

At first glance, 2014 may seem like a year dominated by disease outbreaks, from polio's reemergence in parts of Asia to the Ebola epidemic that still continues to make headlines. But a closer

look indicates 2014 was replete with regulatory rulings, big investments in genomic medicine and activism in the name of research funding.

JANUARY

\$1,000 genome

On **14 January**, San Diego-based Illumina announced that it would offer a new sequencing system known as the HiSeq X Ten, capable of sequencing an entire genome for \$1,000. The system, which can sequence over 18,000 genomes annually, is sold only as a combination of ten machines, with a price tag of nearly \$10 million. Although the system is touted to sequence a single genome for \$1,000, this is not an immediate cost: independent bioinformaticians estimate that 18,000 genomes need to be sequenced every year for four years before the cost of sequencing each genome comes down to the \$1,000 mark.

FEBRUARY

IVF rules

On **27 February**, the UK government proposed guidelines for an experimental *in vitro* fertilization (IVF) procedure that uses three different donors to create an embryo. In this method, nuclear DNA from one egg is transferred into another egg, the latter of which is then fertilized by a sperm cell. The proposed rules stated that the procedure would be reserved for those individuals deemed highly likely to pass on mitochondrial diseases and that the donor of the healthy egg would not have automatic parental claims over the child. The guidelines were finalized by the UK Department of Health in May and are being considered by Parliament for legalization.

MARCH

Ebola outbreak

Although the first case of the Ebola virus in West Africa has been traced back to December 2013, the World Health Organization (WHO) first published notification of the Ebola outbreak there on **23 March**. At the time, the outbreak was limited to Guinea, but the disease has since spread to other parts of the region, resulting in more than 13,000 cases and nearly 5,000 deaths, and has produced isolated cases in Europe and North America.

MAY

Polio returns

The WHO declared the spread of wild poliovirus a public health emergency on **5 May** after several conflict-ridden regions of the world saw a resurgence in the number of cases. Cameroon, Equatorial Guinea, Syria and Pakistan—where most of the new cases emerge—posed the greatest risk of spreading the virus beyond their borders. The WHO called for increased surveillance and vaccination among citizens of those countries to help stop the spread of the disease.

JUNE

Court rules

In a 5-4 ruling on **30 June**, the US Supreme Court stated that family-owned corporations are not required to pay for insurance coverage of contraceptives as mandated by the country's Affordable Care Act. The issue was brought to the national stage

after the craft store chain Hobby Lobby and the furniture company Conestoga Wood Specialties both refused to offer coverage for certain birth control options, including intrauterine devices.

JULY

Threats of contagion

On **1 July**, US National Institutes of Health (NIH) employees found six forgotten vials of the smallpox virus while cleaning out an old storage room in Bethesda, Maryland. Although the vials were safely transported to the US Centers for Disease Control and Prevention (CDC) headquarters in Atlanta and no one was infected in the process, the incident raised many questions about the organizations' handling of biosafety risks.

Reliable diagnostics

The US Food and Drug Administration (FDA) finalized its guidelines for the use of companion diagnostics on **31 July**. The

AUGUST



Matthew Horwood / Alamy

Up in smoke

The WHO published a report on **26 August** recommending a ban on indoor use of e-cigarettes and sales of the products to minors. The report also stated that tighter restrictions are needed on advertising,

particularly that manufacturers cannot claim that e-cigarettes are a healthier alternative to tobacco or help to quit smoking, especially because there is no strong evidence to back these claims.

guidelines for companion diagnostics are meant to help companies identify the need for them in the earliest stages of drug development. This way, both the diagnostics and the drugs can be developed simultaneously and patients can have access to both test results and consequent options of treatment.

AUGUST

Funding to finish

Prime Minister David Cameron of the UK announced on **1 August** that the 100,000 Genomes Project would benefit from a £300 million (\$475 million) funding deal to help reach its 2017 goal. Illumina is providing most of the money, but other companies, medical charities and the UK National Health Service are also contributing. Launched in late 2012, the 100,000 Genomes Project will collect and sequence 100,000 whole human genomes in the hope of better understanding diseases, particularly cancer.

SEPTEMBER

Dengue vaccine

Sanofi Pasteur announced on **3 September** that its dengue vaccine, poised to be the world's first, showed efficacy against each of the four serotypes of the disease and effectively reduced the overall number of dengue cases by nearly 61%. The success of the trial, which was carried out on more than 20,000 children across five Latin American countries, has the Paris-based company aiming for a 2015 market release of the vaccine.

Stem cell vision

On **12 September**, a Japanese woman in her 70s became the first person to receive tissue made from induced pluripotent stem cells (iPSCs) generated from her own skin cells. Researchers at the RIKEN Center for Developmental Biology in Kobe, Japan, coaxed the iPSCs to transform into retinal pigment epithelium cells to treat the woman's age-related macular degeneration. These retinal cells were then transplanted into her eye during a two-hour-long operation at the Kobe City Medical Center General Hospital. The patient reported brighter eyesight following the procedure, but the physicians behind the treatment hope maximum eyesight will be restored between six months and a year after the procedure.

OCTOBER



Pouring Funds

As a result of a viral marketing campaign from over the summer, the Amyotrophic Lateral Sclerosis (ALS) Association in Washington, DC, announced on **31 October** that it would triple its annual funding for research. The campaign, which involved participants dumping buckets of ice water

on themselves, raised more than \$100 million, more than 35 times the amount collected during the same time during last year. In addition to tripling research support, the ALS Association will also use the funds to support centers that provide care and rehabilitation services to patients with ALS.

Risky microbes

Research scientists who work with any of a list of 15 dangerous microbes or toxins and receive federal funding for their work will have to flag experiments deemed risky or potentially harmful, according to new rules released by the US government on **24 September**. Microbes on this list include the H5N1 virus and the bacterium that causes anthrax. Upon identifying a risky experiment, scientists working on it have 30 days to notify the funding agency and 90 days to submit a risk-mitigation plan. Failure to comply could result in a loss of funding.

Open Payments

To introduce more transparency into the healthcare system, the US Centers for Medicare and Medicaid Services launched the Open Payments database on **30 September**. The database, currently made up of data from August to December 2013, lists payments made to physicians and hospitals by pharmaceutical and medical device companies. This initial set of data showed that

roughly 550,000 physicians from more than 1,300 teaching hospitals earned \$3.5 billion from these financial relationships.

NOVEMBER

Funding request

On **5 November**, US president Barack Obama asked Congress for more than \$6 billion in emergency funding to expand efforts against the Ebola outbreak in West Africa. The request asked for \$4.6 billion for immediate use, with an additional \$1.54 billion to be made available should the situation escalate and call for more funding. As *Nature Medicine* went to press, Congress had not yet voted on the measure. If approved, the funding will go towards containing the outbreak and testing vaccines and therapeutics overseas. In the US, the funds would create 50 Ebola treatment centers whose goal would be increasing domestic preparedness for the disease.

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