

although this practice is not effective. Snails and slugs withdrew from produce after the molluscicide was applied to surrounding vegetation, but returned after several days. We purchased a lettuce head that had been reportedly treated with molluscicides at the Coronation Market and found a small slug inside. The role of produce in transmitting *A. cantonensis* is still unclear; humans may become infected by inadvertently consuming small slugs or other infected hosts or by consuming produce directly contaminated with larvae. Infections in slugs have not been found in previous studies conducted on the island (2). Regardless, the use of molluscicides to limit human infection from produce is an ineffective strategy.

At the Coronation Market, vendors repeatedly used a bucket of water to rinse vegetables before displaying them. This practice could transmit *A. cantonensis* in 2 ways. First, if free larvae are deposited on vegetables in either the slime or feces of mollusks, cross contamination can occur. Second, dead or decaying intermediate hosts may release larvae into water (6). If infected mollusks were rinsed from vegetables into the buckets, the water could become contaminated with larvae. While cross-contamination by common wash buckets has not been implicated in an outbreak of a parasitic infection, it has been linked to outbreaks of other infectious agents (7,8).

Vendors at venues such as Coronation Market primarily buy produce to sell. These vendors typically purchase their produce from intermediaries who purchase and transport it from farms in outlying areas. As a consequence, many vendors are unsure of the farm or region from which their produce came. This practice makes it difficult, if not impossible, for health officials and researchers to isolate and link etiologic agents with particular produce items or regions and complicates the investigation of any foodborne infection.

*A. cantonensis* is an important parasitic agent in Jamaica for which a definitive route of infection is often not found. We found that potential paratenic hosts are occasionally eaten raw. Because of the high prevalence of *A. cantonensis* infection in mollusks in certain parts of Jamaica, consumption of raw, infected shrimp may be a source of sporadic angiostrongyliasis on the island. Control of *A. cantonensis* is complicated because of the apparent ineffectiveness of molluscicides, the potential for cross-contamination of produce at markets, and the difficulty of tracking produce and other products to their source.

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## Nipah Virus Strain Variation

**To the Editor:** AbuBakar et al. described strain variation in Nipah virus during the 1998–1999 outbreak in Malaysia (1). They found an isolate from pigs in Perak, as well as from a flying fox, that differed markedly from pig and human isolates from the main epidemic in southern Malaysia. AbuBakar et al. proposed that this finding indicates 2 separate spillover events from bats to pigs occurred, the first in Perak in 1998 and the second in southern Malaysia in 1999. However, investigations at the time of the outbreak showed that many pigs were moved from Perak onto southern farms in early 1999. We suggest that successive spillovers of the pig population in the north can also explain the observed strain differences between northern and southern isolates.

A model from experimental studies and active farm data demonstrate that Nipah virus may have circulated repeatedly and become endemic within 1 or several large pig farms in Perak (J.R.C. Pulliam, unpub. data), which is consistent with the occurrence of human cases in Perak before the 1998–1999 outbreak. Evolution of the virus population in pigs, fol-

lowed by the reintroduction in Perak of the original strain from bats and its subsequent southward movement in infected pigs, would explain observed strain differences. Models suggest that evolution of the virus within pig populations would result in lower death rates but prolonged illness. Although the pig-adapted virus strain may have circulated on both northern and southern farms, sampling biases in favor of the more virulent strain would be expected in areas of high death rates, which would explain the observed genetic relationships between sequenced isolates.

We suggest that pigs be experimentally infected with the Perak strain of Nipah virus to determine whether differences exist in illness and death caused by this virus. Further sequencing of virus from archived pig samples will clarify with greater confidence whether multiple strains circulated in both regions.

#### Acknowledgments

This work is published as part of a collaboration with the Australian Biosecurity Cooperative Research Center for Emerging Infectious Disease.

Funding for the Henipavirus Ecology Research Group is provided by a National Institutes of Health/National Science Foundation 'Ecology of infectious diseases award' (R01-TW05869) from the John E. Fogarty International Center.

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**In response:** Pulliam et al. (1) presented a model to help explain the observed Nipah virus (NV) strain differences reported earlier by AbuBakar et al. (2). The model is built around an assumption that NV was endemic in several pig farms in the north of Malaysia and that a subsequent reintroduction of the original NV caused the fatal encephalitis outbreak in 1998.

While the model is plausible, that NV infection was endemic among pigs before the 1998 outbreak is difficult to imagine in the absence of verifiable evidence. As with any virus that crosses species, NV would likely have caused severe infection, and what happened in 1998 is a classic example. Before NV could have evolved, become less virulent, and subsequently become endemic, it would have been first introduced to pigs. This initial introduction would have caused an outbreak, but no such outbreaks were reported before 1998. Furthermore, the life span of pigs reared in farms is relatively short before they are sent to the markets, which limits the time in which NV evolution could take place. Slaughtering these pigs would also

have caused infection among abattoir workers and pork handlers. At present, the finding of 2 different NV strains from 2 different outbreak foci favors the suggestion that 2 possibly overlapping NV outbreaks occurred in Malaysia in 1998. Further investigation of NV archived materials would shed further light into the possible origin of NV in the 1998 Malaysia outbreaks.

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## Trichinellosis Outbreak

**To the Editor:** Trichinellosis is a zoonotic disease caused by the nematode *Trichinella*. Although now uncommon as a result of public health control measures, trichinellosis outbreaks have been reported in the United States (1), Europe (2,3), Mexico (4), Thailand (5), Canada (6), Lebanon (7–10), and elsewhere.

In Israel, the disease is rare because most Jewish and Muslim citizens avoid eating pork. Until 1997, only 6 small outbreaks were reported in humans; they occurred mostly in