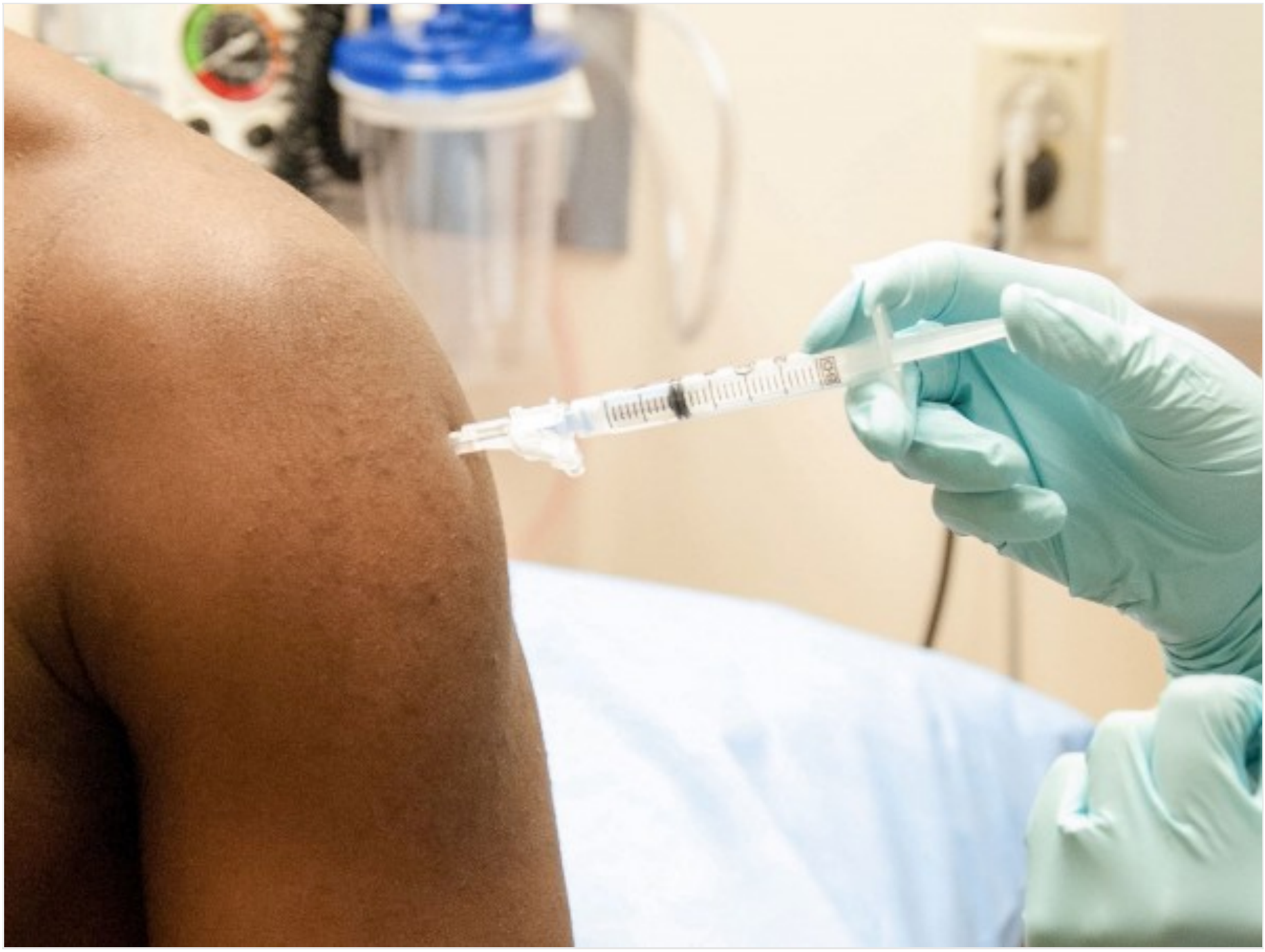
The first new Ebola vaccine moves closer to real-world test



The Ebola vaccine furthest along in development has cleared a critical milestone and edged closer to entering large-scale efficacy trials in West African countries hard hit by the current epidemic.

As reported online today in *The New England Journal of Medicine* (*NEJM*), a U.S. study done in 20 healthy people at no risk of developing the disease found the vaccine caused no serious side effects and, as hoped, triggered immune responses against the Ebola virus. The vaccine, jointly developed by GlaxoSmithKline (GSK) and the U.S. National Institute of Allergy and Infectious Diseases (NIAID), contains a gene for the Ebola surface protein stitched inside a harmless chimpanzee adenovirus. Researchers at NIAID in Bethesda, Maryland, began the trial on 2 September, and the super–fast-track development of the vaccine could move it into trials involving 15,000 people in Liberia and Sierra Leone at high risk of developing the disease as soon as mid-January, NIAID Director Anthony Fauci told *Science*Insider.

Other small studies of the vaccine, which, combined, involve 260 people, are under way in Mali, the United Kingdom, and Switzerland and should produce data by the end of next month. Ripley Ballou, who heads Ebola vaccine development for GSK, told *Science*Insider that the company needs these data

before it can finalize plans for efficacy studies. In particular, Ballou says the ongoing trials should clarify which dose of the vaccine will trigger the most robust immune responses without side effects.

The report in *NEJM* describes results from two different doses: The higher one triggered more impressive antibody and T cell responses, but it also caused "transient fever" in two recipients. Fever is an early symptom of Ebola itself, and a vaccine that raises body temperature could lead recipients to needlessly worry they were developing the disease. "Clearly we want to select a dose that is both immunogenic and has an acceptable reactogenicity profile, including a low rate of fever," says Ballou, who is based in Rixensart, Belgium. The ongoing trials are also evaluating a dose in between the two used in the NIAID trial.

Fauci says he has no hesitation moving forward with the higher dose used in the NIAID study. "Obviously, we'd like to see no fevers, but the fact that we had two fevers that lasted less than 24 hours doesn't bother me," Fauci says. "We see transient fevers with other vaccines."

Similar small-scale tests of a second Ebola vaccine began in October; results are also expected by December that will determine whether to move it into efficacy trials, and at which dose. That vaccine, licensed by the Canadian government to NewLink Genetics of Ames, Iowa, contains the gene for Ebola's surface protein stitched into a weakened version of vesicular stomatitis virus (VSV), a pathogen that causes disease in livestock. NewLink, a small startup that focuses mainly on cancer drugs and has no products on the market, has been somewhat in the shadows of GSK, a big pharma. But on 24 November, NewLink and pharmaceutical giant Merck of Whitehouse Station, New Jersey, announced that they had entered a licensing agreement to jointly research and develop the VSV Ebola vaccine.

Results from those efficacy studies could be in by April 2015. If the vaccines protect people from Ebola and appear safe, a pressing question will surface: Will GSK and Merck have enough doses produced by then to vaccinate enough people—which could mean hundreds of thousands or even millions—to help bring this epidemic to an end?

The Ebola Files: Given the current Ebola outbreak, unprecedented in terms of number of people killed and rapid geographic spread,* Science *and* Science Translational Medicine *have made a collection of research and news articles on the viral disease* ***freely available* *to researchers and the general public.*