

## FACTS &amp; FIGURES

## Tickled pink

## Viral marketing: Spreading the word of a new threat

A hundred years ago, a devastating illness—polio—swept the world. It could invade the central nervous system (CNS), paralyzing and even killing some victims. Thanks to vaccines developed in the 1950s, polio has now been nearly wiped out. But another equally devastating virus may be taking its place. Enterovirus 71 has polio's knack for attacking the CNS. And there have been several outbreaks, including some in the U.S.

**Threat:** Health officials need to prepare for this emerging threat, warns DMS's Dr. John Modlin, an international expert in enteroviruses and infectious diseases. The former chair of the national Advisory Committee on Immunization Practices, he spelled out the situation in a recent article in the *New England Journal of Medicine*.

"I'm one of a handful of people who are concerned about it," says Modlin. "Until we see larger outbreaks closer to our home soil, I doubt that we're going to interest a large number of people [in] looking at this virus."

Enteroviruses are almost as common as rhinoviruses, which cause the common cold. More than 90 types have been identified, including polioviruses, coxsackieviruses, and echoviruses. Since enteroviruses are excreted in stool, fecal contamination is the major way they're transmitted. They can also be spread by person-to-person contact within



MARELEA/PHOTOS

46,000

Number of volunteer hours recorded at DHMC in 2006

500

Number of currently active volunteers at DHMC

50

Number of volunteers who help run DHMC's Pink Smock Gift Shop

37

Number of years the Pink Smock Shop has been in operation

350

Number of square feet the shop occupied at the old DHMC in Hanover

1,862

Number of square feet the shop currently occupies in Lebanon

\$141,000

Sales of greeting cards alone at the Pink Smock Shop in FY06

\$315,875

Net receipts generated by the Pink Smock Shop in FY06

100%

Percentage of net receipts from the Pink Smock Shop that go to the DHMC Auxiliary and to patient care

SOURCES: DARTMOUTH-HITCHCOCK MEDICAL CENTER, PINK SMOCK GIFT SHOP

households. Most infected people do not become ill, and those who do usually develop only mild upper-respiratory symptoms, a flu-like illness with fever and muscle aches, or a rash.

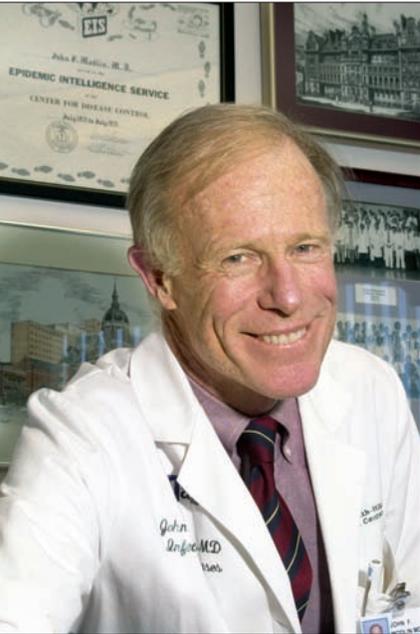
**Scary:** "You can kind of look at these viruses as summer flu," according to Modlin. "Only a minority of those who are infected have any symptoms, and only a minority of those will have serious neurologic disease." Poliovirus and enterovirus 71 are the only enteroviruses known to attack the CNS. And the scary thing is that when enterovirus 71 does trigger neurologic symptoms, says Modlin, they can be worse than in polio and are more likely to be fatal.

Enterovirus 71 was first isolated in California in 1969. Since then, it has caused epidemics in Eastern Europe in 1975 and 1978 and in Southeast Asia between 1997 and 2000. "The most recent focus of increased incidence in the U.S. was in the Denver area a couple of years ago, where there were five or six cases of serious disease," says Modlin.

**Outbreaks:** What has him most concerned are some large outbreaks, such as one in 1998 in Taiwan; at least 130,000 people there were infected, 405 were hospitalized for CNS symptoms, and 78 died. "These outbreaks looked very much epidemiologically and clinically like the large outbreaks of polio that we saw 100 years ago in New York and Boston," says Modlin.

Early symptoms of poliovirus include sore throat and fever. If the CNS is affected, a stiff neck

**SUNDOWN:** Sun exposure early in life is related to rising skin cancer rates—but try telling that to an adolescent. Actually, DMS's Dr. Ardis Olson has done so, with measurable success, through a program called SunSafe in the Middle School Years.



JOHN GILBERT FOX

**Modlin is worried about a viral threat.**

and paralysis may soon follow. Early symptoms of enterovirus 71 can include hand-foot-mouth syndrome. Common to other enteroviruses, too, the syndrome causes a fever; sore throat; and painful red bumps on the hands and feet, inside the mouth, and sometimes on the buttocks. As in polio, if neurologic illness does develop, enterovirus 71 begins to invade the ventral brain stem, cerebellum, and spinal cord; this can cause a number of serious neuromotor problems, such as paralysis of one or more extremities, as well as acute pulmonary edema, or fluid in the lungs.

**Vaccine:** There is now no vaccine for the virus, but the Soviet Union developed one in the 1970s when Bulgaria had a large outbreak. But the outbreak subsided and the vaccine was never used, so it's unknown whether it would have been effective.

Yet "it should be technically feasible to produce a vaccine," Modlin feels. For a [WEB EXTRA](http://dartmed.dartmouth.edu/summer07/html/vs_virus_we.php) with Modlin, see [dartmed.dartmouth.edu/summer07/html/vs\\_virus\\_we.php](http://dartmed.dartmouth.edu/summer07/html/vs_virus_we.php).

Laura Stephenson Carter

## Who would import RICE to Vietnam?

**Y**ou'd think bringing RICE to Vietnam would be like importing maple syrup to New England. Except this RICE is an acronym for "remote interaction, consultation, and epidemiology," a DMS project to transform the Vietnamese health-care system using cellular smartphones.

If people in Vietnam need more than routine health care, they often bypass their local clinic and go directly to a central hospital, where they feel the care is better. RICE is building a system that will enable central hospitals to share expertise and resources with rural areas.

**Link:** In March, the director of DMS's biomedical libraries, William Garrity, and other Dartmouth volunteers spent 13 days in Vietnam on a RICE pilot project. They tested a smartphone link between the National Hospital of Pediatrics (NHP), located in Hanoi, and rural clinics and regional hospitals. Smartphones have tiny keyboards, internet and e-mail access, and basic productivity software. A lot of Vietnamese clinicians already use them, Garrity says. "Nobody uses landlines out there. Everyone has a mobile."

Smartphones can be used for consultations between physicians, as well as to transmit educational information, share the NHP's digital library holdings, convey information on patient transfers, track disease incidence, and provide access to rudimentary medical records. With more information, physicians at remote facilities can be more ef-

fective, says Garrity. And if patients can get appropriate care at local clinics, they may be less likely to rush to the overcrowded central hospitals. The situation there is similar to what would happen "if everybody with the sniffles in the Upper Valley came to DHMC and didn't go to their closer facility"—not an efficient way to run a health-care system, says Garrity.

Since rural Vietnam is a potential nidus for pandemic flu or SARS, if sick people travel from rural areas to major cities they may spread infection along the way. But if they seek care locally, a pandemic could be contained early. Further, clinics could use smartphones to quickly report outbreaks.

During the trip, Garrity gave presentations to NHP librarians

and physicians on information technology. He also accompanied the team on visits to rural clinics to help identify their informational needs.

**Key:** Garrity's expertise as an information specialist is key to the project, says DMS plastic surgeon Dr. Joseph Rosen. Rosen organized RICE in 2005; got funding for it from Microsoft, with help from Dr. Eliot Grigg, a 2001 Dartmouth College graduate; and led the March trip.

RICE's long-term goal is "to identify, secure, and deploy PC- and smartphone-based clinical decision-support tools" to foster better and more integrated health care, says Garrity. He hopes in the near future that an NHP librarian can visit DMS and another DMS librarian can visit Hanoi—bringing maple syrup, perhaps?

Kelley Meck

**If sick people seek care locally, a pandemic could be contained early.**

WILLIAM GARRITY



**This rural Vietnamese village was one of several the DMS team visited. For a [WEB EXTRA](http://dartmed.dartmouth.edu/summer07/html/vs_hanoi_we.php) slide show, see [dartmed.dartmouth.edu/summer07/html/vs\\_hanoi\\_we.php](http://dartmed.dartmouth.edu/summer07/html/vs_hanoi_we.php).**