

conclude that that day has come. The current US measles outbreak, which began in December and was first reported in late January, has blown up into a national debate over the rights of parents to decide whether their children should be vaccinated. But by global standards, it is a tempest in a teapot: as of 6 February, measles had struck 121 people in 17 states and the District of Columbia.

Those numbers are unremarkable. Since October, a measles outbreak has affected more than 370 people in Germany; it saw almost 1,800 cases in 2013 and more than 1,600 in 2011. The Philippines had more than 50,000 cases in 2014. The United Kingdom had only 137 cases last year, but in both 2012 and 2013 it had close to 2,000 (see page 148).

In fact, even by US standards, the current outbreak is not unprecedented. Last year, a much larger outbreak was sparked by Amish missionaries returning from the Philippines to Ohio, where low vaccination rates among the community caused 383 cases.

Perhaps that incident stayed out of the national spotlight because it was an unusual set of circumstances that occurred in an isolated rural community. But the current outbreak centres on 'the happiest place on Earth' — Disneyland in southern California. At least 42 people seem to have been exposed to measles at the theme park, which receives an estimated 16 million visits a year.

Fortunately for the public's health, attention around the outbreak has come down in favour of vaccination and against the myths about its dangers. Public opinion has turned against parents and physicians who are suspicious of vaccines. Two potential Republican presidential candidates, Governor Chris Christie of New Jersey and Senator Rand Paul of Kentucky, at first declared that parents should have the right to decide whether their children are vaccinated, and then had to clarify their positions in the face of harsh criticism.

Whether or not the theme park's involvement in the episode contributed to the media coverage, Disneyland's cherished place in US culture makes it ideal for an infectious-disease outbreak. It is popular with international tourists eager for a quintessential American experience, who as

a group are less likely than US residents to be vaccinated. The park also hosts large numbers of infants less than one year old — younger than the age at which the first measles shot is generally given in the United States.

And Disneyland is at the epicentre of the US anti-vaccine movement. Although 94.7% of US children entering school at around age 5 are vaccinated against measles, in hundreds of California schools the percentage of vaccinated children falls well short of the 92%

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considered necessary to produce the 'herd immunity' that prevents transmission of the disease. The state's public-health department reports that 2.54% of children entered school in 2014 with an exemption from vaccination based on personal belief.

The federal government has little say in who gets a measles shot — those rules are written by individual states. Most, like California, allow parents to send their children to school unvaccinated by claiming a religious or philosophical objection to the practice. But two — Mississippi and West Virginia — allow only medical exceptions. And that, many observers have argued, is why Mississippi, one of the poorest states in the union, has the highest percentage of 5-year-old children who have received vaccination for measles, mumps and rubella.

Last month, the Mississippi state legislature was considering a bill to allow the same types of personal-belief exemption that most other states allow. But on 3 February, a committee in the state's House of Representatives killed the proposal. On 4 February, legislators in California said that they would introduce a bill to adopt the same strict rules as Mississippi. And several other states, including Maine, Minnesota and Oregon, are considering measures that would require parents to consult with a physician about vaccines before being granted an exemption.

That is a step in the right direction. Parents, of course, have the right to decide what is best for their children. But when it comes to vaccination, those decisions should be based on complete and accurate information about the risks and benefits. ■

## A single light

*A year of illumination switches on with a Nature special issue.*

Among the measures approved at the 68th session of the United Nations General Assembly in December 2013 were resolutions to develop “a world against violence and violent extremism” and “measures to eliminate international terrorism”. Against such targets, the goal of UN resolution A/RES/68/221, passed in the same session, might seem unambitious: to recognize the importance of light in the lives of the citizens of the world.

Some 42 days into that effort — officially called the International Year of Light and Light-based Technologies 2015 — *Nature* is doing its bit. In this special issue, we offer a series of articles that explore how researchers are pushing the properties of light to new extremes, and the impact that these studies are already having and could have in future. The print-journal package begins on page 153 and there is more available online at [nature.com/light2015](http://nature.com/light2015).

Light and science have been entwined for more than a thousand years; light and life for much longer. This is reflected in the goals of the UN celebration, from discussions of solar energy and its crucial potential in tackling energy and climate problems to the societal impact of artificial light in our cities and homes, and how it guides development. According to



the UN, “the 21st century will depend as much on photonics as the 20th century depended on electronics”. If so, then more of the work that researchers are engaged in to understand and harness light — to make light work — will need to move out of the laboratory.

Light inspires, too. The organizers of the UN year of light are seeking people to follow in the (chunky) footsteps of writers such as Fyodor Dostoyevsky and Johann Wolfgang von Goethe, who wrote about optics. They invite those who feel that they have something to say about light and any phenomena or feeling connected to it to enter a literary competition. Poems, short stories, essays and plays are welcome, but must be submitted by the end of next month (see [go.nature.com/5pqdnt](http://go.nature.com/5pqdnt) for details). Winning entries will appear in a special anthology — published a thousand years after Ibn al-Haytham's classic treatise, *Book of Optics* (see page 164).

Light in 2015 may be all about applications and technology, but it retains a powerful theoretical pull on the scientific mind. Countless children in night-time gardens have been astonished and intrigued by the news that the light arriving from distant stars is a historical record — the stars themselves could be long gone even as the light carries their image on its journey. Generations of students have tried to decipher whether light is a wave or a particle, and in doing so have come to accept that scientific reality demands a greater tolerance of uncertainty than the textbooks suggest. Albert Einstein's general theory of relativity — the centenary of which is recognized as part of the UN's celebration — has come to represent an intuition warped just as much as the light in the gravitational field that it describes.

Light has outgrown its metaphorical role as an answer to questions; light itself remains a puzzle. To solve that puzzle is an ambition that deserves the recognition that the coming months will shine on it. As the biochemist and author Isaac Asimov put it: “There is a single light of science, and to brighten it anywhere is to brighten it everywhere.” ■