Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.
Non-Western vaccines are serious players in the global effort against Covid-19, but we need more transparent data, reports Graham Lawton

IT STYLES itself as “a vaccine for all mankind”, and with some justification. Last week, the Sputnik V Covid-19 vaccine, developed by the Gamaleya National Center of Epidemiology and Microbiology in Russia, was approved in India, a country of around 1.4 billion people. India is the 60th nation to approve the vaccine, meaning it is now available to a combined population of 3 billion, or 40 per cent of everyone on the planet.

Add in the vaccines made by Chinese pharmaceutical companies Sinopharm and Sinovac, which between them have been approved in 64 nations including China itself (another 1.4 billion people), and it is clear that non-Western vaccines account for a significant and growing share of the global vaccination drive.

If, as the World Health Organization has repeatedly stressed, nobody is safe until everyone is vaccinated, then the world is now banking to no small extent on these three vaccines.

So what do we know about them? Unfortunately, getting comprehensive information is difficult. Based on what has been released so far, all three are safe and effective. But there are still many unknowns.

Sputnik V got off to a controversial start when Russia announced in August 2020 that it had approved the vaccine before gathering detailed clinical data. In November, Gamaleya invited more scepticism when it released preliminary results claiming 92 per cent effectiveness based on very low numbers.

But this February, it redeemed itself with a peer-reviewed paper in The Lancet reporting data from an ongoing phase III clinical trial in Russia. The headline figure from this large-scale human trial declared the vaccine to be 91.6 per cent effective at preventing symptomatic Covid-19 in adults.

Many sceptics were won over. “The development of the Sputnik V vaccine has been criticised for unseemly haste, corner cutting, and an absence of transparency,” wrote Ian Jones at the University of Reading and Polly Roy at the London School of Hygiene & Tropical Medicine, both in the UK, in an accompanying commentary. “But the outcome reported here is clear.”

“If everything in The Lancet paper is kosher, then it looks to be a very effective vaccine,” says John Moore at Weill Cornell Medicine in New York.

On Monday, Gamaleya announced that its vaccine is in fact 97.6 per cent effective at preventing infection, according to an analysis of unpublished data from 3.8 million fully vaccinated people in Russia.

Questions remain. Like the Oxford/AstraZeneca and Johnson & Johnson vaccines, Sputnik V uses a modified adenovirus vector. This is a cold-like virus, which is genetically engineered to carry the DNA to code for the SARS-CoV-2 coronavirus’s spike protein, the tool the pathogen uses to break and enter human cells. The virus the vaccine uses cannot replicate, but delivers enough spike protein DNA to generate an immune response. It requires two doses.

The fact that Sputnik V uses a technology similar to the AstraZeneca and Johnson & Johnson vaccines, which have both been linked to a rare blood clotting syndrome called cerebral venous sinus thrombosis in a small number of people, raises the possibility that it may have the same rare side effect. “It would be interesting to get a better picture of the Sputnik vaccine’s safety profile, given that it is also based on related adenoviral vector technology,” says Wayne Koff, CEO of the Human Vaccines Project in New York.

In a statement released last week, Gamaleya denied that this was a problem. “A comprehensive analysis of adverse events during clinical trials and over the course of mass vaccinations with the Sputnik V vaccine showed that there were no cases of cerebral venous sinus thrombosis,” it said.

However, given the lack of detailed understanding of what causes the problem, Gamaleya’s denial isn’t supported by the evidence, says Moore.

Another query is whether Sputnik V can protect against variants of SARS-CoV-2. In February, Kirill Dmitriev, CEO of the Russian Direct Investment Fund, which bankrolls the vaccine programme, said Gamaleya was investigating the effectiveness of the vaccine against new variants, but Gamaleya didn’t respond to New Scientist’s request for further information. Earlier this month, a small, independent study in Argentina found that antibodies from people who had received both doses of Sputnik V were effective against the B.1.1.7 variant first spotted in the UK, but much less so against B.1.351, first detected in South Africa.

Detailed information on the Chinese Covid-19 vaccines has been even harder to obtain. The two leading jabs are from Sinovac and Sinopharm. Both are based on inactivated SARS-CoV-2 viruses.

Sinopharm’s website says its vaccine has a “high efficacy rate”, but doesn’t give a specific figure. When the United Arab Emirates gave limited approval to the vaccine in December, its ministry.
A promising aspect of Sputnik V is that it is a “heterologous prime-boost” vaccine, which means the first and second doses differ. Each dose uses a different adenovirus vector to get the coronavirus spike protein DNA into human cells. This should prevent the second shot from amplifying an immune response to the vector used in the first shot rather than to the target spike protein of the SARS-CoV-2 virus.

Heterologous prime-boost immunisation is seen as a possible way to squeeze an even bigger response from existing vaccines. To achieve a similar effect, a team at the University of Oxford is leading a trial of various combinations of the vaccines from Oxford/AstraZeneca, Pfizer/BioNTech, Moderna and Novavax in people over the age of 50. Not every possible combination will be tested as most people in that age group have already received a first dose of the AstraZeneca or Pfizer vaccine. But the second doses will be mixed as much as possible, says chief investigator Matthew Snape.

The Sputnik V team has a clinical trial in Russia testing its vaccine in combination with AstraZeneca’s. Similar trials are ongoing elsewhere, according to Snape, but none has results yet. However, experiments in mice have shown that giving the AstraZeneca jab and then Pfizer’s produces a stronger immune response than two shots of the AstraZeneca one. “That’s very interesting and encouraging,” says Snape.

The Lancet recently reported that both Sinopharm and Sinovac presented data to the World Health Organization showing that their vaccines are safe and meet its minimum efficacy requirement, which is 50 per cent.

Another unknown is how many people the vaccines will actually reach. Despite the two Chinese vaccines having jointly racked up approvals in 64 countries, China’s huge population and limited vaccine manufacturing capacity means these nations will only receive batches in “drips and drabs”, says Andrea Taylor at Duke University in North Carolina.

Meanwhile, Sputnik V has the third most approvals of any covid-19 vaccine, after the AstraZeneca and Pfizer/BioNTech jabs, which are approved in 91 and 82 countries respectively. However, it is unlikely to be injected into billions of arms. Gamaleya says it expects its vaccine to fulfil 25 to 30 per cent of demand in countries where it has been approved.

More information – regarding Sputnik V at least – should be coming soon. According to Dmitriev, India’s decision to approve it was partly based on data from a clinical trial in India that has yet to be published. The vaccine is also in trials in Belarus and Venezuela. All three trials are showing that the vaccine has “very high efficacy”, says Dmitriev. There are also real-world results from Argentina and Mexico confirming a “high level of safety and efficacy”, he says. None of these have been published. The phase III trial in Russia, meanwhile, is due to be completed at the end of this month.

The European Medicines Agency is currently reviewing data on Sputnik V as it becomes available and it seems likely that even more countries will approve the vaccine. It is cheap to make and relatively easy to store and distribute. Gamaleya also makes its technology available for free, so countries can produce their own supplies. In India, for example, domestic vaccine manufacturers together aim to make 70 million doses a month.

We should perhaps take the “all mankind” rhetoric with a pinch of salt. “Russia is trying to capitalise as much as possible on its successful achievements in vaccines,” says Nikolai Petrov, a Russia expert at international affairs think tank Chatham House in London. “[President] Vladimir Putin is using vaccines as a tool to promote Russian interests and as soft power in international relations.” China has also been accused of using vaccines to advance its geopolitical interests. However, the Russian and Chinese vaccines appear at least as safe and effective as other vaccines and for billions of people around the world, they will be a lifeline.