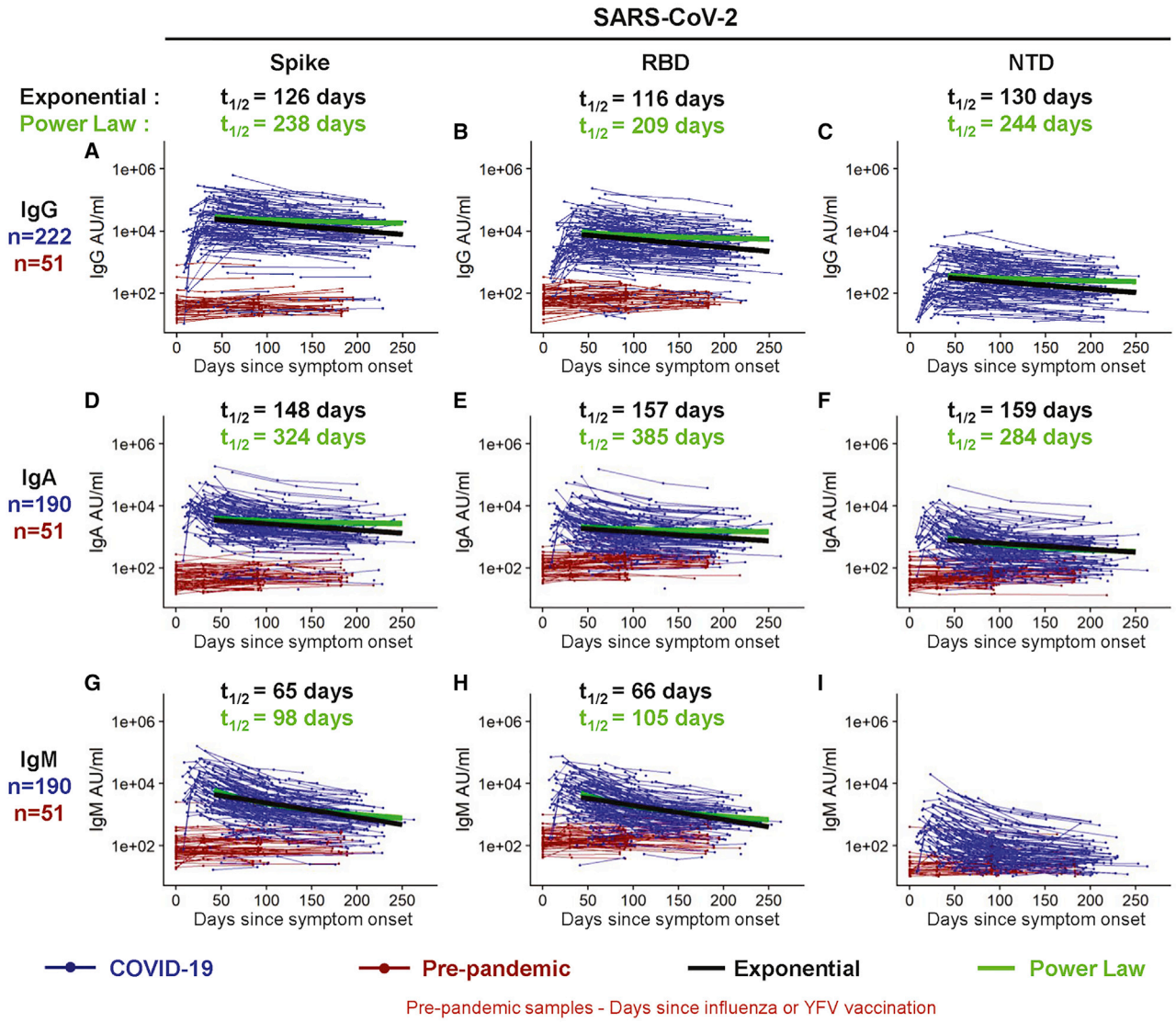

Figure 1. Longitudinal SARS-CoV-2 spike-binding antibody responses

IgG (A–C), IgA (D–F), and IgM (G–I) antibodies reactive to SARS-CoV-2 spike (A, D, G); spike receptor binding domain (RBD, [B, E, and H]), and the spike N-terminal domain (NTD, [C, F, and I]) were measured in triplicate by an electrochemiluminescent multiplex immunoassay and reported as arbitrary units per ml (AU/mL) as normalized by a standard curve. Longitudinal antibody titers of COVID-19 patients (in blue, n = 222 COVID-19+ for IgG; n = 190 COVID-19+ for IgA and for IgM) are plotted over days since symptom onset, whereas longitudinal pre-pandemic donor samples (in red, n = 51 for IgG, IgA, and IgM) were collected in the course of a non-SARS-CoV-2 vaccine study before 2019 and plotted over days since immunization. IgG decay curves and half-lives estimated by an exponential decay model are shown in black, and the decay curves and half-lives at day 120 post symptom onset estimated by a power law model are shown in green.

the persistence of long-lived plasma cells in the bone marrow many years after infection.[9-13]

COVID-19 infection results in increased levels of antibodies to two common human betacoronaviruses (HKU1 and OC43) and to SARS-CoV-1

We next examined if SARS-CoV-2 infection had any impact on the levels of antibodies to the other human coronaviruses. We measured IgG, IgA, and IgM antibody binding to the spike proteins of other known human coronaviruses in the COVID-19 patients (n = 222 for IgG and n = 190 for IgA and IgM) and compared these data to the 51 pre-pandemic healthy donor samples. In the COVID-19 patients, IgG and IgA antibodies to the alphacoronaviruses 229E and NL63 did not show any significant changes compared to the antibody levels in the pre-pandemic healthy controls (Figures 2A, 2B, 2F, and 2G; Figures S1C and S1D). In contrast, the IgG and IgA antibodies to betacoronaviruses HKU1 and OC43 were substantially elevated in COVID-19 patients relative to pre-pandemic controls (Figures 2C, 2D, 2H, and 2I; Figures S1C and S1D; $p < 0.0001$). After this boost, HKU1 and OC43 IgG antibody levels declined with estimated half-lives of 288 (95% CI [235, 372]) and 212 (95% CI [176, 268]) days, respectively (exponential decay

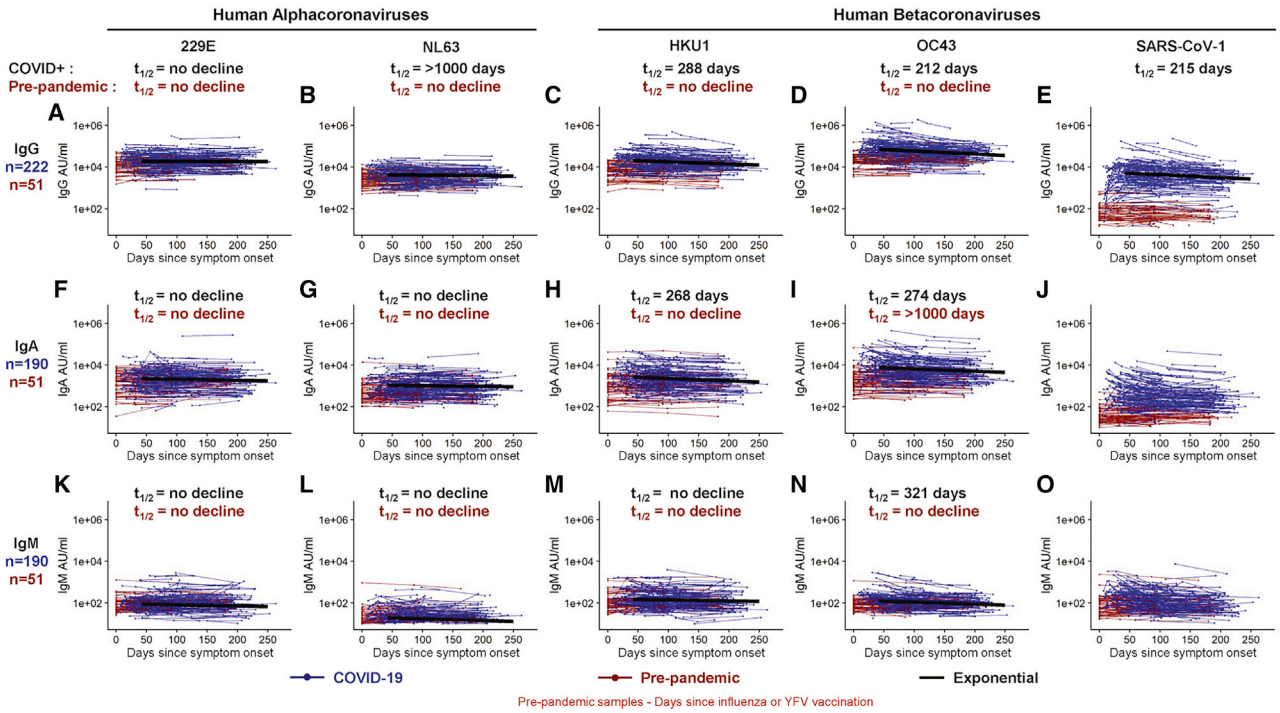

Figure 2. Longitudinal binding antibody responses to other coronavirus spike proteins

IgG (A–E), IgA (F–J), and IgM (K–O) antibody responses in sera collected from COVID-19+ patients (in blue, n = 222 for IgG; n = 190 for IgA and IgM) and pre-pandemic donors (in red, n = 51 for IgG, IgA and IgM) that were measured to 229E spike (A, F, and K), NL63 spike (B, G, and L), HKU1 spike (C, H, and M), OC43 spike (D, I, and N), and the SARS-CoV-1 spike protein (E, J, and O) in triplicate. Longitudinal antibody titers of COVID-19 patients are plotted over days since symptom onset, whereas longitudinal pre-pandemic donor samples were collected in the course of a non-SARS-CoV-2 vaccine study before 2019 and plotted over days since immunization. Antibody responses were measured by an electrochemiluminescent multiplex immunoassay and reported as arbitrary units per ml (AU/mL) as normalized by a standard curve. IgG decay curves and half-lives estimated by an exponential decay model are shown in black. There was no significant decline in IgG reactive to endemic alpha and betacoronaviruses in longitudinal samples collected in healthy donors before the pandemic (red, [A–D]).

model). IgM levels to common betacoronaviruses HKU1 and OC43 were low in both pre-pandemic controls and COVID-19 patients (Figures 2M and 2N). While pre-existing exposure and antibodies against HKU1 and OC43 betacoronaviruses are common in adults, pre-existing SARS-CoV-1 exposure is rare and antibody levels to SARS-CoV-1 spike protein were very low (essentially negative) in the pre-pandemic healthy controls. However, SARS-CoV-1 spike-reactive antibodies increased significantly after SARS-CoV-2 infection. These increases were quite striking for IgG ($p = 0.0038$) and also IgA ($p = 0.0084$) and most likely represent cross-reactive antibodies directed to SARS-CoV-2 spike epitopes that are conserved between SARS-CoV-2 and SARS CoV-1[14]. These newly induced cross-reactive IgG antibodies generated after COVID-19 infection declined with an estimated half-life of 215 days (95% CI [168, 298]) (exponential decay model) (Figure 2). Taken together, these results show that people infected with SARS-CoV-2 may have also have some heightened immunity against the common human betacoronaviruses and more importantly against SARS-CoV-1.

Durable neutralizing antibody responses to SARS-CoV-2 in infected patients

Neutralizing antibodies were measured with a live virus focus reduction neutralization test that uses a recombinant SARS-CoV-2 virus expressing the fluorescent reporter gene mNeonGreen (FRNT-mNG) (Figure 3A). During the first 250 days post-symptom onset, $FRNT_{50}$ titers varied considerably between individuals and ranged from < 20 to 3726 (Figure 3A). Of the 183 individuals for whom longitudinal neutralization titers were assayed, 140 (77%) had at least one time point with neutralization titers above the limit of detection (> 20). Seventy-five percent (43/57) of COVID-19 patients generated serum neutralizing antibodies between 30–50 days after symptom onset and similarly 72% (48/67) had measurable titers between 180–263 days after symptom onset. Using an exponential decay model, we evaluated the kinetics of neutralizing antibody titers after day 42 and estimated a half-life of 150 days (95% CI [124, 226]). However, similar to the spike-reactive IgG binding antibodies, we hypothesized that the neutralizing antibody rate of decay may actually slow over time during the recovery period. To address this, we fit a power law to the data. The power law model fit significantly better than the exponential decay model (DAIC = 9) and estimated the half-life of neutralizing antibody responses at 120 days post-symptom onset to be 254 days (95% CI [183, 400]).

Next, we assessed the relationship between the levels of spike and RBD binding antibodies and SARS-CoV-2 neutralization. Figures 3B and C show the SARS-CoV-2 spike and RBD binding antibody response kinetics of the 183 participants for whom

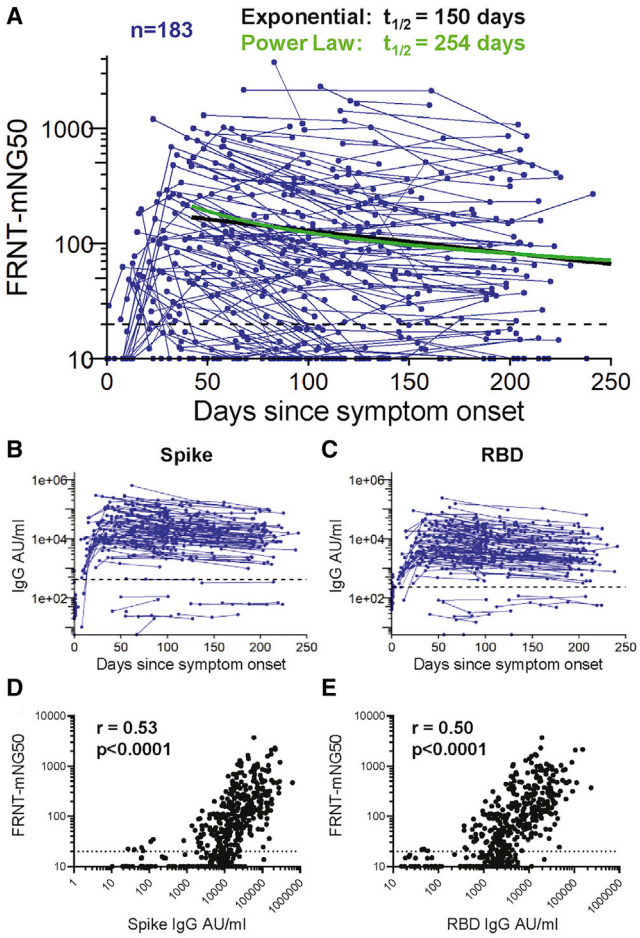

Figure 3. Neutralizing antibody responses to SARS-CoV-2

(A) *In vitro* serum neutralization antibody titers to SAR-CoV-2 were measured in duplicate by focus-reduction neutralization assay COVID-19 patients (n = 183). The limit of detection is indicated with a dashed line at FRNT-mNG$_{50}$ = 20. The half-life estimated by the exponential decay model (black) is 150 days, whereas the half-life estimated at day 120 using the power law model (green) is 254 days. (B and C) IgG antibody titers reactive to SARS-CoV-2 spike (B) and RBD (C) of the matched 183 COVID-19 for whom neutralization titers were assessed. The geometric mean titer plus 3 standard deviations of pre-pandemic samples is indicated by a dashed line.

(D and E) SARS-CoV-2 spike (D) and RBD (E) reactive IgG levels correlated with neutralization titers at the matched time point (repeated-measures correlation, $p < 0.0001$). The limit of detection is indicated with a dashed line at FRNT-mNG$_{50}$ = 20.

neutralization titers were assessed. These exhibited a wide range of antibody binding levels ranging from non-responders (n = 11) who did not elicit antibody titers above those of pre-pandemic controls (defined as a COVID-19 patient titer below the mean pre-pandemic antibody titer plus three standard deviations, see dashed line on Figures 3B and 3C) to those with IgG levels > 200,000 AU/mL. Spike and RBD binding IgG levels correlated significantly with the neutralization titers (Figure 3D, E; $p < 0.0001$).

Taken together, our findings show that induction of neutralizing antibodies occurs in the majority of COVID-19 patients. These neutralizing antibodies can persist over the 8–9 month period following infection, and show a correlation with spike and RBD binding IgG.

SARS-CoV-2 spike and RBD-specific memory B cells increase for several months after infection and then plateau over 8 months

Memory B cells (MBC) are an important component of humoral immunity and contribute to viral control by generating antibody responses upon re-exposure to the pathogen. We used full-length spike and RBD antigen probes to quantify the frequencies of SARS-CoV-2 spike- and RBD-specific MBC in longitudinal PBMC samples from 111 COVID-19 patients (Figure 4) and from 29 pre-pandemic controls (Figures S3A and S3B). Our flow cytometric gating strategy to identify SARS-CoV-2-specific MBC and classify them as IgG, IgM, and IgA MBC isotypes is shown in Figure 4A.

Among the total MBC, the spike IgG+ MBCs were significantly increased in COVID-19 patients (n = 111; Figure 4B) in comparison to pre-pandemic controls (n = 29; Figure S3A) (median increase, 0.73% versus 0.02%; $p < 0.0001$). After a steep early expansion over the first 2-3 months, the spike IgG+ MBC persisted in COVID-19 patients with no decline out to 250 days post symptom onset. These findings (Figure 4B) are supported by a positive slope (0.004) from the model of the longitudinal spike IgG+ MBC responses after day 30 (95% CI [0.002, 0.006], $p < 0.001$; Figures S4A and S4B).

The spike IgM+ MBC appeared within the first 2 weeks post-symptom onset and quickly declined (Figures 4C and 4D). The decay continued after day 30 (slope = −0.007, 95% CI [-0.010, −0.005], $p < 0.001$). One month after symptom onset, 56% of spike MBC were IgG+, which increased to a peak of 80% at 5–6 months (Figure 4D). Circulating spike IgA+ MBC were also detectable in many subjects at low frequencies and without significant change over time (day 30–250: slope = 0.000, 95% CI [-0.002, 0.002], $p = 0.91$, Figure 4D).

Since the RBD contains the primary neutralizing epitopes on the spike, we also used an RBD-specific probe to characterize this subset of spike-specific memory B cells. Overall, approximately 20% of the spike IgG+ memory B cells targeted the RBD, which was consistent across subjects and time (Figures 4E and 4F). As expected, RBD+ IgM+ MBC emerged early in infection and subsequently switched to RBD+ IgG+ MBCs, which gradually increased during follow-up (day 30–250: slope = 0.004, 95% CI [0.002, 0.005], $p < 0.001$, Figure 4E). Thus, the maintenance of circulating spike- and RBD-specific IgG memory B cells suggests that these cells could be recruited for a rapid secondary response following re-exposure or vaccination.

Induction of durable and polyfunctional virus specific memory CD4+ and CD8+ T cells in infected patients

CD4+ T cells are critical for generation of high affinity antibody responses and can also have anti-viral effects. In addition, they provide help for CD8+ T cell responses, which are vital for killing infected cells and mediating viral clearance. Thus, we next examined virus-specific CD4+ and CD8+ T cell responses longitudinally in COVID-19 patients and uninfected controls using a high-dimensional, multi-parameter *ex vivo* intracellular cytokine staining (ICS)

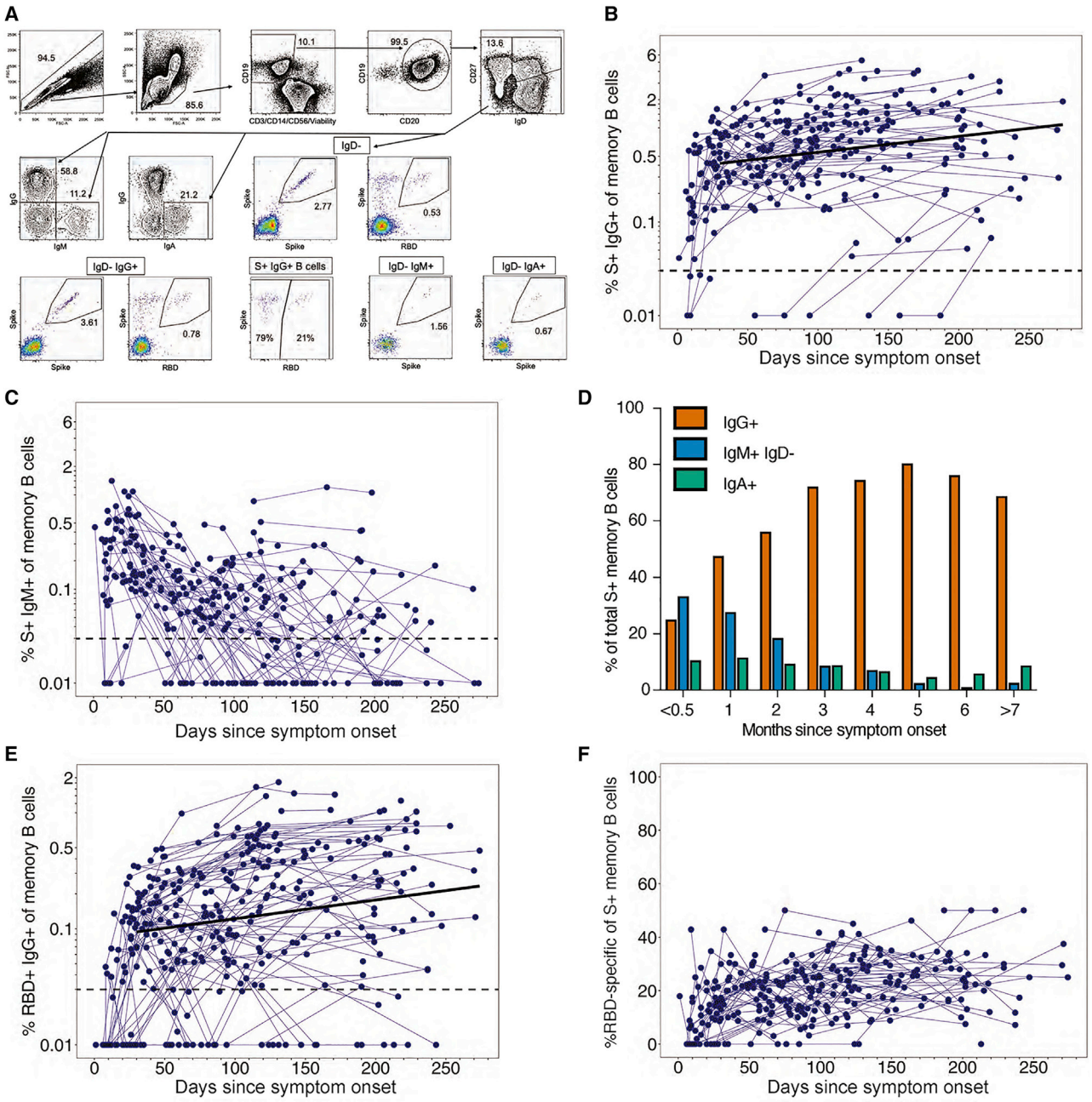

Figure 4. SARS-CoV-2 spike and RBD-specific memory B cells

(A) Representative memory B cell gating strategy is shown for identification of SARS-CoV-2 spike and RBD-specific IgD- IgG+, IgD- IgM+, and IgD- IgA+ memory B cells in PBMCs from a SARS-CoV-2 convalescent participant.

(B and C) The frequency of spike+ (B) IgG+ and (C) IgM+ memory B cells out of memory B cells (IgD- CD19+ CD20+) is displayed over time from initial symptom onset among SARS-CoV-2-infected subjects (n = 105 subjects; measured in singlet replicates). The dashed line indicates the limit of detection. The bold line represents the median fitted curve from a linear mixed effects model of post-day 30 responses.

(D) The median percent of spike+ memory B cells expressing IgG, IgM or IgA isotypes was assessed at monthly intervals post-symptom onset.

(E) The frequency of RBD+ IgG+ of memory B cells over time (n = 141).

(F) The proportion of S+ IgG+ memory B cells that are specific for the receptor binding domain are depicted over time.

assay. The assay is sensitive, precise, and specific for detection of antigen-specific T cells expressing multiple cytokines and effector molecules following a short-term (6 h) stimulation with peptide pools. Our lab developed and validated the assay, and we are currently using the method to quantitate Th1/Th2 CD4+ and CD8+ T cell responses in SARS-CoV-2 vaccine trials. Here,

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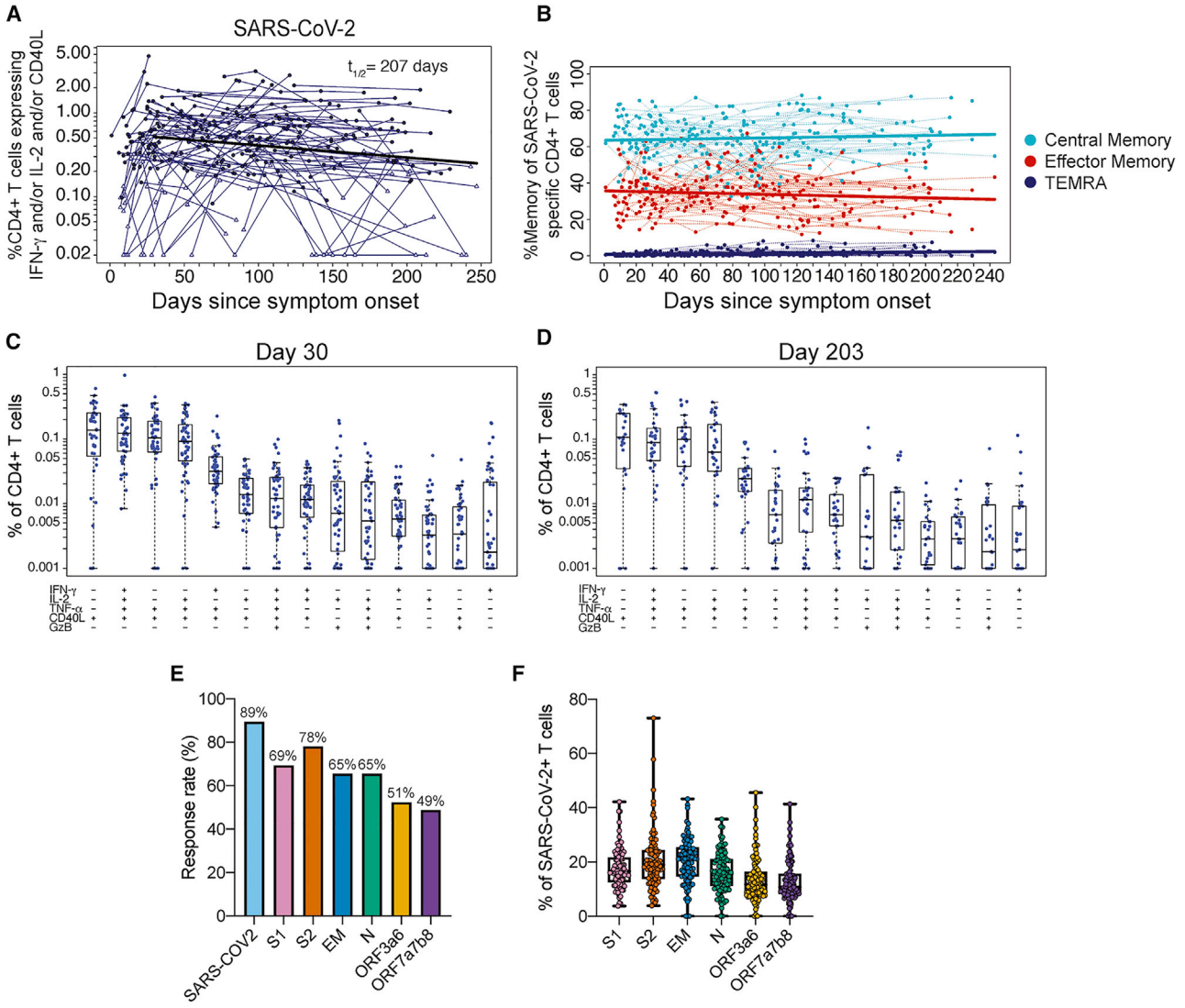

Figure 5. CD4+ T cell responses to SARS-CoV-2 antigens

(A) The sum of background-subtracted CD4+ T cells expressing *ex vivo* IFN-g, IL-2 and/or CD40L to peptide pools spanning SARS-CoV-2 structural proteins: S1, S2, envelope (E), membrane (M), nucleocapsid (N), and the following ORFs: 3a, 3b, 6, 7a, 7b, and 8 (n = 114; tested in singlets) for each individual/time point. Each sample that is "positive" (by MIMOSA) for at least one SARS-CoV-2 antigen is indicated by a solid circle, whereas samples that are "negative" for all of the SARS-CoV-2 antigens at that time point are indicated by open triangles. The bold line represents the median fitted curve from a nonlinear mixed effects model of post-day 30 responses among those with a positive response at ≥1 time point; $t_{1/2}$ is the median half-life estimated from the median slope, with 95% CI [104, 411].

(B) The proportion of SARS-CoV-2-specific CD4+ T cells expressing a specific memory phenotype over time: central memory (CCR7+ CD45RA-), effector memory (CCR7- CD45RA-), or T_{EMRA} (CCR7- CD45RA+); restricted to positive responders.

(C and D) Polyfunctionality of SARS-CoV-2-specific CD4+ T cells are shown at (C) 21-60 days since symptom onset (median, 30 days) and (D) > 180 days median post symptom onset (median, 203 days). Percentages of cytokine-expressing CD4+ T cells are background subtracted and only subsets with detectable T cells are displayed. Data shown were restricted to positive responders and a single data point per individual per time frame. All subsets were also evaluated for expression of IL-4, IL-5, IL-13, IL-17, and perforin and were found to be negative.

(E) Bar graphs indicate the proportion of COVID-19 convalescent patients who had a positive CD4+ T cell response to the individual SARS-CoV-2. peptide pool *ex vivo* stimulations. Some antigens were combined for stimulation as indicated.

(F) For each subject with positive SARS-CoV-2-specific CD4+ T cells, the proportion of the total SARS-CoV-2 responding CD4+ T cells that are specific for each stimulation.

we assessed T cell responses to the SARS-CoV-2 structural (S, E, M, and N) and accessory proteins (ORF 3a, 6, 7a, 7b, and 8) using overlapping peptide pools that span the sequences of these proteins.

Among COVID-19 patients, 89% (102/113) mounted CD4+ T cell responses (Figure 5A) recognizing at least one SARS-CoV-2 structural protein that was detectable at one or more visits. By contrast, SARS-CoV-2 specific CD4+ T cells were

rarely detected in the uninfected control group using this assay (Figure S3C). Antigen-specific CD4+ T cells expanded over the first month after infection and then gradually declined over subsequent months. Their estimated half-life was 207 days (95% CI [104, 211]) as shown in Figure 5A, and these findings are supported by the individual CD4+ T cell response levels and slopes after day 30 (slope = −0.0033, 95% CI [-0.0017, −0.0066], p < 0.0001) (Figures S4C and S4D). Of note, we observed a wide range in the total magnitude of responses, some reaching >1% of circulating CD4+ T cells, and an overall median frequency of 0.51% (Figures 5A and S5).

To better characterize the development of T cell memory in SARS-CoV-2 infection, we examined the differentiation profiles of virus-specific T cells longitudinally in COVID-19 patients. Based on CD45RA and CCR7 expression, SARS-CoV-2-specific CD4+ T cells were primarily central memory phenotype (CD 45RA- CCR7+) and to a lesser extent effector memory (CCRA-CCR7-); this profile of the memory T cell subsets was very consistent between subjects and stable over time (Figure 5B). The antigen-specific CD4+ T cells were Th1-biased with a predominant CXCR3+CCR6- phenotype, and highly polyfunctional, with simultaneous detection of antigen-specific CD154, IFN-γ, IL-2, TNF-α and less frequently granzyme B in the early expansion phase (21–60 days post symptom onset; median, 30 days) (Figure 5C). Interestingly, many of the virus-specific CD4+ T cells also exhibited this polyfunctionality at the memory time point (>180 days post symptom onset; median, 203 days) (Figure 5D). Circulating SARS-CoV-2-specific Th2 (IL-4, IL-5, and IL-13), Th17 (IL-17), or perforin-expressing subsets were not detected (Figures 5C and 5D).

Next, we examined the CD8+ T cell responses in COVID-19 patients and found that 69% generated CD8+ T cells recognizing at least one SARS-CoV-2 structural protein that were detectable at one or more visits (Figure 6A), in contrast to infrequent to rare, low-level antigen-specific responses in the uninfected control donors (Figure S3D). Expansion of CD8+ T cells occurred over the first month and then frequencies gradually declined, with a half-life of 196 days (95% CI [92, 417]) and a negative estimated slope after 30 days of symptom onset (slope = −0.004, 95% CI [-0.002, −0.008], p < 0.0001) (Figure 6A). The median frequency of SARS-CoV-2-specific CD8+ T cells was 0.2%, indicating a lower overall response magnitude than observed for CD4+ T cells. However, like the CD4+ T cells, a wide range in magnitudes was observed with many SARS-CoV-2-specific CD8+ T cell frequencies above 1% and even up to 12% (Figure 6A).

A very different pattern of phenotypic changes were observed with virus-specific CD8+ T cells compared to what we saw with the CD4+ T cells (Figure 6B versus Figure 5B). In contrast to the dominance of the central memory subset with SARS-CoV-2-specific CD4+ T cells, the vast majority of the virus-specific CD8+ T cells showed an effector memory phenotype during the early phase of the response. However, this population of SARS-CoV-2-specific effector memory (CD45RA-CCR7-) contracted over time (slope = −0.904, p < 0.0001; Figure 6B) and simultaneously there was an increase in the proportion of the TEMRA (CD45RA+CCR7-) subset of virus-specific CD8+ T cells (slope = 0.075, p < 0.0001; Figure 6B). A small but stable fraction of SARS-CoV-2-specific CD8+ T cells expressed a central memory phenotype (slope = 0.024, p = ns; Figure 6B).

The SARS-CoV-2-specific CD8+ T cells were highly polyfunctional with the highest magnitude populations secreting IFN-γ, TNF-α, and granzyme B; other dominant subsets also expressed IL-2 or perforin (Figures 6C and 6D). This polyfunctional profile was seen in the expansion phase (median 30 days; Figure 6C) and also at the later time points (>180 days post symptom onset; median 203 days; Figure 6D). It is important to note that this pattern of CD8+ T cell differentiation has been described in detail after vaccination in humans with the live attenuated yellow fever virus vaccine (YFV-17D).[15] This YFV-17D vaccine generates long-lived and functional virus-specific memory CD8+ T cells that persist in humans for decades.[15,16] That the CD8+ T cell differentiation program after COVID-19 infection resembles what is seen after YFV infection of human suggests that COVID-19 patients may also generate long-lived CD8+ T cell memory.

CD4+ and CD8+ cells target different SARS-CoV-2 antigen specificities

The majority of COVID-19 patients generated CD4+ T cells that recognized most SARS-CoV-2 viral structural and accessory proteins, with the highest percentage responding to S2 (78%) and S1 (69%) (Figures 5E and 5F). Among the COVID-19 subjects with positive responses, the proportion of SARS-CoV-2-specific CD4+ T cells reacting to each peptide pool was evenly distributed (Figure 5F). Thus, CD4+ T cells equally targeted multiple SARS-CoV-2 proteins.

In contrast to the results seen with CD4+ T cells, SARS-CoV-2-specific CD8+ T cells showed preferential recognition of the nucleocapsid protein. The dominant CD8+ T cell response rate was directed to the nucleocapsid (57%); followed by ORFs 7a, 7b, and/or 8 (25%); S1 (25%); ORFs 3a and/or 6 (16%); S2 (12%); and E and/or M (9%) (Figure 6E). Also, among the COVID-19 patients with CD8+ T cell responses, there was a bias with the largest percentage (median, 43%) reacting to the nucleoprocapsid protein (Figure 6F). While SARS-CoV-2 CD8+ T cell responses rates were much lower in uninfected controls, when present in a few control donors with lower frequencies, these were also targeted to the nucleocapsid protein (Figure S3D). A likely explanation for these findings is that in SARS-CoV-2 infection, antigen-presenting cells *in vivo* may display a higher proportion of peptides derived from the nucleocapsid protein and hence more nucleocapsid-specific CD8+ T cells are generated during infection. This has interesting implications suggesting that nucleocapsid-specific CD8+ T cells might be more efficient in recognizing virally infected cells.

Age and disease severity are significantly associated with magnitude of SARS-CoV-2 immune responses

We evaluated whether COVID-19 patient age, disease severity, or gender could account in part for the heterogeneity observed among the SARS-CoV-2-specific immune responses as estimated from the individual models (post day 30 for cellular and post day 42 for antibody responses). We observed that age was significantly associated with higher immune responses to SARS-CoV-2, independently of any covariation with disease

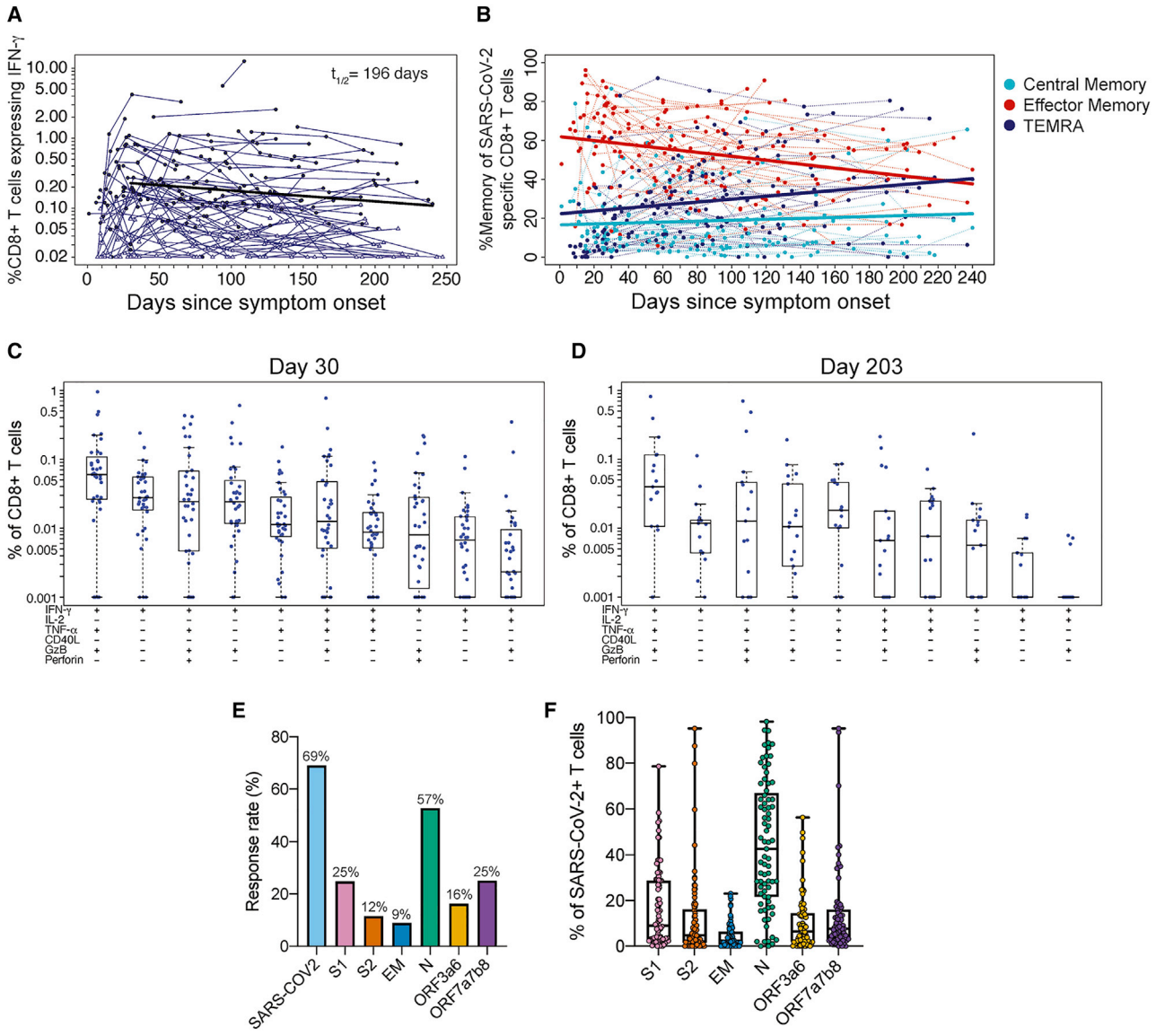

Figure 6. CD8+ T cell responses to SARS-COV-2 antigens

(A) The sum of background-subtracted CD8+ T cells expressing IFN-γ (with or without other cytokines), in response to peptide pools covering SARS-CoV-2 structural proteins: S1, S2, envelope (E), membrane (M), nucleocapsid (N), and the following ORFs: 3a, 3b, 6, 7a, 7b, and 8 (n = 114; tested in singlets) for each individual/time point. Each sample that is positive (MIMOSA) for at least 1 SARS-CoV-2 antigen is indicated by a solid circle, whereas samples that are negative for all of the SARS-CoV-2 antigens at that time point are indicated by open triangles. The bold black line represents the median fitted curve from a nonlinear mixed effects model of post-day 30 responses among those with a positive response to the antigen(s) under consideration at [3]1 time point; $t_{1/2}$ shown is the median half-life estimated from the median slope, with 95% CI [92, 417].

(B) The proportion of SARS-CoV-2-specific CD8+ T cells by memory phenotype over time: effector memory (EM; CCR7- CD45RA-), T_{EMRA} (CCR7- CD45RA+), and central memory (CM; CCR7+ CD45RA-). Analyses were restricted to positive responders.

(C and D) Polyfunctionality of SARS-CoV-2-specific CD8 T cells at (C) 21–60 days post symptom onset (median, 30 days) and (D) >180 days median post symptom onset (median, 203 days). Percentages of cytokine expressing CD8+ T cells are background subtracted and only subsets with detectable T cells are displayed. Data shown were restricted to positive responders and a single data point per individual per time frame. All CD8+ T cell subsets were also evaluated for expression of IL-4, IL-5, IL-13, and IL-17 and were found to be negative.

(E) The bar graphs indicate the proportion of COVID-19 convalescent patients who had a positive CD8+ T cell response to the individual SARS-CoV-2 stimulations.

(F) The fraction of the total SARS-CoV-2 responding CD8+ T cells per subject that are specific for each peptide pool.

severity (Figure 7A). Neutralizing antibody titers and IgG antibody responses to nucleocapsid increased 1.35-fold and 1.25-fold, respectively, with each decade of age and the same disease severity (95% *Cis* [1.19, 1.54] and [1.08, 1.43], p values < 0.003). Similarly, increased age positively correlated with increased frequencies of spike and RBD-specific IgG+ memory

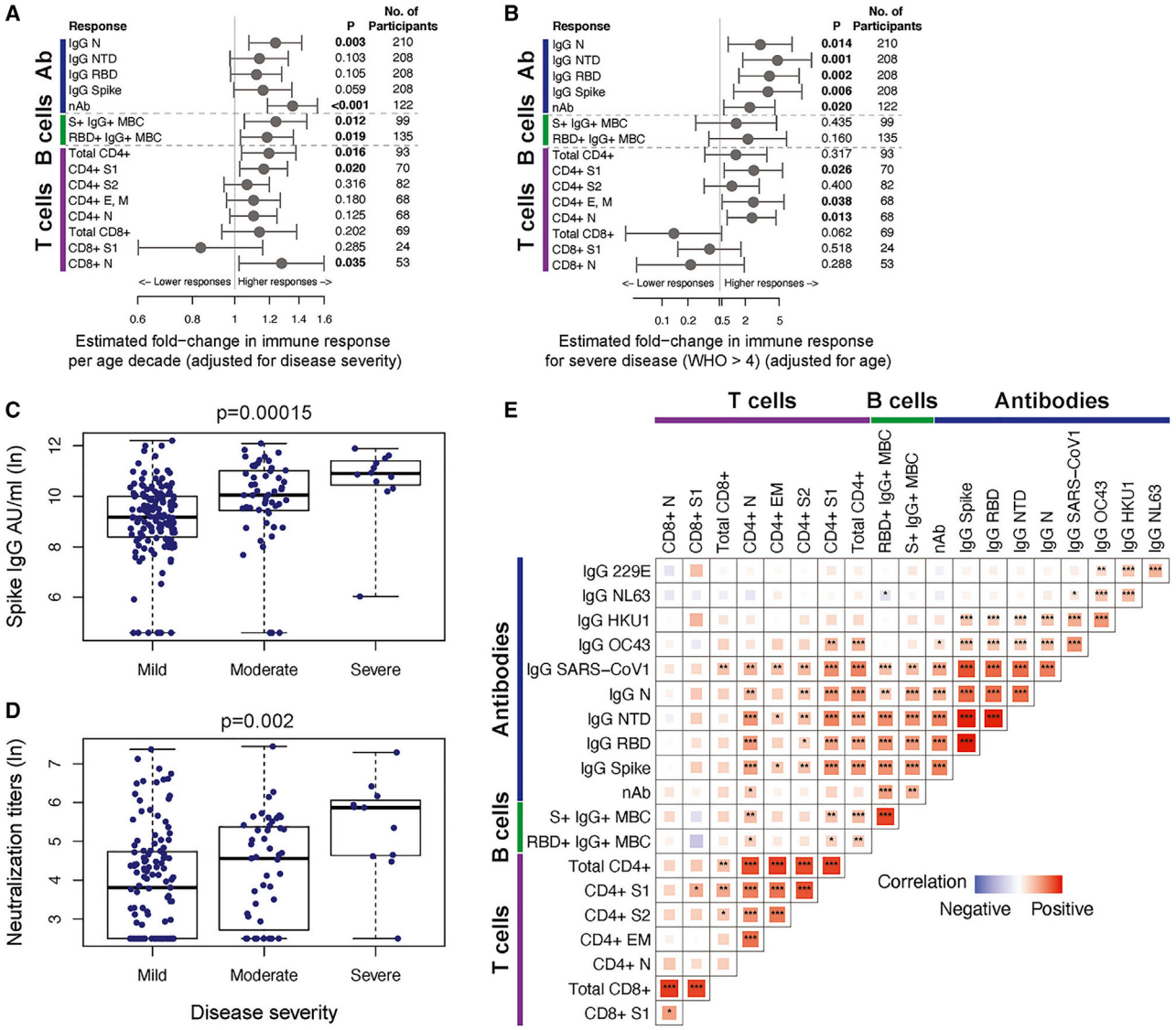

Figure 7. Correlations between SARS-CoV-2-specific immune responses and assessment of covariates

(A) The forest plot depicts the estimated fold-change in the level of each immune response per decade of age, with 95% Wald-based CIs and p values.

(B) The forest plot shows the estimated fold-change in the level of each immune response for severe (WHO score >4) versus non-severe (WHO score £4) disease, with 95% Wald-based CIs and p values. S1 CD8+ T cell responses compared moderate-severe (WHO score >2) to mild (WHO score £2) disease as there were no participants with severe disease with at least one positive S1 CD8+ T cell response post-day 30. Estimates in (A) and (B) are from mixed effects models of post-day 30 (B and T cell responses) or post-day 42 (antibody responses) among responders that account for fixed effects of age and disease severity on the level of immune response.

(C and D) Univariate assessment of disease severity on the magnitude of (C) spike IgG antibodies and (D) SARS-CoV-2 neutralizing antibodies at day 120 is shown for mild (WHO score: 0-2), moderate (WHO score: 3-4), and severe disease (WHO score: 5+); p values from one-way ANOVA.

(E) The heatmap shows Spearman correlations between critical SARS-CoV-2 memory immune responses (day 30 B and T cell responses and day 180 antibody responses) with significance levels: *p < 0.05, **p < 0.01, and ***p < 0.001. The tile size and color intensity correspond to the absolute value of the Spearman rank correlation coefficient, with red or blue indicating a positive or negative correlation, respectively. Day 30, 42, and 180 immune responses were estimated from mixed effects models of the longitudinal SARS-CoV-2 binding antibodies, SARS-CoV-2 neutralizing antibodies, CD4+ and CD8+ T cell responses, and B cell responses.

B cells, with 1.19- to 1.24-fold higher responses per decade of age (p values < 0.02; Figure 7A), accounting for disease severity. Increased age also correlated with higher SARS-CoV-2 and S1-specific CD4+ T cell responses (1.16- to 1.20-fold increase by decade of age, p values < 0.02) and N-specific CD8+ T cell responses (1.24-fold increase by decade of age, p = 0.039) accounting for disease severity (Figure 7A).

Since the cohort included primarily persons with mild-to-moderate COVID-19, we had limited ability to assess the relationship of severe disease and SARS-CoV-2 immune responses,

especially among the cellular responses. However, we found that after accounting for age, severe disease (WHO score >4) was associated with higher IgG antibodies to nucleocapsid, spike, RBD, and NTD (Figures 7B and 7C), and SARS-CoV-2 neutralization titers (Figure 7D). Severe disease was also associated with 2.30- to 2.46-fold higher S1, E and/or M, and nucleocapsid-specific CD4+ T cells (all p values < 0.05; Figure 7B). We found no significant relationships between gender and the immune responses evaluated, apart from 1.66-fold higher IgG NTD responses antibodies among males compared to females, after accounting for age and disease severity (95% CI [1.08, 2.55], p = 0.022). In all, our analyses suggest that there are synergistic but also independent mechanisms driving higher adaptive immune responses in COVID-19 patients who are older and/or who experienced more severe disease.

Early SARS-CoV-2 B and T cell responses correlated with durable spike and RBD IgG antibody binding and neutralization titers

We assessed correlations between SARS-CoV-2-specific immune responses using the individual-level models to interpolate the magnitude of responses for each COVID-19 patient at early (day 30) or later (day 180) convalescent time points (Figure 7E). We found that durable serum neutralization titers correlated with the magnitude of IgG+ binding antibodies to spike, NTD and RBD at day 180 each (day 180; Spearman R = 0.62, 0.61, and 0.61, respectively; all p values < 0.0001). Similarly, the frequency of RBD+ IgG+ memory B cells at day 30 correlated with the maintenance of RBD+ IgG antibodies (day 180; Spearman R = 0.53, p < 0.0001) and neutralization antibody titers (day 180; Spearman R = 0.48, p < 0.0001). We also observed that the magnitude of S1-specific CD4+ T cells at day 30 correlated with durable IgG antibodies against spike (day 180; Spearman R = 0.56, p < 0.0001), NTD (Spearman R = 0.62, p < 0.0001), and RBD (Spearman R = 0.47, p = 0.0002) (Figure 7E). These findings are consistent with early SARS-CoV-2 memory B cells and CD4+ T cells supporting the generation of durable antibody responses.

DISCUSSION

Establishing immune memory is essential in the defense against SARS-CoV-2 infection. To end the COVID-19 pandemic, it is critical to know how long immunity against SARS-CoV-2 will persist after infection and whether it will be sufficient to prevent new infections and severe disease in years to come. Identifying, in-depth, the adaptive immune components leading to recovery and modeling the trends of each response was enabled by the longitudinal sampling of a large number of COVID-19 patients. Here, we show that most convalescent COVID-19 patients mount durable antibodies, B cells, and T cells specific for SARS-CoV-2 up to 250 days, and the kinetics of these responses provide an early indication for a favorable course ahead to achieve long-lived immunity. Because the cohort will be followed for 2–3 more years, we can build on these results to define the progression to long-lived immunity against this novel human coronavirus, which can guide rational responses when future outbreaks occur.

The hallmark of the initial immune defense against SARS-CoV-2 is the emergence of antibodies recognizing the SARS-CoV-2 spike protein, including the RBD and NTD components of the S1 subunit, during the early phase of viral replication. These antibodies are likely secreted from plasmablasts rapidly generated from B cells that are activated upon their first encounter with the pathogen spike antigen. The brisk rise over the first month of infection, followed by a fast decline of the circulating spike IgG and IgA antibodies, is a consistent finding and likely explained by the disappearance of the short-lived plasmablasts. These events occur even sooner for the spike IgM and nucleocapsid antibodies.

Some antibodies that bind to specific epitopes on the spike RBD and NTD can block SARS-CoV-2 infection of respiratory epithelial cells by inhibiting the interactions of the viral spike with the ACE2 receptor.[17-20] Thus, as expected, the early rise and decline of antibodies neutralizing live SARS-CoV-2 were similar to the kinetics of antibodies binding the spike and RBD protein. The striking finding is the bi-phasic curve of the spike-specific binding and neutralizing antibody responses when analyzed with the power law model, which provides a better fit for the antibody kinetics after the peak response.[21] This bi-phasic decline accords with other recently published observations on SARS-CoV-2 serological kinetics.[22,23] With sampling data extended to 250 days, we were able to detect a slowing of the decay of these functional antibodies toward a plateau level, suggestive of the generation of longer-lived plasma cells, and durable antibody responses. The importance of these observations is that following recovery, neutralizing antibodies may persist, albeit at low levels, and may act as the first line of defense against future encounters of SARS-CoV-2 and possibly related human coronaviruses.

Another interesting finding of this investigation is the remarkably stable antibody responses among the pre-pandemic and COVID-19 patients to the common human coronaviruses that are acquired in children and adults. These data are most consistent with the generation of long-lived plasma cells and refute the current notion that these antibody responses to human coronaviruses are short lived. Moreover, the COVID-19 patients mounted increased IgG antibody responses to SARS-CoV-1, a related pathogen that none likely had experienced previous exposure to. This finding is consistent with the booster response of SARS-CoV-1 neutralizing antibodies that we recently observed following SARS-CoV-2 mRNA vaccination.[3,24] Taken together, these results may have implications for a broader strategy for vaccines targeting multiple betacoronaviruses.

The durable antibody responses in the COVID-19 recovery period are further substantiated by the ongoing rise in both the spike and RBD memory B cell responses after over 3–5 months before entering a plateau phase over 6–8 months. Persistence of RBD memory B cells has been noted.[25-27] We presume this may be explained by sustained production of memory B cells in germinal centers of lymph nodes draining the respiratory tract in the early months, followed by the memory B cell redistribution into the circulation as the germinal centers begin to recede. Thus, the induction and maintenance of memory B cells and, over time, long-lived plasma cells, will continue to furnish higher affinity antibodies if re-exposures occur.

In contrast to spike memory B cell kinetics, SARS-CoV-2-specific CD4+ and CD8+ memory T cells each peak early, within the first month, but then slowly decline over the next 6–7 months. Central memory Th1-type CD4+ T cells dominate throughout the early infection and recovery period. However, the CD8+ T cells exhibit a predominant effector memory phenotype early that transitions to those effector memory cells re-expressing CD45RA, maintaining expression of antiviral cytokines and effector functions that have been shown to provide protective immunity against other viral pathogens. We also provide clear evidence that the CD4+ T cells mount a broader antigen-specific response across the structural and accessory gene products, whereas the CD8+ T cells are predominantly nucleocapsid specific and spike-specific responses are substantially lower in frequency.

Our study demonstrates the considerable immune heterogeneity in the generation of potentially protective response against SARS-CoV-2, and by focusing on the dynamics and maintenance of B and T cell memory responses, we were able to identify features of these early cellular responses that can forecast the durability of a potentially effective antibody response. The ability to mount higher frequencies of RBD-specific memory IgG+ B cells early in infection was the best indicator for a durable RBD-specific IgG antibody and neutralizing antibody response. In addition, higher frequency CD4+ T cells were associated with stronger spike IgG and neutralizing antibody responses. However, the induction and peak response of SARS-CoV-2-specific CD8+ T cells occurs independently to these antibody responses. Interestingly, while it has been widely reported that age correlates with COVID-19 disease severity, we found that age and disease severity were independent co-variates associated with the magnitude of both SARS-CoV-2-specific CD4+ T cell and humoral SARS-CoV-2 immunity, but not with the magnitude of CD8+ T cell responses. In the case of T cells, whether the T cell differences are related to the frequencies or specificities of pre-existing coronavirus CD4+ and CD8+ T cell immunity will require additional future analysis.

The COVID-19 pandemic remains a global public health threat after 1 year of overwhelming disruption and loss. Overcoming the challenges to end the pandemic is accentuated by the recognition that SARS-CoV-2 can undergo rapid antigenic variation that may lower vaccine effectiveness in preventing new cases and progression to severe disease.[24,28,29] Our findings show that most COVID-19 patients induce a wide-ranging immune defense against SARS-CoV-2 infection, encompassing antibodies and memory B cells recognizing both the RBD and other regions of the spike, broadly-specific and polyfunctional CD4+ T cells, and polyfunctional CD8+ T cells. The immune response to natural infection is likely to provide some degree of protective immunity even against SARS-CoV-2 variants because the CD4+ and CD8+ T cell epitopes will likely be conserved. Thus, vaccine induction of CD8+ T cells to more conserved antigens such as the nucleocapsid, rather than just to SARS-CoV-2 spike antigens, may add benefit to more rapid containment of infection as SARS-CoV-2 variants overtake the prevailing strains.

Limitations of the study

Our study evaluates COVID-19 patients only up to 8 months and requires models to estimate immune response half-lives thereafter. Because our longitudinal study will extend beyond 2 years, we can corroborate our models with subsequent experimental data on the persistence of immune memory. Our study population was primarily outpatients with mild-to-moderate COVID-19 and thus we were unable to evaluate immune memory in those with the extreme presentations, both asymptomatic and severe COVID-19. However, mild-moderate illness accounts for >80% of COVID-19 cases[30], highlighting the relevance of our findings over time.

STAR★METHODS

Detailed methods are provided in the online version of this paper and include the following:

- KEY RESOURCES TABLE
- RESOURCE AVAILABILITY
  - Lead contact
  - Materials availability
  - Data and code availability
- EXPERIMENTAL MODEL AND SUBJECT DETAILS
  - Study populations
- METHOD DETAILS
  - PBMC processing
  - Antibody binding assay
  - Viruses and cell lines
  - Focus reduction neutralization test
  - Spike and RBD memory B cell flow cytometry assays
  - Intracellular cytokine staining (ICS) assay
- QUANTIFICATION AND STATISTICAL ANALYSIS
  - Binding and neutralizing antibody responses
  - B cell responses
  - T cell responses

SUPPLEMENTAL INFORMATION

Supplemental information can be found online at https://doi.org/10.1016/j.xcrm.2021.100354.

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AUTHOR CONTRIBUTIONS

M.J.M and R. Ahmed conceived the study. M.J.M., S.E., J.C., E.J.A., A.K.M, N.R., and J.O.K. established the cohort and recruited the participants. S.L.L., M.P.L., C.W.D., M.P.G., S.G., K.A.S., G.M., C.N., V.V.E., L.L., and D.S.S. conducted serological assays and related analyses. H.A., V.I.Z., B.P., and Z.M. conducted formal statistical analyses and modeling. K.W.C., R.W., and L.E.N. planned, performed, and analyzed antigen-specific B cell flow cytometry. S.C.D., K.W.C., and S.F. conceived, supervised, performed, and analyzed T cell experiments. V.E.E, K.F., and L.L. performed FRNT assays. K.W.C., S.L.L., and Z.M. drafted the original manuscript; M.J.M., M.S.S., and R. Ahmed edited the manuscript. All authors read and approved the manuscript. M.J.M., R.A, J.W., and M.S.S. secured funds and supervised the project.

DECLARATION OF INTERESTS

The authors declare no competing interests.

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STAR★METHODS

KEY RESOURCES TABLE

REAGENT or RESOURCE	SOURCE	IDENTIFIER
Antibodies		
Mouse Anti-Human CD3/BV510	BD Biosciences	564713; RRID:AB_2738909
Mouse Anti-Human CD14/BV510	BD Biosciences	563079; RRID:AB_2737993
Mouse Anti-Human CD56/BV510	BD Biosciences	563041; RRID:AB_2732786
Mouse Anti-Human CD19/BUV395	BD Biosciences	563549; RRID:AB_2738272
Mouse Anti-Human CD20/BUV737	BD Biosciences	612849; RRID:AB_2870169
Mouse Anti-Human CD21/PE-Cy7	BD Biosciences	561374; RRID:AB_10681717
Mouse Anti-Human CD27/BV605	BD Biosciences	302830; RRID: AB_2561450
Mouse Anti-Human CD38/BB700	BioLegend	566445; RRID:AB_2744375
Mouse Anti-Human IgA/VioBlue	Miltenyi Biotec	130-114-005; RRID:AB_2733958
Mouse Anti-Human IgD/BV650	BD Biosciences	740594; RRID:AB_2740295
Mouse Anti-Human IgG/BV786	BD Biosciences	564230; RRID:AB_2738684
Mouse Anti-Human IgM/PE-Dazzle 594	BioLegend	314530; RRID:AB_2566483
Streptavidin (PE)	Invitrogen	S21388; RRID:AB_2892541
Streptavidin (AF488)	Invitrogen	S32354; RRID:AB_2315383
Streptavidin (AF647)	Invitrogen	S32357; RRID:AB_2892542
Live/Dead Fixable Aqua Stain	Invitrogen	L34957
Fixable Viability Dye/eFluor 450	Invitrogen	65-0863
Mouse Anti-Human CD14/BUV661	BD Biosciences	741684; RRID:AB_2868407
Mouse Anti-Human CD19/BUV563	BD Biosciences	612916; RRID:AB_2870201
Mouse Anti-Human CD16/BV570	BioLegend	302036; RRID:AB_2632790
Mouse Anti-Human CD56/BV750	BioLegend	362556; RRID:AB_2801001
Mouse Anti-Human CD3/APC-Fire750	BioLegend	300470; RRID:AB_2629689
Mouse Anti-Human CD4/BV480	BD Biosciences	566104; RRID:AB_2739506
Mouse Anti-Human CD8/BUV805	BD Biosciences	612889; RRID:AB_2833078
Mouse Anti-Human CD197(CCR7)/BV605	BioLegend	353224; RRID:AB_2561753
Mouse Anti-Human CD45RA/BUV496	BD Biosciences	750258; RRID:AB_2874456
Mouse Anti-Human CD25/BV650	BD Biosciences	563719; RRID: AB2744337
Rat Anti-Human FOXP3/PE-Cy5.5	Invitrogen	35-4776-42; RRID:AB_11218682
Mouse Anti-Human CD32/PE-Dazzle	BioLegend	303218; RRID:AB_2716072
Mouse Anti-Human CD65/BV711	BioLegend	305042; RRID:AB_2800778
Mouse Anti-Human CD183/PE-Cy5	BD Biosciences	551128; RRID:AB_394061
Mouse Anti-Human CD196 (CCR6)/BV786	BD Biosciences	563704; RRID:AB_2738381
Rat Anti-Human CD294 (CRTH2)/PE	BioLegend	350106; RRID:AB_10900060
Mouse Anti-Human IFN-g/V450	BD Biosciences	560371; RRID:AB_1645594
Rat Anti-Human IL-2/APC	BioLegend	500310; RRID:AB_315097
Mouse Anti-Human TNF/BUV395	BD Biosciences	563996; RRID:AB_2738533
Mouse Anti-Human IL-17A/PE-Cy7	BioLegend	512315; RRID:AB_2295923
Rat Anti-Human IL-4/BB700	BD Biosciences	Custom
Rat Anti-Human/Anti-Mouse IL-5/BB630	BD Biosciences	Custom
Rat Anti-Human IL-13/BV421	BD Biosciences	Custom
Mouse Anti-Human CD154 (BUV737)	BD Biosciences	748983; RRID:AB_2873383
Mouse Anti-Human Granzyme B/AF700	BD Biosciences	560213; RRID:AB_1645453
Mouse Anti-Human Perforin/FITC	BD Biosciences	353310; RRID:AB_2571967
Mouse Anti-Human Ki-67/BB660	BD Biosciences	Custom

(*Continued on next page*)

Continued

REAGENT or RESOURCE	SOURCE	IDENTIFIER
Bacterial and virus strains		
icSARS-CoV-2-mNG	Xie et a.	N/A
Chemicals, peptides, and recombinant proteins		
SARS-CoV-2 Spike peptides	Biosynthesis	Custom
SARS-CoV-2 E, M, N and ORF peptides	Genscript	Custom
SARS-CoV-2 Spike protein (S6P)	Fred Hutchinson Cancer Research Center	Custom
SARS-CoV-2 RBD protein	Fred Hutchinson Cancer Research Center	Custom
Methylcellulose	Sigma-Aldrich	M0512-250G
TrueBlue Peroxidase Substrate	KPL	5510-0050
Critical commercial assays		
V-PLEX COVID-19 Coronavirus Panel 2 (IgG) Kit	Meso Scale Discovery	K15369U
V-PLEX COVID-19 Coronavirus Panel 2 (IgA) Kit	Meso Scale Discovery	K15371U
V-PLEX COVID-19 Coronavirus Panel 2 (IgM) Kit	Meso Scale Discovery	K15370U
Experimental models: Cell lines		
VeroE6 C1008 cells	ATCC	Cat# CRL-1586; RRID:CVCL_0574
Software and algorithms		
FlowJo	BD Biosciences	V9.9.4
R	R Foundation for Statistical Computing	V3.6.1
GraphPad Prism	GraphPad	V7, 8 and 9
Viridot	Katzelnick et al.	https://github.com/leahkatzelnick/Viridot
Monolix	Lixoft	MonolixSuite2019R1
Other		
ELISPOT reader	Immunospot	CTL ImmunoSpot S6 Universal Analyzer

RESOURCE AVAILABILITY

Lead contact

Further information and requests for resources and reagents should be directed to and will be fulfilled by the lead contact, M. Juliana McElrath (jmcelrat@fredhutch.org).

Materials availability

This study did not generate new unique reagents.

Data and code availability

The underlying data for this paper will be shared by the lead contact upon request without restriction.

EXPERIMENTAL MODEL AND SUBJECT DETAILS

Study populations

Two longitudinal COVID-19 cohort studies at Fred Hutchinson Cancer Research Center (Seattle, Washington) and Emory University (Atlanta, Georgia) began after receiving institutional review board approvals (IRB 10440, IRB 00001080 and IRB00022371). Adults ^{3}18 years were enrolled who met eligibility criteria for SARS-CoV-2 infection and provided informed consent. Study participants provided medical history of co-morbidities, presentation of SARS-CoV-2 infection onset and disease course, and peripheral blood at initial and follow up visits for analysis of serum antibody and cellular immune responses. Additional longitudinal archived sera and PBMC from pre-pandemic study populations from Emory and Seattle served as controls for the immune assays.

The Atlanta study population included adult volunteers over the age of 18 who were diagnosed with COVID-19 by a commercially available SARS CoV-2 PCR assay, rapid antigen test, or clinical syndrome only (later confirmed with serology) due to limited SARS-CoV-2 testing during the early period of the pandemic. Ambulatory participants were recruited through local advertisements,

internet-based avenues (such as social media, listserves), COVID-19 testing sites, and primary care clinics. Hospitalized patients were identified through SARS-CoV-2 testing. Informed consent was obtained from all participants prior to conduct of study procedures. Initial acute peripheral blood samples were collected from hospitalized patients at the time of enrollment. Convalescent samples from hospitalized patients were collected when the patients were able to return for a visit to the clinical research site at the next study visit. Serial peripheral blood samples were collected starting at about 30 days after the onset of COVID-19 symptoms and/or after PCR positivity for SARS-CoV-2. Thereafter, samples were collected at 3, 6, and 9 months. The study is ongoing with expected completion of sample collection from participants in February 2023. Participants were excluded if they were immunocompromised, HIV positive, had active hepatitis B or C virus infection, used immunosuppressive drugs for 2 weeks or more in the preceding 3 months, received blood products or immune globulin 42 days prior to enrollment, received convalescent COVID-19 plasma, or were pregnant or breast feeding. We report on 110 participants to date, of which 73% were diagnosed by SARS-CoV-2 PCR, the remaining were diagnosed by rapid antigen test or serology. Demographic features of the participants are as follows: median age was 48; 45% were male; the majority (80%) were white, 11% Black/African American, 6% Asian, and 8% were Hispanic/Latinx ethnicity. The most frequent co-morbid conditions were hypertension, obesity, heart disease and diabetes mellitus. The most frequent COVID-19 symptoms were myalgia/fatigue, fever, cough, headache, loss of smell and taste (Table S1). Hospitalized patients were older, with a median age of 56; a higher percentage were Black/African American (27%); and 100% had fever.

Longitudinal pre-pandemic sera samples from Emory were collected from individuals participating in a yellow fever vaccine study from 2014-2016 or an influenza vaccine study from 2015-2018[15,31]. Data were included for analysis of binding antibody responses and are presented as days post-irrelevant (yellow fever) vaccination. The study was approved by the Emory University IRB and donors were enrolled after providing written informed consent.

The Seattle COVID-19 Cohort study participants were recruited from the Seattle metropolitan area by social media advertisements, partnership with the local emergency medical service and by word of mouth. Study participants were screened and enrolled by the Seattle Vaccine Trials Unit staff. Eligibility criteria included adults at risk for SARS-CoV-2 infection or those diagnosed with COVID-19 by a commercially available SARS-CoV-2 PCR assay or blood antibody test and willing to have at least four blood draws collected over one year. Exclusion criteria included pregnancy and inability to donate blood.

Informed electronic consent was obtained from all Seattle participants during a screening phone call with study clinical staff. Interested participants were screened, consented and medical history and COVID-19 illness onset date and symptoms collected. Participants undiagnosed with COVID-19 had a nasopharyngeal (NP) swab collected and tested for SARS-CoV-2 via an FDA-approved PCR test and blood was collected for SARS-CoV-2 antibody (Abbott) and study assays. Those with either a positive PCR or antibody test were asked to return for future blood draws. Those who tested negative were asked to return as controls for the positive cohort and in case they tested positive in the future. Participants with a positive test prior to study enrollment or those diagnosed in study were asked to provide blood donation at approximately 7 days, 2 weeks, 1, 2, 3, 4, 6, 9- and 12-months post symptom onset. After completing one year of study, participants will be given the option of continuing the longitudinal study for up to two or more years. At each study visit, participant symptoms and medical history is updated. Those with COVID-19 symptoms after enrollment in all groups are offered a nasopharyngeal swab PCR SARS-CoV-2 test.

As of October 2020, 805 individuals have contacted the Seattle COVID-19 cohort study and 425 have enrolled. This includes 281 negative and 144 SARS-CoV-2 positive participants. Reasons for not enrolling include lack of interest, not meeting the eligibility criteria, inability to travel to blood draw location and inability to collect study blood. No participants have terminated from the study. Study enrollment and follow-up remains ongoing. Samples from SARS-CoV-2 negative subjects were included in B and T cell assays as 'contemporaneous' negative controls.

Peripheral blood mononuclear cells (PBMC) were obtained from HIV-1 seronegative donors who were recruited at the Seattle Vaccine Trials Unit before 2019 as part of the study "Establishing Immunologic Assays for Determining HIV-1 Prevention and Control." All participants signed informed consent, and the Fred Hutchinson Cancer Research Center IRB (Seattle, WA, USA) institutional human subjects review committee approved the protocol prior to study initiation. Pre-pandemic samples from this cohort were used as assay controls in B and T cell assays.

METHOD DETAILS

PBMC processing

PBMC for cellular assays were isolated by density centrifugation and cryopreserved from ACD-anticoagulated whole blood within eight h of venipuncture, as described previously [32]. Sera were also processed and cryopreserved within 4 h after collection.

Antibody binding assay

Antibody binding titers were measured using a multiplex plate coated with the SARS-CoV-2 spike, SARS-CoV-2 spike receptor binding domain, SARS-CoV-2 spike N-terminal domain, SARS-CoV-2 nucleocapsid, SARS-CoV-1 spike, 229E spike, NL63 spike, HKU1 spike, and OC43 spike proteins (Mesoscale Discovery). Plates were blocked with 150ml/well with 5% bovine serum albumin in phosphate buffered saline (PBS) and shaken at 700 RPM at room temperature for at least 30 min. Plates were washed 3 times with 150ml/well 0.05% Tween-20 in PBS. Serum and plasma samples were added to the plate at dilutions between 1:500 and 1:50,000 and shaken at 700 RPM at room temperature for 2 h. Following a wash, plates were incubated with 50ul/well of Sulfo-Tag anti-human

IgG, IgA, or IgM detection antibody and shaken at 700RPM at room temperature for 1 h. After a subsequent wash, 150ml/well of MSD GOLD read buffer was added to the plate and plates were immediately read on the MSD instrument to measure light intensity. Antibody levels are reported as arbitrary units/mL (AU/mL) based on normalization to a standard curve.

Viruses and cell lines

VeroE6 cells were obtained from ATCC (clone E6, ATCC, #CRL-1586) and cultured in complete DMEM medium consisting of 1 × DMEM (VWR, #45000-304), 10% FBS, 25mM HEPES Buffer (Corning Cellgro), 2mM L-glutamine, 1mM sodium pyruvate, 1 × Non-essential Amino Acids, and 1 × antibiotics. The infectious clone SARS-CoV-2 (icSARS-CoV-2-mNG), derived from the 2019-nCoV/USA_WA1/2020 strain, was propagated in VeroE6 cells and sequenced [33,34].

Focus reduction neutralization test

Neutralization assays with SARS-CoV-2 virus were performed as previously described [33-35]. Plasma/serum were serially diluted (three-fold) in serum-free Dulbecco's modified Eagle's medium (DMEM) in duplicate wells and incubated with 100–200 FFU infectious clone derived SARS-CoV-2-mNG virus at 37°C for 1 h [33]. The antibody-virus mixture was added to VeroE6 cell (C1008, ATCC, #CRL-1586) monolayers seeded in 96-well blackout plates and incubated at 37°C for 1 h. Post-incubation, the inoculum was removed and replaced with pre-warmed complete DMEM containing 0.85% methylcellulose. Plates were incubated at 37°C for 24 h. After 24 h, methylcellulose overlay was removed, cells were washed twice with PBS and fixed with 2% paraformaldehyde in PBS for 30 min at room temperature. Following fixation, plates were washed twice with PBS and foci were visualized on a fluorescence ELISPOT reader (CTL ImmunoSpot S6 Universal Analyzer) and enumerated using Viridot [36]. The neutralization titers were calculated as follows: 1 - (ratio of the mean number of foci in the presence of sera and foci at the highest dilution of respective sera sample). Each specimen was tested in two independent assays performed at different times. The FRNT-mNG$_{50}$ titers were interpolated using a 4-parameter nonlinear regression in GraphPad Prism 8.4.3. Samples with an FRNT-mNG$_{50}$ value that was below the limit of detection were plotted at 20.

Spike and RBD memory B cell flow cytometry assays

Fluorescent SARS-CoV-2-specific S6P[37] (provided by Roland Strong, Fred Hutchinson Cancer Research Center, Seattle, WA) and RBD (provided by Leonidas Stamatatos, Fred Hutchinson Cancer Research Center, Seattle, WA) probes were made by combining biotinylated protein with fluorescently labeled streptavidin (SA). The S6P probes were made at a ratio of 1:1 molar ratio of trimer to SA. Two S6P probes, one labeled with AlexaFluor488 (Invitrogen), one labeled with AlexaFluor647 (Invitrogen), were used in this panel in order to increase specificity of the detection of SARS-CoV-2-specific B cells. The RBD probe was prepared at a 4:1 molar ratio of RBD monomers to SA, labeled with R-phycoerythrin (Invitrogen). Cryopreserved PBMCs from SARS-CoV-2-convalescent participants and a pre-pandemic SARS-CoV-2-naive donor were thawed at 37°C and stained for SARS-CoV-2-specific memory B cells as described previously[19] with a panel of fluorescently-labeled antibodies (see Key Resource Table). Cells were stained first with the viability stain (Invitrogen) in PBS for 15 min at 4°C. Cells were then washed with 2% FBS/PBS and stained with a cocktail of the three probes for 30 min at 4°C. The probe cocktail was washed off with 2% FBS/PBS and the samples were stained with the remaining antibody panel and incubated for 25 min at 4°C. The cells were washed two times and resuspended in 1% paraformaldehyde/1 × PBS for collection on a LSR II or FACSymphony flow cytometer (BD Biosciences). Data was analyzed in Flow Jo version 9.9.4.

Intracellular cytokine staining (ICS) assay

Flow cytometry was used to examine SARS-CoV-2-specific CD4+ and CD8+ T cell responses using a validated ICS assay. The assay was similar to a published report [5,38,39] and the details of the staining panel are included in the Key Resource Table. Peptide pools covering the structural proteins of SARS-CoV-2 were used for the six-h stimulation. Peptides matching the SARS-CoV-2 spike sequence (316 peptides, plus 4 peptides covering the G614 variant) were synthesized as 15 amino acids long with 11 amino acids overlap and pooled in 2 pools (S1 and S2) for testing (BioSynthesis). All other peptides were 13 amino acids overlapping by 11 amino acids and were synthesized by GenScript. The peptides covering the envelope (E), membrane (M) and nucleocapsid (N) were initially combined into one peptide pool, but the majority of the assays were performed using a separate pool for N and one that combined only E and M. Several of the open reading frame (ORF) peptides were combined into two pools: ORF 3a and 6, and ORF 7a, 7b and 8. All peptide pools were used at a final concentration of 1 mg/mL for each peptide. As a negative control, cells were not stimulated, only the peptide diluent (DMSO) was included. As a positive control, cells were stimulated with a polyclonal stimulant, staphylococcal enterotoxin B (SEB). Cells expressing IFN-g and/or IL-2 and/or CD154 was the primary immunogenicity endpoint for CD4+ T cells and cells expressing IFN-g was the primary immunogenicity endpoint for CD8+ T cells. The overall response to SARS-CoV-2 was defined as the sum of the background-subtracted responses to each of the individual pools. A sample was considered positive for CD4+ or CD8+ T cell responses to SARS-CoV-2 if any of the CD4+ or CD8+ T cell responses to the individual peptide pool stimulations was positive. Positivity was determined using MIMOSA [40]. The total number of CD4+ T cells must have exceeded 10,000 and the total number of CD8+ T cells must have exceeded 5,000 for the assay data to be included in the analysis.

QUANTIFICATION AND STATISTICAL ANALYSIS

Binding and neutralizing antibody responses

Mixed effects exponential and power law models were used to analyze waning of antibody (day 42 to day 263 post symptom onset). For binding antibody analyses, antibody (Ab) was natural log transformed, yielding linear equations of the form ln(Ab) = a+b*(day-42) and ln(Ab) = a+b*ln(day/42) for the exponential and power law models, respectively, and fit using the lmer function (lme4 package) in R. Models included population level fixed effects and individual level random effects for intercept and slope and covariance between the random effects. Simplified models – with random effects only for intercept – were also fit. Neutralization antibody data were analyzed in Monolix (Lixoft). For analysis in Monolix, the exponential and power law models were formulated as ordinary differential equations, dAb/dt = k*Ab and dAb/dt = k*Ab/t, respectively, with antibody at day 42 lognormally distributed and lognormal multiplicative error. Neutralization titers < 20 were treated as left censored. For comparison of models, difference in Akaike information criterion (DAIC) > 4 was considered statistically significant. Models (in R and Monolix) were fit using maximum likelihood. To account for repeated-measures, correlations between antibody binding levels and neutralization titers were calculated using a repeated-measures correlation (rmcorr package) in R [41].

B cell responses

We considered linear mixed effects models for B cell response, y_{ij}, as a function of t_{ij}, the j^{th} time since symptom onset for the i^{th} individual, with random effects for intercept and slope and $t_{ij} > 30$ days for all i, j:

$$\log_e y_{ij} = \beta_{0i} + \beta_{1i} t_{ij} + \varepsilon_{ij}$$

where $\beta_{0i} = \beta_0 + b_i$ and $\beta_{1i} = \beta_1 + c_i$ with (b_i, c_i) iid $\sim N_2(0, \Sigma)$, with

$$\Sigma = \begin{bmatrix} \sigma_b^2 & Cov(b,c) \\ Cov(b,c) & \sigma_c^2 \end{bmatrix}$$

and σ_b^2 and σ_c^2 are the between-person variation in the intercept and slope of log B cell responses respectively, *Cov(b, c)* is the covariance between the intercept and slope, and ε_{ij} iid $\sim N(0, \sigma^2)$. The random effects, b_i and c_i, are each assumed to be independent for different individuals and the within-individual errors ε_{ij} are assumed to be independent for different *i, j* and to be independent of the random effects. The function lme from the R package nlme was used to fit the models.

T cell responses

Longitudinal analyses of CD4+ and CD8+ T cell responses were performed for individuals with a positive response for at least one time point 30 days after symptom onset. The MIMOSA (Mixture Models for Single-Cell Assays) [40] model incorporated cell count and cell proportion information to define a positive CD4+/CD8+ T cell response by ICS by comparing peptide pools stimulated cells and unstimulated negative controls. This method assumed a common distribution for cytokine positive CD4+/CD8+ T cells in stimulated and unstimulated samples in non-responders, resulting in paired differences that were zero on average. In contrast, for responders, the distribution of the proportion of cytokine positive cells for stimulated samples was assumed to be greater than for unstimulated samples, resulting in paired differences that were greater than zero on average. The MIMOSA method modeled this structure through a Bayesian hierarchical mixture model framework. One component (or distribution) of the model represented the responders, and the other component modeled the non-responders. The parameters defining these distributions, as well as the probabilities that each ICS response was either a responder or non-responder, were estimated from the observed data. This sharing of information across SARS-CoV-2 responders and non-responders increased the sensitivity and specificity to make positivity calls [42]. Responses with probability of response > 0.999 were considered positive responders.

We considered nonlinear mixed effects models for T cell response, y_{ij}, as a function of t_{ij}, the j^{th} time since symptom onset for the i^{th} individual, with random effects for intercept and slope and $t_{ij} > 30$ days for all i, j:

$$\log_e y_{ij} = \beta_{0i} - \exp(\beta_{1i}) t_{ij} + \varepsilon_{ij}$$

where $\beta_{0i} = \beta_0 + b_i$ and $exp(\beta_{1i}) = exp(\beta_1 + c_i)$ with (b_i, c_i) iid $\sim N_2(0, \Sigma)$, with

$$\Sigma = \begin{bmatrix} \sigma_b^2 & 0 \\ 0 & \sigma_c^2 \end{bmatrix}$$

and σ_b^2 and σ_c^2 are the between-person variation in the intercept and slope of log T cell responses respectively, and ε_{ij} iid $\sim logNormal(0, \sigma^2)$. The random effects, b_i and c_i, are each assumed to be independent for different individuals and the within-individual errors ε_{ij} are assumed to be independent for different *i, j* and to be independent of the random effects. The function nlme from the R package nlme was used to fit the models.

Diagnostic plots of residuals were examined to assess validity of the model assumptions.

Age at enrollment, gender, and disease severity (WHO score > 4) were included as covariates in the mixed effects models to assess their association with each immune response.

Individual-level estimates at days 30 (T and B cell responses), day 42 (binding and neutralizing antibody responses) and day 180 (all responses) were obtained from the mixed effects models described above. Spearman rank correlations, Wald-based two-sided 95% confidence intervals and p values were reported.

Generalized estimating equations (GEE), with an independence working covariance matrix, were used to confirm the results of the covariate assessments for B and T cell responses from the mixed effects models. Two-tailed P values based on the robust standard error estimates for the covariate coefficients were consistent with the corresponding two-tailed P values for the covariate associations from the mixed effects models.

All tests were two-sided and P values < 0.05 were considered statistically significant unless otherwise noted. Details of specific statistical analyses can be found in the Results section and in the Figure legends.

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

Please mandate masks to start the year

toni matlock <fallforward@me.com> Tue, Aug 10, 2021 at 9:18 PM
To: publiccomment@mcpsmt.org
Cc: toni matlock <tonimatlock@gmail.com>

Hello,

I'm speaking up to clarify data getting thrown around. First, masks do work as a layer in preventing the spread of covid. Along with hand washing and physical distancing. The comments on the data that they do not "work" are inaccurate. It's the layers combined that protect us and others. They help reduce spread. Period. I agree though that it is not your job to debate the science but to follow CDC guidelines and the majority of medical advice which is in fact that masks are helpful. Also, please note that the schools take measures to separate different classes of children on the playground and in the lunchroom when they take off masks. During those times they use physical distancing for protection. I also appreciate that by wearing the mask it can help minimize exposure by managing the distance of the spread which would also potentially make quarantine less.

The risk to unvaccinated children is too great to not have children wear masks to protect each other. The Delta variant and Long COVID are not worth the risk. The message from the school should be to support preventative measures and current expert opinions. All of this is not medical advice or abuse - it's prevention. It's as innocuous as wearing a seat belt.

Finally after listening to the people who oppose masks, claiming there is more harm from the masks and so on, I do not think it is wise to trust the decision to parents. Their emotional reactions are not connecting with any data - even the ones they think do. Plus data has shown that voluntary masking in schools has failed. Perhaps data from our schools after 6 weeks will reveal that the mandate can change but I hope you will continue to err on the side of caution.

Thanks for your service,

Toni Matlock
Parent of 2nd grader in MCPS

P.S. Just because mask protesters have been loud it does not mean they are in the majority or right.

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

My vote is no mask

yankees02020202 <yankees02020202@aol.com> Tue, Aug 10, 2021 at 9:30 PM
To: publiccomment@mcpsmt.org

I would rather see kids smiling than living in fear. Long term affects might be too much to reverse from.

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

School masking

Angela Listug <alistug@gmail.com> Tue, Aug 10, 2021 at 9:40 PM
To: "publiccomment@mcpsmt.org" <publiccomment@mcpsmt.org>

From two specialized pediatricians at Duke studying masks in schools over the last year. I think listening to science and experts is the right thing to do when it comes to the safety of children (and really in general).

https://www.nytimes.com/2021/08/10/opinion/covid-schools-masks.html action=click&module=Opinion&
pgtype=Homepage

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

It's hard to believe you're listening...

Jill MH Taber <jill.michal@gmail.com> Tue, Aug 10, 2021 at 10:24 PM
To: Robert Watson <rwatson@mcpsmt.org>, awake@mcpsmt.org, vmcdonald@mcpsmt.org, dlorenzen@mcpsmt.org, kmercer@mcpsmt.org, javgeris@mcpsmt.org, Michael Gehl <mgehl@mcpsmt.org>, jvogel@mcpsmt.org, gdecker@mcpsmt.org, nhobbins@mcpsmt.org, Wilena Old Person <woldperson@mcpsmt.org>, publiccomment@mcpsmt.org

...when two board members seem to be absent from the majority of the meeting (MCPS Board meeting 8/10/2021).

A virtual board meeting for this discussion and decision was cowardly, at best. I heard several board members say that they read public comments and that they listen, even if they don't agree with my position. But for transparency and sunshine's sake: **board members should be present, with video ON, the entire meeting.** Trustees McDonald and Wake were seemingly absent most of the meeting tonight, magically present to vote. Please don't tell me you're listening when two seem to be absent from the Zoom call.

Jill Taber

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Jill MH Taber

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

Wow. Can’t believe it

Mike Evjen <mikeevjen@icloud.com> Tue, Aug 10, 2021 at 10:25 PM
To: publiccomment@mcpsmt.org

Wondering if you were a part of the same meeting I just watched. Just like any other politician in that you don’t listen to your constituents. Can not believe you voted that in. Aren’t you tired of living in fear and a bubble? Every report out there is subjective to which side you wish to listen to. Apparently you wish to listen to the fear side. There were only three on your panel who had any common sense. The rest of you I am not sure why you even had the meeting since you knew you were already going to vote the mask rule in. I am tired of living in fear and will no longer do it. It is time to stop

Mike Evjen

Mike

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

Masks in schools

Jennifer James <missoulamomma@gmail.com> Wed, Aug 11, 2021 at 7:38 AM
To: "publiccomment@mcpsmt.org" <publiccomment@mcpsmt.org>

Hello,

Reaching out as a concerned Missoula parent in support of the superintendent's proposed COVID mitigation plan that includes mandatory face coverings regardless of vaccination status. With reliable news coverage and statements by epidemiologists supporting the use of masks indoors, regardless of vaccine status, in populated settings due to the increasing number of children becoming sick, I want to keep our kids and community safe. Masking our youth also protects other vulnerable demographics, including our teachers. Please support mask mandates in school, regardless of vaccination status. You have my support to keep our kids safe as a 20yr Missoula resident and mother.

Jennifer James

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

Mandates 21-22 school year

Bobby Parge <bobparge@gmail.com> Wed, Aug 11, 2021 at 8:57 AM
To: publiccomment@mcpsmt.org

Dear trustees,
I am a proud lifelong Montanan, Born and raised in the great city of Missoula. I joined the Army and left Missoula for a short 5 years. I was stationed down in Fort Bliss, Tx while traveling around many other states training. Our unit was deployed to one of the roughest parts in Afghanistan in 2011-2012. Unlike many others, I survived the tour and was able to come back to my wife and one child at the time. Upon reenlisting I was given a pretty easy choice; pick the service or pick my family. So we moved back to Missoula in 2014 and have been working for Montana Rail Link as a locomotive engineer.
I am 99.995% sure this email will get looked over like the rest of them, but I am writing this to you as a concerned parent of two wonderful grade school girls. Luckily we were able to sell our house and move out to the Frenchtown School District because of certain curriculum, extreme liberal agendas, and parts of the constitution the City of Missoula is trying to take away from us . Depending on how discussions go out there we might be turning to private school or home schooling, but that's not what this email is about.
Our family has all had covid flu and not denying its existence but, I have done hours upon hours of research, followed the CDC's and Dr. Fauci's guidelines and recommendations. I am not a Conspiracy Theorist, a Dr., or know more or less than any of you board members. I am here to lay out some very simple facts and fight for our kids and everyone's rights as United States Citizens.
First and foremost why wouldn't you even allow guest speakers and concerned parents and the meeting last night? Aren't we all the ones writing your paychecks? We are working on Legislation to move our taxes and funding away from the school districts and the boards so we can afford to have our kids get a proper education and to live life and be kids. They don't need to deal with stress and living in fear that you and your teachers are enacting.
Dr. Fauci has flip flopped back and forth more times than not and is unable to keep his own facts straight.
Biden's Covid team, especially Dr. Vivek Murthy has stated multiple times face masks DON'T work. They are doing more harm than good mentally and physically to these kids.
The CDC came out recently and said the PCR tests don't work. Can't test the difference from Covid-19 and the Flu. If they can't test the Covid Variant how can they test for the Delta variant or any of the others that will be coming out each month.
The MSM and CDC are hiding the true numbers of Vaccination deaths.
U.S.A.'s MSM's media is behind a greater agenda. Very easy to see what's going on in the world when you look at Australia, Israel, UK, Cuba, and many others.
The American Front Line Doctors are putting out more and more information every day regarding covid-19 pandemic and the vaccinations.
Dr Dan Stock is one of many people fighting for our kids and to get the truth to the public. Click on the link below.
https://www.hitc.com/en-gb/2021/08/10/mount-vernon-school-board-video/
I urge every one of you board members to take a strong look at their information, Lawsuits being censored by the MSM, CDC, and the W.H.O. Class Actions lawsuits are being filed into the courts. Lists of Indictments and arrests are happening all over the world, including Crimes Against humanity and Treason. It will fall to the lowest level of governments, board of directors and trustees not following the constitution and rule of law.

I know this isn't very well written but I think it's enough to get my point across. Thank you again and hopefully everyone of the board members reads this and takes a deeper look into what's really going on with this pandemic agenda.
Bobby Parge
406-880-6929

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

Unmask Our Children

Matthew Pagel <matthewrpagel@gmail.com> Wed, Aug 11, 2021 at 10:02 AM
To: publiccomment@mcpsmt.org

I strongly en*courage* Superintendent Watson and the Lewis and Clark community to allow our children to breathe at school this year, unobstructed by masks.

Childhood and breath are precious and should not be sacrificed for another school year. The costs of masking – the discomfort and potentially unhealthy obstruction of breath, elimination of smiles, and constant reminder of disease and mortality - are significant to children, while the benefits of masking are not (to children and others).

End the mask requirement as the sensible, ethical, and courageous action to take. Our children will thank you.

Sincerely,
Matthew Pagel
(Lewis and Clark Alumnus and Parent, Biomechanical Engineer)

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

Decision on masks

Kristy Tripp <kristytripp4@gmail.com> Wed, Aug 11, 2021 at 1:42 PM
To: Public Comment <publiccomment@mcpsmt.org>, Robert Watson <rwatson@mcpsmt.org>

I don't even have words for the incredible disappointment with the choice made by the board last night. I listened to the entire meeting, I attended the rally as did hundreds of other concerned parents.

What your decision did was stole a year from my kids, mind you my girls' senior year, no sports, no proms, no graduation, nothing, none of it, because I refuse to allow YOU to choose what is best for my kids. Wearing a mask while maybe no big deal to some kids is a big deal to others. If these masks as pointed out by one parent are not effective, and also stated by YOU to prevent fire smoke from affecting them, why on earth do we think it's going to make a difference for even smaller particles such as a virus? it's absurd and nothing more than virtual signalling to wear one (look at me I'm being an obedient human who cares about others). And let's talk about all the "free" time kids will have from the mask, recess, lunch, breaks in class and so on, so WHY? if they can mingle in these situations and possibly spread the virus why must they sit in a class with their face covered at other times, this is the stupidest thing yet. Think about that! Does the virus know its recess time so don't spread, does it know mask breaks so it doesn't spread, my goodness a little critical thinking on this could go along ways.

Many schools sent out questionnaires via email asking what families wanted, MCPS did no such thing. Why because you all know what's best for my family? or your decision was already made. It's not convenient for some families to attend a zoom meeting or go to a rally, but I'll bet you many more would have responded and you would have got more than the 1000's signatures opposing it as one parent noted she had. She actually took the time to try and reach out to the families and ask.

MCPS' handling of covid has been nothing short of an absolute disappointment. If we truly thought this would be a 6 week process it might be different, but your track record last year is a great indicator of how this year will be a disappointment for many, and the students will be yanked around with schedules that don't work, and more mandates! I'll be 1000% shocked if you actually lift the masks at 6 weeks, and keep them off the faces of the students. I guess if so, jokes on me, and my kids have paid the price.

We are exploring all options this week and plan to withdraw our students, and several other families are doing the same (it will most definitely be prior to Oct 1). I will be encouraging and supporting those families to pull them as well so MCPS is not given funding for butts in those seats, and we are also looking at Senate Bill 157, among many others to determine a path.

A huge thank you to the 3 board members who supported giving parents the choice on this one, we appreciate your voice. I hear Target Range dist has a board opening I might be seeing more of you soon.

Sincerely,
Ben & Kristy Tripp

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

Mask Mandate

Tiffany Nunnally <tiffanydavidson@hotmail.com> Wed, Aug 11, 2021 at 2:42 PM
To: "publiccomment@mcpsmt.org" <publiccomment@mcpsmt.org>

Dear Board of Trustees,

I am writing in regards to last night's meeting, specifically regarding the mask mandate that was implemented, and to foreshadow my comments before the next Board Meeting scheduled in October (or the 6-week mark to review the mask mandate specifically).

First, I am incredibly saddened by the vote of the majority of the board members. As a parent of a five-year-old commencing his first year of public-school education, I am incredibly alarmed and troubled that this "mandate" was passed. As I listened to the reasoning propounded by the board members in favor of this authoritative mandate, I was disappointed in the lack of logic behind the statements in support of the mandate. Some of the comments that stood out to me are as follows:

1. Ms. Old Person set forth her main reasoning for voting in support, which was entirely anecdotal. Ms. Old Person stated that she has three younger boys in public school in this district and she was voting for it because she was concerned about their risk of infection from Covid-19 and discussed how her people (ie: Native Americans) have been hit hard by this virus. While I empathize with her position, I cannot understand how her own personal feelings and fear for her children should be a basis for her affirmative vote. I am on a board where I have to make reasonable decisions not based on my personal beliefs, but what is based on the data and statistics provided to me and in the best interests of the organization I support. Further, my response to her personal fears is that if she is that concerned for her children's health, as I think any mother should be, then her children should have the freedom of choice to wear a face covering to school. Her basis was not based upon logic or fact, which was disappointing.
2. Mr. Avgeris was clearly struggling with how he should vote. He recognized that parents should have the ability to make decisions on behalf of their children, but also kept lamenting to the fact that public health policy and "experts" are recommending masking and that he is not an expert, and we should rely on those "experts." While I agree with his struggle, I cannot agree with his reliance on the "experts" as the experts he refers to are the CDC. Their own statistics show that this virus is not impacting children 18 years and younger (thank God). Another comment of his that stood out to me and took me back was that small children really don't mind that they have to wear a face covering. To that, I have to wonder how many children he has asked. My 5-year-old was in tears last night when I told him he had to wear a mask to school. He said to me, "I will never see my teacher's face, just like with Ms. Rachel last year." Ms. Rachel was my son's preschool teacher. You should also know that my 9-year-old nephew has been begging my sister-in-law to allow him to stay home and be homeschooled. She informed him last night that he was going to have to wear a face covering for at least six weeks and he was nearly in tears and again, made his case for homeschooling. Another instance is my next-door neighbor, a 7-year-old deaf boy who is very close with my son. He hates wearing them as the face coverings mess with his hearing aids and make him feel like he cannot breathe. They also make it very difficult for him to read other people's lips. I could continue with instances of small children being unhappy and/or uncomfortable with wearing face coverings, but I won't at this juncture. So, the blanket statement that the kids don't seem bothered by wearing face

coverings is entirely misplaced and it was frustrating to hear Mr. Avergis throw this out as a point in favor of masking.

3. Ms. Lorenzen chose to speak up regarding children riding the bus and making a case for feeling bad for those rural kids who had to wear face coverings because of a public transportation mandate. I am still not entirely sure what the point of her argument was, other than to make a point for fairness (oh- I was busy comforting my 5-year-old trying to explain to him this mandate and the ins and outs while she was speaking) so I did not hear everything. However, listening to her empathy for rural kids really did not make a whole ton of sense, because my child will be riding the bus to and from school. He does not reside in a rural setting, so I am unsure why that was a statement made in favor. Again, it seemed more about fairness but it just did not hit home with me. I was waiting for more of a statistical/data driven response but there was none.

I will not repeat what was presented last night from the board members and individual parents/mental healthcare providers who opposed the mandate - I think the actual statistics and facts were presented and were entirely ignored by the majority of the board members who voted in favor. The commentary that really hit home for me was from Ms. Vogel and Mr. Gehl. I was also really put off when Mr. Gehl was shut down from making comments early on in the meeting by the other board members and really disgusted by some of your board member's eyerolling and facial expressions when he spoke. It was really telling of the preconceived bias they had going into this meeting. My concern at this point is you want 6 weeks to collect more data, ok, I can respect that; however, I do not see how or where the individuals who voted in favor of this mandate actually looked at the data. The CDC's own data shows that children are not being impacted by this virus. I also want to know what happens when the next variant comes out - let me guess, more required masking? My guess is that there will be mandatory masking the rest of the school year based on what I saw last night and it is evident that the pleas from the Governor to listen to the parents were entirely ignored. I hope the majority of the board members realize that Mr. Watson's own statements regarding the basis for his recommendation are completely contradictory. He states he recommended mandatory masking for this period of time regardless of vaccination status, but masks are necessary because kids 12 years and younger cannot get vaccinated? See the disconnect?

Moreover, and importantly, you have now stripped away my ability to make decisions for my own child. Again, you want to focus on "CDC **recommendations**" and the American Academy of Pediatrics recommendations (who by the way is recommending that we as parents where face coverings in our own homes with our children - this is madness). These are recommendations not backed by any actual scientific data. I was very much pro-masking when this pandemic started and up until a vaccine became available. Now, we have a vaccine and basically no data showing that masking is effective. I want to know how MCPS can correlate mask effectiveness to preventing the spread of the disease? I don't think you can, because it has not been done within the last 18 months. What happened at last night's board meeting was an authoritarian move that lacks any backing by hard science or data and was supported by anecdotal fodder by the majority of your board members. Therefore, over the next six weeks I really hope the majority of you who voted in favor of this mandate really study some science and stop focusing on your fear or your personal beliefs. Give our children and us parents the god given right to make these decisions for our children.

I am currently researching alternative schooling options for my son, because I am scared of what this board and the school district is capable of at this point. I am even more alarmed by the fact that it was so nonchalantly discussed that kids will be expelled for not abiding by this mandate - how is that in any way beneficial for any of the children in this school district? Will you really expel my 5-year-old because he has a few breakdowns in school over wearing a face covering and/or just refuses to wear it? If that is the case, then we have the wrong leadership looking out for our children. The majority of you praised your efforts from last year and I can tell you that last year

was a nightmare for the great majority of parents and children. Children fell behind and were given BS grades. Another nephew of mine who is a C average student somehow managed to get straight As. It was not because he put in more effort - believe me.

This year should have been started on a clean slate and gave our children an opportunity to be as normal as possible and you have stripped that away from a bigger majority than you think. The beauty in freedom of choice is choosing what course of action we take on a daily basis. We as human beings undergo risk assessment throughout the day every day. You took that away from the parents and children last night and I sincerely hope you will take a hard long look at this mandate and reconsider in October. If no change is made, then I will bid farewell to MCPS until more educated and fewer personal decisions are made for the best interests of our children by this Board. Lastly, I respectfully request that this meeting be held at a venue where it can be done in person as I think you will have a lot of people who want to attend and look you in the eye to provide commentary.

Thank you for your time.

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

Masking Plan

Liz Moisan <liz.moisan@gmail.com> Wed, Aug 11, 2021 at 2:58 PM
To: publiccomment@mcpsmt.org

Thank you for keeping the mask mandate in the schools. As numbers in the community continue to climb, I appreciate the efforts you are making to keep our kids (especially those that cannot yet be vaccinated) and teachers safe.

Liz Moisan
(Children in 3rd and 6th grade)

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

Unmask these kids!

Brittney Kilian <brittneylaurice@gmail.com> Wed, Aug 11, 2021 at 4:12 PM
To: publiccomment@mcpsmt.org

This is really getting ridiculous. Studies prove that children are not spreading Covid. Studies also prove that the new delta variant is 10% the strength of the regular strain. I do not want my child masked for 8 hours a day. I will consider pulling my child from the public school system if they require masks.

Brittney L. Kilian

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

masks and school days

Marie Michels <mariemichels@gmail.com> Thu, Aug 12, 2021 at 7:21 AM
To: publiccomment@mcpsmt.org

Please allow the students who are vaccinated to not wear masks, this is so hard on them and it is not effective. Additionally students need to be in school, we all know that! let the parents make some decisions for their students please.
Marie Michels

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

Masks at School

ANGELA SUSOTT <ARSUSOTT@msn.com> Thu, Aug 12, 2021 at 10:20 PM
To: "publiccomment@mcpsmt.org" <publiccomment@mcpsmt.org>

So disappointed in your joke of a board meeting regarding masks…most of you looked asleep and very uninterested in anything people had to say. What a joke it is that you vote in masks without even a discussion between you all…yet a zillion people go to the fair and rodeo sit leg to leg, put kids in bubbles…but oh sitting in a classroom at a desk …yes through a mask on the kids what a joke!

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

Re: Masks Mandate in School

Gabriel Earle <gabrielearle@yahoo.com> Sun, Aug 15, 2021 at 12:29 PM
To: "publiccomment@mcpsmt.org" <publiccomment@mcpsmt.org>, Darby Earle <darbyearle@gmail.com>, Jersey Earle <earlejersey@gmail.com>, Kendall Earle <kendallearle@gmail.com>

To Whom it May Concern:

You are not qualified to assume the responsibility for the safety of my family. Get your own family affairs in order before trying to intervene in mine.

Thousands of kids are at the fair, right now, at the time of my email, touching all the same surfaces and not wearing masks. When they go to school they'll have to wear a mask, kind of. Sports have started. Students don't have to wear masks the whole time. They're all touching the same equipment and balls. Your mandate is a half measure to a whole problem. A problem that you are not qualified to address through tyrannical approaches in dealing with my family.

For decades you have been absent in the life of my family when threats have presented themselves. Your johnny-come-lately arrival is not the knight on a horse savior you seem to believe it is. Where were you in the depths of our despair? You were nowhere. You did not exist. You are nobody to us. Repeal the mask mandate and give these students a normal educational existence.

Gabriel Earle
406-240-7950
gabrielearle@yahoo.com

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

Re: Masks Mandate in School

Gabriel Earle <gabrielearle@yahoo.com> Sun, Aug 15, 2021 at 9:51 PM
To: "publiccomment@mcpsmt.org" <publiccomment@mcpsmt.org>, Darby Earle <darbyearle@gmail.com>, Jersey Earle <earlejersey@gmail.com>, Kendall Earle <kendallearle@gmail.com>

Mask Mandaters:

My family and I just got back from the motorcycle races at the fair. It was awesome! Thousands, upon thousands, literally thousands!, of unmasked Americans, men, women and children, were there celebrating. IN YOUR FACE. We were all shoulder to shoulder. None of the political six foot spacing. BOOOM. Beat that. Nevermind, you can't. You're unable. You're feeble. You're weak and you are nobody.

We will live our lives as normal. We are living our lives as normal. And we are rubbing it in your face. And before I rub it in your face I'm rubbing it other places. Just to make sure you feel the humiliation. Ha. Ha.

Lift the mask mandate. You. Will. Lose.

WE. WILL. WIN.

We the people.

Gabriel Earle
406-240-7950
gabrielearle@yahoo.com

MISSOULA COUNTY PUBLIC SCHOOLS

Public Comment <publiccomment@mcpsmt.org>

Mask Mandate

1 message

Gabriel Earle <gabrielearle@yahoo.com> Tue, Aug 17, 2021 at 10:40 AM
To: Public Comment <publiccomment@mcpsmt.org>, Darby Earle <darbyearle@gmail.com>, Kendall Earle <kendallearle@gmail.com>, Jersey Earle <earlejersey@gmail.com>

Mask Mandaters -

My wife, our biological daughters and I have been school shopping over the last couple days. We're in all the stores and there are so many unmasked students and parents there, all touching the same surfaces and products over and over again and standing shoulder to shoulder. All this in spite of your little power trip.

Your mask mandate is a half measure to a whole problem. Lift the mask mandate and give these students a normal educational experience.

Your Daddy.

Gabriel Earle
406-240-7950