Infrared Survey Telescope (WFIRST). The agency had aimed to spend more on WFIRST in the coming years as its contributions to the JWST shrank, trading off the end of one mission's development for the beginning of another. Now, the JWST delay risks compounding problems for WFIRST. Last month, US President Donald Trump proposed cancelling WFIRST; astronomers protested, and Congress gave the project $150 million.

US astronomers ranked the JWST and WFIRST as the most important large space missions, respectively, in decadal surveys of their scientific priorities released in 2000 and 2010.

NASA delayed the JWST launch after an independent board of experts concluded this month that the project could not meet its June 2019 launch goal. Last September, the agency shifted to that target, abandoning the October 2018 launch date it had aimed for since rebooting the project in 2011.

Now, yet another independent panel — led by former aerospace executive Tom Young — will review the project's schedule. NASA will use these analyses to pick a more specific launch target in the coming months. "We have one shot to get this right before going into space," says Thomas Zurbuchen, NASA's associate administrator for science.

Until recently, project managers were able to deal with schedule problems by moving work tasks around locations. For instance, engineers decided to clean the telescope's mirror at NASA's Johnson Space Center in Houston before shipping it to the crowded spacecraft-assembly facility at Northrop.

Northrop staff are now working 24 hours a day, but cannot handle enough parts simultaneously to stay on schedule. The increased number of workers is adding to the project's overall cost, the US Government Accountability Office reported last month.

"We have one shot to get this right before going into space."

There are other problems, too. In April 2017, a technician applied too high a voltage during a test, damaging components of the propulsion system that took more than a month to replace. In October, engineers discovered several tears in the sunshield caused by "workmanship error". And part of the five-layer sunshield snagged during a deployment test.

In a statement, Northrop said that it "remains steadfast in its commitment to NASA and ensuring successful integration, launch and deployment" of the telescope.

All the testing is crucial because the JWST will operate from an orbit about 1.5 million kilometres from Earth, where it cannot be serviced by astronauts as the Hubble Space Telescope was. The JWST will be 100 times more powerful than Hubble, and will survey the Universe mainly in infrared wavelengths. Among the many celestial phenomena that it aims to explore are the first stars and galaxies to form in the Universe, as well as planets in and beyond the Solar System.

NASA had asked scientists to submit proposals for the JWST's first set of observations by next week, but the agency has cancelled that deadline. "We'd rather have it launch later and work perfectly than rush and have problems," says Emily Levesque, an astronomer at the University of Washington in Seattle. "But there are going to be a lot of people considering what this means for astronomy."

Garth Illingworth, an astronomer at the University of California, Santa Cruz, says that the next decadal survey, scheduled for 2020, should be postponed. "It's hard to imagine a group of people thinking clearly about what to do in the future with uncertainty about JWST's performance hanging around," he says.

NASA will also have to figure out how to accommodate the extra costs — perhaps by taking them out of the operations budget for the JWST, penalizing Northrop or delaying WFIRST. The agency has spent $7.3 billion on the JWST so far, Lightfoot said, and cannot exceed $8 billion without permission from Congress. ■

BIOMEDICAL RESEARCH

Cancer researchers push to relax rules for clinical trials

US government examines whether study criteria unnecessarily exclude some people.

BY HEIDI LEDFORD

Nearly 20% of publicly funded cancer clinical trials in the United States fail because investigators are unable to enrol enough participants. Yet patients and their physicians often grow frustrated when they encounter the sometimes-insurmountable requirements to join a study.

Now, researchers are pruning the lengthy lists of eligibility criteria for trials, in the hope of nixing unnecessary rules that might be hindering research. On 16 April, representatives of the US Food and Drug Administration (FDA) will meet stakeholders in Washington DC to discuss how restrictive eligibility criteria for clinical trials could be limiting people's opportunities to access experimental treatments — and the quality of the data generated by the studies. The agency plans to use the information it gathers to develop guidelines for drug makers.

"You can have the greatest ideas and the greatest science," says Stuart Lichtman, an oncologist at Memorial Sloan Kettering Cancer Center in New York City. "But if no one goes on the study, what good is it?"

Eligibility requirements are typically intended to protect either the participant or the study. Participants with some degree of liver failure, for example, might not be allowed to take part in a trial of a drug thought to pose a risk to that organ. Criteria might also exclude people with conditions that could confound the results of a study.

But some researchers say that a 'cut-and-paste' mentality has increased clinical-trial requirements over time, as scientists have used previous trial protocols as templates for their next studies. That might be needlessly restricting participation in trials.

David Gerber, a lung-cancer specialist at the University of Texas Southwestern Medical Center in Dallas, and his collaborators have found that 80% of clinical trials sponsored by the US National Cancer Institute excluded people with previous cancer diagnoses (D. E. Gerber *et al. J. Natl Cancer Inst.* **106,** dju302; 2014). Yet in many cases, he says, the previous cancer might have been caught early and removed successfully before the person developed lung cancer.

"What really frustrates me are instances when, in my mind and in my heart, it really seemed that the patients should be eligible," says Gerber. "If I had the exact same treatment outside of a clinical trial, I would give

JAMIE COTTEN/*THE WASHINGTON POST*/GETTY

Participants in clinical trials of cancer drugs must often meet a lengthy list of eligibility criteria.

it to them without a concern."

A joint project by the FDA, the American Society of Clinical Oncology (ASCO) in Alexandria, Virginia, and the advocacy group Friends of Cancer Research in Washington DC has found that five common criteria for cancer-trial eligibility could often be amended without harming participants or the integrity of the trial. The team published its results last October (E. S. Kim *et al. J. Clin. Oncol.* **35**, 3737–3744; 2017).

People with HIV, for example, were once excluded from trials because of their poor prognosis. Now, with treatment, they often live as long as people without the virus and should be included in many cancer trials, the group concluded.

The team also recommended that in some cases, researchers should ease restrictions on people with organ dysfunction. That could be particularly important in light of the ageing populations in some countries, including the United States, says Lichtman. The restrictions were put in place when cancer treatments were more broadly toxic, he notes, and might not be necessary for the more targeted drugs available today.

One recommendation that could generate some controversy, he says, is a push to lower the age of eligibility for many adult cancer trials from 18 to 12. This reflects an understanding of basic drug metabolism, says Edward Kim, an oncologist at Atrium Health in Charlotte, North Carolina, who chaired the ASCO effort. "There is nothing magical about 18," he says. "Your body pharmacologically metabolizes drugs the same way at age 12 as it does at age 18."

But some adult-cancer physicians might feel uncomfortable treating younger people, and often treatment of these individuals takes place in specialized children's hospitals, unlike adult clinical trials. Furthermore, most adolescent cancers are rare, and they can differ from adult cancers — even when they start in the same organ. This means the change might have little impact on research overall, says paediatric oncologist Peter Adamson of the Children's Hospital of Philadelphia in Pennsylvania. But it could still help individual adolescents who might otherwise have been excluded from trials, he adds: "It's the right thing to do."

Kim and others are now working to see their changes implemented, and have submitted their suggestions to an influential programme that coordinates clinical development of new therapies at the US National Cancer Institute. Kim says he has been contacted by researchers at large pharmaceutical companies who are eager to make the changes in their upcoming trials.

The result, he says, could be data that are more relevant to the people whom he and his colleagues treat every day. "These patients have these characteristics and they're going to be treated eventually by their doctors," says Kim. "This is the real world." ■

ASTROPHYSICS

Dark-matter detector in Italy strikes again

Upgraded experiment sees a beguiling data fluctuation.

BY DAVIDE CASTELVECCHI

A group of physicists says that it is still detecting signs of dark matter — the mystery substance thought to make up 85% of matter in the Universe — 20 years after it saw the first hints of such a signal.

DAMA, a collaboration of Italian and Chinese researchers, has announced long-awaited results from six years of data-taking, which followed an upgrade to the experiment in 2010. The findings are a boost for the multiple groups attempting to reproduce DAMA's results, which have been controversial and contradict those of other experiments. But DAMA's improved sensitivity also makes its results harder to explain, physicists say.

Observations of galaxies and of the Universe's primordial radiation imply that the vast majority of matter is of a type that is invisible and interacts almost exclusively through gravity. Many theories exist for explaining the nature of this dark matter, and lots of experiments have been attempting to detect it through its subtle interactions with ordinary matter.

Rita Bernabei, a physicist at the University of Rome Tor Vergata who has led DAMA since its early days, presented the latest results on 26 March at a meeting at central Italy's Gran Sasso National Laboratory, where the experiment sits in a cavern under a mountain. Like many detectors, DAMA aims to measure the tiny amount of energy given off when atoms of ordinary matter on Earth interact with unseen particles in a 'halo' of dark matter thought to envelop the Milky Way.

DAMA works by recording flashes of light that occur inside crystals of sodium iodide when subatomic particles hit the nucleus of a sodium or iodine ion. Interactions with dark-matter particles should make that signal vary throughout the year. That's because, as the Sun moves around the Galaxy, Earth ploughs through the dark-matter halo more quickly in some parts of its orbit around the Sun than in others. The signals should peak in early June and be at their lowest in early December, says Katherine ▶