Better Coronavirus Vaccine: Moderna's mRNA-1273 or Pfizer and BioNTech's BNT162b2?

It's a two-horse race -- for now.

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For two successive Monday's in a row, biotech investors have gotten clinical trial data for the coronavirus vaccines in late-stage development. **Pfizer** (NYSE:PFE) and **BioNTech** (NASDAQ:BNTX) struck first with stellar interim data for their vaccine, BNT162b2. And a week later, rival **Moderna** (NASDAQ:MRNA) released interim results showing its coronavirus vaccine, mRNA-1273, also protected patients from developing COVID-19.

Let's look at five different ways to compare the vaccines, both of which are based on messenger RNA technology.

1. Efficacy

On the surface, Moderna has a slight lead on efficacy. mRNA-1273 has a vaccine efficacy of 94.5% based on the 90 cases of COVID-19 in patients who received placebo and 5 cases in patients who got the coronavirus vaccine.

Pfizer and BioNtech reported a vaccine efficacy for BNT162b2 of "above 90%." The companies didn't break out the 94 COVID cases in the study at that point, but doing the math, 86 cases in the placebo group and 8 in the group who got the vaccine would likely result in an efficacy that's slightly above 90%. Of course, the companies are clearly rounding down to 90%, so the breakdown could be more favorable with fewer cases in the group who got the vaccine and more in the placebo group.

In reality, the difference between 94.5% and "above 90%" is small compared to the potential variables between the studies. First and foremost, the results

are currently based on so few cases that an extra case or two in the group that got the vaccines would change the numbers by a few percentage points.

There are also some differences in the ways that the clinical trials were set up that make cross-trial comparisons of efficacy difficult. For instance, Pfizer and BioNTech's study started counting COVID-19 cases one week after the second dose of the vaccine while Moderna started counting two weeks after the second dose. The difference could result in a few extra cases being counted by Pfizer and BioNTech if patients weren't fully protected during that second week.

Both clinical trials will continue until the final analysis, so the efficacy numbers could change. Even then, the only way to truly know which vaccine works better would be to run a head-to-head clinical trial. Given how close the efficacy of the two vaccines appears to be, it seems unlikely that either company would bother to run the study, but some academic institution or government entity might take on the task.

IMAGE SOURCE: GETTY IMAGES.

2. Severity

Avoiding COVID-19 cases is an important aspect of a coronavirus vaccine, but keeping patients from developing severe cases of the disease is equally important considering that severe cases can result in the patient dying.

Moderna has the clear advantage here -- for now, at least -- because Pfizer and BioNTech haven't released any data on the breakdown of severe cases.

In Moderna's clinical trial, 11 participants who received placebo developed severe cases of COVID-19, compared to none in the group vaccinated with

mRNA-1273. While 11 vs. 0 sounds impressive, keep in mind, that's 11 out of 90 cases in the placebo group, or 12% of the cases. Since there were only 5 people who developed COVID-19 in the group vaccinated with mRNA-1273, it's hard to draw any real conclusion about the lack of a severe case of COVID-19 at this point.

3. Safety

Like the question of severity, investors can't compare the safety of the two vaccines because Pfizer and BioNTech didn't release any safety data from the late-stage clinical trial. The companies only said the independent data monitoring committee hadn't "reported any serious safety concerns."

Moderna used similar language about how its independent data safety monitoring board "did not report any significant safety concerns." But the company also reported some side effect data reported after the second dose, including that 9.7% of patients experience fatigue, 8.9% had muscle pain, and 5.2% had joint pain. The first dose of the vaccine doesn't appear to be all that bad with injection site reaction in 2.7% of participants occurring as the most common side effect.

Both groups are waiting until they have at least two months of safety data in half of the patients in the studies -- a requirement of the Food and Drug Administration -- before they'll apply for an emergency use authorization, so investors should get a better comparison of the side effect profiles after the companies meet that milestone.

4. Manufacturing

Pfizer and BioNTech appears to be best capable of maximizing their first-mover advantage ahead of other coronavirus vaccines in development. The group expects to be able to produce up to 50 million vaccine doses in 2020 and up to 1.3 billion doses in 2021.

Moderna has said it'll have approximately 20 million doses of mRNA-1273 ready to ship in the U.S. by the end of 2020, and the biotech thinks it will be able to produce 500 million to 1 billion doses globally in 2021.

5. Distribution

Moderna's mRNA-1273 will be much easier to distribute. The vaccine is stable in a standard freezer at -20 degrees Celsius for up to six months, in a refrigerator for up to 30 days within that 6 month shelf life, and at room temperature for up to 12 hours.

BNT162b2, on the other hand, has to be stored and transported at -80 degrees Celsius, which requires specialized freezers that most doctors offices and pharmacies are unlikely to have on site. Once the vaccine is thawed, it can only remain in the refrigerator for 24 hours.

Winner?

It's clearly too early to pick a winner based on efficacy and safety. Additional data that should be released in the weeks and months ahead could differentiate the two. Or it might get us closer to declaring a tie.

Given the storage requirements, Moderna will have an easier time distributing its coronavirus vaccine. But if Pfizer and BioNTech can make the colder storage requirements work logistically, the duo looks set to sell more of their vaccine given the higher potential manufacturing output in the year ahead.

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