

Biomedical briefing

POLICY

Prophylactic action

A report published on 24 June by the United Nations Programme on HIV/AIDS (UNAIDS) and *Lancet* Commission urged the countries that are most affected by HIV to focus on stopping new infections of the virus and expanding access to antiretroviral treatments. These measures are necessary to prevent the epidemic from rebounding in the next five years (*Lancet*, doi: 10.1016/S0140-6736(15)60658-4, 2015). An estimated 35 million people are infected with HIV. The report found that sustaining current treatment and prevention efforts would require the most-affected African countries to spend at least one-third of their government's total budget until 2030 on healthcare. The report makes seven key recommendations, including the need to scale up AIDS treatment and focus on HIV prevention. "We have to act now. The next five years provide a fragile window of opportunity to fast-track the response and end the AIDS epidemic by 2030," Michel Sibl , executive director of UNAIDS, said in a press release.

Vaccine mandate

California governor Jerry Brown signed a strict rule into law on 30 June that requires all parents to vaccinate their children before enrolling them in daycare, public school or private school, regardless of religious or personal beliefs. Proponents of the law were spurred by the December 2014 measles outbreak at Disneyland, in which nearly half of the people infected had



Heated research

Researchers at the Center for Infection and Immunity at Columbia University's Mailman School of Public Health took a unique approach to raising money for research: they used a webcast to broadcast their attempt at eating chili peppers, in exchange for donated funds. On 7 July, Mady Hornig and Ian Lipkin (pictured above), principal investigators of a project to uncover the microbiome's role in myalgic encephalomyelitis (ME)—also known as chronic fatigue syndrome (CFS)—took the 'Chili ME Challenge', a phenomenon that is being used

as a crowdfunding strategy in the US and other countries, such as Australia and Ireland. CFS has no effective treatments and the mechanisms behind the disease are still mostly unknown. The funds from the challenge will help to find treatments and better understand the condition. More than \$500,000 has been raised on behalf of the Chili ME Challenge. "It has been very productive, and it has allowed us to initiate work that would otherwise take at least months to years to find support to pursue," Lipkin says.

not been vaccinated. More than 80,000 Californian children whose parents claim personal-belief exemptions could be affected by the law when it takes effect in July 2016, and schools start to ensure that students have been vaccinated. Only those with physician-certified allergies and immune system deficiencies will be exempt from vaccination. "The science is clear that vaccines dramatically protect children

against a number of infectious and dangerous diseases," Brown said in a statement. "While it's true no medical intervention is without risk, the evidence shows that immunization powerfully benefits and protects the community."

WHO review

A panel of independent experts tasked with evaluating the World Health Organization's (WHO) response to the Ebola

crisis found that the WHO is unprepared for global health emergencies. The report, released on 7 July, criticized the WHO for waiting too long to declare a global health emergency and called for both structural changes and increased funding. At present, there are no WHO core funds reserved for emergency situations. The WHO issued a response stating that it had already begun to implement some of the recom-

recommendations, including expanding its global health emergency workforce. “Many of these negatives we really look at as constructive criticism that will lead to changes that would help us be ready for emergencies,” Tarik Jasarevic, a WHO spokesperson, told *Nature Medicine*. Member states will discuss the report’s other recommendations, such as establishing an intermediate alert system to warn of impending crises, at a meeting later this month.

Act on cures

On **11 July**, the 21st Century Cures Act was passed by the US House of Representatives. The bill provides an extra \$1.75 billion annually to the US National Institutes of Health (NIH) for five years, a budget increase of around 5% from the proposed 2016 budget. It also assigns an annual \$110 million to the US Food and Drug Administration (FDA), an addition of around 10%. The funding would support research into biomarker therapy, provide opportunities to streamline the clinical trial process and create incentives for the development of drugs for rare diseases. “This bill is about making sure our laws, regulations and resources keep pace with scientific advances,” US Representative Fred Upton, who introduced the bill, said in a statement. Although the bill was passed with bipartisan support in the House of Representatives, it remains unclear whether the bill will pass the US Senate’s review as well.

RESEARCH

Air supply

On **22 June**, researchers from the Wyss Institute for Biologically Inspired Engineering at Harvard University in Boston identified cellular respiration as the

key mechanism that could explain why some antibiotics work better than others (*Proc. Natl. Acad. Sci. USA*, doi: [10.1073/pnas.1509743112](https://doi.org/10.1073/pnas.1509743112), 2015). Antibiotics fight bacterial infections either by killing off the bacteria (‘bactericidal’ antibiotics) or by inhibiting bacterial growth (‘bacteriostatic’ antibiotics). By measuring the oxygen consumption rate in bacteria treated with both classes of antibiotics, the researchers found that bactericidal antibiotics accelerated respiration, producing an excess of oxygen molecules, which are toxic to pathogens. Bacteriostatic antibiotics, however, reduced cellular respiration, increasing the pathogen’s tolerance for the drug. Tailoring combinations of antibiotics to produce a net increase in cellular respiration could thus prove effective against bacteria. “We’re actively exploring if other small molecules, in addition to antibiotics, can increase respiration as a way to augment the effectiveness of antibiotics,” says James Collins, an author of the study at the Wyss Institute.

Crick collaboration

On **14 July** the pharmaceutical giant GlaxoSmithKline (GSK) announced a collaboration with the newly formed Francis Crick Institute in London. This is the first time that the biomedical research center is collaborating with a pharmaceutical company. The partnership is intended to foster the development of new medicines, using the basic-science expertise of the Crick Institute’s scientists and the R&D experience of the scientists at GSK. The Crick Institute is not scheduled to open until the end of 2015, at which point the organizations will begin to look at diseases such as HIV, malaria and cancer, with more projects slated for 2016. “Together, we shall

accelerate breakthroughs in the understanding of human health and disease,” David Roblin, chief operating officer of the Crick Institute, said in a press release. “GSK is an outstanding first partner to work with and I am excited to see what we deliver together.”

Mini minds

Researchers reported in a **16 July** study that they had successfully used skin cells of people with autism to grow tiny brains (*Cell*, doi: [10.1016/j.cell.2015.06.034](https://doi.org/10.1016/j.cell.2015.06.034), 2015). Skin cells of people who have enlarged brains—a characteristic of roughly 20% of all those with autism—were converted into induced pluripotent stem cells to grow these ‘brain organoids’ that mimic brains during early gestation. The organoids showed increased production of inhibitory neurons, whereas excitatory neurons were normal. The researchers suppressed the expression of *FOXG1*, a gene associated with autism, in these organoids, and were able to restore the balance in the inhibitory neurons, offering a possible method for clinical intervention. “This study speaks to the importance of using human cells and using them in an assay that could bring a better understanding of the pathophysiology of autism and, with that, possibly better treatments,” Flora Vaccarino, a neurobiologist at the Yale School of Medicine and an author of the study, said in a press release.

DRUGS

Curbing cholera

Oral cholera vaccination campaigns can help protect entire communities from the disease even if some people fail to finish the immunization program, according to a new study published on **8 July** (*Lancet*, doi: [10.1016/S0140-](https://doi.org/10.1016/S0140-6736(15)60246-X)

[6736\(15\)60246-X](https://doi.org/10.1016/S0140-6736(15)60246-X), 2015). Of the nearly 270,000 people in the trial, only about 65% of those assigned to receive Shanchol, an oral vaccine manufactured by India-based Shantha Biotechnics, completed the two-dose regimen. Despite this low participant compliance, the researchers still found a nearly 40% drop in cholera amongst both vaccinated and unvaccinated people in the 90 Bangladeshi communities covered in the study. “It shows that in a highly migrating population, you can have protection—very reasonable, very good protection,” says Firdausi Qadri, the director of the Centre for Vaccine Sciences at the International Centre for Diarrhoeal Disease and Research, Bangladesh, and a study coauthor.

Double duty

The US FDA on **2 July** approved Orkambi (combination of lumacaftor and ivacaftor), the first drug for treating cystic fibrosis caused by two copies of the F508 deletion (F508del) mutation. The mutation is the most common cause of the disease, and people who have two copies—one from each parent—comprise roughly half of the 30,000 people in the US with the disease. Two trials involving more than 1,000 individuals with cystic fibrosis associated with F508del mutations were conducted to test Orkambi’s efficacy. In both studies, compared to the placebo group, those who took Orkambi demonstrated improvement in lung function, fewer exacerbations in the lung and improved body mass indexes. Orkambi is recommended for those 12 years of age and older, but it would still benefit about 8,000 people in the US. The drug, which will be priced at \$259,000 per year, is manufactured by Vertex Pharmaceuticals in Boston.