Counterfeit anti-malarial drugs prompt call for crackdown

Jane Sanders
Research News

A worsening epidemic of sophisticated anti-malarial drug counterfeiting in southeast Asia and Africa is increasing the likelihood of drug-resistant parasites, yielding false-positive results on screening tests and risking the lives of hundreds of thousands of malaria patients, mostly children, researchers say.

The situation has prompted an international group of researchers to urge national and international authorities to combat the problem with stringent regulations, law enforcement and the provision of inexpensive medicines to undercut the counterfeiters. Based on their own research and other scientists’ studies, they outline the problem and make recommendations for addressing it in a paper published last month in the Public Library of Science jour.

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Malaria is a widespread international problem, primarily in poor and developing countries in the tropics — though some cases have been reported in Florida. Transmitted by mosquitoes, the disease infects 300 million to 500 million people a year. Each year, about 1.5 million of those — mostly children — die even though genuine anti-malarial drugs are quite effective. One of the most efficacious drugs is artemesinate, derived from the Artemisia annua plant native to China. According to studies, the percentage of counterfeit tablets containing no artemesinate apparently increased from 38 percent to 53 percent in southeast Asia between 1999 and 2004. In some countries, the majority of the available artemesinate is fake. Meanwhile, identifying counterfeit tablets has become increasingly difficult as counterfeiters have implemented sophisticated manufacturing techniques.

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Important information about the transition to a new telephone system

One of the major Office of Information Technology (OIT) projects currently underway is the installation of a new telephone system for Georgia Tech. This effort, known as Transitioning Telecommunications & Tech (T3), will provide the campus with a sustainable, feature-rich voice system that will meet current and future needs.

The transition from the Georgia Technology Authority telephone service to the new service began this month and is expected to conclude by the end of the year. OIT will be working with departmental telephone coordinators and facility managers to coordinate the preparation and cutover actions and schedule. Since the campus will be converted to the new system on a building-by-building basis, there will essentially be two telephone systems serving Georgia Tech.

As a result, effective July 15, five-digit dialing will not work reliably between the old and new systems. Therefore, it will be necessary to dial nine plus the full 10 digits (area code and telephone number) to reliably reach another campus user. Upon completion of the transition, the campus will return to five-digit dialing.

General information about the T3 project, including contact information for the team and the preliminary schedule, may be obtained by visiting www.oit.gatech.edu/campus_initiatives or contacting the project office at 894-0497. Updates to the project and the schedule will be posted on this site.

The Georgia Institute of Technology
Don’t shoot: new device blocks digital cameras

Rick Robinson
Research News

Researchers at Georgia Tech have completed a prototype device that can block digital-camera function in a given area. Commercial versions of the technology could be used to stymie unwanted use of video or still cameras.

The prototype device, produced by a team in the Interactive and Intelligent Computing division of the Georgia Tech College of Computing, uses off-the-shelf equipment — camera-mounted sensors, lighting equipment, a projector and a computer — to scan for, find and neutralize digital cameras.

The system works by looking for the reflectivity and shape of the image-producing sensors used in digital cameras. Gregory Abowd, an associate professor leading the project, says the new camera-neutralizing technology shows commercial promise in two principal fields — protecting limited areas against clandestine photography or stopping video copying in larger areas such as theaters.

“We’re at a point right now where the prototype we have developed could lead to products for markets that have a small, critical area to protect,” he said. “Then we’re also looking to do additional research that could increase the protected area for one of our more interesting clients, the motion picture industry.”

James Clawson, a research technician on Abowd’s prototype team, said preventing movie copying could be a major application for camera-blocking technology.

“Movie piracy is a $3 billion-a-year problem,” Clawson said. “If someone videotapes a movie in a theater and then puts it up on the Web, the movie industry has lost revenue.”

Moreover, movie theaters are likely to be a good setting for camera-blocking technology, said Jay Summet, a research assistant who is also working on the prototype. A camera’s image sensor — called a CCD — is “retroreflective,” which means it sends light back directly to its origin rather than scattering it.

Retroreflections would probably make it relatively easy to detect and identify video cameras in a darkened theater.

The current prototype uses visible light and two cameras to find CCDS, but a future commercial system might use invisible infrared lasers and photo-detecting transistors to scan for contraband cameras. Once such a system found a suspicious spot, it would feed information on the reflection’s properties to a computer for a determination.

Once a scanning laser and photodetector located a video camera, the system would flash a thin beam of visible white light directly at the CCD. This beam — possibly a laser in a commercial version — would overwhelm the target camera with light, rendering recorded video unusable.

Researchers say that energy levels used to neutralize cameras would be low enough to preclude any health risks to the operator.

Camera neutralization’s potential has helped bring it under the wing of VentureLab, a Georgia Tech group that assists fledgling companies through the critical feasibility and first-funding phases. Operating under the name DomainIC, Abowd’s company has already received a grant from the Georgia Research Alliance.

Abowd said that funding availability will likely decide which technology — small- or large-area — will be developed first.

There are some caveats, according to Summet. Current camera-neutralizing technology may never work against single-lens-reflex cameras, which use a folding-mirror viewing system that effectively masks its CCD except when a photo is actually being taken. Moreover, anti-digital techniques don’t work on conventional film cameras because they have no image sensor.

Good computer analysis will be the heart of effective camera blocking. Summet believes.

“Most of the major work that we have left involves algorithmic development,” he said. “False positives will be eliminated by making a system with fast, efficient computing.”

Robert Loewy awarded Guggenheim Medal

Megan McRainey
Institute Communications and Public Affairs

Robert Loewy, the William R. T. Oakes professor and chair of the School of Aerospace Engineering, has received one of the most prestigious awards in aeronautics — the Daniel Guggenheim Medal.

The Daniel Guggenheim Medal was established in 1929 for the purpose of honoring persons who make notable achievements in the advancements of aeronautics. Its first recipient was aviation pioneer Orville Wright. Over the years, recipients have included some of the greatest names in aerospace: Jerome Hunsaker, Donald Douglas, Charles Lindbergh, Igor Sikorsky, Glen Martin and William Boeing.

Loewy has served as chair of the School of Aerospace Engineering since 1993. Prior to that, he was a professor and director of the Rotocraft Technology Center at Reusseller Polytechnic Institute.

His current research interests include helicopter structural dynamics and aerodynamics; turbine engine aeroelasticity and dynamics; composite structures for aircraft and spacecraft; structural dynamics of large satellites; unsteady aerodynamics; and smart materials and structures.

Loewy has led the School of Aerospace Engineering since 1993.

The Guggenheim Medal is jointly sponsored by the American Institute of Aeronautics and Astronautics (AIAA), American Society of Mechanical Engineering (ASME), American Helicopter Society (AHS) and Society of Automotive Engineers.
and packaging strategies — including low, but ineffective, levels of the proper active ingredients and applying counterfeit holograms to packaging — to deceive investigators and consumers. Fernandez and his collaborators found that some counterfeit anti-malarial drugs contain up to 10 milligrams of the active ingredient — compared to the 50 milligrams contained in genuine tablets.

Also, many fake artesunate tablets contain other drugs, possibly because the counterfeiters are trying to further deceive patients and doctors by producing a placebo effect, Fernandez said. “For example, some of the counterfeit tablets we analyzed contained acetaminophen that would reduce a fever, or the antibiotic erythromycin, or even early-generation anti-malarials that are no longer effective.”

“We make no apology for the use of the term ‘massacre’ to describe this criminal lethal trade,” the authors write. “Indeed, some might call it murder. Somewhere people are directing a highly technical and sophisticated criminal trade ... in the full knowledge that their ineffective ‘product’ may kill people who would otherwise survive malaria infection.”

Serious implications exist for the relatively new practice of incorporating ineffective levels of active ingredients in artesunate tablets, the authors note. Exposure of malaria parasites to low concentrations of artesunate in patients taking counterfeit products will greatly increase the risk for the spread and selection of malaria parasites that are resistant to artemisinin derivatives. That could lead to a loss of effectiveness for these essential medicines and an avoidable failure of malaria control.

The researchers’ analyses determined there are now at least 12 different types of fake artesunate, and evidence suggests that production is on an industrial scale.

At this point, we believe there are probably multiple sources, but they may be using the same distribution network,” Fernandez added.

Since 2001, artemisinin derivative-based combination therapy (ACT) has increasingly become the first-line malaria treatment in Africa. Authorities estimate that 130 million courses of ACT will be used in Africa in 2006.

“The high cost and shortage of ACT provide a favorable situation for the spread of fake artemisinins that could put the lives of thousands of African children at risk,” the authors write. “It will be an avoidable tragedy if a lack of political will and action allows fake artesunate to compromise the hope that artemisinin derivative-based combination therapy offers for malaria control in Africa and Asia and results in the emergence and spread of resistance to the artemisinin drugs, shortening the useful life of these vital medicines.”

In related research, several of the authors, led by Fernandez, are studying new, high-throughput screening techniques to detect and quantify the contents of counterfeit anti-malarial drugs and other fake pharmaceuticals.

Assistant Professor Facundo Fernandez and his collaborators are developing novel analytical chemistry techniques to detect and quantify the contents of counterfeit anti-malarial drugs and other fake pharmaceuticals.

“In this research, we are not just trying to fight fake drugs, but also to learn about how to avoid their production,” Fernandez said. “If we can learn the recipe for making these fake products, we can inform the public and help them avoid buying fake drugs.”