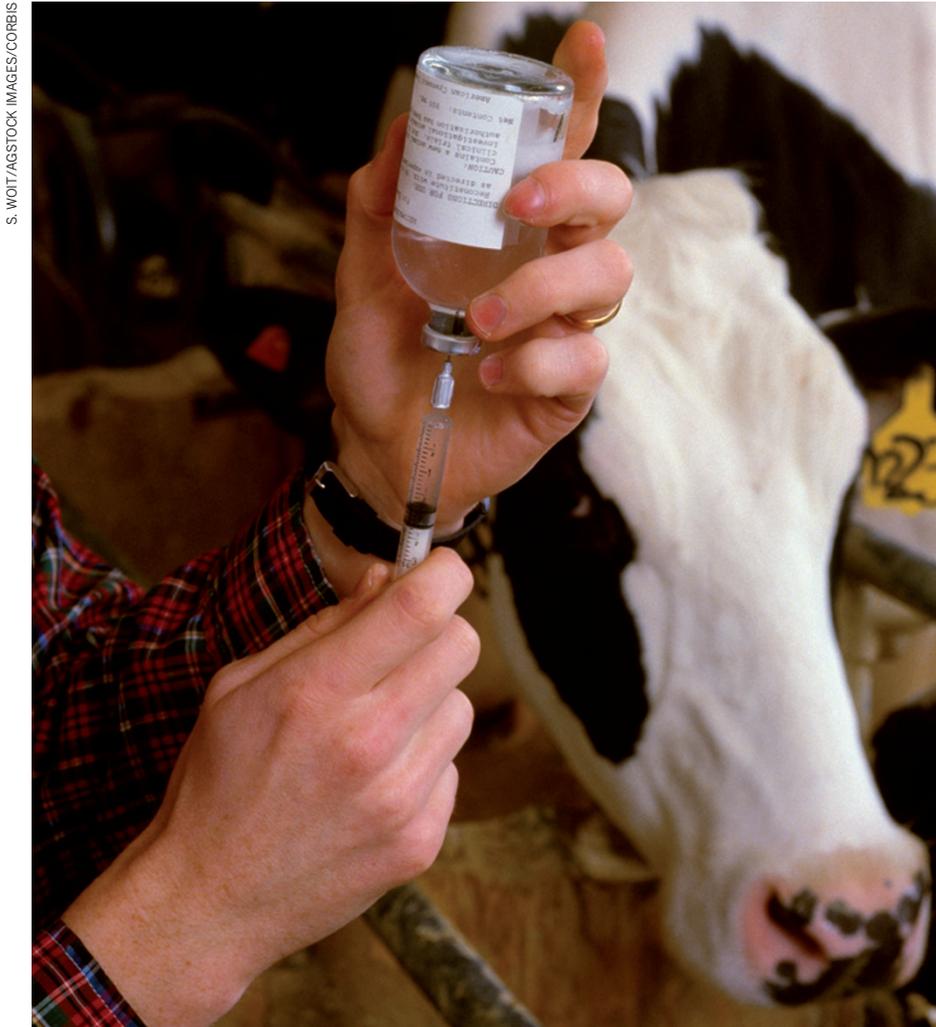


# CAREERS

**TURNING POINT** Evolutionary pharmacologist reaches out online **p.133**

**FUNDING** Crowd-funding gains traction amongst researchers **p.133**

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veterinarians to contain it. The trend towards hot summers in some areas could exacerbate viral epidemics, providing favourable conditions for the spread of zoonotic diseases such as West Nile virus and hantavirus.

With the notable exception of clinical practice, shortages haunt pretty much all the sectors in which veterinarians typically look for jobs. Within government, academia and industry, alike, positions for veterinarians with master's degrees or PhDs remain vacant, according to a report by the US National Research Council (NRC) published at the end of May and written by a committee chaired by Kelly. The committee was formed after members of the US Congress expressed concerns about whether the nation had enough personnel to monitor zoonotic disease outbreaks, regulate food safety and evaluate medicines. "The Department of Labor predicts a lot of opportunities for veterinarians, and I think many of those opportunities will open up in the near future," says Michael Gilsdorf, executive vice-president of the National Association of Federal Veterinarians, based in Washington DC.

Veterinarians in research-related posts say that many people are not aware of the versatility of a veterinary career. "People have a very narrow view of what veterinarians do," says Bonnie Buntain, a public-health expert at the University of Calgary in Canada who started out as a horse veterinarian. "Who would have thought that a horse vet from Hawaii would be guiding national regulations on food safety and humane animal treatment in Washington DC at the USDA, and then be offered a tenured professor position?" Those who like to apply analytical skills to real-world problems in research laboratories, the environment, the food supply and beyond will find ample opportunities — but they may have to invest in some extra schooling.

## DETECTIVE WORK

Research veterinarians have much to offer. Federal and state governments need them to identify animals with disease; enforce humane slaughter regulations; track wildlife; monitor *Escherichia coli* and *Salmonella* in food; detect the effects of toxic compounds in the ecosystem; inspect dog-breeding facilities and more. Most of the veterinarians involved in government work are employed by the USDA. More-specialized positions are available at the National Institutes of Health (NIH), the Food and Drug Administration (FDA) and the Centers for Disease Control and Prevention ▶

## HIGHER EDUCATION

# Beyond the farm

*Veterinary expertise is an advantage for researchers hoping to stem disease outbreaks and bolster food safety.*

BY AMY MAXMEN

In 2002, Newcastle disease spread rapidly through chickens in Los Angeles, California. More than 6,500 poultry died in the effort to control the outbreak. "It took virtually the entire available veterinary staff at the USDA [US Department of Agriculture]

to isolate and eradicate the disease in three months," says Alan Kelly, dean emeritus of the School of Veterinary Medicine at the University of Pennsylvania in Philadelphia. He fears that if highly infectious foot-and-mouth disease ever reached the United States — it hit the United Kingdom in 2007 and Japan in 2010 — the nation might not have enough

► (CDC). At the NIH in Bethesda, Maryland, veterinarians preside over animal facilities, or study cancer and other diseases in animals. At the FDA, based in Silver Spring, Maryland, they investigate food safety, and help to regulate the genetically modified (GM) animals that are slowly making their way through the FDA's regulatory pipeline. And at the CDC in Atlanta, Georgia, they monitor zoonotic disease outbreaks.

Internationally, industry positions for people with a doctorate in veterinary medicine (DVM) and a master's or PhD in toxicology, pharmacokinetics or another field are becoming ever more lucrative. Jobs at pharmaceutical and biotechnology companies pay base salaries ranging from US\$85,000 to \$150,000, depending on the level of seniority. Mary McConnel, a strategic initiatives director at Pfizer, says that her combination of a DVM and a master's in business seemed to be in demand. As soon as she sent her CV to Pfizer, "they were after me like a bat out of hell", she says. McConnel enjoys her job as a consultant for veterinary businesses, and the generous salary that goes with it.

In general, those with a DVM and a science degree have a variety of options in pharmaceutical and biotechnology companies. They might conduct experiments on the efficacy and safety of drugs in animals before human trials begin, or they might help to develop treatments for animals. At animal-supply companies, they often develop and care for GM laboratory animals. At diagnostic laboratory companies, they develop diagnostic tests for both pets and laboratory animals.

### SHORTFALL SOLUTIONS

For all their usefulness, however, research veterinarians have been on the decline — especially in government. According to a 2009 report by the US Government Accountability Office, the number of veterinarians working for the federal government had fallen by 40% since 1990. And one-third of veterinarians employed by the USDA, the FDA and the US Army were due to retire in 2011.

Meanwhile, veterinary schools in the United States and the United Kingdom say that they struggle to find candidates that have both clinical and research experience. According to the NRC report, roughly 11% of the veterinarians with faculty positions will be retiring by 2016. Plus, student enrolment at veterinary schools is increasing, which is pushing up the demand for teachers. At the University of Glasgow, UK, Nicholas Jonsson says that the university is now having to hire veterinarians who do not have PhDs. "In the past that would have been unthinkable," he says, "but we desperately need faculty for teaching and clinical posts."

Although most of Jonsson's students pursue careers in pet medicine, he encourages them to consider a career that goes beyond the day-to-day routine of clinical practice.

Jonsson started his career as a farm-animal

veterinarian in rural Australia. For him, it was a less-than-ideal job, he says. "You're on call every other weekend, you drive a lot, you're kicked and beaten and stomped." He then returned to university for a PhD, and later moved to Glasgow, where he researches the evolution of drug resistance in parasites.

US agencies have made some effort to entice new talent. In 2003, the NIH's National Cancer Institute launched a programme for graduate-level biomedical education in partnership with DVM programmes at veterinary colleges across the country. The seven alumni who have completed the NIH Comparative Biomedical Scientist Training programme have gone on to work as postdocs, tenure-track assistant professors, NIH staff scientists and industry pathologists. And in 2008, the CDC introduced a two-year research-focused residency programme with the aim of addressing a shortage of veterinarians to monitor disease outbreaks.

### DUAL-DEGREE ADVANTAGE

The path to many research-veterinarian opportunities entails a dual degree, usually with a focus on both veterinary medicine and a basic science such as toxicology, genetics, epidemiology or parasitology. Of the 28 veterinary schools in the United States, 13 offer joint DVM-PhD programmes.

The price of veterinary school alone — around \$66,000 per year for a four-year degree in the United States, and under half that in the United Kingdom for UK citizens — presents an obstacle. After accumulating \$140,000 in debt, Kelly says, young veterinarians tend to want to start earning money rather than enrol in graduate programmes that offer, at best, modest stipends. "It's a desperate situation that has to change," Kelly says. "Salaries need to increase and the cost of veterinary education has to



Nicholas Jonsson encourages students to go beyond the usual career choice of pet medicine.

decrease." The NRC report recommends that the government, economists, industry, deans and veterinary organizations create strategies to reduce the costs of veterinary schools — such as sharing facilities and starting online courses.

Grants from the NIH, called T32 institutional training awards, provide salaries for pre- and postdoctoral DVMs pursuing biomedical research. Merck, Pfizer and other large drug companies offer fellowships to support DVMs who want to return to a research career.

Despite the high price tag of veterinary school, Claude Nagamine says that pursuing the DVM was his best career move — he relishes not only the frequent interaction with animals but also the job security. He decided to pursue a DVM after failing to earn tenure as an assistant professor in the cell-biology department at Vanderbilt University in Nashville, Tennessee.

As he pondered his next move, he says, he realized he loved working with animals. He had spoken with veterinarians working in the animal facility and was intrigued.

Immediately after veterinary school, he began a research residency at an animal-care facility at the Massachusetts Institute of Technology in Cambridge, and ended up at Stanford University in California, where he not only conducts his own research, but also helps scientist colleagues to navigate the regulations and paperwork involved in animal experimentation. "If you're driven to do publishable research, there are lots of jobs out there," he says.

Research veterinarian Anne Fairbrother says that her work combines research with investigative pursuits. Fairbrother, who holds a DVM and a PhD in wildlife disease, worked at the US Environmental Protection Agency for 13 years, monitoring the risks posed by GM plants on wildlife. This often involves checking the concentration of chemicals in soil, plants and water, and then comparing them with concentrations in animal serum and tissue.

Or, if animals start to die in abnormal numbers, she might be asked to search for clues related to parasite or viral infections, compounds such as petroleum that might have leaked from gas stations and signs of industrial pollutants. "If you go to a place where there is contamination, you know what questions to ask to find out the history of the area and which signs to look for, because sometimes chemicals are causing problems but it could be something else," she says. "That diagnostic approach is something that you learn in veterinary school."

But a love for animals is probably the main requirement for researchers looking to multiply their career options with a DVM degree. At a time when degrees and certifications rarely confer job guarantees, the veterinary research option stands apart. ■

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