POLICY

US law may lift postdoc pay

New labour rules require overtime pay for many.

BY HEIDI LEDFORD

A change in US labour regulations will render many postdocs eligible for overtime pay — and create an incentive to raise their wages. The law may ultimately lead to fewer postdocs. But some say that the policy could spark much-needed changes to a research system that relies heavily on postdocs, yet offers them few opportunities for career advancement.

The new rule, finalized on 18 May by the US Department of Labor, will make overtime pay mandatory for many postdocs who make less than US$47,476 per year. Overtime is paid at 1.5 times the normal hourly wage, and kicks in once workers exceed 40 hours on the job in 1 week.

But rather than pay the overtime, funders and universities are expected to raise minimum postdoc salaries to meet that threshold before the rule takes effect in December. "It's a win for postdocs," says Benjamin Corb, director of public affairs at the American Society for Biochemistry and Molecular Biology in Rockville, Maryland. "And I think it's the right move for the community."

The average salary for a US postdoc is around $45,000, with many making substantially less. But as postdocs become more expensive, laboratories may begin to cut back on the number that they hire. "You can't just say everybody's going to get more money," says Paula Stephan, who studies the economics of scientific research at Georgia State University in Atlanta.

But fewer postdocs, she says, may be what the system needs. In December 2014, the US National Academies published *The Postdoctoral Experience Revisited*, a report arguing that postdoc salaries should be raised to $50,000 a year, and that many postdocs should be reclassified — and better paid — as staff scientists. In 2015, a poll of 20,000 *Nature* readers found that scientists are eager to see more permanent staff-scientist positions created. That change has been difficult to implement while postdoc salaries remain low.

Corb agrees that short-term cutbacks in postdoc numbers could yield a healthier research system: "To increase postdoc pay and thin out the pool of postdocs may end up, in the long run, being a net positive for the enterprise." ■

Male *Aedes aegypti* mosquitoes infected with *Wolbachia* bacteria are unable to produce offspring.

INFECTIOUS DISEASE

Infected mosquitoes could fight Zika

US government reviews plan to use bacteria to reduce number of disease-carrying mosquitoes.

BY EMILY WALTZ

The United States could soon become the first country to approve the commercial use of a common bacterium to fight the spread of mosquitoes that can transmit viruses such as Zika, dengue and Chikungunya.

The US Environmental Protection Agency (EPA) is reviewing an application from the biotechnology start-up MosquitoMate to use the bacterium *Wolbachia pipientis* as a tool against the Asian tiger mosquito (*Aedes albopictus*). The company plans to market *Wolbachia* as a pesticide — one that kills only mosquitoes, and leaves other insects untouched. The EPA's decision on the matter will come after a public-comment period that ends on 31 May.

MosquitoMate's strategy involves rearing mosquitoes infected with a particular strain of *Wolbachia* and releasing the males into the environment. When these male mosquitoes mate with wild females who do not carry the same strain of *Wolbachia*, the resulting fertilized eggs don't hatch, because the paternal chromosomes do not form properly. As infected male mosquitoes continue to be released to breed with wild partners, the pest population dwindles.

Eight countries have now reported cases of microcephaly or other fetal birth defects that are probably caused by Zika, leading officials in many areas to consider new options for reducing mosquito populations. "We need as many effective tools as we can get, so we need to give *Wolbachia* a try," says Tom Scott, an entomologist at the University of California, Davis. "That will require a well-developed plan for how trials would be done."

MosquitoMate, which was started by researchers at the University of Kentucky in Lexington, has tested *Wolbachia* in *A. albopictus* mosquitoes in three states over the past three years. The approach has reduced the wild mosquito population by more than 70% in those areas, says Stephen Dobson, an entomologist at the University

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of Kentucky and founder of the company.

MosquitoMate is also using *Wolbachia* to target the mosquito *Aedes aegypti*, which is thought to be the main vector for Zika. The firm began field trials this month of infected *A. aegypti* mosquitoes in Clovis, California, and has applied to conduct similar tests in Florida and in Orange County, California.

Other groups are also investigating *Wolbachia*'s ability to stamp out *A. albopictus*. Researchers from Sun Yat-sen University in Guangzhou, China, and Michigan State University in East Lansing began field trials of *Wolbachia*-infected mosquitoes last year on Shazai Island in Guangzhou.

In March, the tests expanded to Dadao Island, also in Guangzhou. The researchers are releasing 1.5 million male *A. albopictus* per week, with plans to increase that to 5 million per week by the end of August. "Our mosquito factory is currently the largest one in the world," says Zhiyong Xi, a medical entomologist and microbiologist at Michigan State, who oversees the project.

But such large, ongoing releases of mosquitoes may be too expensive for many countries or cities. With this in mind, the non-profit international collaboration Eliminate Dengue is testing an approach that requires the rearing of many fewer mosquitoes. Instead, it uses a starter set of mosquitoes that carry *Wolbachia* to infect an entire wild population.

The resulting offspring harbour the bacteria yet develop normally. But the *Wolbachia* infection prompts an immune response and consumes key cellular resources, which helps to prevent viruses — such as Zika and dengue — from growing and replicating in these mosquitoes (H. L. C. Dutra *et al. Cell Host Microbe* http://doi.org/bhsh; 2016).

"We're not trying to kill or suppress the mosquito population, we're just making them ineffective at transmitting a range of pathogens to people," says Scott O'Neill, head of Eliminate Dengue and dean of science at Monash University in Melbourne, Australia. The group is testing the technology against *A. aegypti* in open trials in Indonesia, Vietnam, Australia, Brazil and Colombia. O'Neill hopes to make the system affordable for developing countries at a cost of about US$1 per person.

"We need as many effective tools as we can get."

But using *Wolbachia* to suppress or infect mosquito populations has never been proved to reduce the incidence of Zika or dengue in humans. O'Neill says that the Eliminate Dengue group has seen "a collapse of dengue transmission" where it has released *Wolbachia*-infected mosquitoes. The group is trying to verify those observations with controlled, randomized studies that are now under way in Indonesia and Vietnam.

So far, tests of mosquitoes infected with *Wolbachia* have prompted little public resistance. By contrast, US residents have used yard signs, social-media campaigns and a petition to protest against proposed trials of genetically engineered mosquitoes developed by Oxitec of Milton Park, UK. Oxitec and MosquitoMate each alter male mosquitoes using a lethal reproductive weapon before releasing them into the environment to mate with and suppress their own kind. But Oxitec modifies its mosquitoes with a gene, whereas MosquitoMate uses a bacterium.

The US Food and Drug Administration, which is considering Oxitec's proposal for a field trial in Florida, received more than 2,600 public comments on the plan. But as *Nature* went to press, the EPA, which is accepting public input on MosquitoMate's plan until 31 May, had received just one comment. ■

CORRECTION

The News Feature 'The material code' (*Nature* **533,** 22–25; 2016) wrongly implied that the phrase 'materials genome' was invented solely by Gerbrand Ceder. It was independently invented and copyrighted by Zi-Kui Liu of Pennsylvania State University.