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COVID Meets Rosh Hoshana and Yom Kippur: Cleveland Edition

We're all tired of COVID. Tired of hearing about it. Tired of having our lives revolve around it. Tired of wearing masks, not seeing elderly relatives who are isolating. We just want things to be normal again, even more so with *Rosh Hoshana/Yom Kippur* coming up. Can we just have a normal *yomim n'oraim*? Doesn't *Klal Yisroel* need it now?

We are all suffering from Corona Fatigue. *Hashem*, take this away! Let us *daven* and learn in peace, let our children have normal school.

Nonetheless, like it or not, *Rosh Hoshana/Yom Kippur* raises substantial and unique challenges we don't face on a typical Shabbos and this needs to be carefully considered by *shuls* in their ongoing heroic efforts to maximize normalcy and safety for their *kehilla*, and by individual making their person choices about where to *daven*. In this public letter I will discuss the special health challenges of *Rosh Hoshana/Yom Kippur*, and end with a *moshul*. After that is an appendix that addresses the following questions for those willing to read longer:

1. What is the state of COVID in our community and in the county?
2. It is so confusing! Things keep changing and there's so much conflicting information!
3. Hospitalization and deaths are down – why? Has the virus mutated into a less lethal form?
4. Where do we stand in terms of treatment for COVID?
5. Immunity after having COVID
6. Fair expectations about a vaccine
7. Herd Immunity

Why trust me? I write from my perspective as a professor of public and population health for 25 years (and a Vice Chair for 6 years) at the distinguished medical school of Case Western Reserve University with over 70 publications in peer-reviewed journals, despite my primary focus on education. These publications include research in infectious diseases: HIV, Tuberculosis, Rotavirus, Hepatitis A and C, and antibiotic resistance in respiratory infections. I have worked with the county health department, and been honored by it with a resolution after a mumps outbreak in our community about 10 years ago. I have done one study of my own related to COVID, recently published in the top Rheumatology journal,

Annals of the Rheumatic Diseases. Since I have taken hydroxychloroquine in the past for my auto-immune disorder and am supposed to go back on it long-term, it was personally disappointing to determine that this drug provided not the slightest benefit in preventing COVID. As I tell my students, never apologize for results – the truth is the truth. Just be sure you have the right methods. I know good study design and proper statistical analysis. My opinions are totally driven by what the data says and what it doesn't actually answer.

Let me preface the discussion by stating that as a professional I can supply information to help people and *Rabbonim* understand the health situation and risks. I am not going to make specific recommendations for the following reasons:

1. There are differences in *shuls* in terms of: how many elderly or otherwise high-risk congregants, available space, air circulation, windows, or the outdoor space or economic wherewithal to create optimal solutions such as *davening* outdoors. Obviously, in terms of other communities, there are differences in numbers of cases.
2. Solutions have to work for the *kehilla*. *Rabbonim* are constantly doing a balancing act. Prioritizing safety is important, and so is *shalom* – always a key ingredient at a time of judgement of *Klal Yisroel*. There will always be people who think measures don't go far enough and others who think those same measures are too extreme.
3. The decisions end up involving criteria that are way above my pay grade, e.g. *halacha* and *hoshkofa.*

Have *rachmonis* on your *shul Rav*! The pandemic has put enormous burden and stress on our *Rabbonim*. And we certainly can't just dismiss it by saying "that's why they get the big bucks"! Remember to be extremely sympathetic to, and be *mispallel* for our *Rabbonim* – an amazing group that distinguishes our community.

Shalom!!! The pandemic creates a situation that is rife for *machlokes*, and at the time of year when *shalom* is most important! People are stressed and have conflicting opinions about COVID. Some of us, myself included, have had tense situations over COVID.

What are the special COVID health challenges of Rosh *Hoshana*/*Yom Kippur*?

Transmission of the virus is very dependent on the volume of exposure. Think of other viruses and when one child gets it, a sibling that sleeps in the same room is more likely to get it than other family members. And even though every family member will have some exposure, some won't get it. Exposure is dependent on length of time, distance, air circulation, wearing face coverings to reduce how far droplets go, the force of the droplets (regular speaking voice vs. projecting one's voice to speak loud or sing, speaking vs. coughing vs. sneezing). Volume of exposure not only matters in terms of getting infected, but it can also affect severity of infection. When a small volume of exposure does cause an infection, it is more likely to result in an asymptomatic or mild infection.

The risks posed by *Rosh Hoshana/Yom Kippur* are so much greater than a typical *Shabbos* that it requires greater vigilance for the following reasons:

1. The very long hours together means great exposure to those *davening* nearby. More people walking around at times. Many people using the same bathroom. More time for people to cough or sneeze.

2. Lots of singing and louder *davening* means voices being projected and more droplets being released and with greater force, carrying further.
3. Crowding. Whatever limitations *shuls* put in place for *Shabbos* may not be sufficient for our holiest days. More women want to come to *shul*, and that often means more children who are also capable of both getting infected and spreading COVID. While there is some weak evidence that kids under age 10 may be less likely to get infected or transmit, it is still far from clear to what degree that is true since we don't generally test kids.
4. Let's face it, everyone desperately wants to be in *shul* on our holiest days! Any *Rav* can recount the many times people have not taken important medications or fasted on *Yom Kippur* when their health demanded differently. It's awfully easy to say "it's hardly even a cough". A little sneezing – "probably allergies". A fever? It's *yom tov* and you can't take your temperature. How easy it is to say it's probably just a little warm in the house. Maybe the slightest low-grade fever, "that's nothing". How can I *daven* at home on *Yom Kippur*? I need the *zechus* of being judged with my *kehilla.* **This may be the greatest threat, that people who are actually mildly symptomatic and very infectious may come to *shul***, be there for many hours, singing and *davening* loudly and using the bathroom creating substantial exposure to others. A possible solution that would require a *halachic* question to your *Rav:* can a *shul* pay a *goy* to do a no touch forehead temperature scan on people before they enter the *shul* on *Shabbos* or *Yom Tov*? Maybe done on the 1st evening and each day of *Rosh Hoshana*, and the evening and day of *Yom Kippur*? Again, way above my pay grade.

I will end the main letter with a *moshul* (followed by an appendix). When COVID first broke out, we all searched for the cure – the treatment that was already out there that would end this pandemic. Early on there were times we got our hopes up. Some treatments worked so well in the lab! But not so well in people (this happens all the time). Then we got our hopes up that a vaccine would come quickly and end the disease. But even with heroic efforts all over the world and over a hundred different vaccines in progress and everything being fast-tracked to the extent possible while maintaining safety, it still takes longer than we hoped. We continue to wait.

Meanwhile, face masks and social distancing have been effective in reducing transmission. And we've been chipping away at the disease. While everyone's attention was on a cure or a vaccine, we've been making progress in managing the illness and reducing mortality. Steroids have been shown to cut mortality in patients on ventilators by as much as 20-30%. Some other drugs have shown modest reductions in mortality. We've learned when to use ventilators and when less invasive sources of oxygen can be used (including some very creative reworking of existing equipment). The disease is still around, but all these measures together have reduced the number who are hospitalized and the number dying.

In this *moshul*, COVID is the *yetzer hora*. We often hope we can find a cure for the *yetzer hora*, some major transformation through radical change in our *avodas Hashem*. Sometimes that works. More often, it doesn't. The vaccine represents *Moshiach*, the ultimate cure that completely ends the *yetzer hora,* which we must *daven* for and work towards making a reality. The face masks and social distancing – this is keeping away from situations where we are more likely to yield to the *yetzer hora*, as we are taught that it is better to stay away from temptation than to challenge the *yetzer hora* on his turf. All the treatments and improvements in clinical practice in managing the disease – this represents the little by little approach to *teshuva* recommended by the *baalei mussar and chassidus*. *Yes*, sometimes we can make jumps and sustain them. In between, we try to keep chipping away, improving little by little. When

we stop and look back, we be quite surprised to see that we've come a long way! The tried and true approach to *teshuva*.

May our *tefilos* this *Rosh Hoshana* and *Yom Kippur* be successful! May we merit the ultimate spiritual vaccine, *Moshiach Tzidkeinu,* speedily in our days!

Kesiva v'chasima tova!

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Appendix

What is the state of COVID in our community and in the county?

1. Cases had been higher for a while. While testing increased a lot, there was also a higher rate of positive tests, meaning those were real increases in cases and not an artifact of more testing. But cases have now been declining steadily in the county with lower rates of positive tests, especially since the face covering law in Cleveland, then Cuyahoga county, then Ohio.
2. However, we do have cases in our community.
3. Deaths have been low in the county. This is primarily due to the large percentage of cases in young adults. Without proper precautions, those young adults eventually transmit to others and eventually you get a lot of cases in higher risk patients. For younger people, there are few deaths but no shortage of people being quite sick for weeks with lingering symptoms. Age 50+ healthy people still have lots of hospitalizations and can be quite sick for months, and some die. I knew someone about age 65 who was in excellent health and died from COVID. Many such cases, though a small percentage. But as more people get sick, the more it happens. High-risk cases still have very high fatality rates. Obesity is a major risk factor and 1/3 of the US is obese. No evidence of lower rates of obesity in the frum community.

It is so confusing! Things keep changing and there's so much conflicting information!

COVID has been the best proof that information is not knowledge. Studies have shown that people who search the internet tend to feel confident that they actually know and understand a subject, regardless of the accuracy of the sources. Sadly, COVID has been highly politicized. Sadder still is that each side sees the politicization of the other side, while failing to see it in sources they trust. Veracity is too often solely determined by agreement with one's political views. So much information is presented by people who don't have the training to actually understand, and cherry pick convenient "data" that seems to prove their opinion, ignoring all the "data" that disproves them.

Most people want simple information, e.g. "Masks are good", "Masks are bad". But information about a new disease that doesn't behave like any other disease is necessarily going to be complicated and nuanced. And what we know changes over time, with more experience and more and better studies. Early studies done quicker under pandemic conditions are not going to be very reliable, yet we were bombarded with them. As we learn more, information comes out that may seem to contradict earlier information, but is usually a case of people not understanding the nuances and limitations of the earlier or later information. With time we know a lot more, but much of it is still fairly imprecise. A study that shows no benefit for a treatment doesn't rule out that there isn't a small benefit because it may not have enough people in it to make that call. And how can the average person understand that a specific study used the wrong methods, or did a very poor and flawed analysis rendering the results meaningless? But people who don't understand are still writing articles pushing the studies that fit their political narrative. And most people get their information from sources that share the same political worldview. The result is that most people have very incomplete and biased information, and are either totally confused or have a false sense that they really know. Experts don't agree on everything with COVID, but we have overwhelming agreement on some things

that are presented on the internet as being in doubt, or even worse, presented as being clearly the opposite. The reality is that good studies take time, and we all want absolute clarity yesterday. One thing is clear- COVID was and continues to be deadly. Some attempt to brand it as merely a flu and nothing to worry about. First of all, the 1918 flu was also "just a flu" – and it infected about 1/3 of the world's population and killed about 50 million people worldwide. Second of all, it doesn't really matter if there have been far more cases and the mortality rate is really much lower. We've had over 180,000 COVID deaths in the US in about 6 months. An average flu season has 35,000-40,000 deaths in 8 months, making COVID about 6 times as deadly. Number of deaths each week since early July are a little less than half the number we had during our worst 6 week period – still 3x worse than the average seasonal flu. And let's face it – before COVID most people didn't realize there were so many deaths from flu.

Hospitalization and deaths are down – why? Has the virus mutated into a less lethal form?

Hospitalizations and deaths are down. Nationwide, the number of infections in recent months has been a little under half of what it was during the peak from early April to mid-May. There are a few reasons. Young adults make up a larger proportion of newer cases and have low risk for hospitalization and extremely low risk of death. We have made progress in managing cases and reducing mortality, e.g. use of steroids. My own analysis of more than 75,000 cases shows reduced fatalities in hospitalized patients, but the reduction for the elderly is fairly modest. Our early death rates were driven a lot by New York City, where the hospitals were overrun, there were equipment shortages and little was known about managing the disease. Cases in the US continue to be the same strain. While viruses have frequent minor mutations, the SARS-CoV-2 virus made one early mutation before reaching the US. That same strain continues to dominate. The evidence doesn't seem to suggest that the virus is less lethal now.

Where do we stand in terms of treatment for COVID?

1. As mentioned above, in hospitalized patients, the use of steroids has been very helpful, and certain antivirals show some benefit as well. Hydroxychloroquine has done poorly in more severe patients. Randomized controlled trials showed no benefit in mild or severe hospitalized patients. A few poor studies have shown hydroxychloroquine to be very harmful or very helpful in hospitalized patients, but those studies have major flaws – actually quite similar flaws but in reverse. In some studies, they only used hydroxychloroquine for severe or high risk patients, and in others they only used hydroxychloroquine in mild, low-risk patients. This makes it difficult to compare to the group that didn't get hydroxychloroquine. Many of these types of studies found that while they used the right statistical methods to try and adjust for these differences, they were unable to control for these large differences. One similar type of study where the statistical methods did succeed in adjusting for these methods showed no benefit and no harm in hospitalized patients.
2. Vitamin D shows some potential, but the evidence is very slim. In our area, most people have insufficient or deficient levels and should be taking supplemental vitamin D anyway. Now's a good time to start if you haven't!
3. There are few studies of hydroxychloroquine in mild patients, treated very soon after symptoms is lacking evidence so far. Randomized controlled trials of 300 and 400 patients

have been conducted. There was minimal difference at 14 days, regardless of use of supplemental zinc and azithromycin with the hydroxychloroquine. Mortality was the same with or without hydroxychloroquine, just 1 in 211-212 patients. There was a difference in hospitalizations, but the rate was well within the margin of error due to the size of the study, so we aren't there yet in deciding. Unfortunately, the spectacular results claimed by a wonderful, well meaning frum doctor with a very interesting theory have not held up to scrutiny. He originally claimed 699 patients treated in the prior 7 days with 100% success. But it was way too soon to judge if it worked, and more importantly, few were actually tested for COVID. After trying to make his data into more of a formal study, and presumably using patients seen later (though he oddly report when the patients were seen), he ended up with only 141 patients with 4 hospitalizations and 1 death. There are still major flaws, like a very bizarre set of rules to be included in the study derived after he had already treated these patients and knew the outcomes - and no proper control group. And more. The jury is still out on early, mild outpatients.

4. The only drug studied for prevention of COVID infection is, again, hydroxychloroquine. A randomized controlled trial studied whether it could prevent infection when taken immediately after exposure. A small benefit easily within the margin of error was found, but the study was very flawed. My own study of Lupus and Rheumatoid Arthritis patients taking immune suppressant medications (so all patients would be similar in risk, prioritization for testing, and likelihood of self-isolation) showed that those taking hydroxychloroquine were slightly *more* likely to be diagnosed with COVID, but comfortably within the margin of error so no sign that it actually confers greater risk.

Immunity after having COVID

1. We have no idea what level of antibodies is protective against infection. That will take a long time to know.
2. Having COVID will provide immunity for some period of time. Weeks? Months? A year or two? It is too soon to know precisely how long. Best guess – 6 months?
3. People begin losing antibodies 2-3 months after clearing the virus. In a study of 34 people who had mild cases, they lost half their antibodies after about 10 weeks. It would likely decline slower after that, but since we have no idea what level is needed for protection, who knows when immunity stops.
4. The relationship between antibody level and protection is often murky. Antibody level doesn't always correlate so strongly with protection. It is more complicated than that.

Fair expectations about a vaccine

1. Many vaccines are in testing. 9 are past safety and dosing trials and already in large-scale Phase III human effectiveness trials. Trials in the US will enroll about 30,000 people. When they can prove at least 50% protection they will be approved.
2. 50% isn't a high bar. Hopefully it will be higher, but 75% effectiveness would be a pretty good outcome. It is unrealistic to expect rates of 95%, but who knows? *Hashem* knows, and he can also choose to end the virus any time He chooses, may it be soon.

3. People who are vaccinated who still get the disease tend to have milder cases. For example, Rotavirus vaccine in Latin America has just 53% protection against infection, but close to 75% protection against severe infection. If a COVID vaccine cuts infections by 75%, it might reduce severe cases by 90%.
4. Just as it isn't clear how long immunity lasts after being infected, it is even less clear how long immunity from vaccine might last. Traditional vaccine technologies don't tend to provide protection for as long as people who had the disease. But there are different technologies being used by different vaccine candidates so we might get lucky and find longer immunity from a vaccine than from getting infected. It is good to have many vaccines, with varied technologies in trials.
5. Once a vaccine reaches the market, it will be hard to get sufficient enrollment in trials of other vaccines to determine effectiveness. And once one vaccine is heavily used and cases drop sharply, it will take more patients and more time for trials of other vaccines to determine effectiveness. It is possible that the best vaccines in terms of effectiveness or length of immunity conferred might never get through testing once any vaccine is approved and used. On the other hand, there are trials of different vaccines going on all over the world and with 9 in large scale trials at this time, hopefully we'll have multiple effective vaccines. If so, it is likely that different parts of the world would proceed with different vaccines so we could gather long-term data on effectiveness and length of immunity.

Herd Immunity

1. We would need about 70% of the people to be immune to achieve herd immunity with COVID.
2. Forget about herd immunity without a vaccine. At the end of April, after New York City had cleared the worst, an antibody test showed 14% positivity in NYC. That's about one-fifth of what would be needed for herd immunity. And we don't how many may have already lost immunity, or will soon. They have been aggressive since then with mitigation measures and have had very low rates of infection since.
3. Herd immunity with a vaccine is possible, but the odds that a vaccine will have a high enough level of effectiveness and enough people get the vaccine (and any booster shots) aren't great. Between all the people that either don't trust vaccines in general, don't trust the safety of a vaccine "rushed" to approval despite the 30,000 patients in the trial or just lack confidence in our medical system after all the attacks on it during COVID, how many will choose to get vaccinated? A vaccine that is 90% effective would be amazing, but would still require about 80% of the population to get the vaccine to reach herd immunity. Those are optimistic numbers independently, let alone together.
4. A high level of effectiveness and a very high uptake of the vaccine in high risk populations would still be a huge win that would allow normal life to resume.