The COVID-19 pandemic has brought with it a so-called infodemic of misinformation and confusion among public and health care professionals about everything from how the virus is transmitted and who is susceptible to vaccine safety and miracle drugs.

The MJH Life Sciences™ COVID-19 Coalition tackled some of the most common myths and controversies in the second in a biweekly series of webinars as part of a partnership with top health care thought leaders across a variety of medical disciplines.

“Fact or Fiction: COVID-19 Myths and Controversies” was moderated by Saskia v. Popescu, Ph.D., a senior infection prevention epidemiologist in Phoenix who holds a master of public health degree and a certification in infection prevention and control, and featured Angela Rasmussen, Ph.D., associate research scientist at the Columbia University Mailman School of Public Health, and Emily Ricotta, Ph.D., M.S., a research fellow at the National Institute of Allergy and Infectious Diseases.

What follows are their responses to nine common myths about COVID-19.

**Myth No. 1: SARS-CoV-2 is totally airborne**

“It makes sense that a respiratory virus is, in fact, transmitted by breathing in respiratory secretions,” Rasmussen said. “However, the word ‘airborne’ is often very misleading.”
While people may associate the term with long-range transmission that would allow the virus to travel through air ducts and potentially infect people in different rooms or on different floors of a building, the SARS-CoV-2 virus doesn’t appear to be transmissible in that way.

“This virus is most transmissible by inhaling short-range aerosol particles or respiratory droplets, the kind that you would get from being in the same room as a person for a long period of time, breathing in shared air or by being in very close contact with a person for a long duration of time,” Rasmussen said. “So yes, the virus is airborne, but it’s not airborne in the sense that if one person walks into your building or your workplace, everybody’s suddenly going to get infected.”

Recommendations for prevention – which include wearing masks, avoiding crowds, minimizing duration of contact with people outside your household, increasing ventilation and washing hands – haven’t changed as concerns about airborne transmission have arisen.

“I think the biggest challenge has been people hearing that term haphazardly thrown around and then hitting the panic button, not realizing what we’re already doing right now is all of those protective measures,” Popescu said.

**Myth No. 2: Herd immunity is right around the corner**

Herd immunity refers to the proportion of a population that must be immune to a disease to stop it from spreading exponentially. It is possible to achieve herd immunity through natural infection or vaccination.

Depending on geographic location and demographics, Ricotta said, between 40% and 70% of a population would need to have been infected and have maintained immunity for herd immunity to be achieved.

Risks of potential long-term effects of COVID-19 are still unknown, and the disease can be deadly for young and old. Its spread could lead to the deaths of millions as well as lasting disabilities.

“So we’re putting a lot of people potentially at risk if we’re trying to aim for herd immunity through natural infection,” Ricotta said.

Herd immunity has never been achieved globally for any virus through natural infection, Rasmussen said. It is also uncertain how long an immune response from natural infection would last or how protective it would be. Rasmussen estimated that about 22% to 25% of the population is seropositive for SARS-CoV-2.

“We have a long way to go to get to herd immunity through any mechanism, but the one that we should be looking for is vaccination,” Rasmussen said.

**Myth No. 3: We can’t trust data quality**

Understanding data can be tricky and data collection isn’t always smooth and clean, Ricotta said, noting the so-called garbage in, garbage out idea that if poor data is put into a model, the results won’t be accurate. The quality of data can be affected by where it is coming from, the consistency in data reporting, interruptions in data collection, differences in what data is included and how it is defined across jurisdictions.
“You just have to be really careful when you’re working with it and interpreting it to make sure you understand all of these different issues that could arise,” Ricotta said.

Rasmussen said expectations about models also need to be managed.

“The reality is none of these models are crystal balls,” she said. “They can’t predict the future. They’re only as good as the information that goes into building them at the time, and that’s constantly changing, so of course the models will have to be constantly updated. So people just need to understand models in the context of what they are. They’re not a road map to a certain future. They’re an indication of what might happen if certain conditions are met.”

Still, there has been a large amount of data publicly available during the pandemic, and more organizations and sectors, including economists and statisticians, are collaborating to gather and interpret the data.

“It has been a really exciting time for data,” Ricotta said.

**Myth No. 4: There is no asymptomatic transmission**

Challenges to understanding whether asymptomatic transmission of the virus occurs and to what extent include difficulties in identifying whether those who report no symptoms at the time of a positive test later go on to develop symptoms.

“There’s been a real problem with distinguishing asymptomatic from pre-symptomatic transmission,” Rasmussen said. “Right now we still don’t really have a good grasp.”

Also, patients reporting that they have no symptoms may not associate their recent headache or bout of diarrhea as a symptom of COVID-19 or may dismiss their runny nose as seasonal allergies.

“We do know that there is a substantial amount of transmission from pre-symptomatic people,” Rasmussen said. “So whether they ever develop symptoms or not, people don’t know that they’re sick and they’re capable of transmitting the virus, which is one of the reasons why we’ve had such a difficult time controlling it.”

Widespread, comprehensive testing, including testing for antibodies every couple of weeks, would be the best way to understand how prevalent the virus is in the population, the panel noted.

“That’s just not feasible in any sense,” Ricotta said. “It’s not something we would do for any virus. So it’s hard to truly tell how much asymptomatic transmission is going on because we just don’t have a great way to measure what that is at this time.”

Rasmussen said studies have found pathological evidence of the disease in patients who reported asymptomatic infection.

Asymptomatic cases also pose a risk if people don’t believe their test results or think they are
safe to go out in public before the recommend-
ed isolation period ends, Popescu said.

**Myth No. 5: Any SARS-CoV-2 vaccine won’t be safe**

“We’ll have to wait and see what the results of the clinical trials are,” Rasmussen said. “I can’t say for sure that any of these vaccines will be safe. ... But I assume that with 160 vaccine candidates-plus in the pipeline that at least one of them and probably more of them, many more of them, will have an acceptable safety profile for use and will be in fact safe and effective.”

Ricotta said safety monitoring goes beyond clinical trials to include post-market evaluation to detect any long-term trends.

“Any vaccine is going to confer a little bit of risk,” Ricotta said. “There are going to be side effects.”

Common side effects include soreness at the injection site, fatigue and fever, and those must be weighed against the risks of the disease.

**Myth No. 6: Young people can’t get sick**

The average age of patients with COVID-19 has shifted, Ricotta said, noting that in March people younger than 20 accounted for about 7% of cases. In August, that proportion had increased to about 15%.

“We’re definitely seeing an age shift. Not all of these cases are going to be symptomatic. We see fewer symptoms in younger individuals,” Ricotta said.

Still, young patients are being hospitalized with the disease.

“We’re seeing a preponderance of blood clots and strokes in younger patients that get hospitalized, things that should not be happening in teenagers,” Ricotta said. “We’re seeing myocarditis present in football players that seem to be healthy otherwise, but they get their health checks and they have cardiac damage. So young adults and children can absolutely get sick from COVID and they can transmit COVID.”

Cases of COVID-19 among children may not be identified because children are less likely to have severe symptoms.

“I am always worried that we’re just not seeing the true incidence in children because their parents aren’t able to get them tested,” Popescu said. “That’s been a repeated issue. Hopefully we will address some of these testing challenges.”

**Myth No. 7: COVID-19 antibodies wane**

Some studies showed that detectable levels of antibodies declined over time, but that doesn’t necessarily translate to a weakened immune response.

Rasmussen explained that immunoglobulin M (IgM) antibodies are typically the first antibodies that respond to an infection.

“They can bind a lot of different things, but they don’t bind them very well and they’re not very neutralizing, meaning they can’t render the virus
noninfectious,” Rasmussen said. “But binding those antibodies gives the immune system a signal to basically do what’s called isotype switching and start making (immunoglobulin G) antibodies, which are neutralizing and are capable of rendering the virus noninfectious and clearing the infection. Those IgG antibodies will spike. The levels will stay high for a little while after you’ve cleared it and then once there’s no more virus there they will go down. That’s normal. But the memory B cells that make those IgG antibodies will still be there.”

Re-exposure to the virus can trigger an anamnestic response, causing immune cells to start pumping out antibodies again.

“So we can’t make assumptions about long-term immune durability based on antibodies titers alone,” Rasmussen said. “That waning of antibodies is consistent with what we know about the immune system. Now over time, over potentially more months or years – this is one area of active research – it may be possible for both the antibodies and the memory B cells to wane to the point that you no longer have functional immune protection. This happens all the time with vaccines. That’s why you get a booster shot for many vaccines. But it doesn’t necessarily mean that we’re completely back to the state we were in when we were naïve to this pathogen in the first place.”

Myth No. 8: Hydroxychloroquine is a miracle drug

“Well it might be a miracle drug if you have lupus or rheumatoid arthritis,” Rasmussen said.

“But hydroxychloroquine is not a miracle drug for COVID, whether it’s by itself, with azithromycin, with zinc or any combination of the above.”

She points to two pieces of evidence: Randomized controlled clinical trials and observational studies don’t suggest any sort of benefit from using hydroxychloroquine either for prophylaxis or for treatment of COVID-19; and early evidence using Vero cells, which are from kidney epithelial cells extracted from African green monkeys, was not replicated in studies using human lung epithelial cells.

“The reason for this appears to be that Vero cells do not express a protein called TMPRSS2, which is a surface protein that’s involved in processing the spike protein of SARS-2 that allows it to better bind ACE2 and be internalized into the cell into an endosome,” Rasmussen said. “Human epithelial lung cells do have TMPRSS2, and it’s thought to be very important for allowing the virus to actually infect the cell. Hydroxychloroquine has no effect on TMPRSS2. In the Vero cells, those viruses are probably getting into that cell line through other cellular proteases that are on the surface.”

Myth No. 9: COVID-19 is no worse than the flu

“Comparing the flu to COVID is sort of an unfair comparison,” Ricotta said. “It’s kind of
like comparing apples to oranges.” She noted that the viruses have different courses of disease and mortality rates, with the mortality rate of COVID-19 being much higher at about 2% to 3%.

Rasmussen explained that the two viruses aren’t evolutionarily related and come from two different viral families.

“Even at the basic cellular and molecular level these viruses are fundamentally distinct from one another,” she said. “And even though, on the surface, they may seem to have some similarities and there may be some overlap in the types of diseases that they cause, they’re really very, very different viruses and we really shouldn’t draw too many comparisons between the two because the things that we will ultimately do to treat them or vaccinate against them will be very different and distinct.”

Getting COVID-19 won’t protect against influenza, and getting an influenza vaccine won’t protect against COVID-19. Rasmussen pointed out that there is still much to be learned about how the two diseases might interact, including whether coinfections could result in less severe disease or more severe disease.

“The flu kills 30,000 to 60,000 people in the U.S. every flu season, and while that’s less than COVID, it’s still a significant number of people, and some of the same people are at risk for both,” Rasmussen said.