environment, Luoma points out. Thus, he and others began to study silver and its effects in the San Francisco Bay. Although these researchers tracked the collapse of the bivalve population, which formed much of the base of the fish and bird food webs, “we did not study the microbial community,” he says.

Some observers worry that silver nanoparticles will poison wastewater treatment plants. Doing so “would take massive uses of silver in the commercial sector,” Luoma says. However, if silver ion dishwashers, washing machines, and air conditioners come into wide use, leached levels of nanoparticles might bring this now-remote possibility closer to reality.

In terms of direct risks to humans, “all indications are you would have to have quite a lot of silver in your system to have any impact,” he adds. Further, some people drink colloidal silver as a dietary supplement, and “seem to be healthy.” Silver toxicity comes within its own early warning system. Thus, a blue tinge, called argeria, appears on skin before other ill effects are manifest.

What about microorganisms developing resistance to silver? Products containing silver are used in dressings for trauma wounds, burns, and diabetic ulcers, according to Silver from UIC. While resistance genes are found in bacteria associated with such wounds, including methicillin-resistant *Staphylococcus aureus*, the silver-impregnated dressings remain effective, according to Christine Cochrane at Liverpool John Moores University in Liverpool, United Kingdom, and her collaborators.

In 2008, activists led by the Washington, D.C.-based Center for Food Safety and the International Center for Technology Assessment petitioned the U.S. Environmental Protection Agency (EPA), urging it to regulate silver nanoparticles as a pesticide. In November 2009, EPA convened one of its advisory panels, asking these outside experts to assess levels of exposure and hazard from current uses of silver nanoparticles, and to advise the agency on how or whether to regulate such products and protect public health and the environment. The agency is not yet saying what comes next. “There are currently no plans for rulemaking,” says Dale Kemery, an EPA press officer, referring to silver nanoparticles. “We cannot comment on any aspect of the [scientific advisory] panel until their report is released.”

“It’s hard to work out how serious this is,” Luoma says. “The biggest concern is the potential for encouraging resistance to develop in certain strains of microbes, and the possibility of impacting the ecosystem at a fairly low level if a lot of this is released.” If nothing else, concerns over rampant use of silver nanoparticles echoes those arising from profligate antibiotic use. At the very least, improved public education is warranted in both cases.

David Holzman
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**Advances Against Malaria on Several Fronts**

Attacking *Plasmodium falciparum* by modulating the immune system of its natural mosquito vector is expected to provide an effective alternative means of curbing malaria, according to George Dimopoulos and his team at the Johns Hopkins Bloomberg School of Public Health and Malaria Research Institute in Baltimore, Md. “Similarly to humans, the mosquito intestine harbors an immune-stimulating natural microbiota, which, in the insect, enhances its ability to defend against infection from the malaria parasites,” he says. Dimopoulos was one of several speakers who described novel approaches to reducing the worldwide malaria burden during a Johns Hopkins Malaria Research Institute (JHMRI) Web summit held this past November.

“Knowing which bacteria best enhance the mosquito’s immunity against infection could have significant implications for the transmission of malaria in the field where bacterial exposure varies greatly from niche to niche,” Dimopoulos says. “Thus we’re using comprehensive functional genomics to identify the mosquito’s core gut microbiome and the molecular interplay between its bacterial residents and the *Plasmodium* parasites.”

When members of the JHMRI team examined the microbial load and species composition of laboratory-reared *Anopheles gambiae* mosquitoes, they found great variation in those microorganisms, even between mosquitoes in the same cage. “However, as in previous studies, the majority of isolated bacteria were gram-negative,” Dimopoulos, says. Sequence analyses from morphologically distinct bacterial colonies consistently showed the dominant organisms to be *Enterobacter asburie*, *Microbacterium* *sp.*, *Sphingomonas* *sp.*, *Serratia* *sp.*, and *Chryseobacterium meningosepticum*.

The JHMRI group is also investigating the genes responsible for *Anopheles* anti-*Plasmodium* immune responses and has specifically addressed the role of Toll and Imd immune signaling pathways. For instance, the gene *caspar*, which encodes a regulator of the Imd pathway, controls mosquito resistance to *P. falciparum*. Importantly, *caspar* silencing results in resistance to the human *Plasmodium* parasite in three divergent and major anopheline malaria vector species in South America, Asia, and Africa. This immune response enhancement does not appear to significantly compromise the mosquito’s fitness. Further, the team produced two lines of viable, Imd pathway-enhanced mosquitoes and is working on a third type which combines the im-
HHS Reviewing Countermeasures; IOM Report Updates National Vaccine Plan

In December, Health and Human Services (HHS) Secretary Kathleen Sebelius announced a sweeping review of federal countermeasures approaches to public health threats, including bioterrorism. The ultimate goal is to develop a “modernized countermeasure production process where we have more promising discoveries, more advanced development, more robust manufacturing, better stockpiling, and more advanced distribution practices,” she says. In a separate but related development in December, a panel of the Institute of Medicine (IOM) in Washington, D.C., issued a report identifying 18 priority areas for updating the National Vaccine Plan. They include devising a strategy to accelerate development of high-priority vaccines, expanding funding for safety research and monitoring, and implementing a national communications strategy to clarify the importance of vaccines and to bolster public confidence in them, according to Claire Broome of the Rollins School of Public Health at Emory University in Atlanta, Ga., who chaired the IOM committee. The IOM report, “Priorities for the National Vaccine Plan,” is available online (http://www.nap.edu).

Marcia Stone

Monitoring Hand Hygiene, Infectious Diseases with Phone Apps, Twitter

Touchscreen devices and microblogging are being put to ingenious use for tracking infectious diseases and monitoring compliance with disease-preventing hygiene regimens, according to several participants who outlined their approaches to these tasks during the annual meeting of the Infectious Diseases Society of America, held in Philadelphia, Pa., last October.

A new approach to monitoring hand hygiene depends on a software application (app), called iScrub, written and designed for use with the iPhone. The app is being made available free through the iTunes App Store and via iPod, according to Chris Hlady, a graduate student at the University of Iowa (UI), Iowa City. He developed the software as part of a project to automate the monitoring of hand-hygiene practices in health care settings. While designed for hospital staff, iScrub also could become a “stealth app” to keep tabs on whether workers at food-handling or other...