

U.S. May Offer Smallpox Vaccine
To Many More Health Workers

Emergency response to a smallpox attack: The case for mass vaccination

Edward H. Kaplan^{*†}, David L. Craft[‡], and Lawrence M. Wein[§]

^{*}Yale University School of Management, and Department of Epidemiology and Public Health, Yale School of Medicine, New Haven, CT 06520-8200; and [†]Operations Research Center and [‡]Sloan School of Management, Massachusetts Institute of Technology, Cambridge, MA 02139-3407

Edited by Burton H. Singer, Princeton University, Princeton, NJ, and approved June 11, 2002 (received for review May 10, 2002)

In the event of a smallpox bioterrorist attack in a large U.S. city, the interim response policy is to isolate symptomatic cases, trace and vaccinate their contacts, quarantine febrile contacts, but vaccinate more broadly if the outbreak cannot be contained by these measures. We embed this traced vaccination policy in a smallpox disease transmission model to estimate the number of cases and deaths that would result from an attack in a large urban area. Comparing the results to mass vaccination from the moment an attack is recognized, we find that mass vaccination results in both far fewer deaths and much faster epidemic eradication over a wide range of disease and intervention policy parameters, including those believed most likely, and that mass vaccination similarly outperforms the existing policy of starting with traced vaccination and switching to mass vaccination only if required.

Although smallpox was eradicated in 1979 by the World Health Organization campaign (1), it remains a feared bioterrorist threat (2). In the aftermath of the September 11 terrorist attacks, the U.S. is stockpiling 286 million doses of smallpox vaccine (3). The Centers for Disease Control and Prevention (CDC) interim response plan (4) calls for targeted vaccination and quarantine: symptomatic smallpox cases would be isolated, contacts of cases vaccinated, asymptomatic contacts monitored but not isolated, and febrile contacts quarantined for 5 days. These guidelines also recommend a broader vaccination strategy if the initial number of cases or outbreak locations is "sufficiently large," or if new cases fail to decline after two or more generations of cases have developed from those initially identified, or 30% of vaccine stores have been used. An expert panel has also recommended a targeted vaccination strategy (ref. 5; <http://www.bt.cdc.gov/DocumentsApp/Smallpox/RPG/index.asp>).

Model. To assess the CDC guidelines (and possible alternatives), we embed their key features in a disease transmission model of a smallpox attack in a large urban center. The model incorporates four stages of infection (1, 6), each exponentially distributed in duration with mean τ_j^{-1} days spent in stage $j = 1, 2, 3$, or 4: (1) asymptomatic, noninfectious and vaccine-sensitive; (2) asymptomatic, noninfectious, and vaccine-insensitive; (3) asymptomatic and infectious; and (4) symptomatic and isolated. In our model, the transition from stage 3 to stage 4 reflects response operations in addition to disease progression. When an infected recognizes his or her symptoms, which may occur some time after the symptoms first appear, (s)he seeks medical help and is immediately isolated. A fraction δ of symptomatic cases die of disease, whereas the remaining fraction eventually recover (and are immune to reinfection).

Disease transmission derives from free (or homogeneous) mixing among available susceptibles and asymptomatic infectious individuals in the population. Although we recognize that free mixing is not an accurate depiction of actual population interactions, free mixing usually leads to larger epidemics than nonrandom mixing would admit (7). Given the potentially disastrous consequences of a smallpox attack, we ask whether proposed control strategies can control such "worst-case" out-

breaks. Surely strategies that contain smallpox epidemics under the free mixing assumption will also work under mixing patterns less favorable to the spread of disease. In this sense, our approach is to plan for the worst but hope for the best.

Absent intervention, each infectious individual generates an average of $R_0 = \beta S^0(0)/r_3$ infections early in the epidemic (8), where $S^0(0)$ is the number of susceptibles immediately after an attack at time $t = 0$, and β is the effective disease transmission rate per person per unit time. Although the transmission rate is likely to decrease after the attack is detected and announced, we use a single value of R_0 throughout the epidemic that represents the postdetection scenario. Because the total number of deaths is highly dependent on the number of infected persons when the emergency response is initiated, an increase in the detection delay (discussed below) or the predetection R_0 has an effect similar to increasing the initial attack size—an effect we investigate later.

Newly detected symptomatic infections become "index cases," isolated to prevent further transmission. Index cases are interviewed to generate a list of c persons with whom they have had potentially infectious contacts in the recent past, but only a fraction p of true contacts (and hence only a fraction p of infectees) are named and located via contact tracing. The model correctly places infected contacts found in their appropriate stage of disease while accounting for the probability that such persons were already traced from a prior index, and thus avoids double counting. This crucial aspect of our analysis differs from previous contact tracing models (9, 10) and reveals a "race to trace:" even if a contact is identified immediately on detection of the infecting index case, the time from infection of the contact to detection of the index (and tracing of the contact) can exceed the time during which the infected contact remains sensitive to the vaccine. Contact vaccination in such a circumstance is both ineffective (the infection is not prevented) and inefficient (vaccine is wasted). Contact tracing can control a smallpox outbreak only if the race to trace is repeatedly won.

Susceptible and asymptomatic infected persons located via contact tracing enter a tracing/vaccination queue serviced by n vaccinators who can each process (locate and vaccinate) μ persons per day on average. Only susceptibles and stage 1 infected individuals can be protected via the vaccine, which is effective with probabilities v_0 and v_1 , respectively. Unsuccessfully vaccinated persons return to the freely mixing population either as susceptibles or infecteds in the appropriate stage of disease. On vaccination, a fraction h of individuals in stage 3 of infection are found to be febrile and are quarantined for α^{-1} days on average. A fraction f of vaccinations result in fatalities. Mathematically, this model is described by the 17 ordinary differential equations discussed further in the Appendix.

We focus on two strategies: traced vaccination (TV), described in the last paragraph, and mass vaccination (MV), where the

This paper was submitted directly (Track II) to the PNAS office.

Abbreviations: CDC, Centers for Disease Control; TV, traced vaccination; MV, nation.

[†]To whom reprint requests should be addressed. E-mail: edward.kaplan@yale.edu



U.S. weighs smallpox plans

Reports of shots for 500,000 workers called premature

U.S. TO VACCINATE
500,000 WORKERS
AGAINST SMALLPOX

SHIFT FROM LIMITED PLAN

More Health Providers Covered
— Mass Vaccinations Seen
in Case of Outbreak

Mass vaccinations
of smallpox best,
new study shows

Study: U.S.
should widen
smallpox plan

Research says mass vaccination
would save more lives than 'ring'

Study Favors
Different Tack
On Smallpox



Smallpox: A Case for Mass Vaccination In this we
Proceedings of the National Academy of Sciences, aut
Edward Kaplan, David Craft, and Lawrence Wein disci
advantages of mass vaccination should a smallpox at
occur. This scientific examination of the issues finds t
mass vaccination strategy would result in far fewer d
faster epidemic eradication than other strategies und

discussion. [view report]

U.S. Weighs Risk of Smallpox, and Risk of Smallpox Vaccine

Health: Looking at the possibility of a germ attack, panel will decide if the medicine, which can be fatal, should be more readily available.

By EDMUND SANDERS
TIMES STAFF WRITER

WASHINGTON—Los Angeles County paramedics Pat Long and Eric Buege make medical decisions every day that save other people's lives. Soon they might face one that could save their own.

This week, an advisory panel in New Orleans will recommend whether the government should loosen its grip on the nation's stockpile of smallpox vaccine, which has been kept under wraps since the disease was eradicated worldwide in 1980.

In light of the Sept. 11 terrorist attacks on the World Trade Center and the Pentagon, and subsequent anthrax mailings, government officials are debating whether to release the vaccine to health and emergency workers and, perhaps, millions of other Americans.

"This is a difficult decision to make," said D.A. Henderson, one of the world's leading authorities on smallpox, during a forum Saturday in Washington. "There is no right answer. It's a balancing of risk."

For Long and Buege, taking the vaccine isn't a simple choice. There's an estimated 1- to 2-in-a-million shot that the vaccine itself could kill them, and a 1-in-100,000 chance of causing serious illness, such as severe rash, infection or brain inflammation.

Their families might also suffer health problems. Studies have shown that 20% of vaccine-related complications occur in people who were not vaccinated but came into contact with someone who was.

The Pomona paramedics must balance those risks against the unknown odds that terrorists might one day use the lethal smallpox virus as a weapon and

that they would be called upon to respond to the attack.

"I don't want to take the risk of the vaccine, for me or my family," Buege said, adding that his views might change if a smallpox attack occurs.

Long, his partner, is less concerned and said he would likely do whatever health officials recommended. "There are so many other things that could kill us. Smallpox is the least of my worries."

It's a dilemma that soon could face millions of Americans. A smallpox terrorist attack could be catastrophic in the United States, where routine smallpox vaccinations ended 30 years ago. Smallpox mortality rates in the unvaccinated top 50%.

On the other hand, if the government resumed smallpox vaccines for the entire U.S. population today, an estimated 300 citizens could die of complications and thousands more would have serious health problems.

"The vaccine is one of the least safe of licensed human vaccines," said Anthony Fauci, director of the National Institute of Allergy and Infectious Diseases.

Routine smallpox vaccinations in the U.S. ended in 1972, when health officials deemed that the health risk of the vaccine was greater than the risk of the virus.

That's why U.S. health officials are moving cautiously as they weigh whether to re-release the vaccine, which has only been provided to lab workers at the federal Centers for Disease Control and Prevention in Atlanta and others who handle the virus.

On Thursday in New Orleans, the CDC's Advisory Committee on Immunization Practices will make a recommendation about the vaccine to Health and Human

Services Secretary Tommy G. Thompson. He will make the final decision.

In the absence of a confirmed smallpox attack, few health experts expect the panel to recommend releasing the vaccine to all Americans, though polls suggest that more than half of the general population would take it if offered.

A tougher call for the CDC will be whether to make the vaccine more widely available to the general public after a confirmed terrorist attack.

'I don't want to take the risk of the vaccine.'

Eric Buege, paramedic

'There are so many other things that could kill us. Smallpox is the least of my worries.'

Pat Long, paramedic

Under current CDC policy, if a smallpox attack takes place, the vaccine will only be given to those people who come into direct contact with people infected with the virus. That strategy, which also was known as "ring vaccination," helped health officials beat naturally occurring outbreaks in the 1940s, '50s and '60s.

But some public health officials fear the ring vaccination strategy would be less effective against a deliberate terrorist attack, particularly in the U.S., where the population is highly mobile. For example, if a terrorist infected with smallpox traveled on New York City subways for a week during rush hour, how would health officials be able to track down all potential contacts?

Instead, many are calling for the CDC to change its policy and recommend broader vaccinations in communities hit by an attack.

According to a study presented Saturday, vaccinating an entire city such as Los Angeles after a smallpox attack that affected about 1,000 people would confine the death toll to about 500 people, according to Edward Kaplan of Yale University's School of Management. Using the CDC's cur-

rent policy, more than 3,000 deaths likely would occur, he said.

"Ring containment simply will not work in this kind of situation," said William Bicknell, a former Massachusetts health commissioner and professor at Boston University's School of Public Health.

Bicknell supports a gradual resumption of routine smallpox vaccinations for all Americans, with the exception of small children, who are more susceptible to health problems.

Another researcher, Alan Zelicoff of Sandia National Laboratories in Albuquerque, presented a study suggesting that a terrorist threat could be posed by an aerosol version of the virus that is more potent than naturally occurring strains.

His conclusions were based on recent reports about an accidental release of a weapon version of the smallpox virus in 1971 by Soviet scientists. The accident may have been responsible for a smallpox outbreak that is believed to have started when a boat passed by an island where testing of aerosol smallpox was taking place. Zelicoff said evidence suggests that an infected Soviet biologist on the boat spread the disease in a nearby city, where three people died.

Henderson, however, said there is not enough evidence to support what he termed Zelicoff's "alarmist" conclusions.

The smallpox virus typically spreads via infected saliva and face-to-face contact within about 6 feet. Early symptoms include fever, headache and backache, beginning about one to two weeks after exposure. That is followed by a severe skin rash on the face, arms and legs, during which time the disease is most infectious.

The last case of smallpox in the U.S. was in 1947. After Sept. 11, government officials began to fear that terrorists might get their hands on the virus and release it into the population.

In November, Thompson contracted with a British biotechnology firm to produce enough vaccine to inoculate every American by the end of this year.



Welcome to RAFAEL!

Please note the following security restrictions:

■ *It is strictly forbidden to enter RAFAEL with video recorders, video tapes, cameras, recording equipment, computers and magnetic media.*

You are required to leave this equipment in the gate area.

■ *When you enter RAFAEL, you will be provided with an identification badge that must be worn at all times. At the end of the visit, please return the badge to the RAFAEL representative who will be accompanying you.*

■ *You may only move around within RAFAEL escorted by the RAFAEL representative.*

■ *Notes or classified material pertaining to your visit may only be removed from RAFAEL after coordination with the RAFAEL representative.*

■ *If you are required by any official authority to provide the name of your point of contact in Israel, you are allowed to give the name and telephone number of the RAFAEL representative.*

Enjoy your visit!

From: "Dr. Moshe Kress" <kress@ie.technion.ac.il>
To: <edward.kaplan@yale.edu>
Subject: CEMA visit
Date sent: Wed, 19 Jun 2002 21:33:08 +0200

Hi Ed,
We scheduled your visit to CEMA for July 17. I hope it fits your plans. If you drive from Jerusalem, and presumably leave at the civilized time of around 8am-9am, then you'll probably get to RAFAEL (2/3 the way from Haifa to Akko) at around 11am-noon. We will then go out for lunch and have your talk at our conference room at 2pm. I talked today with one of our security people who thinks that there will be no problem to get you a clearance, but you can never know these strange people... I don't know if you have my communication coordinates: Home: 04-8372308 Office: (direct) 04-8795360 (My secretary, Ida: 04-8794140) Mobile: 058-513693. Lehit Moshe

[washingtonpost.com](#)

[Home](#)
[News](#)
[OnPolitics](#)
[Entertainment](#)
[Live Online](#)
[Camera Works](#)
[Marketplace](#)
[Washington](#)

[E-MAIL NEWSLETTERS](#) | [ARCHIVES](#)

SEARCH:

[News Home Page](#)
[Nation](#)
[World](#)
[Metro](#)
[Business](#)
[Technology](#)
[Sports](#)
[Style](#)
[Education](#)
[Travel](#)
[Health](#)
[Alternative Care](#)
[Children & Youth](#)
[Chronic Diseases](#)
[Fitness](#)
[Health Care Issues](#)
[Men](#)
[Mental Health](#)
[Nutrition](#)
[Seniors](#)
[Women](#)
[Columns](#)
[Special Reports](#)
[Live Online](#)
[Photo Galleries](#)
[Health Index](#)
[Real Estate](#)
[Home & Garden](#)
[Food](#)
[Opinion](#)
[Weather](#)
[Weekly Sections](#)
[News Digest](#)
[Classifieds](#)
[Print Edition](#)
[Archives](#)
[Site Index](#)
[Help](#)

SPECIAL ADVERTISING SECTION
Health & Image
DIRECTORY

Find local practices and businesses that cater to your health and well being.


Limited Smallpox Vaccine Use Eyed

Expert Panel Rejects Mass Inoculations

By David Brown
Washington Post Staff Writer
Friday, June 21, 2002; Page A01

ATLANTA, June 20 -- A panel of scientific experts that advises the federal government recommended yesterday that a small number of health care workers in each state -- perhaps 20,000 Americans in all -- be vaccinated against smallpox to protect them in the event of an outbreak.

The advice, if accepted by the Bush administration, would expand the use of the vaccine for the first time in nearly 30 years. But it represents the most limited of several options the panel considered for incorporating smallpox vaccination into the country's defense against biological terrorism.

The choice reflects the panel's belief that the risk of an attack employing smallpox virus is too small to justify the many complications that would arise from widespread vaccination.

Currently, only scientists who handle the virus are vaccinated. The last human case of smallpox occurred in 1978, and the microbe is known to exist only in a few laboratory freezers. Some

About Smallpox

- [Smallpox Vaccine Supply Could Be Stretched](#) (The Washington Post, Mar 29, 2002)
- [Hunting for a Safer Smallpox Vaccine](#) (The Washington Post, Feb 15, 2002)
- [Pledge for Smallpox Vaccine Runs Into Tight-Budget Reality](#) (The Washington Post, Dec 3, 2001)
- [Full Coverage](#)

AMERICA AT WAR

SPECIAL REPORT

Find Post Stories by Topic:

Investigation

Find

---or---

Search Story Archive by Keyword:

[Advanced Search](#)

Top Stories

- [Ridge Presses Security Plan](#) (The Washington Post, Jun 21, 2002)
- [For Some Afghans, Assembly Was Therapy](#) (The Washington Post, Jun 21, 2002)
- [Cheney Blames Leaks on Congress](#) (The Washington Post, Jun 21, 2002)
- [Full Coverage](#)

Q & A

- [The Question of the Day](#) on terrorism is answered by the Council on Foreign Relations.

Primers on the News

- [Iraq and the War on Terrorism](#)
- [Iran and the War on Terrorism](#)
- [The Philippines and the War on Terrorism](#)
- [The Conflict in Kashmir](#)
- [Understanding Pakistan](#)

JAMES KARRAS ENTERPRISES

61-45 98 Street, Suite 16-J • Rego Park, NY 11374 • (718) 271-9247

JAMES KARRAS ENTERPRISES
61-45 98 St., Suite 16-J
Rego Park, NY 11374

JUMBO SIZE COLOR PHOTOGRAPH
OF YOUR TELEVISION APPEARANCE

A unique memento of a special event
of four different color photographs
as you appeared on the television

ONLY: \$26.95
P&H: \$ 3.00
TOTAL: \$29.95

NY RESIDENTS PLEASE ADVISE

All photographs are JUMBO SIZE
are printed on fine quality
Kodak paper.

I Understand that I may receive
for a refund within 30 days
completely satisfied for a

NAME (PLEASE PRINT)

COMPANY (IF APPLICABLE)

ADDRESS

CITY

Placements for Dr. Edward H. Kaplan: Smallpox Vaccination Research Release Launch Date of PR Campaign: July 3, 2002

Media Outlet	Headline	Date	SOM Cited?
<i>Los Angeles Times</i>	"U.S. Weighs Risk of Smallpox, and Risk of Smallpox Vaccine Health"	6/16/2002	NO
<i>Reuters</i>	"Experts Urge Mass Vaccination for Smallpox Attack"	7/7/2002	NO
<i>Seattle Times</i>	"500, 000 to Receive Smallpox Vaccine; U.S. to Protect Health, Emergency Workers"	7/7/2002	NO
<i>The New York Times</i>	"U.S. to Vaccinate 500,000 Workers Against Smallpox"	7/7/2002	NO
<i>Ascribe Newswire</i>	"Mass Vaccination May Be Best Response to Smallpox Attack"	7/8/2002	YES
<i>Channel 8 News</i>	5:00, 6:00, 11:00 News	7/8/2002	YES
<i>Houston Chronicle</i>	"Experts: Mass Vaccines Will Fight Smallpox Better"	7/8/2002	NO
<i>NBC</i>	"Today Show: Smallpox interview with Couric"	7/8/2002	YES
<i>Newsday</i>	"Another Smallpox Plan/Study Calls for Mass Vaccinations, unlike CDC Strategy"	7/8/2002	NO
<i>Reuters</i>	"Smallpox Vaccine is Oldest, Least Safe"	7/8/2002	NO
<i>Reuters</i>	"U.S. Weighs Smallpox Plan"	7/8/2002	NO
<i>The Wall Street Journal</i>	"U.S. May Offer Smallpox Vaccine to Many More Health Workers"	7/8/2002	YES
<i>USA Today</i>	"Study: U.S. Should Widen Smallpox Protection"	7/8/2002	YES
<i>Associated Press Newswires</i>	"Smallpox Response"	7/9/2002	YES
<i>Reuters</i>	"U.S. Officials Consider Worst-case Smallpox Plan"	7/9/2002	NO
<i>San Francisco Chronicle</i>	"Kaiser Testing Smallpox Vaccines"	7/9/2002	NO
<i>The New York Times</i>	"Study Favors Different Tack on Smallpox"	7/9/2002	NO
<i>The Saigon Times Daily</i>	"Experts Urge Mass Vaccination for Smallpox Attack"	7/9/2002	NO
<i>The Wall Street Journal Europe</i>	"U.S. Studies Smallpox-Shots Policy"	7/9/2002	YES
<i>United Press International</i>	"Mass Vaccination Can Cut Deaths"	7/9/2002	YES
<i>NewsWeek</i>	"The Government Must Plan for Mass Vaccinations"	7/10/2002	YES
<i>The Wall Street Journal</i>	"Smallpox Scenarios" Editorial	7/10/2002	NO
<i>Los Angeles Times</i>	"Facing the Smallpox Threat"	7/11/2002	YES

Yale SCHOOL of MANAGEMENT

135 Prospect Street P.O. Box 208200 New Haven Connecticut 06520-8200

Contact: Karin Nobile
Director of Media Relations

Tel 203 432 6010 Fax 203 432 9992
karin.nobile@yale.edu
<http://mba.yale.edu>

MASS VACCINATION MAY BE BEST RESPONSE TO SMALLPOX ATTACK SAY YALE SCHOOL OF MANAGEMENT AND M.I.T. SLOAN EXPERTS

New Haven, CT, July 3, 2002 – In the event of a smallpox attack, a mass vaccination policy would result in fewer deaths and faster disease eradication than alternative vaccination strategies, reports a new study published in *Proceedings of the National Academy of Sciences* (article 2827). Since the terrorist attacks of September 11, the best response to a smallpox attack has been a topic of hot debate.

Yale School of Management expert Edward Kaplan, the William N. and Marie A. Beach Professor of Management Sciences & Professor of Public Health, and colleagues from M.I.T.'s Sloan School and Operations Research Center, used a mathematical model to compare a number of different vaccination strategies on disease spread and death resulting from a smallpox attack on a large urban center.

The Centers for Disease Control and Prevention's (CDC) current response plan, endorsed by the Advisory Committee on Immunization Practices on June 20 calls for isolation of confirmed smallpox cases and targeted vaccination of only those who have been in contact with infected individuals, with a mass vaccination effort to take place only if the initial vaccination and quarantine methods are unsuccessful. Parameters of this new mathematical model include the number of people initially infected, the transmission rate, the fraction of potential contacts named by infected individuals, and the resources available to track potential contacts and administer vaccinations.

Under several different scenarios, the model predicted that mass vaccination would stop the spread of infection faster and result in fewer deaths than targeted vaccination or the CDC plan. In fact, the currently endorsed plan led to an estimated 4,120 additional deaths compared to a mass vaccination plan implemented from the beginning in a large attack on a city with 10 million inhabitants. The researchers found that a pre-attack vaccination of a portion of the population lessened the gap between the different strategies. These results suggest that unless a pre-attack vaccination is used to increase immunity within the population, a mass vaccination strategy should be seriously considered.

"Emergency Response to a Smallpox Attack: The Case for Mass Vaccination," by Edward H. Kaplan, Yale School of Management, and David L. Craft, Operations Research Center, and Lawrence M. Wein, M.I.T Sloan.

Media contact: Edward H. Kaplan, Yale University School of Management, and the Department of Epidemiology and Public Health, Yale University School of Medicine, New Haven, CT; tel. (203) 432-6010, fax (203) 432-9992, or email Edward.Kaplan@yale.edu.

###

0702:07

The New York Times

NEW YORK, SUNDAY, JULY 7, 2002

U.S. TO VACCINATE 500,000 WORKERS AGAINST SMALLPOX

SHIFT FROM LIMITED PLAN

More Health Providers Covered — Mass Vaccinations Seen in Case of Outbreak

By WILLIAM J. BROAD

The federal government will soon vaccinate roughly a half-million health care and emergency workers against smallpox as a precaution against a bioterrorist attack, federal officials said. The government is also laying the groundwork to carry out mass vaccinations of the public — a policy abandoned 30 years ago — if there is a large outbreak.

Until last month, officials had said they would soon vaccinate a few thousand health workers and would respond to any smallpox attack with limited vaccinations of the public. Since 1983, only 11,000 Americans who work with the virus and its related diseases have received a vaccination, according to the Centers for Disease Control and Prevention.

The plan to increase the number of “first responders” who receive the vaccination to roughly 500,000 from 15,000 and to prepare for a mass undertaking of vaccinations in effect acknowledges that the government’s existing program is insufficient to fight a large outbreak.

The government’s new vaccination safeguards come amid continued talk in Washington of war against Iraq, which terrorism experts suspect of maintaining clandestine stocks of the virus, as well as growing criticism of the government’s limited plan. Only Russia and the United States have declared stocks of the virus.

A highly contagious disease, smallpox was declared eradicated globally in 1980, eight years after the United States stopped routine vaccinations.

Until its eradication, smallpox killed roughly one in three people who were infected but not vaccinated. Because immunity is believed to diminish with time, most people alive today are considered vulnerable to smallpox. But federal officials have long resisted the resumption of mass smallpox vaccinations, citing the probable risk of serious side effects, even death.

Last month, a federal advisory panel backed a plan for “ring vaccinations,” in which health workers would isolate infected patients and vaccinate people in close contact with them, forming a ring of immunization around an outbreak and a barrier to its spread. In theory, such a strategy can work because the vaccine, if given within four days of exposure to the virus, protects people from the disease.

Some experts on infectious disease

said the plan’s main virtue was that it required little smallpox vaccine.

The government’s more aggressive plans are possible because vaccine supplies are rapidly increasing as a result of crash manufacturing and stockpiling efforts begun soon after last fall’s terrorist strikes, officials said. Also, studies have found that existing vaccine doses can be diluted without loss of effectiveness.

“Now we can act differently because we have more vaccine,” Dr. Donald A. Henderson, senior science adviser to Tommy G. Thompson, the secretary of health and human services, said in an interview. Dr. Henderson, who led the global smallpox eradication effort, added that in a crisis “we can make vaccine available on request throughout the community.”

Officials said that about 100 million doses of the smallpox vaccine (160 million if diluted) are in hand and that by late this year or soon thereafter enough will be available for every American, more than 280 million people.

Health and military experts, citing new models of how the contagion can spread and new disclosures about how the weaponized virus can sail on the wind, have recently argued that limited, local vaccinations could produce thousands if not millions of needless infections and deaths. Most critics of the ring vaccination plan advocate mass vaccinations of the United States population — but often before a smallpox attack, not after, as the government is now planning.

In addition to vaccinating more “first responders,” the government plans to develop ways to speed vaccine deliveries around the country and help states plan how to carry out mass vaccinations after an attack.

Officials said the vaccinations of hospital workers and smallpox response teams, to begin fairly soon, would help train health professionals in smallpox vaccination and educate the public to the attendant risks.

The White House, Defense Department and other federal agencies are involved in the vaccination planning. “Everyone is aware,” an administration official said.

Jerome M. Hauer, acting assistant secretary for emergency preparedness at the Department of Health and Human Services, said the agency hoped to send planning documents on how to best conduct mass vaccinations to cities and states in the next week or two. Mr. Hauer added that logistics changes to that end were under way at the Centers for Disease Control and Prevention in Atlanta, which oversees the production, safekeeping and distribution of the nation’s stockpile of smallpox vaccine.

Other details of the plans, such as who would receive peacetime vaccinations, have yet to be approved by

Critics had said the ring approach, while useful in battling natural outbreaks, would do little or nothing against a moderately skilled enemy intent on mayhem.

“Unless the initial attack is very small and the infectiousness of the agent is quite mild, ring vaccination is not going to do much good,” said Edward H. Kaplan, a Yale public health specialist who questioned the method’s value at a federal meeting in Washington three weeks ago.

In a report, the Cato Institute, a policy group in Washington, called ring vaccination “woefully inadequate for countering a direct attack.”

Critics argued that a number of factors had diminished the method’s effectiveness since the disease was eradicated in 1980: populations are now increasingly mobile, levels of immunity are very low and advanced technologies have become commonplace, raising the odds that a smallpox attacker would be at least moderately skilled.

“Today it’s a totally different scenario,” said William J. Bicknell, an international health expert at Boston University who recently faulted federal smallpox policy at a Cato meeting. The ring plan, he declared flatly in an interview, “will not work.”

Federal officials said the rising criticism played no direct role in shaping preparations for mass vaccinations.

“The key to responding to any public health emergency is flexibility,” Mr. Hauer said. “You listen to critics, but you can’t let that drive policy. You have to do what’s best for public health and national security.”

Ring vaccination, he added, was envisioned as simply a first line of defense that could quickly expand to much wider immunizations if necessary.

Mr. Hauer added that the ring strategy was inherently small-scale because it required health profes-



Associated Press

Dr. Donald A. Henderson, science adviser to the secretary of health.

sionals to carefully trace the whereabouts and contacts of infected people. Such work is so hard and time consuming, he noted, that ring vaccination is unsuitable as the only means of fighting a wide epidemic.

He said another complication could arise if the disease broke out simultaneously in multiple cities, suggesting a strike of unknown size and danger. In that case, he said, “the forces pressing you to mass vaccinate become greater.”

Dr. Henderson, the chairman of the Secretary’s Council on Public Health Preparedness at the Department of Health and Human Services,

A more aggressive approach that comes amid growing criticism.

said critics have falsely portrayed the government as relying exclusively on ring vaccination.

“Let me be clear,” he said. “If there is an emergency, and if we have to vaccinate widely, we need to be ready for it. That’s what we’re doing.”

Mass vaccinations are not without risk because the smallpox vaccine uses a live virus, vaccinia, a cousin of smallpox, that on occasion can cause brain damage or even kill. In the days of wide vaccination, roughly one person in a million died.

The risk may be greater for people with weakened immune systems, like AIDS patients or people undergoing chemotherapy.

U.S. Plans to Vaccinate 500,000 Workers Against Smallpox to Prepare for Outbreak

the added steps, officials said, will make it possible to move far more aggressively if a terrorist attack ends up infecting more than 100 people or so.

At a June 15 public forum in Washington on federal smallpox vaccination policy, Dr. Kaplan, of Yale, presented a study done with colleagues from the Massachusetts Institute of Technology that described how smallpox attack could affect crowded metropolitan region in New York City. What began as 1,0 infections at a train station or airport, he said, would spiral over weeks and months into 97,000 deaths if fought with ring vaccination alone.

“By contrast,” he said, “post-attack mass vaccination would rest in only 525 deaths” from the smallpox virus, which takes about 17 weeks to develop in the body before symptoms become obvious.

Some federal officials call the study unrealistic. But at the meeting such ideas gained force as new evidence came to light on how powdered smallpox can be used as a biologic weapon.

Dr. Alan P. Zelicoff, a smallpox expert at the Sandia National Laboratories, reported that he and experts from the Monterey Institute International Studies had linked 1971 outbreak in the Kazakh Republic to a Soviet field test of weaponized smallpox.

Dr. Zelicoff, a physician, quoted former Soviet official as saying if accident occurred when a plume of smallpox germs sailed about 10 miles on the wind.

By the meeting’s end, medical experts were questioning not only the ring plan but also federal assertion that the smallpox threat is low.

Dr. Kenneth I. Berns, president of the Mount Sinai Medical Center in New York City, said he judged it probability that Iraq possessed weaponized smallpox as “reasonably high” and that Saddam Hussein would use such germs in a war against the United States as “quite high.”

“That’s the confounding issue that we all face,” Dr. Berns told the forum, according to a transcript.

Frank public discussion of the Iraqi threat, he added, “is absolutely essential.”

In interviews, officials of the Department of Health and Human Services declined to comment on federal threat assessments but detailed wide contingency planning for mass smallpox vaccinations.

On June 20, a federal panel known as the Advisory Committee on Immunization Practices backed the idea of immunizing some emergency workers before any attack. Expert estimated that the immunization would go to some 15,000 health care and law enforcement workers who would be most likely to respond to biological attack and come in contact with victims.

But Dr. Henderson, the health department’s senior adviser on bioterrorism, said the tentative new plan was for many more to be vaccinated. “We could easily be at a half-million without too much difficulty,” he said. Wide peacetime vaccinations, he said, would help educate not only the nation’s medical community on the practical aspects of smallpox immunization but also the public.

If the peacetime group suffers a couple of deaths, “there will be a lot of publicity and concern,” Dr. Henderson said. “It’s a question of how people are going to respond.”

GIVE TO THE FRESH AIR FUND

The New York Times

Reuters

HOME
 JOB MARKET
 REAL ESTATE
 AUTOMOBILES
 NEWS

International
 National
 Politics
 Business
 Technology
 Science
 Health
 Sports
 New York Region
 Education
 Weather
 Obituaries
 NYT Front Page
 Corrections

OPINION
 Editorials/Op-Ed
 Readers' Opinions

FEATURES
 Arts
 Books
 Movies
 Travel
 Dining & Wine
 Home & Garden
 Fashion & Style
 New York Today
 Crossword/Games
 Cartoons
 Magazine
 Week in Review
 Photos
 College
 Learning Network

SERVICES
 Archive
 Classifieds
 Personals
 Theater Tickets
 Premium Products
 NYT Store
 NYT Mobile
 E-Cards & More
 About NYTDigital
 Jobs at NYTDigital
 Online Media Kit
 Our Advertisers

MEMBER CENTER
 Your Profile
 E-Mail Preferences
 News Tracker
 Premium Account
 Site Help
 Privacy Policy

NEWSPAPER
 Home Delivery
 Customer Service
 Electronic Edition
 Media Kit
 Text Version

SEARCH [Go to Advanced Search/Archive](#)
 Past 30 Days

Experts Urge Mass Vaccination for Smallpox Attack

By REUTERS

Filed at 3:50 p.m. ET

WASHINGTON (Reuters) - Mass vaccination would save thousands more lives in a smallpox attack than the current limited strategy that has been recommended to the U.S. government, experts said on Sunday.

In a study criticizing the limited vaccination plan, they recommended federal officials be ready to vaccinate millions of people.

"Mass vaccination really leads to fewer deaths than the CDC (Centers for Disease Control and Prevention) interim plan," Lawrence Wein of the Massachusetts Institute of Technology, who worked on the study, said in a telephone interview.

Besides, he said, if there were a smallpox attack, "I think it highly likely that people would take to the streets to demand vaccination, or would flee," possibly spreading the disease even more widely.

Wein and Edward Kaplan of Yale University, both experts in modeling epidemics, published their study in Tuesday's issue of the Proceedings of the National Academy of Sciences and urged the CDC to change its current policy when it issues new guidelines later this year.

Smallpox, once a scourge that killed nearly a third of its victims and scarred the rest, was eradicated in 1979. But some countries, including Iraq and the former Soviet Union, experimented with the virus as a potential germ warfare agent.

Fearful of a smallpox attack, the U.S. government last year ordered millions of doses of smallpox vaccine -- enough, in the words of Health and Human Services Secretary Tommy Thompson, to vaccinate "every man, women and child" in the country.

PLANS FOR VACCINATING 500,000 REPORTED

Another Smallpox Plan

Study calls for mass vaccination, unlike CDC strategy

REUTERS

Washington — Mass vaccination would save thousands more lives in a smallpox attack than the current limited strategy that has been recommended to the U.S. government, experts said yesterday.

In a study criticizing the limited vaccination plan, they recommended federal officials be ready to vaccinate millions of people.

"Mass vaccination really leads to fewer deaths than the CDC interim plan," Lawrence Wein of the Massachusetts Institute of Technology, who worked on the study, said in a telephone interview.

Current federal Centers for Disease Control and Prevention policy, endorsed by the Advisory Committee on Immunization Practices last month, calls for quarantining anyone confirmed to have been infected in a smallpox attack, and vaccinating anyone who may have had contact with the infected patients. The advisory panel also recommended vaccinating potential first-line responders now as a precaution.

Wein said yesterday that, if there were a smallpox attack, "I think it highly likely that people would take to the streets to demand vaccination, or would flee," possibly spreading the disease even more widely.

The study by Wein and Edward Kaplan of Yale University, both experts in modeling epidemics, will be published in tomorrow's issue of the Proceedings of the National Academy of Sciences. In it they urge the CDC to change its policy when it issues new guidelines later this year.

Smallpox, once a scourge that killed nearly a third of its victims and scarred the rest, was eradicated in 1979. Some countries, including Iraq and the former

Soviet Union, experimented with the virus as a potential germ warfare agent.

Fearful of a smallpox attack, the U.S. government last year ordered millions of doses of smallpox vaccine — enough, in the words of Health and Human Services Secretary Tommy Thompson, to vaccinate "every man, woman and child" in the country.

Yesterday, The New York Times reported the federal government was planning to vaccinate 500,000 health care and emergency workers soon. The newspaper quoted federal officials as saying the government was laying plans for a mass vaccination of the population, just in case.

However, a U.S. Health and Human Services Department spokesman, Bill Pierce, told Reuters the number to be vaccinated had not been decided.

In their study, Kaplan and Wein ran a computer model of what would happen if someone used a smallpox weapon against a city of 10 million people. Kaplan told the advisory panel that an initial 1,000 infections could lead to 97,000 deaths.

They predicted that the policy endorsed by the advisory panel, termed ring vaccination, would lead to 4,000 more deaths than mass vaccination would — even taking into account a high rate of side effects, some deadly, from the vaccine.

Current policy takes into account that more people have suppressed immune systems now than in the 1970s, and they could be at special risk not only from the vaccine, but from people recently immunized with it.

Such people include cancer patients being treated with chemotherapy and people infected with the AIDS virus.

Experts: Mass vaccines will fight smallpox better

WASHINGTON — Mass vaccination would save thousands more lives in a smallpox attack than the current limited strategy that has been recommended to the U.S. government, experts said Sunday.

In a study criticizing the limited vaccination plan, they recommended federal officials be ready to vaccinate millions of people.

Lawrence Wein of the Massachusetts Institute of Technology and Edward Kaplan of Yale University, both experts in modeling epidemics, published their study in the current issue of the Proceedings of the National Academy of Sciences and urged the government to change its policy.

Government advisers last month said a so-called ring vaccination strategy, which would involve finding and vaccinating people who had contact with an infected person, would probably be sufficient in case of an attack. More people could be vaccinated if this approach failed, they said.



TIMES NEW
 Track news this
[Create Your Own](#)
[Take](#)
[Sign Up for](#)

TX-D460 DAILY NEWSPAPER
HOUSTON CHRONICLE
 Houston, TX
 Morning Circulation - 545,727

JULY 8, 2002

02-2827
Bacon's
 4304 P.11A

National briefs

YANKEES WIN, RED SOX LOSE; INKSTER PREVAILS IN U.S. WOMEN'S OPEN • SPORTS

America's Oldest
Continuously
Published Newspaper

Hartford Courant.

VOLUME CLXIV, NUMBER 189 COPYRIGHT 2002, THE HARTFORD COURANT CO.

MONDAY, JULY 8, 2002

15★ New Haven County/SI

SMALLPOX VACCINATIONS PLANNED

Federal Officials Want To Inoculate As Many As 500,000 Health-Care Workers

By CECI CONNOLLY
WASHINGTON POST

WASHINGTON — Federal health officials say they are finalizing a plan that would vaccinate hundreds of thousands of emergency medical personnel against smallpox this fall and expand to include other health-care and rescue workers most at risk if the deadly virus is unleashed in the

United States.

The Associated Press reported over the weekend that government officials were expected to decide by month's end how many to vaccinate — a number ranging between 10,000 and 500,000. But in interviews Sunday, senior health officials expected that the number would be at the high end of the range.

"At the end of the day, the num-

bers could be significantly greater than 500,000," said Jerome Hauer, acting assistant secretary for emergency preparedness at the Department of Health and Human Services. He said vaccinations could begin within eight weeks.

As more vaccine becomes available and experts have a chance to study adverse reactions to the inoculation, administration officials

expect to make it widely available on a voluntary basis.

What began as a small, conservative approach by the government for protecting against the unlikely event of a smallpox attack is rapidly developing into a broad, aggressive proposal. Demand for the vaccine, new projections on how easily the

PLEASE SEE SMALLPOX, PAGE A6

CONTINUED FROM PAGE A1

smallpox virus could be spread in a terrorist attack and the size and scope of America's medical profession have pushed the Bush administration to expand its view.

For now, any vaccination would be voluntary. However, even a single case of smallpox could trigger mass vaccination and quarantine, Hauer warned, because "we would assume any presentation of smallpox at this point in time is likely to be an intentional" attack, rather than a naturally occurring outbreak.

The debate over smallpox vaccination revolves around two unknowns: the likelihood of an outbreak vs. the likelihood of severe, sometimes fatal, complications from the vaccine.

Although smallpox was eradicated worldwide in 1980 and only the United States and Russia are known to hold small caches of the virus, some experts believe samples of the virus may have gotten into the hands of terrorists or rogue states.

A smallpox attack could go undetected for days or weeks, the first hint of trouble coming in the form of a mysterious rash. There is no known cure for the disease, and because it is highly contagious it could spread quickly.

Even with the slim chance of an attack, the Bush administration is moving rapidly on several fronts to prepare for one — stockpiling millions of doses of vaccine, developing a quarantine plan and negotiating with interest groups such as the truckers' association that want vaccine for their workers.

Last month, a panel of scientific experts recommended a limited vaccination plan targeting small teams of health-care workers who would be protected in the event of an outbreak. The panel, arguing that the risk of serious side effects outweighed fears of an outbreak, estimated 20,000 people nationwide would be inoculated as a preventive measure. Complications include a sore arm, low-grade fever, encephalitis (brain inflammation) and even death.

The group also endorsed traditional "ring vaccinations" of isolating infected patients and people in close contact with them to contain the outbreak.

Health and Human Services

Secretary Tommy Thompson, who will decide the policy, is likely to go far beyond the panel's position, said several of his top advisers.

"We're going to have to have a large number of people vaccinated," said D.A. Henderson, chairman of the Council on Public Health Preparedness at HHS. His rough count of emergency department staffs at one-fifth of the nation's 5,000 hospitals puts the number at 250,000.

Firefighters, police officers and doctors and nurses in private practice could quickly be added to the list, said Hauer. Some states have lobbied for a supply of vaccine — and some federal officials privately concede they might be legally obligated to provide it.

Most Americans older than 30 were inoculated for smallpox as children, but medical experts doubt the vaccine would still protect them from disease.

Julie Gerberding, the new director of the Centers for Disease Control and Prevention, said in an interview last week that in a series of conference calls medical associations, hospital groups and public health workers were pressing for more widespread vaccination of their workers.

"It's an unfolding process," she said, noting the vaccination program could expand in coming months. Plans for a larger vaccination program were first reported in Sunday's New York Times. In interviews Sunday, officials stressed that Thompson has yet to approve a final plan.

The federal government already has more than 75 million doses of vaccine and by year's end expects to purchase enough for every American.

But as Thompson's aides attempted to craft an implementation plan they found "it's much more complicated than one might imagine," said Henderson.

Each vial in the U.S. stockpile contains 100 doses of vaccine, which would be diluted five times. That means groups of 500 people would have to be inoculated at once, since vaccine loses its potency once a vial is opened.

Thompson's team is also debating whether to require an HIV test for anyone receiving the vaccine, since it could be harmful to people with weakened immune systems.



782
cx221a
Burrelles
INFORMATION SERVICES
LC
5 .A-9.n



258
cx22ag
Burrelles
INFORMATION SERVICES
LC
27 .A-9.n

U.S. May Offer Smallpox Vaccine To Many More Health Workers

By SARAH LUECK
And MARILYN CHASE

WASHINGTON—Federal officials are considering offering the smallpox vaccine to far more health-care workers than a federal advisory panel had outlined.

"Closer to one million or 1.5 million" hospital workers, infectious-disease experts and others who would respond to a federal bioterror attack may get vaccine, a federal official said. Health and Human Services Secretary Tommy Thompson is expected to review policy options next week in order to provide guidelines for state and local officials, who will help determine which workers should be offered the vaccine.

Last month, the federal advisory panel had recommended a policy that would result in roughly 10,000 to 20,000 health-care workers and "first responders" being offered the vaccine. The recommendation called for workers to be offered the vaccine and for certain hospitals and other facilities to be designated to receive smallpox patients.

But health officials worry that in the event of an attack, patients with smallpox may not know they should go to a specific hospital and could expose staff members at the location they visit first. In addition, hospitals are reluctant to take on the designation as a smallpox facility.

Before it was eradicated world-wide in 1972, smallpox killed millions of people and scarred millions more. The U.S. had topped general vaccination for smallpox in 1972. Now, half the U.S. population lacks immunity to smallpox, and it is unclear whether decades-old vaccinations offer any protection.

Though federal officials say the risk of a terrorist attack using smallpox is low, Sept. 11 and the anthrax attacks last fall have raised fears of bioterrorism.

Preattack vaccinations of health-care workers could start as soon as this fall, and the inoculations would be voluntary. The vaccine itself carries risks.

HHS officials are struggling to craft a smallpox-vaccine policy that is in line with the panel's recommendation and conserves the nation's stockpile of vaccine while providing enough people with protection from smallpox so they could respond to an outbreak.

Jerome M. Hauer, assistant secretary

of HHS's Office of Emergency Public Health Preparedness, said the number of people receiving preattack vaccinations depends on what Mr. Thompson decides. Yesterday the New York Times reported that as many as 500,000 people could get the vaccine. But Mr. Hauer said that "if the recommendations are broadened" from those of the federal advisory panel, the number could be higher.

As the government works out its policy, a new study by management experts at Yale University and the Massachusetts Institute of Technology argues that mass vaccination of Americans, not targeted "ring" vaccinations, would be the best response to an actual smallpox attack.

In the event of a bioterror attack on a major U.S. city, over 4,000 more smallpox deaths would occur using ring vaccination, the study argues. In ring vaccination, only those who have had close contact with infected people would be vaccinated. The Yale-MIT study says in today's densely populated, mobile society that approach would result in a larger outbreak, taking longer to control, and spawning more panic than would mass vaccination.

The study used mathematical models to compare casualties and the length of time needed to contain a smallpox epidemic. The study by Edward Kaplan of the Yale School of Management, Lawrence Wein of the MIT Sloan School and David Craft of the Operations Research Center at MIT, is scheduled to be published tomorrow in the Proceedings of the National Academy of Sciences.

HHS's Mr. Hauer said in an interview yesterday that while the department was discussing the study with its authors and weighing all available data, the problem with such studies, based on mathematical models, is that they are theoretical. U.S. health officials—after soliciting comments by a range of doctors, epidemiologists and public-health veterans—have so far resisted the idea of mass vaccination even in the event of an attack because of the risk of potential fatal side effects.

Mr. Hauer said the federal response to a smallpox outbreak would vary depending on how many cases there were, how many cities were affected and other factors and that entire states could be vaccinated if necessary. "Our strategy has to be very flexible in response to an event," Mr. Hauer said.

By SARAH LUECK
And MARILYN CHASE

WASHINGTON—Federal officials are considering offering the smallpox vaccine to far more health-care workers than a federal advisory panel had outlined.

"Closer to one million or 1.5 million" hospital workers, infectious-disease experts and others who would respond to a bioterror attack may get vaccine, a federal official said. Health and Human Services Secretary Tommy Thompson is expected to review policy options next week in order to provide guidelines for state and local officials, who will help determine which workers should be offered the vaccine.

Last month, the federal advisory panel had recommended a policy that would result in roughly 10,000 to 20,000 health-care

workers and "first responders" being offered the vaccine. The recommendation called for select health and emergency workers to be offered the vaccine and for certain hospitals and other facilities to be designated to receive smallpox patients.

But health officials worry that in the event of an attack, patients with smallpox may not know they should go to a specific hospital and could expose staff members at the location they visit first. In addition, hospitals are reluctant to take on the designation as a smallpox facility.

Before it was eradicated world-wide in 1980, smallpox killed millions of people and scarred millions more. The U.S. had stopped general vaccination for smallpox in 1972. Now, half the U.S. population lacks immunity to smallpox and it is unclear whether decades-old vaccinations offer any protection.

Smallpox-Vaccine Plan Is Reviewed

Though federal officials say the risk of a terrorist attack using smallpox is low, Sept. 11 and the anthrax attacks last fall have raised fears of bioterrorism.

Preattack vaccinations of health-care workers could start as soon as this fall, and the inoculations would be voluntary. The vaccine itself carries risks.

HHS officials are struggling to craft a smallpox-vaccine policy that is in line with the panel's recommendation and conserves the nation's stockpile of vaccine while providing enough people with protection from smallpox so they could respond to an outbreak.

Jerome M. Hauer, assistant secretary of HHS's Office of Emergency Public Health Preparedness, said the number of people receiving preattack vaccinations depends on what Mr. Thompson decides. Yesterday the New York Times reported that as many as 500,000 people could get the vaccine. But Mr. Hauer said that "if the recommendations are broadened" from those of the federal advisory panel, the number could be higher.

As the government works out its policy, a new study by management experts at Yale University and the Massachusetts Institute of Technology argues that mass vaccination of Americans, not targeted "ring" vaccinations, would be the best response to an actual smallpox attack.

In the event of a bioterror attack on a major U.S. city, over 4,000 more smallpox deaths would occur using ring vaccination, the study argues. In ring vaccination, only those who have had close contact with infected people would be vaccinated. The Yale-MIT study says in today's densely populated, mobile society that approach would result in a larger outbreak, taking longer to control, and spawning more panic than would mass vaccination.

The study used mathematical models to compare casualties and the length of time needed to contain a smallpox epidemic. The study by Edward Kaplan of the Yale School of Management, Lawrence Wein of the MIT Sloan School and David Craft of the Operations Research Center at MIT, is scheduled to be published tomorrow in the Proceedings of the National Academy of Sciences.

HHS's Mr. Hauer said in an interview yesterday that while the department was discussing the study with its authors and weighing all available data, the problem with such studies, based on mathematical models, is that they are theoretical. U.S. health officials—after soliciting comments by a range of doctors, epidemiologists and public-health veterans—have so far resisted the idea of mass vaccination even in the event of an attack because of the risk of potential fatal side effects.

Mr. Hauer said the federal response to a smallpox outbreak would vary depending on how many cases there were, how many cities were affected and other factors and that entire states could be vaccinated if necessary. "Our strategy has to be very flexible in response to an event," Mr. Hauer said.

U.S. May Offer Smallpox Vaccine To Many More Health Workers

By SARAH LUECK
And MARILYN CHASE

WASHINGTON—Federal officials are considering offering the smallpox vaccine to far more health-care workers than a federal advisory panel had outlined.

"Closer to one million or 1.5 million" hospital workers, infectious-disease experts and others who would respond to a bioterror attack may get vaccine, a federal official said. Health and Human Services Secretary Tommy Thompson is expected to review policy options next week in order to provide guidelines for state and local officials, who will help determine which workers should be offered the vaccine.

Last month, the federal advisory panel had recommended a policy that would result in roughly 10,000 to 20,000 health-care workers and "first responders" being offered the vaccine. The recommendation called for select health and emergency workers to be offered the vaccine and for certain hospitals and other facilities to be designated to receive smallpox patients.

But health officials worry that in the event of an attack, patients with smallpox may not know they should go to a specific hospital and could expose staff members at the location they visit first. In addition, hos-

Jerome M. Hauer, assistant secretary of HHS's Office of Emergency Public Health Preparedness, said the number of people receiving preattack vaccinations depends on what Mr. Thompson decides. Yesterday the New York Times reported that as many as 500,000 people could get the vaccine. But Mr. Hauer said that "if the recommendations are broadened" from those of the federal advisory panel, the number could be higher.

As the government works out its policy, a new study by management experts at Yale University and the Massachusetts Institute of Technology argues that mass vaccination of Americans, not targeted "ring" vaccinations, would be the best response to an actual smallpox attack.

In the event of a bioterror attack on a major U.S. city, over 4,000 more smallpox deaths would occur using ring vaccination, the study argues. In ring vaccination, only those who have had close contact with infected people would be vaccinated. The Yale-MIT study says in today's densely populated, mobile society that approach would result in a larger outbreak, taking longer to control, and spawning more panic than would mass vaccination.

The study used mathematical models to compare casualties and the length of time needed to contain a smallpox epidemic. The

2A · MONDAY, JULY 8, 2002 · USA TODAY

Study: U.S. should widen smallpox plan

Reseachers say mass vaccination would save more lives than 'ring'

By Dan Vergano and Steve Sternberg
USA TODAY

The government should consider abandoning plans to vaccinate a limited number of people after a smallpox bioterrorism attack and instead adopt mass public vaccinations, say researchers who have analyzed the number of deaths that would follow both plans.

Even considering possible side effects, a citywide mass vaccination would save more lives, the researchers report today in the *Proceedings of the National Academy of Science*.

For example, after a 1,000-person outbreak of smallpox in a city of 10 million people, the government's limited plan would result in 4,680 deaths, compared with 560 after immediate mass vaccination, the researchers found.

Interim guidelines of the Centers for Disease Control and Prevention now call for "ring" vaccination: Quarantine the smallpox victims and vaccinate and monitor people they might have contacted. Only the CDC director can allow mass vaccinations about four weeks after a large outbreak.

In the study, researchers led by Edward Kaplan of Yale's School of Management and School of Medicine found that ring vaccination saves more lives than immediate mass vaccination only in outbreaks that start with a few people who infect few others. Bioterrorism might not follow that pattern.

"Be realistic," Kaplan says. "The public won't let ring vaccination happen because of panic after an outbreak is announced, so we should be planning for a mass vaccination anyway."

Smallpox, a contagious virus, was officially eradicated in 1979, but fears of bioterrorists using it have grown since last year's anthrax attacks through the mail. The virus' symptoms can take two weeks to appear after exposure. Infection leads to fever, rash, skin lesions — and, finally, death in about 30% of cases.

Even starting with a handful of people initially infected, ring vaccination saves more lives only when each victim infects fewer than 1.4 other people, on average, the researchers found.

The government plans to have about 300 million doses of smallpox vaccine by 2003. In May, a University of Michigan analysis suggested that widespread vaccination of the U.S. population, about 280 million people, would cause 200 to 300 deaths from vaccine side effects.

Anthony Fauci, director of the National Institute of Allergy and Infectious Diseases, says an outbreak would represent a "flexible situation" in which the administration would immediately consider widening the vaccination campaign to include thousands of health care workers.

A *New York Times* article Sunday said that the government plans to inoculate 500,000 health care and emergency workers with the vaccine. Bill Pierce, a spokesman for the Health and Human Services Department, says officials are weeks away from making such a decision.

In January, states were asked to make mass vaccination plans for many diseases, not just smallpox.



Search by Words

Search by Company

Search by Industry

Search by Person

Important information
about Unavailable articles.

Customize This Area

Set your preferences for the number of headlines displayed, article format and more.

DOW JONES

Format to Print/Save

[Return to Headlines](#)

Article 10

REUTERS

USA: Smallpox vaccine is oldest, least safe.

By Maggie Fox, Health and Science Correspondent

07/08/2002

Reuters English News Service

(C) Reuters Limited 2002.

WASHINGTON, July 8 (Reuters) - When Edward Jenner tested his experimental vaccine against smallpox in 1796, he scraped the oozing pustule of a calf infected with cowpox and used a knife to press it into the skin of a small boy.

Today's vaccine is not much more advanced, although the boy escaped smallpox infection and the modern vaccine eradicated the disease.

But a vaccine that uses a live virus is harder to control, and this is the problem that U.S. health officials are struggling with in trying to decide who to vaccinate against smallpox.

Smallpox was declared eradicated in 1980, but the United States is worried that the virus may be used in a biological attack. The U.S. government is working to "stretch out" existing supplies of vaccine by diluting it and has ordered millions of new doses.

Routine vaccination stopped in the 1970s, so there has been no incentive to update the old tried-and-true vaccine to modern standards.

It is made from the lymph of heifers infected with cowpox - a virus so closely related to smallpox that the body uses the same defenses for both. A person who has been infected with cowpox, a usually benign virus, is immune to smallpox.

The lymph in the vaccine is literally scraped from the pustules that cowpox causes in a calf.

FILTERING THE HAIR OUT

Dr. Donald Henderson, who helped lead the global campaign that wiped out smallpox as a naturally occurring disease, describes it as being made by "scraping the blisters off an infected calf and filtering the hair out."

Because of this crude manufacturing method, and because the vaccine uses a live virus, it had a relatively high rate of side-effects, compared to more modern vaccines such as those against measles and hepatitis.

About three of every 1 million people who got the old DryVax smallpox vaccine developed encephalitis, an inflammation of the brain, and two in 1 million died. Anywhere between seven and nine people, mostly infants, died every year in the United States from the smallpox vaccine.

During the last U.S. smallpox outbreak, in New York in 1947, 11 people got

REUTER NEWS REPORT

NEW YORK, NY
MONDAY
JUL 8 2002



Burrelles
INFORMATION SERVICES

2 .XZ..8 1 XX.... RC

Interview: Edward Kaplan, professor of public health at the Yale School of Medicine, talks about if, when and how Americans should be vaccinated against small pox

07/08/2002

NBC News: Today

(c) Copyright 2002, National Broadcasting Company, Inc. All Rights Reserved.

KATIE COURIC, co-host: **Edward Kaplan** is a professor of Public Health at Yale Medical School, and the Beech professor of management sciences at the **Yale School of Management**.

Professor Kaplan, good morning.

Mr. **EDWARD KAPLAN** (Yale School of Medicine): Good morning, Katie.

COURIC: What do you think about this more aggressive proposal to vaccinate at least 500,000 health care workers who may be sort of the first line of defense in the event of a small pox attack?

Mr. KAPLAN: I think it's exactly the right thing to do. We have to have people who are themselves protected, who could then go out and protect the rest of us in the event of an emergency.

COURIC: This is all based on--on a policy called ring vaccinations. Can you explain what that means?

Mr. KAPLAN: Well the ring vaccination policy actually refers not to the first line responders, but to cases in the general population. The idea is that when people would become symptomatic, and recognized, they would be instantly isolated, they would be interviewed to determine who their contacts have been recently. Their close contacts and contacts of those contacts would all be vaccinated. So that's what the ring vaccination idea is.

COURIC: And that's something that you don't necessarily agree with?

Mr. KAPLAN: That's correct. The research that my colleagues at MIT and I have conducted suggests that unless the initial attack is very small, and the infectiousness of the agent is very mild, ring vaccination is unlikely to contain the spread of small pox in large attacks.

COURIC: So what then, Professor Kaplan, should the strategy be?

Mr. KAPLAN: We would suggest that upon recognizing that a large attack has taken place, that one should immediately begin mass vaccination in the area of the attack. The idea is to quickly immunize as large a percentage of the population as possible, rather than trying to go out and find who specifically has either been infected--been infected recently, or perhaps is most likely next in line.

COURIC: But I understand, Professor Kaplan, that--that small pox can basically lie dormant, and it takes about four days for, I guess, the initial symptom, which is a mysterious rash. Doesn't it make more sense to--to vaccinate people prior to attack--to do something prophylactically?

Mr. KAPLAN: Whether one wants to vaccinated prophylactically or not depends in my view, strongly, not only on the risk of an attack, but also upon what one's plan is for responding post attack. If I have great confidence that in the post attack response plan the epidemic can be halted very, very quickly, then the pressure to pre-vaccinate goes down. On the other hand, if I don't have confidence that the plan can contain the spread, then of course it would make more sense to vaccinate pre-attack.

COURIC: Well let me go back to the--my question. If you don't know you've been exposed to small pox until you actually have symptoms of--of the disease, can you really get to it in time after, you know, post attack?

Mr. KAPLAN: The idea with a post attack mass vaccination is indeed you would get to the majority, the overwhelming majority of the population in time. It is believed that vaccinations within a four-day window after exposure can prevent, in many cases, the development of the--the development of symptoms. By the way, the time between infection and symptoms is not four days, it's more on the order of 14 days. Four days refers to this

Bacon's TVNewsClips



Client: 4304 PNAS
Program: News 2 at Noon
Station: WCBS
Market: NEW YORK
Airdate: Jul 08, 2002 12:00:00
Running-Time: 00:00:00

News 2 at Noon

Ted Williams and children are fighting over what to do with their father coming out tomorrow and the proceedings of the national academy ring vaccination and says that mass vaccination might save 4,000 recommended. So the timing of all this talk is interesting, but the us on August 1st.

02-2827



Order today and save
over 20% at fye.com
for your entertainment





News
Business
Sports
Local
Health
Tech • Science
Living • Travel
TV News
Opinions
Weather
Shop@MSNBC
MSNBC.com



Find a Local Business

ANTHRAX AND BIOTERROR

Complete coverage

U.S. weighs smallpox plans



Today show

Reports of shots
for 500,000 workers
called premature

Edward Kaplan, professor of public health at
Yale School of Medicine, discusses the nation's
smallpox plans on 'Today.'

Free Windows Media Player [PLAY VIDEO](#)

By Maggie Fox
REUTERS

July 8 — U.S. health officials said on Monday
they are considering the possibility of mass
inoculations to combat a smallpox attack.
Although they are still formulating the policy, a
spokesman said such a widespread effort was
among the scenarios being weighed in the event
of any smallpox attack.

[E-MAIL THIS](#)  [COMPLETE STORY](#) 

ADVERTISING ON MSNBC

RESOURCE GUIDE

- Yellow Pages
- Auctions at uBid
- Personals Channel
- Professional Tips
- Newsletters
- Shopping

SPONSORS



Adverti:
[Shop](#)

Xena:
\$39.
d
NEW
Mo
S
GI
odr



Search

Go!

[Medical Library](#)[Cool Tools](#)[Fitness & Nutrition](#)[Lifestyle & Wellness](#)[Women's Health](#)[Men's Health](#)[Senior Health](#)[Children's Health](#)[Pregnancy & Baby](#)[Alternative Health](#)[Ills & Conditions](#)[Work & Health](#)[Self-Care Centers](#) **NEW!**[Ask the Experts](#) **NEW!**[Health Decision Guide](#)[MayoClinic.com](#)[Blue Cross Blue Shield of Minnesota](#)**COMPLEMENTARY CARE**[Acupuncture](#)[Massage therapy](#)[Fitness centers](#)[Product catalog](#)**COOL TOOLS**[Quizzes](#)[Polls](#)[Calculators](#)[Ask the Experts](#)**MEDICAL LIBRARY**[Drug Database](#)[Herb Index](#)[Health A-Z](#)[Book Reviews](#)[First Person Essays](#)

In the News

[Printer-friendly version](#)

Study Urges Mass Inoculation Against Smallpox

A mathematical model says that the existing U.S. strategy of containment would kill more people than vaccinating everyone in an affected community.

By Adam Marcus

MONDAY, July 8 (HealthScoutNews) -- The government's vaccination strategy to combat a smallpox attack by containment would likely cost thousands more lives more than a wider inoculation effort, according to a new analysis.

The smallpox vaccine is highly effective against the virus, but in a small percentage of people it can cause serious and potentially fatal side effects.

Health officials therefore believe that the risks of a mass immunization campaign outweigh the odds of a bioterrorism attack with smallpox -- at least so far. Instead, the Centers for Disease Control and Prevention has advocated a policy of "ring vaccination" and quarantines to contain the deadly virus, which the World Health Organization declared eradicated in 1980.

In this strategy, smallpox vaccine is given as needed to successively wider circles of people who've come into contact with the infection. Only if this approach fails to stem the outbreak would the government proceed with a mass inoculation plan.

However, the three disease modelers -- Edward Kaplan of Yale University and Lawrence Wein and David Craft of the Massachusetts Institute of Technology -- found that in a hypothetical attack on a city with 10 million inhabitants, mass inoculation is the best strategy for reducing deaths.

Last month, an advisory panel for the CDC recommended immunizing roughly 15,000 emergency workers, hospital staff and other "first responders" likely to encounter the disease early in an attack. Officials now believe that number may ultimately reach 500,000, and the government is making plans for a massive public vaccination effort if needed.

Kaplan, Wein and Craft, who report their calculations this week in the *Proceedings of the National Academy of Sciences*, assume 1,000 people are



The New York Times

This copy is for your personal, noncommercial use only. You can order presentation-ready copies for distribution to your colleagues, clients or customers, please click here or use the "Reprints" tool that appears next to any article. Visit www.nytimes.com for samples and additional information. Order a reprint of this article now. »

July 8, 2002

Study Uses Math Model to Determine Effects of a Smallpox Attack

By WILLIAM J. BROAD

A new study finds large differences in how four different vaccination strategies would fight a smallpox terror attack, with the best resulting in 440 deaths and the worst 110,000 deaths.

The study used a mathematical model to compare how an attack on a large city that infected 1,000 people would progress when countered with diverse vaccination plans meant to halt the spread of the highly contagious disease.

In all cases, the mass vaccination of the United States population worked far better than limited, local immunizations — a strategy the federal government has tended to prefer.

"We find that mass vaccination results in both far fewer deaths and much faster epidemic eradication," the authors conclude. In the best case, the epidemic was stopped in 115 days and in the worst 350 days.

The new analysis is being published this week in the online edition of Proceedings of the National Academy of Sciences. Its authors are Edward H. Kaplan, a public health specialist at Yale University, and David L. Craft and Lawrence M. Wein, both of the Massachusetts Institute of Technology.

Ever since smallpox was eradicated from human populations decades ago, federal officials have resisted mass vaccination because the vaccine uses a live virus that can cause severe side effects and even kill. In the days of wide vaccination, roughly one person in a million died.

But federal policy is in flux because of fears of bioterrorism. Although today only Russia and the United States have declared stocks of the virus, experts say clandestine supplies probably exist.

Most people are now considered vulnerable because immunity is thought to wane over time. The United States stopped routine vaccinations in 1972. Smallpox kills roughly 1 in 3 victims who are unvaccinated.

Vaccination can save even infected people because the vaccine, if given within four days of exposure to the virus, halts the disease's advance.

NEW YORK TIMES
(NATIONAL EDITION)

NEW YORK, NY
TUESDAY 248,860
JUL 9 2002



Burrelle's
INFORMATION SERVICES
4805 .xz1a 1 .a.... QK

Study Favors Different Tack On Smallpox

By WILLIAM J. BROAD

A new study finds large differences in how four different vaccination strategies would fight a smallpox terror attack, with the best allowing 440 deaths and the worst 110,000 deaths.

The study used a mathematical model to compare how a smallpox attack on a large city that infected 1,000 people would progress when countered with diverse vaccination plans meant to halt the spread of the highly contagious disease.

In all cases, the mass vaccination of the United States population worked far better than limited, local immunizations, a strategy the federal government has tended to prefer.

"We find that mass vaccination results in both far fewer deaths and much faster epidemic eradication," the authors concluded.

In the best case, the hypothetical epidemic was halted in 115 days and in the worst, 350 days.

The new analysis is being published this week in the online edition of Proceedings of the National Academy of Sciences. Its authors are Edward H. Kaplan, a public health specialist at Yale University, and David L. Craft and Lawrence M. Wein, both of the Massachusetts Institute of Technology.

Ever since smallpox was eradicated from human populations decades ago, federal officials have resisted mass vaccination because the vaccine uses a live virus that can cause severe side effects and even kill. In the days of widespread vaccination, roughly one person in a million receiving the vaccine died.

But federal policy is in flux because of fears of bioterrorism. Although today only Russia and the United States are known to have stocks of the virus, experts say clandestine supplies probably exist.

Most people are considered vulnerable to a smallpox attack because immunity is thought to wane over time. The United States stopped routine vaccinations in 1972. Smallpox kills roughly one in three victims

THE NEW YORK TIMES, TUESDAY, JULY 9, 2002

The vaccination method promoted by federal authorities is found wanting.

who are unvaccinated.

Vaccination can save even infected people because the vaccine, if given within four days of exposure to the virus, halts the disease's advance.

The new study, coming amid rising criticism of federal policy in recent months, claims to be the first to make detailed comparisons of the vaccination options. It is an elaboration of a preliminary presentation that Dr. Kaplan gave at a federal meeting in Washington on June 15.

The study found the least effective method to be "ring vaccination," the primary way smallpox was eradicated from human populations. It consists of isolating infected patients and vaccinating people found to be in close contact with them, forming a ring of immunization around any outbreak and a barrier to its spread.

In the hypothetical attack, ring vaccination allowed 367,000 cases of smallpox and 110,000 deaths and took 350 days to extinguish the outbreak.

By contrast, mass vaccinations carried out as soon as authorities became aware of an attack — smallpox takes roughly two weeks to incubate in the body and show symptoms — would result in 1,830 cases and 560 deaths within 115 days.

The study found that if the authorities were overwhelmed and decided belatedly to switch from ring-to-mass vaccination on the 33rd day of the crisis, the effect would still be considerable, 15,570 cases and 4,680 deaths.

"The cost of waiting," the authors said, "is very high — 4,120 incremental deaths."

The study found that the vaccination of the United States population before an attack worked best of all to cut fatalities.

If only 40 percent of the population were immunized before any such attack, the same attack followed by wider mass vaccinations would produce 440 deaths. But if followed with ring vaccinations, the result would be 40,000 deaths.

"Unless preattack vaccination is used," the authors concluded, serious consideration should be given to dropping federal plans for ring vaccination in favor of mass immunizations "in the event of a smallpox attack in a large urban center."

WA-D170 DAILY NEWSPAPER
SEATTLE POST-INTELLIGENCER
Seattle, WA

Morning Circulation - 169,105

JULY 9, 2002



02-2827
Bacon's

NATION

Plans readied for smallpox quarantine

Health officials want to be prepared to isolate people in case of bioterror attack

BY LAURA MECKLER
The Associated Press

ATLANTA - Federal health officials are quietly making plans for quarantining Americans who might be exposed to a highly contagious smallpox patient, addressing sensitive questions of how to hold people, possibly against their will, in case of a bioterror attack.

The planning, still in draft form, addresses logistical and policy questions, including where people would be kept while waiting for officials to confirm a smallpox case and, if necessary, administer vaccinations.

"It's not pretty to think through these type of doomsday scenarios, but it's important to

start to put yourself there and imagine things unfolding if you want to anticipate how to react," said Dr. Marty Cetron, a quarantine expert at the Centers for Disease Control and Prevention.

Within the next few weeks, the plan will be circulated among top federal officials and others involved in the preparation, said Cetron, a member of a CDC working group on the issue.

The group began with this scenario: Officials get word that an international flight is headed for the United States with a smallpox-infected passenger aboard. The case would be fairly easy because the people would be in one place and health officials wouldn't have

to track them down.

Still, if the passengers weren't held for treatment, CDC experts estimate that a plane filled with 500 people including one with smallpox could result in dozens - maybe hundreds - of sick people, including passengers on the plane who got sick and the people they would infect.

The vaccine is only effective within four days of someone being exposed to smallpox, so if people leave the scene it would be difficult to find them in time.

Under the plan, officials would stress that people would be better off staying in quarantine because that's where the vaccine and other medications would be available. That's a big change from past centuries, when people in quarantine were written off.

Once planning is complete for this scenario, the CDC group plans to tackle more complicated situations, such as a smallpox patient in a sports stadium.

Smallpox was declared eradicated in 1980, but samples of the deadly virus still exist in both the United States and Russia. Bioterrorism experts consider the possibility of a smallpox attack one of the most frightening, albeit unlikely, threats because one infected patient could infect many others.

Routine immunizations against smallpox in the United States ended in 1972, meaning many Americans have no protection against the disease. Federal officials are now considering vaccinating as many as 500,000 health care workers and emergency personnel who would be first to see any smallpox case. But because the vaccine carries significant risks, including death, officials do not want to resume mass vaccinations - a point President Bush made yesterday.

"I worry about calling for a national vaccination program and that it could cause a loss of life," Bush said at a news conference.

Rather, the plan is to vaccinate others

only if they are exposed to the virus, or exposed to someone who is exposed. Another alternative - one endorsed yesterday in a study in the Proceedings of the National Academy of Sciences - would be mass vaccinating all Americans if a smallpox case emerged. The authors of that study predicted significantly fewer people would die using a mass vaccination strategy.

The airliner scenario is not entirely fictitious. In December, a flight from Taiwan bound for Newark, N.J., was delayed for about four hours in Seattle after an anonymous tipster told U.S. Customs Service agents that a passenger had smallpox. It turned out to be a hoax, but the situation provided a real-life example of how people on the plane reacted.

"People got really scared because they sat there on a plane for two hours without any idea what was going on," said Kristy Lillibridge, an epidemiologist.

AS smallpox response

07/09/2002

Associated Press Newswires

Copyright 2002. The Associated Press. All Rights Reserved.

Mass Vaccination May Be Best Response to Smallpox Attack, Say **Yale School of Management** and M.I.T. Sloan Experts

ATTENTION: Health Policy editors

NEW HAVEN, Conn., July 9 (AScribe Newswire) -- In the event of a smallpox attack, a mass vaccination policy would result in fewer deaths and faster disease eradication than alternative vaccination strategies, reports a new study published in Proceedings of the National Academy of Sciences (article 2827). Since the terrorist attacks of September 11, the best response to a smallpox attack has been a topic of hot debate.

Yale School of Management expert Edward Kaplan, the William N. and Marie A. Beach Professor of Management Sciences & Professor of Public Health, and colleagues from M.I.T.'s Sloan School and Operations Research Center, used a mathematical model to compare a number of different vaccination strategies on disease spread and death resulting from a smallpox attack on a large urban center.

The Centers for Disease Control and Prevention's (CDC) current response plan, endorsed by the Advisory Committee on Immunization Practices on June 20 calls for isolation of confirmed smallpox cases and targeted vaccination of only those who have been in contact with infected individuals, with a mass vaccination effort to take place only if the initial vaccination and quarantine methods are unsuccessful. Parameters of this new mathematical model include the number of people initially infected, the transmission rate, the fraction of potential contacts named by infected individuals, and the resources available to track potential contacts and administer vaccinations.

Under several different scenarios, the model predicted that mass vaccination would stop the spread of infection faster and result in fewer deaths than targeted vaccination or the CDC plan. In fact, the currently endorsed plan led to an estimated 4,120 additional deaths compared to a mass vaccination plan implemented from the beginning in a large attack on a city with 10 million inhabitants. The researchers found that a pre-attack vaccination of a portion of the population lessened the gap between the different strategies. These results suggest that unless a pre-attack vaccination is used to increase immunity within the population, a mass vaccination strategy should be seriously considered.

"Emergency Response to a Smallpox Attack: The Case for Mass Vaccination," by Edward H. Kaplan, **Yale School of Management**, and David L. Craft, Operations Research Center, and Lawrence M. Wein, M.I.T Sloan.

Web Site: <http://mba.yale.edu>

-30-

Media Contact: Karin Nobile, **Yale School of Management**, Media Relations, 203-432-6010, fax 203-432-9992; karin.nobile@yale.edu

Edward H. Kaplan, Yale University School of Management, and the Department of Epidemiology and Public Health, Yale University School of Medicine, New Haven, CT, 203-432-6010, fax 203-432-9992; Edward.Kaplan@yale.edu.

AScribe - The Public Interest Newswire / 510-653-9400

www.ascribe.org \$\$\$

LEXIS-NEXIS® Academic Universe		YALE UNIVERSITY LIBRARY
Home Sources How Do It? Site Map Help		Subscribed Resources
Edit Search FOCUS Print/Save Options E-Mail		

Search Terms: "Edward Kaplan"

Document List

Expanded List

KWIC™

Full

◀ Previous Document 4 of 6. Next ▶

Copyright 2002 U.P.I.
United Press International

July 9, 2002, Tuesday

SECTION: FINANCIAL NEWS

LENGTH: 967 words

HEADLINE: Mass smallpox vaccination can cut deaths

DATELINE: NEW HAVEN, Conn., July 8

BODY:

Mass vaccination of the U.S. general population against the smallpox virus would result in fewer deaths than the government's current plan of quarantining and vaccinating only those exposed in the event of a bioterrorist attack, concludes a new mathematical model released during the government's vaccination strategy deliberations.

Vaccinating most or all of the population would make any post-attack strategy work better because fewer people would be vulnerable to the disease and fewer people would have to be given emergency vaccinations, **Edward Kaplan**, principal investigator of the study and a professor at the Yale University School of Management, told United Press International.

Another advantage of the strategy is it would deter terrorists from releasing smallpox in the first place because it would reduce the chances of causing widespread mortality, he said. Smallpox kills approximately one third of people who become infected with it. Other than the vaccine, which can be effective up to four days after infection, there are no effective treatments. The government's current strategy is executed by the Centers for Disease Control and Prevention in Atlanta. The agency is charged with developing a response plan for a bioterrorist attack and at present that plan involves a method known as ring containment, which would quarantine and vaccinate only those exposed.

Kaplan and his colleagues used a mathematical model to compare mass vaccination and ring containment. Taking into account the number of people initially infected, the rate of spread of the virus and the number of people available to administer vaccinations, the model predicted mass vaccination would halt the spread of smallpox more rapidly and result in 4,120 fewer deaths in a city with 10 million inhabitants.

UNITED PRESS
INTERNATIONALWASHINGTON, DC
TUESDAY
JUL 9 2002Burrelle's
INFORMATION SERVICES1
.XZ..8 8 XX.... CC



Smallpox protection plan inadequate: study

Tuesday, 9 July 2002



In the early stages smallpox can be mistaken for chicken pox. (Pic: *Medical Journal of Australia*)

Researchers have found that mass vaccination against smallpox in the US would prevent more deaths in an outbreak than the existing containment plan.

The results come on the heels of reports that the US is planning to vaccinate half a million health workers against smallpox.

The study, published in the *Proceedings of the National Academy of Sciences (PNAS)*, used a mathematical model to compare different responses to a smallpox attack on a city with 10 million inhabitants.

The scientists considered the number of people initially infected, the transmission rate, the fraction of potential contacts named by infected individuals, and the resources available to track potential contacts and administer vaccinations.

The best approach was mass vaccination, the model predicted. A mass vaccination campaign before an attack would slow the spread of infection most effectively, resulting in 4120 fewer deaths than the current plan.

The existing plan, endorsed by the US Centers for Disease Control and Prevention (CDC), calls for quarantine of confirmed smallpox cases, targeted vaccination of those who have been in contact with infected individuals, and mass vaccination only if the initial methods do not work.

Australia's current policy reflects a similar approach, said Acting Chief Medical Officer Professor John Mathews in a written statement. It calls for 'ring' vaccination of people in close proximity to smallpox cases.

Recent Health News

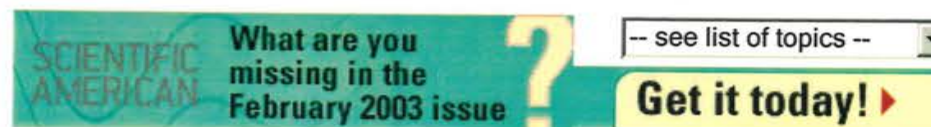
Sewage sludge may be a health hazard
Anti-cancer compound looking good
Eat, drink (after surgery) and be merry?

Archive

Monthly Health News

More on Health

Malaria in Malawi
The Hidden Gender
A Pill a Day
Cloning Around with Stem Cells



January 27, 2003

go

Advanced Search

TODAY'S NEWS

EXPLORE

ASK THE EXPERTS

QUICK POLL

FEATURE ARTICLES

TECHBIZ

NANOTECHNOLOGY



CURRENT ISSUE

UPCOMING ISSUE

PAST ISSUES



NEWS

July 09, 2002

Scientists Say Mass Vaccination Is Best Response to a Smallpox Attack

[e-mail this article](#)

[printer-friendly version](#)

[subscribe](#)

Smallpox was eradicated from humans in 1979. But in light of last fall's terrorist attacks, it has returned to the forefront of public consciousness as a potential bioweapon. Because of the uncertainty surrounding both the chances of an assault involving the virus and the availability of vaccine stockpiles, the response policy to such an attack is continually evolving. Now a report published today in the *Proceedings of the National Academy of Sciences* suggests that mass vaccination after a smallpox attack would save thousands more lives than the government's current plan of action.

Edward H. Kaplan and David L. Craft of the Yale School of Medicine and Lawrence M. Wein of the Massachusetts Institute of Technology designed a computer model to track smallpox cases and deaths that would result from an attack on a large urban center. They tested a number of scenarios and compared two main treatment options. In the first, so-called traced or ring vaccination, people who have had contact with a person showing symptoms of the disease are vaccinated and those sick with the disease are quarantined. In mass vaccination, in contrast, the entire population is vaccinated once victims start exhibiting symptoms. Last month the Centers for Disease Control and Prevention (CDC) unveiled a response plan that calls for ring vaccination followed by mass vaccination only if the outbreak cannot be contained by the primary measures or if the initial number of cases is sufficiently large.

The modeling results indicate, however, that mass vaccinations would result in fewer deaths and quicker elimination of the disease regardless of the number of initial victims. The scientists tested different scenarios with varying values for parameters such as the number of infections, transmission rates, the fraction of contacted people correctly identified by victims and the resources available to administer vaccines. For a hypothetical city of 10 million inhabitants, the team found that more than 4,000 additional deaths would occur under the current CDC plan than if a mass vaccination was implemented. The authors conclude that "the cost in both deaths and time of delaying the switch to [mass vaccination]—as suggested by interim CDC policy—is very high, particularly in light of the public clamoring for vaccination and the mass panic that would likely ensue in the event of an attack." Considering recent news reports that the federal government plans to vaccinate as many as 500,000 health care and emergency workers, there is some positive news to be found in the new findings. The researchers also found that vaccinations of a portion of the population prior to an attack reduced the gap between the various strategies and led to fewer overall deaths. — Sarah Graham

Advertisement

FREE Newsletter

enter email

Go

Subscribe

Archive

Careers

Marketplace

Bookstore

Shop

SPECIAL ONLINE ISSUE

TACKLING MAJOR KILLERS: HEART DISEASE



BUY IT NOW ONLY AVAILABLE ONLINE



www.sfgate.com

[Return to regular view](#)

Kaiser testing smallpox vaccines Oakland facility among 4 seeing if doses can be diluted

David Perlman, Chronicle Science Editor
Tuesday, July 9, 2002
©2002 San Francisco Chronicle.

URL: <http://www.sfgate.com/cgi-bin/article.cgi?file=/chronicle/archive/2002/07/09/BA223522.DTL>



Oakland -- Kaiser Foundation doctors in Oakland began testing two different smallpox vaccines Monday to see whether either or both could be diluted and used if the government decides to vaccinate every American after a major bioterrorism attack.

One of the vaccine batches -- totaling more than 75 million doses -- is nearly 50 years old and was recently discovered in a long-forgotten freezer by workers at Aventis Pasteur, the global pharmaceutical firm.

The other -- about 15 million doses -- has been stored frozen in powder form since 1971 by the federal Centers for Disease Control and Prevention in Atlanta. Tests have already shown that it could be diluted to make 75 million doses.

Now the researchers at Kaiser, along with three other major medical centers,

are testing both vaccines to learn if both are safe and effective. They also want to learn whether the older batch might be diluted tenfold to make 750 million doses available -- more than enough to vaccinate this country's 285 million citizens and to donate to other allied nations that might come under attack.

"The sooner we can say that we have these doses available, the sooner a plan can be devised to make the vaccine available to people who need it," said Dr. Steve Black, co-director of the Kaiser-Permanente vaccine study center.

Besides Kaiser, others conducting tests are the University of Iowa, the Baylor University medical school and Vanderbilt University.

The Kaiser doctors are still seeking 50 volunteers for the study.

The first Oakland volunteer, 20-year-old Sarah Palmer, a Piedmont teacher's aide, was vaccinated Monday and said she had two reasons for signing up.

"It sounded like a good opportunity to be already vaccinated if there was a danger, and besides, I thought I could help the whole country," she said. The testing effort comes amid considerable controversy over how best to counter a possible epidemic in the event of a terrorist attack.

USA: U.S. officials consider worst-case smallpox plan.
By Maggie Fox, Health and Science Correspondent

07/09/2002
Reuters English News Service
(C) Reuters Limited 2002.

WASHINGTON, July 8 (Reuters) - U.S. health officials said on Monday they were considering the possibility of mass inoculations to combat a smallpox attack.

Although they are still formulating the policy, a spokesman said such a widespread effort was among the scenarios being weighed in the event of any smallpox attack - now considered more likely after a series of anthrax-laced letters killed five people last fall and made 13 other severely ill.

At issue is whether it is better to immunize a lot of people with a vaccine that can have side-effects, or vaccinate fewer people, limiting the risk of side-effects but leaving more people vulnerable to infection. Health and Human Services Secretary Tommy Thompson is supposed to announce a decision within a few weeks.

An HHS spokesman said a report in The New York Times on Sunday that said 500,000 health and emergency workers would be vaccinated in the coming weeks was premature.

"There are a great many decisions that remain to be made by the secretary, including working with states to better understand exactly what the recommendation is," spokesman Bill Pierce said. "There is no number. There is only speculation by high-placed people."

The Washington Post on Monday quoted Jerome Hauer, a leading bioterrorism expert and acting assistant secretary for emergency preparedness at HHS, as saying vaccinations could start in eight weeks. "At the end of the day, the numbers could be significantly greater than 500,000," he said.

U.S. President George W. Bush said he was worried that people might become ill from the vaccine. "I haven't made any decisions as to who is going to be vaccinated or not," he told a news conference.

'LOSS OF LIFE' FEARED

"I think one concern that I can share with you is that if everybody received a vaccine, there are some to whom that vaccine might be fatal. And I worry about that. I worry about calling for a national vaccination program and that it could cause a loss of life."

Even before the Sept. 11 attacks, and before the anthrax letters were sent, the government had been planning better preparations for a possible biological attack.

Anthrax and smallpox were at the top of the list of potential agents - because they are easily spread, can be deadly, and because they are hard to diagnose at first.

Smallpox, which was declared eradicated worldwide in 1980, is highly infectious and kills about 30 percent of patients.

The United States stopped routine vaccination in 1972. Only the U.S. and Russian governments are supposed to have any samples of the virus, but experts say the former Soviet Union and possibly Iraq made smallpox into weapons.

The smallpox vaccine is based on old technology and can have severe side-effects including, in about two in a million cases, death. Thus the dilemma on whether to limit vaccination.

Current interim policy calls for what is known as ring vaccination - finding the people likely to have been in contact with every infected person, and vaccinating them. This approach wiped out smallpox at the end of the epidemic.



July 10, 2002

REVIEW & OUTLOOK

FROM THE ARCHIVES: July 10, 2002

Smallpox Scenarios

Remember the old joke about the doctor who tells the patient there's bad news, and then the very bad news? Well, the bad news is that America faces the real possibility that terrorists will unleash killer germs, like smallpox, on civilians. The very bad news is that Washington is stuck on a response that would result in the most people dying.

At least that's the conclusion of a paper soon to be published in the Proceedings of the National Academy of Sciences. It's the latest in a growing body of work from academics and health professionals criticizing the government's plan for dealing with a smallpox outbreak. The more we look around, the harder it is to find anyone who thinks the bureaucrats' plan makes one iota of sense.

That plan denies the public prior access to a vaccine. A government wunderpanel, the Advisory Committee on Immunization Practices, recently recommended sticking with a policy known as ring vaccination. Under this bit of brilliance, we'd wait until after an outbreak and then send in doctors to isolate the infected and immunize anyone who'd had contact with them. Health and Human Services Secretary Tommy Thompson so far seems willing to adopt this plan, with a few modifications.

We'd like to suggest that before the Secretary throws in with the public health priesthood, he first run his eyes over that upcoming PNAS paper by Edward H. Kaplan of Yale, and David L. Craft and Lawrence M. Wein of MIT. Their work claims to be the first to make a detailed comparison of vaccination scenarios.

Assuming an outbreak infecting 1,000 people in a large city, ring vaccination would result in 367,000 Americans falling ill and 110,000 deaths. It would also take a full year to extinguish the outbreak.

The paper also examined other scenarios the government is considering, such as mass vaccinating (instead of ring vaccinating) after an outbreak. It found that if authorities vaccinated as soon as an outbreak occurred, 560 people would die. If they first tried ring vaccination and then switched to mass vaccination after 33 days, 4,680 would die. As the authors put it (we assume without irony): "The cost of waiting . . . is very high."

The best scenario? It happens to be the one that would also allow Americans to choose for themselves. According to the Kaplan paper, if 40% of the population were previously vaccinated, the number of deaths after an attack drops to 440 (assuming mass vaccination after an attack as well). Prior vaccinations would also give the public health community more time to screen people most at risk for potential vaccine side effects.

THE WALL STREET JOURNAL.

OPINION

WEDNESDAY, JULY 10, 2002

Smallpox Scenarios

Remember the old joke about the doctor who tells the patient there's bad news, and then the very bad news? Well, the bad news is that America faces the real possibility that terrorists will unleash killer germs, like smallpox, on civilians. The very bad news is that Washington is stuck on a response that would result in the most people dying.

At least that's the conclusion of a paper soon to be published in the Proceedings of the National Academy of Sciences. It's the latest in a growing body of work from academics and health professionals criticizing the government's plan for dealing with a smallpox outbreak. The more we look around, the harder it is to find anyone who thinks the bureaucrats' plan makes one iota of sense.

That plan denies the public prior access to a vaccine. A government wunderpanel, the Advisory Committee on Immunization Practices, recently recommended sticking with a policy known as ring vaccination. Under this bit of brilliance, we'd wait until after an outbreak and then send in doctors to isolate the infected and immunize anyone who'd had contact with them. Health and Human Services Secretary Tommy Thompson so far seems willing to adopt this plan, with a few modifications.

We'd like to suggest that before the Secretary throws in with the public health priesthood, he first run his eyes over that upcoming PNAS paper by Edward H. Kaplan of Yale, and David L. Craft and Lawrence M. Wein of MIT. Their work claims to be the first to make a detailed comparison of vaccination scenarios.

Assuming an outbreak infecting 1,000 people in a large city, ring vaccination would result in 367,000 Americans falling ill and 110,000 deaths. It would also take a full year to extinguish the outbreak.

The paper also examined other scenarios the government is considering, such as mass vaccinating (instead of ring vaccinating) after an outbreak. It found that if authorities vaccinated as soon as an outbreak occurred, 560 people would die. If they first tried ring vaccination and then switched to mass vaccination after 33 days, 4,680 would die. As the authors put it (we assume without irony): "The cost of waiting . . . is very high."

The best scenario? It happens to be the one that would also allow Americans to choose for themselves. According to the Kaplan paper, if 40% of the population were previously vaccinated, the number of deaths after an attack drops to 440 (assuming mass vaccination after an attack as well). Prior vaccinations would also give the public health community more time to screen people most at risk for potential vaccine side effects.

Mr. Thompson is expected to make some decisions on smallpox guidelines in the coming weeks. His advisers seem focused solely on the risks of giving citizens access to a mass vaccination program prior to an outbreak. We'd redirect Mr. Thompson to the potential consequences of denying such access. Not only would he be denying Americans preventive medicine, he may well be setting the stage for an outbreak of significant proportions.

Don't be the last to know. 

bringing perspective to breaking news
NEWSWEEK.MSNBC.COM



News

Business

Sports

Local

Health

Tech • Science

Living • Travel

TV News

Opinions

Weather

Shop@MSNBC

MSN.com

QwestDex

online yellow pages

Find a Local Business

Newsweek

Home Page

Cover Story

Archives

Feedback

Index

National News



An infectious-disease specialist at a biosafety lab that specializes in the disease

'The Government Must Plan for Mass Vaccinations'

Public-health expert Edward H. Kaplan assesses the options for coping with a smallpox attack

Ric Feld / AP

NEWSWEEK WEB EXCLUSIVE

July 10 — How best to cope with fears of a smallpox terror attack? Proposals to carry out mass public inoculations, a policy dropped 30 years ago, are controversial because of the potential side effects from the live vaccine.

E-MAIL THIS 

COMPLETE STORY 

Adverti

1 de
of se

Softw.

ADVERTISING ON MSNBC

RESOURCE GUIDE

- Yellow Pages
- Auctions at uBid
- Personals Channel
- Professional Tips
- Newsletters
- Shopping

file://C:\Documents%20and%20Settings\ehk1.SOMNT\My%20Documents\Newsweek_S... 7/29/2002

LYCOS NETWORK

[Lycos Home](#) | [Site Map](#) | [My Lycos](#)

CLICK HERE to see how luscious simple
cooking can be with...
BON APPÉTIT KEEP IT SIMPLE

25% OFF
PLUS A
FREE
GIFT!

LYCOS HEALTH with WebMD

SEARCH HEALTH FOR:

Se

[Health Home](#)
[Health News](#)
[Conditions A-Z](#)
[Drugs & Herbs](#)
[Wellness Topics](#)
[Medical Library](#)
[Resource Center](#)
[Health Calculators](#)
[Find a Physician](#)
[Chat & Events](#)
[Message Boards](#)
[Member Columns](#)

Sign In

Post a message,
chat...

Join

Free newsletters
and more

Event Highlight

Monday, August
26, 2002 9:00
a.m.

[Virtual Vacation:
Lake Austin Spa
Resort](#)

Smallpox: Should Everyone Be Vaccinated?

Study Says 'Yes' -- If Biological Terrorist Attack Has Occurred

By [Jeanie Davis](#)

July 10, 2002 -- America is gearing up for the worst-case scenario -- a deadly smallpox attack. The best defense is mass inoculation, with all U.S. residents rolling up their sleeves as soon as there's evidence of exposure, says one Yale epidemiologist.

The Yale report comes on the heels of a new federal announcement -- one calling for vaccination of emergency personnel and healthcare workers, some 500,000 people. Each state would designate teams to receive the shots, teams that will consist of doctors, disease trackers, nurses, lab workers, and law enforcement officers -- the first to respond in case of bioterrorism attack, according to the Department of Health and Human Services.

Volunteers at four sites around the country are already being inoculated with diluted doses of two vaccines to test their effectiveness. A vaccine known as Dryvax was made 20 years ago; 15 million doses of it are available. Another vaccine by Aventis Pasteur, Inc., was donated to the government; the company has stockpiled it for decades.

"I think it makes sense to vaccinate emergency responders pre-attack, precisely so that there will be a pool of persons who can protect the rest of us," says Edward H. Kaplan, PhD, professor of management science and public health at Yale School of Medicine, in an email interview with WebMD.

However, Kaplan takes issue with the CDC's overall plan for handling deadly outbreaks, which is known as "ring vaccination." It means vaccinating those who are exposed and



Need
information
to help find
a
nursing home
for yourself
or
a loved one?

www.medicare.gov
Helping you help yourself

nature

nature

scienceupdate

updated at midnight GMT today is monday, july 29

search nature science update

go

advanced search

home

content

- news
- features
- by subject
- conferences

services

- send to a friend
- printable version
- e-alert
- search
- help
- feedback

information

- about the site
- about us

supported by

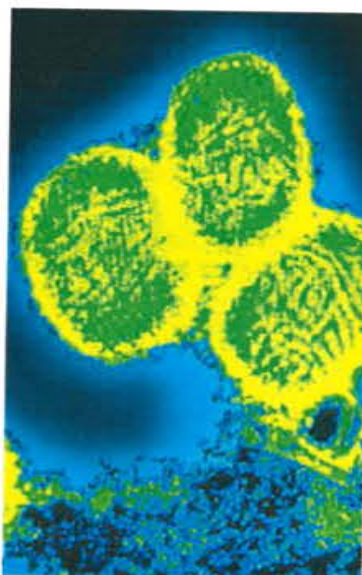


click here for more

Bioterror policy questioned

Model hints U.S. smallpox defence policy may be flawed.
10 July 2002

TOM CLARKE



A deliberate smallpox outbreak could require mass vaccination.

© SPL

study. Its adoption was "based on assumption instead of analysis", he says, echoing a view held by several epidemiologists.

Mass vaccination of the entire US population would be a better way to combat an attack, he suggests. "We need a policy that can withstand the worst-case scenario," he says.

Government health officials agree that an outbreak of the size imagined in Kaplan's study would require a broader vaccination policy. They say they are preparing for just such an eventuality.

"If there is an emergency and we need to vaccinate widely, we need to be ready for it. That's what we're doing," Jerome Hauer of the US Department of Health and Human Services

A new study claims that the current US strategy for containing a deliberate release of smallpox could lead to tens of thousands of unnecessary deaths¹.

The policy - to trace, vaccinate and quarantine all those infected and exposed - would be too little and take too long to protect a large metropolitan area such as New York. The technique successfully controlled wild smallpox outbreaks in cities in the last century.

"Ring vaccination would be a disaster," says mathematical modeller Edward Kaplan of Yale University in New Haven, Connecticut, who led the

news

related stories

- **Smallpox pill promising**
20 March 2002
- **Smallpox, big problem?**
13 December 2001
- **Vaccines breed viciousness**
13 December 2001
- **Biologists fight back**
10 December 2001

links out

- **U.S. Centers for Disease Control**

more news

- **Malaria as diverse as us?**
18 July 2002
- **2,600 years of chocolate**
18 July 2002
- **Laser delivers DNA**
18 July 2002
- **Lab fires physicist over retracted finding**
18 July 2002
- **Charm offensive**
17 July 2002
- **Microphones tell asteroids from A-bombs**
17 July 2002

Facing the Smallpox Threat

Remember the "Cipro panic" that spread across the United States in October after a Florida photo editor died of inhalation anthrax? Americans not only bought all of the antibiotic ciprofloxacin on U.S. shelves, many crossed the Mexican and Canadian borders and emptied pharmacy shelves there too.

A trace of such anxiety reemerged Wednesday when an academic journal published a study questioning a Bush administration interim policy, under which smallpox vaccinations would be made available to health workers and others likely to be in close contact with infected people before the general population.

The authors, principally Edward H. Kaplan of the Yale School of Management, raised doubts about this so-called ring vaccination strategy. In today's densely populated, mobile society, the authors contended, ring vaccinations could allow a larger outbreak that would take longer to control and spawn more panic than a mass vaccination.

But despite the study's assertions, there is much to be said for the administration's approach to managing a smallpox epidemic. This month, Health and Human Services Secretary Tommy G. Thompson plans to give a speech outlining the administration's strategy. There

are three facts he should highlight to reassure the public and answer the criticism.

First, there is no shortage of the vaccine. The government has 100 million doses in its stockpiles and expects to have a dose for every U.S. resident by early next year. Second, there is broad support in the public health sector for the ring strategy. Finally, Kaplan's study was based on mathematical models, not tested real-world observations.

Thompson still has much more to do to protect the nation against smallpox, which is probably a much greater threat than anthrax. There is abundant evidence that at least three nations—the former Soviet Union, Iraq and North Korea—created and possibly sold potent strains of smallpox for use as weapons.

Thompson should give states—which must devise their own smallpox management plans by October—guidance in weighing the benefits of mass vaccinations against risks including recently vaccinated people transmitting the disease and the vaccine itself seriously harming some people with weak immune systems.

To its credit, the administration has not dismissed the real threat that smallpox poses. But with public health systems in tatters in many cities and counties, including Los Angeles, stockpiling vaccine is only a start.

Mass vaccination after a smallpox attack might be best, researchers suggest

Three weeks ago, an advisory committee for the US Centers for Disease Control and Prevention evaluated strategies for responding to a potential smallpox attack and recommended that the US government vaccinate in advance a few thousand health and emergency workers who are likely to be the first to respond to such an incident. If an attack occurred, the panel, the Advisory Committee for Immunization Practices (ACIP), further advocated a surveillance-and-containment strategy in which only those individuals exposed to the virus and their immediate contacts receive vaccinations.

However, a modelling study published this week now casts doubt on the efficacy of such a limited response. The study, by Edward Kaplan (Yale University, New Haven, CT, USA) and colleagues, suggests that in a worst-case scenario—ie, a determined, well executed attack—a mass vaccination response would produce fewer casualties and contain the outbreak more quickly than a surveillance-and-containment approach (*Proc Natl Acad Sci* 2002, DOI: 10.1073/pnas.162282799).

The ACIP recommendations were based on two considerations. The first was concerns about side-effects from the smallpox vaccine, which uses a live form of vaccinia, a virus closely related to the smallpox virus, variola. The second is that the surveillance-and-containment strategy was effective in the latter years of the campaign that eradicated smallpox in the wild.

Kaplan argues that the wild outbreaks are not good models for response to a terrorist attack. He says that once the smallpox eradication campaign began, many of the outbreaks successfully contained using the surveillance-and-containment approach involved small numbers of people in isolated regions where prior vaccinations and prior exposure had rendered a significant number of potential contacts immune.

Nowadays, however, the immunity for many aged older than 30 years who were vaccinated previously is believed to have worn off. "You have to assume 100% susceptibility", says Kaplan.

Kaplan suggests that the effort to contain a 1947 outbreak in New York City—which affected a large, mobile population—was a better model for

how the USA should respond. In that case, a mass vaccination campaign brought the outbreak under control.

James Hughes, director of the CDC's National Center for Infectious Diseases, says that the surveillance-and-containment strategy will always be a component of any attack response, but that planning is not limited to that one option. "A lot of the planning that is going on is taking into account the worst-case scenarios and developing plans to ensure that states and local governments rapidly implement a mass vaccination programme if warranted", he said.

He adds that there are no solid estimates for how many people will have to be vaccinated in advance. Last weekend, several news outlets, including the *New York Times* (<http://www.nytimes.com>), reported that some Health and Human Services Department officials estimated that the number may be as many as half a million. But state and local governments, in consultation with the federal government, have to decide how many vaccinations are needed, says Hughes.

David Lawrence

The Expanding Smallpox Plan

The federal government will be taking an important step forward if it vaccinates half a million or more health care workers and emergency personnel with smallpox vaccine to protect them against a possible terrorist attack. That number of vaccinations, now being discussed by federal health officials, would be a giant leap beyond the 10,000 to 20,000 recently envisioned by the government's top vaccine advisory committee.

But it would still fall short of what is needed. The government should make the vaccine available to every American who wants it. That would let everyone make a personal judgment on the risks and benefits of taking the vaccine, and would help forestall a mad scramble for protection should an attack actually occur.

We recognize that the vaccine poses risks both to those who might take it and to those who might come into close contact with them. The vaccine is based on the vaccinia virus, a cousin of the smallpox virus. It can cause death or injury in susceptible people, particularly people with weakened immune systems. Such people could presumably decline to be vaccinated, but they would remain vulnerable to

infection with vaccinia virus shed by those who had taken the vaccine. That could subject them to the same risks as an intentional vaccination. Fortunately, the emerging government plan is apt to provide a big pool of subjects that should be studied closely to provide an up-to-date assessment of the risks and the best ways to mitigate them.

As described by William J. Broad in last Sunday's *Times*, the government is also laying the groundwork for mass vaccination of the public after an attack occurs. That is a welcome recognition that the old plan of small-scale "ring vaccinations," in which health workers would isolate smallpox victims and vaccinate people in close contact with them, would not work well enough to contain a large outbreak. Mass vaccinations would almost certainly be needed, and the public would surely demand no less. The vaccine can protect people from smallpox if it is given within four days of exposure to the virus.

Still, the best way to protect Americans would be to offer them vaccinations well in advance of any attack. The administration should use its emerging plan to test the feasibility of reaching that goal.

[Search by Words](#)[Search by Company](#)[Search by Industry](#)[Search by Person](#)[Important information
about Unavailable articles.](#)[Customize This Area](#)
Set your preferences for the
number of headlines
displayed, article format and
more.**DOW JONES**[Format to Print/Save](#)[Return to Headlines](#)

Article 1

Canada

Smallpox plan puts lives at risk: study: Thousands of deaths: Mass vaccination would best counter bioterrorism, academics sayMark Kennedy
Ottawa Citizen

07/13/2002

National Post

National

A04

(c) National Post 2002. All Rights Reserved.

OTTAWA - The federal government's plan to respond to a bio-terrorist smallpox attack with limited vaccinations -- instead of an immediate population-wide immunization -- is fraught with risks that could lead to many unnecessary deaths, according to a new report.

The first-of-its-kind study by academics in the United States used a mathematical model to compare how a smallpox attack on a large city that initially infected 1,000 people would spread. In an interview, one of the study's authors said the general findings are also applicable to Canada.

The study compared three different responses -- an initial local vaccination to try to contain the virus geographically, an immediate country-wide mass vaccination after the attack, and a delayed mass vaccination once it becomes clear the local immunizations failed to stem the spread of the deadly virus.

"We find that mass vaccination results in both far fewer deaths and much faster epidemic eradication," concludes the study published yesterday in the online edition of Proceedings of the National Academy of Sciences.

"Moreover, the cost in both deaths and time of delaying the switch to [mass vaccination] ... is very high ... in light of the public clamouring for vaccination and the mass panic that would likely ensue in the event of an attack."

The study found that in the hypothetical attack, an initial localized vaccination would lead to 367,000 cases of smallpox and 110,000 deaths. It would take 350 days to eliminate the outbreak.

By comparison, a mass vaccination carried out as soon as public health officials became aware of an attack would result in 1,830 cases and 560 deaths. It would take 115 days to end the outbreak.

A delayed mass vaccination -- carried out once officials were convinced by the 33rd day of the crisis that the limited approach wasn't working -- would still result in considerable casualties. There would be 15,570 cases, with 4,680 deaths, and the outbreak would end after 165 days.

"The cost of waiting," warns the report, "is very high."

In the event of a small outbreak in Canada, a federal smallpox contingency plan calls for a "ring" or "search-and-contain" vaccination strategy, inoculating and isolating everyone who has physical contact with the initial victim in hopes of

[HOME](#) | [CLASSIFIEDS](#) | [ADVERTISE](#) | [SUBSCRIBE](#) | [CONTACT US](#)

NEWS
DEATHS
SPORTS
DESERT LIFE
BUSINESS / AG
COMMENTARY
ENTERTAINMENT
HEALTH
CLASSIFIEDS
REAL ESTATE
WEATHER
NATION / WORLD
SUBSCRIBE
SPECIAL FEATURES
DIRECTORIES
DISCUSSION
GUESTBOOK
SCHOOLS
ABOUT US

EDITOR'S NOTEBOOK

Vaccinations for smallpox stirring debate

[Email this page](#)
[Printer friendly page](#)

BY TERRY ROSS
July 14, 2002

American health workers and other emergency "first-responders" — as many as 500,000 of them — are expected to soon be given smallpox vaccinations as part of an expanding response to a possible terror attack using the deadly disease.

Most Americans probably thought there would never again be a danger from smallpox after it was declared eradicated worldwide in 1988 — marking mankind's first successful elimination of a highly infectious disease.

Unfortunately, those with evil intent are not swayed by humanitarian concerns and see instead the potential for a deadly weapon against a population that is now pretty much helpless against it.

The United States and Russia have openly declared that they maintain small stocks of the deadly bacterium for research purposes, but it has long been suspected that it is in the hands of others also. Particularly troubling is the fear that Iraq — which may soon be the target of U.S. attack to rid that nation of Saddam Hussein — is one of those secret possessors of the disease organism.

And Hussein has not shown reluctance in the past to using chemical and biological weapons, even against his own people. It is doubtful he would hesitate to throw everything he has at American forces and strike back at the American homeland if possible.

The U.S. population, as well as others around the world, are particularly vulnerable to smallpox because vaccinations ceased decades ago and even those vaccinated in the past would have less immunity now.

The potential for harm is great. In outbreaks in the past, one in three unvaccinated persons who were infected died. But that was in natural occurrences. No one is sure about what would happen if smallpox is "weaponized" and spread artificially through the air.

A study done by public health specialists at Yale University and the Massachusetts Institute of Technology predicted the impact in a crowded urban area. An attack that began with 1,000 infections at a crowded airport or other location could cause 97,000 deaths during the course of several weeks or months if not properly handled.

Fortunately, there is some good news in that smallpox takes up to two weeks to develop and it has been found that vaccinations of people within four days of infection can prevent the disease. Edward Kaplan of Yale estimates a mass vaccination immediately after an attack could prevent most deaths.

The question facing government policymakers is how to best deal with the possibility of a

[Search by Words](#)[Search by Company](#)[Search by Industry](#)[Search by Person](#)[Important information](#)
about Unavailable articles.**Customize This Area**

Set your preferences for the number of headlines displayed, article format and more.

[Format to Print/Save](#)[Return to Headlines](#)

Article 2

Features

Ripping yarn of a snake tied up in knots

07/14/2002

Sunday Times - London

News International

Final 1

9

(Copyright Times Newspapers Ltd, 2002)

Zoologists at the University of Cincinnati have found a snake that tears its victims into bite-sized pieces. The other 2,700 or so known snake species are thought to swallow their prey whole. Living in southern Asia, the Gerard's water snake eats freshly moulted crabs often bigger than itself. It seizes a crab in its mouth, then forms a loop with its body through which it puts its head. Having tied itself in a knot around the prey, the snake tugs until it tears off a piece. This allows the snake to live side by side with a closely related species that prefers crabs hard-shelled - and whole.

Not knowing what birds do at night may be hindering efforts to conserve them. Some species feed in different places and in different ways after dark. Designing reserves requires knowledge of what birds do, and where. But birds are usually surveyed only during daytime. Simon Gillings, of the University of East Anglia, has studied lapwing and golden plover. They are not usually thought of as nocturnal, but they're actually dirty stop-outs, he says. They gather up to 70% of their food in the dark.

Peter Horton and colleagues of Sheffield University have increased the natural ability of thale cress to protect itself against intense light and heat. They engineered the weed to produce more of a chemical that diverts damage away from plant tissues onto itself. A similar approach might enable crops such as maize to be grown in hotter, more exposed areas and so alleviate two challenges facing global agriculture: an ever-rising population and the threat that climate change will reduce the area of fertile land.

A re-examination of a catalyst first considered for vehicle exhaust converters in the 1970s has shown that it could reduce wastage of precious metals and extend converter life. Metals such as palladium are packed into today's converters to counter the loss in efficiency that heat and wear cause. Now scientists at the Japan Atomic Energy Research Institute have shown that palladium atoms in a palladium-perovskite catalyst jump in and out of the perovskite lattice in an atmosphere typical of the exhaust gas of a car engine. This prevents the heat-induced clumping of metal particles that reduces surface area and hence catalytic efficiency.

A new study suggests that America's strategy for containing a deliberate release of the smallpox virus could lead to thousands of needless deaths. Current plans call for only those in the area surrounding a release and those exposed to infected people to be vaccinated. "Ring vaccination would be a disaster," says **Edward Kaplan**, of Yale University. According to his study, it could lead to the death of up to 97,000 people from an outbreak among 1,000 people in a city such as New York. He is calling for the immediate vaccination of the entire US population in response to a smallpox attack. This way, he says, as few as 525 could die.

WWW

RISKS OUTWEIGH BENEFITS

Few Physicians to Be Vaccinated Against Smallpox

BY MIRIAM E. TUCKER
Senior Writer

ATLANTA — The risk of exposure to smallpox is too small—and the risk posed by the vaccine too great—to justify vaccinating most physicians at this time, the Centers for Disease Control and Prevention's Advisory Committee on Immunization Practices recommended at its annual summer meeting.

In the absence of an act of smallpox bioterrorism, ACIP advised against vaccinating physicians other than those on designated "smallpox response teams" and se-

The CDC and the HHS are expected to review ACIP's recommendations in the coming weeks before issuing a policy.

Another factor that might influence the policy is a new report from Yale University published online July 15 in the *Proceedings of the National Academy of Sciences* (www.pnas.org). Epidemiologic modeling suggests that "ring vaccination"—which was used to eradicate wild cases of smallpox—would likely result in far more cases and deaths than if mass vaccination were applied in the event of a smallpox bioterrorist attack in a large U.S. city. In ring vaccination, the case's household members and other close contacts and their contacts are vaccinated.

ACIP suggested that in the absence of an outbreak, smallpox response teams, trained to investigate suspected smallpox cases and establish control measures, would be vaccinated. Teams might include medical epidemiologists, laboratory scientists, and security/law enforcement personnel. Each state would set up one or more such teams—no numbers have been decided. Smallpox referral centers would handle smallpox cases; selected physicians, nurses, and possibly other support personnel at the centers also would get the vaccine.

(A few hundred lab workers who directly handle recombinant vaccinia viruses or other orthopoxviruses are already vaccinated against smallpox.)

Under this ACIP plan, if a case of smallpox were identified, the primary control strategy would be surveillance and containment, including ring vaccination.

Acknowledging that the first cases could present to any physician—including physicians in an office setting—the committee concluded that the risk of vaccinating all physicians exceeds the benefits. This reflects the assumption that the overall risk of a smallpox release is extremely low, and that the risk of exposure to any given U.S. provider is even more remote and is outweighed by the risk of vaccine side effects.

If exposed to a patient infected with smallpox, an unvaccinated health care



Postexposure vaccination is highly protective if given within a week, Dr. Walter Orenstein said.

lected health care personnel in facilities to be designated as smallpox referral centers.

CDC officials estimated at the meeting that perhaps 15,000-20,000 people would be vaccinated under this plan. But the ACIP recommendations included no numbers, and widespread news reports published after the meeting stated that as many as 500,000 people might be targeted.

Such reports "are extraordinarily premature," Health and Human Services spokesman Bill Pierce said in an interview. "The 500,000 [figure] could be right, it could be high, or it could be low." And reports that vaccination will begin this fall are speculative. "There is no timetable."

Education Programs
Focus on Bioterrorism

Federal health agencies have helped start two programs aimed at educating health care professionals about bioterrorism.

The Department of Health and Human Services and four pharmaceutical firms—Bayer Corp., GlaxoSmithKline, Eli Lilly & Co., and Pharmacia Corp.—have launched an educational program on responding to bioterrorism threats. The pilot project, which involves the distribution of reference guides, will begin in 13 cities, including Boston, Chicago, Los Angeles, and Tampa, Fla.

A copy of the guide can be found at www.HomelandHealth.com.

A new Web site funded by the Agency for Healthcare Research and Quality seeks to teach health care professionals how to diagnose and treat rare infections and exposures to bioterrorism agents such as anthrax and smallpox. Designed by the University of Alabama, Birmingham, the site offers five free online courses; each course provides 1 hour of continuing education credit. For more information, visit www.bioterrorism.uab.edu.

New Smallpox Vaccines Not
Being Tested in Children

The new smallpox vaccine recommendation poses a conundrum when it comes to children.

No child will be vaccinated against smallpox in the absence of a bioterrorist attack. But should such an attack occur in the near future, physicians could be forced to administer a vaccine that isn't licensed for pediatric use—and that hasn't even been tested in children.

The only smallpox vaccines that can be used right now are Wyeth's Dryvax and Aventis Pasteur Inc.'s smallpox vaccine, both derived from an outmoded process involving scarification of calves and collection of vaccinia virus from draining calf lymph. These vaccines are not ever expected to be licensed, due to concerns about contamination.

Two new cell culture-derived smallpox vaccines made by Acambis Inc., now in phase II testing, probably won't be licensed until late 2003 or 2004, said Dr. James W. LeDuc of the CDC.

But as of now, the new vaccines—which may be more or less reactogenic than the older versions—are not being tested in children.

"If there were an outbreak, we'd be immunizing children without data. But I wonder if it's ethical to do those studies" prior to release of smallpox, said ACIP member Dr. Paul Offit, chief of infectious diseases at Children's Hospital of Philadelphia. "If the disease doesn't exist, how do you convince parents to agree to testing?" he asked.

The American Academy of Pediatrics is concerned, according to Dr. Jon Abramson, chair of the AAP's Committee on Infectious Disease and AAP liaison to the ACIP.

"We are in communication with the company, the National Institutes of Health, and the Food and Drug Administration to make sure these studies are done in children," Dr. Abramson told this newspaper.

provider would receive postexposure vaccination, which is highly protective if given within a week. Dr. Walter Orenstein, director of CDC's National Immunization Program, said in an interview.

Dr. Kathleen M. Neuzil, the American College of Physicians-American Society of Internal Medicine's liaison to the ACIP, noted that a recipient of smallpox vaccine, which is made from live vaccinia virus, may infect others for a week or two after vaccination. A vaccinated physician would thus pose a risk to patients during that time.

"The chances that any one physician will encounter smallpox are slim and far less than the chances of side effects or of harm to patients," Dr. Neuzil of the University of Washington, Seattle.

The risk is more acceptable for designated response and health care teams, who could face a 100% risk of exposure during a nearby outbreak, Dr. Orenstein said.

Postexposure vaccination is an acceptable approach, said Dr. Donald A. Henderson, who led the smallpox eradication campaign in the 1960s and now heads the U.S. Office of Public Health Preparedness.

People don't transmit smallpox without first developing a rash following a 7-17-day prodrome, he explained. People infected with smallpox "are probably not on the subway or on a plane. They're home in bed. The most likely place to contract smallpox is at home or in the hospital. It's not like measles, where you can get it from someone before they're sick," Dr. Henderson said, commenting from the audience during the committee's 2-day deliberation.

Further, the rush to vaccinate may be risky. Dr. Vincent A. Fulginiti noted. Smallpox vaccine carries a far higher risk than currently available routine vaccines.

Based on data from the late 1960s, the estimated all-cause death rate following receipt of smallpox vaccine was about 5 deaths per 1 million in children less than 1

year of age, 0.5 deaths per 1 million in children aged 1-19 years, and possibly 5 deaths per 1 million in adults, said Dr. Fulginiti, professor emeritus of pediatrics at the University of Arizona, Tucson.

Postvaccinal encephalitis occurred in about 2-6 per 1 million vaccinees. Vaccinia necrosum was seen in about 1 per 1 million children and probably would be far more common among adults. Thousands of other adverse events, such as eczema vaccinatum, generalized rashes, and accidental implantation occurred in the past and would likely be much more common today given the larger number of people living with altered immune systems, Dr. Fulginiti said.

Another complicating matter is that none of the smallpox vaccines is licensed. Currently, only two investigational smallpox vaccines may be used, and only with signed informed consent. (See box above.) Also still in investigational status are doses of vaccinia immune globulin for treating the 600 or so adverse events expected to occur with vaccination of 4 million to 6 million people.

The recommendation assumes that nearly all Americans are vulnerable to smallpox, but some data suggest that people vaccinated as children prior to 1972 might still have some protection. In a European study, protection diminished with time, but smallpox fatalities were still nearly fivefold lower among those vaccinated 20 years earlier than in those who were never vaccinated (*J. Infect. Dis.* 125[2]:161-69, 1972).

Unlike most ACIP policy decisions, this one was made without a key piece of data: the risk of exposure. The threat of smallpox bioterrorism probably hasn't increased since ACIP's last smallpox response statement in June 2001, but "the perception of threat has increased since Sept. 11," noted ACIP Chair Dr. John F. Modlin.

More information is available from the CDC at www.cdc.gov/nip/smallpox.



Home
 About Us
 AAF Scholarships
 Search Archives
 Recommended Links
 Contact Us
 User Login

The American Prowler

[Another Perspective](#) [At Large](#) [Buy the Book](#)
[Campaign Crawlers](#) [The Current Crisis](#) [The Daily Grind](#)
[Enemy of the Week](#) [Lifestyles Left and Right](#)
[Live From New York](#) [Loose Canons](#) [Movie Takes](#)
[Political Hay](#) [Reader Mail](#) [The Skeptical Investor](#)
[Special Report](#) [Sports Arena](#) [To Be Absolutely Frank](#)
[The Virginian](#) [Washington Prowler](#)



LOOSE CANONS

Ring Around the Pox

By **Jed Babbin**

Published 7/16/02 12:04:00 AM



[Print Friendly Format](#)



[E-Mail this to a Friend](#)

The Clinton administration failed this country in so many ways, it's hard to say which was the most important. By any measure its misjudgment of terrorism -- categorizing it as a law enforcement problem rather than a national security problem -- has to be in the top five. The Clintonoids refused the Sudan's offer to hand over OBL on a silver platter because they thought they didn't have enough evidence to convict him in court. Now, the Centers for Disease Control and Health and Human Services Secretary Tommy Thompson are setting President Bush up for the same kind of mistake. CDC and HHS want to deal with biological terrorism as a public health problem and not a national security problem. If those decisions aren't taken out of the hands of Thompson and the CDC, we will remain vulnerable to biowar attacks that may take hundreds of thousands of lives.

The anthrax attacks that panicked Congress and the media last winter killed several people. But those attacks weren't the sort that could teach us how to respond to the kind of attack we may soon face. Anthrax, as serious as it is, is both treatable and not contagious. That makes responding to an anthrax attack relatively simple. The spread of the disease is limited to people who are exposed directly, and casualties can be minimized by treatment with conventional antibiotics. But many of our enemies, such as Iran, Iraq and North Korea, have biowar arsenals that contain much deadlier diseases. Probably the worst that is now available is smallpox. Dealing with a smallpox attack is an entirely different matter.

According to Dr. John Mann, an infectious disease expert with Johns Hopkins University Hospital, smallpox is both highly contagious and untreatable after the disease has incubated. Once a person is infected, the disease incubates for two to

La
 Jul

Get
[www.MyO](#)

DC

STRIKE

Who took
 baseball?

A TALE
 CITIES

The Inglev
 cases sugg
 have to be
 preferentia

A LIBER
 CAMP

To get into
 California
 attended a
 of hard kn

THIS BI
 WHO?

A nation u
 baseball's
 suicide sq

TENNES
 TANKS

And talk r
 even for th
 flasher.

WHY DO
 LIE?

The blunt
 feminist de
 Rocky nor

THE NA
 THING

New Orlea
 Hall -- a ti
 American

SECRET
 CLINTO

CNN gets

THE JERUSALEM POST

www.jpost.com

MONDAY, JULY 22, 2002 • 13 AV 5762 • 12 JUMADA I 1423

Israel should get smallpox vaccine now – expert

By JUDY SIEGEL

In the event of terrorists' spreading smallpox in a large city as a biological warfare weapon, it would be preferable to carry out mass vaccinations than merely to vaccinate those who develop symptoms within four or five days and trace those who have been in contact with them before they infect others.

So says Prof. Ed Kaplan, a public health expert at the Yale University School of Management and the Yale School of Medicine, who has since January worked on an epidemiological model on emergency response to a smallpox attack at the request of the US National Institutes of Health. Kaplan, a frequent visitor to Israel, has been speaking during the past week on his team's conclusions before audiences at the Technion in Haifa, Rafael (the Armament Development Authority) and yesterday at the Hebrew University-Hadassah School of Medicine in Jerusalem. This week, he will lecture before senior Health Ministry officials at Sheba Hospital as well.

So far, ministry officials have declined to comment on their plans or whether Israel has enough smallpox vaccine in stock to cope with any crisis.

Kaplan said Israelis are better able to cope with a biological warfare threat than Americans, because their logistics for mass vaccination are already well oiled from the Gulf War. Booster vaccinations against polio for all Israelis under the age of 40 also went very smoothly when an outbreak of polio occurred less than 15 years ago.

"Terrible as it is, Israelis are managing quite well with terror. Since the US went on Yellow Alert with the September 11 terror attacks, Americans woke up to terror, but no one knows what this alert means and what to do," he said.

Kaplan, along with colleagues David Craft and Lawrence Wein, published his model in the newest issue of the *Proceedings of the [US] National Academy of Sciences*. After conducting a mathematical analysis of how many people were likely to infect others before coming down with symptoms and a variety of other factors, they said that if smallpox – eradicated worldwide two decades ago as a natural disease – were used by terrorists to cause worldwide panic and kill, tracing contacts and quarantining and vaccinating them would result in more deaths than would vaccinating everyone. This, despite the fact that one in a million vaccinated would die on average just from the vaccine due to having a weak immune system.

Symptoms, including high fever and a rash that can be mistaken for measles or chicken pox, appear within five days of infection, and vaccinating victims by then can greatly reduce their risk of dying from smallpox, he said.

He advised Israeli health officials to obtain smallpox vaccine for the whole population as soon as possible. While there is a worldwide shortage now, there should be 350 million doses ready for the US alone by the end of 2003. If smallpox were to be used by terrorists as a biological warfare weapon in a large city, or in an airport or train station that could spread the disease quickly – either in the US or Israel – he urged mass vaccination in the area instead of tracing contacts of those infected.

Before any attack, vaccinating some Americans or Israelis should also be considered to raise the level of immunity in the population. He said that while mass vaccination before any attack might be expected to deter terrorists from using smallpox and encouraging them to use another pathogen, Kaplan thinks terrorists might still be tempted to use smallpox to cause panic among the general population.

For the full story of Prof. Kaplan's research, see the *Health & Science Page*, Sunday, July 28.

SECTION 1 CHICAGO TRIBUNE

Attack on smallpox

MONDAY JULY 22, 2002

If Yale public health specialist Edward H. Kaplan and his colleagues are right, a smallpox attack on an American city could explode into a full blown epidemic and kill 110,000 Americans in a year before public health officials could rein it in.

That study is one of the latest—and scariest—in an intense firefight between the federal government and some leading public health researchers over how to best prepare for the threat of a terrorist smallpox attack. While the dueling likely will continue at least until the end of the year, most Americans are left to wonder what they should do.

The short answer: Nothing yet, because the government doesn't have enough vaccine for all Americans. Moreover, there are no plans to offer voluntary smallpox vaccinations even when it does. That is a mistake. The government should be planning now to make the vaccine available and let people and their doctors decide whether to take it.

Routine immunizations ended more than three decades ago and almost everyone in America is probably vulnerable to the disease. Doctors aren't sure how long it takes for the inoculation to wane, but they're certain that most people need another shot for complete protection.

If there were an attack, the clock would be running: Those exposed to the virus would have only 4 or 5 days to get inoculated to stop the disease's advance. If the attack were massive enough, hundreds of thousands might demand immediate inoculation, overwhelming the public health system.

That's one reason many are calling for a broad vaccination of health care and emergency workers, maybe 500,000 people, rather than the much smaller plan of some 20,000 immunizations recommended last month by a government panel. The best protection of all, studies show, would be a widespread inoculation of the United States population before an attack.

Public health officials are reluctant, however, because the smallpox vaccination is especially risky. One or two people in a million will die from

it, and others will suffer serious side effects, such as encephalitis. In some cases, the vaccine can overwhelm the immune system—particularly in HIV patients or cancer survivors—and some could get seriously ill simply by being in contact with someone who is vaccinated but doesn't have the disease.

Some experts, too, have been skeptical of the threat of a smallpox terrorist attack, pointing out that there are many other potential bioterror weapons. But the smallpox debate has taken on greater urgency in recent weeks as the Bush administration has talked tough about a possible invasion of Iraq, a country suspected of harboring secret stocks of the virus.

Adding to the tensions were recent reports, still unconfirmed, of a 1971 biological weapons test that went awry in the former Soviet Union, inadvertently killing three people and forcing officials to immunize nearly 50,000 people, according to *The New York Times*.

None of that is proof of an impending bioterrorist attack. But it has prompted researchers at the Centers for Disease Control to start injecting monkeys with the virus to determine if newly developed medications are effective and to find new tests to quickly diagnose the illness. A person infected with smallpox does not have symptoms, including the telltale rash, until about two weeks after exposure. At that point, the germ can spread quickly through personal contact.

Given the serious nature of the threat and the vulnerability of the population, it makes sense for the government to make smallpox vaccine widely available.

A recent poll by Harvard University's School of Public Health showed three out of five Americans said they were willing to be immunized, despite the health risks, and even though no imminent threat of such an attack exists. Some believe that all the preparations for a smallpox attack make it less likely that an enemy would try to use such a weapon. Good. The more vaccinated, the stronger that argument—and the sooner America can return to a time when the threat of smallpox existed only in history books.

Bioinformatics Lecture Series 2001-2002

"Emergency Response to a Smallpox Attack"

by Dr. Ed Kaplan
Yale School of Management

July 23, 2002, 10:00-11:00
Ebner Auditorium

No pre-registration required

ABSTRACT

In the event of a smallpox bioterrorist attack in a large US city, the interim response policy is to isolate symptomatic cases, trace and vaccinate their contacts, quarantine febrile contacts, but vaccinate more broadly if the outbreak cannot be contained by these measures. We embed this traced vaccination policy in a smallpox disease transmission model to estimate the number of cases and deaths that would result from an attack in a large urban area. Comparing the results to mass vaccination from the moment an attack is recognized, we find that mass vaccination results in both far fewer deaths and much faster epidemic eradication over a wide range of disease and intervention policy parameters, including those believed most likely, and that mass vaccination similarly outperforms the existing policy of starting with traced vaccination and switching to mass vaccination only if required. We also consider the arguments for and against pre-attack vaccination, and find that from the perspective of minimizing deaths in the population, the decision should hinge upon both the likelihood of a smallpox attack and the post-attack response policy employed. The more confidence one has that post-attack response can successfully control an epidemic, the lower the need for pre-attack vaccination -- conversely, the less confidence one has in the efficacy of post-attack response, the greater the pressure to vaccinate pre-attack.

Note: Those interested in receiving information about all future activities are invited to join our mailing list.

<http://bioinfo.weizmann.ac.il/announce.html>



siam Confer

A Place to Network and Exchange

www.siam.org/mee

Date 7/24/02



siam Conferences

A Place to Network and Exchange Ideas.

www.siam.org/meetings

Date

- Directions To Tel Hashomer
- Highway to Tel Aviv
 - Pass Sheppaum Junction (to R)
 - take turnoff at Gcha (Rt #1)
 - Gannat junction
 - pass next exit (Messuk)
 - stay right → get off at Tel Hashomer (hospital sig)
 - stay right and follow road
 - go straight (get into left lane traffic light)
 - turn right just before the entrance to hospital
 - After enter hospital, take
 - Follow road past parking towards grocery store
 - PARK W/BACK PARK
 - Just before left turn to will see on right corner storey building with grass
 - 2nd floor of GERTNER INSTIT

Society for Industrial and Applied Mathematics
3600 University City Science Center • Philadelphia, PA
215-382-9800 • Fax 215-386-7999 • siam@siam.org

PHONE: 03-534-9595

- want to use existing facilities
perp is familiar with

Don Michaeli

- * - Vaccinate via Kupat Cholim
- * - plan logistics as if it must be executed today (could vaccinate pre attack if under can requisition hospitals) judge high, by MV post attack
- joint planning between ~~dept~~ health emergency unit of Ministry of Health, and similar unit of IDF / Defense Ministry
- Hospital / Kupat Cholim director respond to orders from regional commander of IDF health unit
- IDF health units get orders from Health Ministry
- * Need to know precise procedure for
- * decision making, who gets to make decision, etc
- * Plan to handle media; plan for mass panic

Society for Industrial and Applied Mathematics
3600 University City Science Center • Philadelphia, PA 19104-2688
215-382-9800 • Fax 215-386-7999 • siam@siam.org • www.siam.org



Commentary - 25 July 2002

Smallpox: Right Topic, Wrong Debate

Randy Larsen - Director, ANSER Institute

America's top public health officials are engaged in a raging debate: how to best prepare for a smallpox attack on the American homeland. Unfortunately, most of this debate focuses on the wrong issue. Instead of arguing about whether we should vaccinate as few as 15,000 or as many as 500,000 medical workers and other first responders before an attack, the debate should focus on how to best prepare for mass vaccination following an attack.

During the Cold War, the most draconian threat to U.S. security was from Soviet nuclear weapons. Today smallpox is a greater threat than nuclear weapons. It is a disease that killed 300 million people in the 20th century. Thanks to the World Health Organization's effort, the naturally occurring form of this disease was eradicated in the 1970s. Unfortunately, the biotechnical revolution has made it possible to use smallpox as a weapon. Like a Cold War Soviet nuclear strike on our homeland, the probability of a smallpox attack is low, but the consequences are so high, we cannot ignore the threat. Just one year ago, America was woefully unprepared. This was dramatically demonstrated in the Dark Winter exercise. A dozen highly experienced national security leaders watched helplessly as smallpox spread across the nation in this scenario. With a strategic vaccine stockpile of fewer than 15 million doses, there was little they could do to protect 280 million Americans.

Thanks to decisive leadership in both the Administration and Congress, America is better prepared today. There are 160 million doses of vaccine available, and by the end of the year, there will be close to 300 million. This vaccine is 99.75 percent effective, even if administered as much as four days after exposure to smallpox. The fact that it is so effective, even after exposure, is why our efforts should focus on building the capability for rapid, post-attack mass vaccination. Some level of preattack vaccination is important, but it should not be the central issue of debate.

The current policy of the Centers for Disease Control states that ring vaccination is the

LEXIS-NEXIS® <i>Academic Universe</i>		YALE UNIVERSITY LIBRARY Subscribed Resources
Home Sources How Do I? Site Map Help Edit Search FOCUS Print/Save Options E-Mail		

Search Terms: smallpox, Kaplan

Document List	Expanded List	KWIC™	Full
---------------	---------------	-------	------

Document 1 of 1.

The Associated Press

The materials in the AP file were compiled by The Associated Press. These materials may not be republished without the express written consent of The Associated Press.

July 29, 2002, Monday, BC cycle

SECTION: Domestic News**LENGTH:** 1038 words**HEADLINE:** Computer simulations help epidemiologists plan for bioterrorist **smallpox** attack**BYLINE:** By MATT CRENSON, AP National Writer**DATELINE:** NEW YORK**BODY:**

Imaginative minds can conjure horribly apocalyptic consequences from a **smallpox** attack.

Here is a disease that kills 30 percent of those it infects and leaves survivors permanently scarred. After plaguing humanity for centuries, it was finally eradicated three decades ago so that no one today has any built-up immunity to it. The **smallpox** vaccinations some people had as children would no longer be effective. Unchecked, **smallpox** has the potential to sweep through the United States population like the plagues of medieval Europe. But with the help of computers, many researchers are concluding that a smallpox attack by terrorists need not produce an uncontrollable public health crisis. Computer simulations show that the proper combination of post-attack vaccination, quarantine and other public health measures could stop smallpox in its tracks:

-A model designed by researchers from the Centers for Disease Control and Prevention found that vaccination and quarantine could stop an outbreak within a year and limit the number of smallpox cases to 4,200 - even if 1,000 people were directly infected by terrorists.

-Researchers from Yale University and the Massachusetts Institute of Technology found through another simulation that a massive vaccination program launched as soon as the first smallpox cases were detected could quickly stop the disease from spreading and limit infections to fewer than two times the initial number.

-By simulating the daily comings and goings of people in Portland, Ore., researchers from the Los

YALE Bulletin

& CALENDAR

www.yale.edu/opa/yb&c

JULY 26, 2002

Vol. 30, No. 33

Study: Mass vaccination is best response to smallpox attack

In the event of a smallpox attack, a mass vaccination policy would result in fewer deaths and faster disease eradication than alternative vaccination strategies, reports a team of researchers including a Yale professor.

Since the terrorist attacks of Sept. 11, the best response to a smallpox attack has been a topic of hot debate.

The new study, which uses a mathematical model to compare a number of different vaccination strategies on disease spread and death resulting from a smallpox attack on a

large urban center, was published in July in the Proceedings of the National Academy of Sciences. The authors were Edward Kaplan, the William N. and Marie A. Beach Professor of Management Sciences at the School of Management, and his two colleagues from the Massachusetts Institute of Technology: David L. Craft of the Operations Research Center and Lawrence M. Wein of the Sloan School.

The current response plan by the Centers for Disease Control and Prevention (CDC),

endorsed by the Advisory Committee on Immunization Practices on June 20, calls for isolation of confirmed smallpox cases and targeted vaccination of only those who have been in contact with infected individuals, with a mass vaccination effort to take place only if the initial vaccination and quarantine methods are unsuccessful.

The new mathematical model takes into account the number of people initially infected, the transmission rate, the fraction

(Continued on page 2)

Smallpox vaccination *(Continued from page 1)*

of potential contacts named by infected individuals and the resources available to track potential contacts and administer vaccinations, explains Kaplan, who is also a professor in the Department of Epidemiology and Public Health at the School of Medicine.

Under several different scenarios, the model predicted that mass vaccination would stop the spread of infection faster and result in fewer deaths than targeted vaccination or the CDC plan. In fact, the currently endorsed plan led to an estimated 4,120

additional deaths compared to a mass vaccination plan implemented from the beginning in a large attack on a city with 10 million inhabitants, notes Kaplan.

The researchers found that a pre-attack vaccination of a portion of the population lessened the gap between the different strategies. These results suggest that unless a pre-attack vaccination is used to increase immunity within the population, a mass vaccination strategy should be seriously considered, Kaplan says.

Should only infected people be vaccinated?

With biological warfare a distinct possibility, how should health authorities in the most likely target countries – the US and Israel – deal with the threat?

Judy Siegel-Itzkovich learns about the options from a visiting expert

After the disease killed as many as 100 million people and left 200 million blind and scarred victims over the past 3,000 years, the world thought in 1979 that it had said goodbye to smallpox.

But despite the success of a heroic effort to eradicate it worldwide, the highly contagious and untreatable viral disease threatens to come back and haunt us via biological warfare. The September 11 attacks last year make the unthinkable a reasonable possibility.

Smallpox is caused by two strains of orthopox virus: *variola major*, which results in severe symptoms and a death rate of 20%-40% of those infected; and *variola minor*, which has less severe symptoms and lower mortality (about 1%). After the Spanish invasion of America, 2.5 million Native Americans perished in nine years, and in the early 18th century, 90% of all Native Americans in Massachusetts died from a variola epidemic.

As late as 1966, more than 10 million people died of smallpox, inducing the World Health Organization to launch its World Eradication Program. The US stopped routine smallpox vaccination in 1972, and Israeli health authorities took this step in 1980.

But while variola stocks were kept under lock and key in the US, it is feared that rogue groups in Iraq, Iran or other countries intent on causing havoc had access to those in the former Soviet Union.

Spreading variola particles in a crowded place such as a train station or airport could result in the virus entering the bodies of thousands of people by inhalation. Unaware of infection, they would go on to their destinations, initially feeling well but then developing visible symptoms – high fevers around Day 11 and a rash by Day 14.

If vaccinated against smallpox within four days of infection, they could be spared from death and even the disease, and prevented from spreading it to many others in a chain reaction. But the smallpox vaccination itself, which uses a live virus called vaccinia that is a "cousin" of smallpox, can cause brain damage and has been known to kill one person out of every one million vaccinated, especially those with weak immune systems due to cancer treatment or AIDS.

So how should health authorities in the most likely target countries – the US and Israel – deal with the threat? Even the half of the population who were vaccinated decades ago as children are believed to have little immunity left.

Should governments bolster their small available quantities of vaccine by mass-producing it? Should they vaccinate the entire population even if no bioterror attack seems imminent?

In the event of a single localized attack, should public-health workers be sent to trace all persons who have been in contact with those infected and vaccinate them because they can pass it on? Or should whole populations be vaccinated after an attack, weighing the risks of delay against the inherent danger from the vaccine to a tiny minority of weak individuals?

"Now is the time to decide how to proceed with vaccination," writes Prof. Dan Michaeli, an infectious-disease expert and chairman of Clalit Health Services, in the July 2002 issue of *IMAJ*, the *Israel Medical Association Journal*. "Revaccination of people who were vaccinated once or more will enable us to acquire vaccinia-immune globulin in substantial amounts. This should be used for people who are prone to immune deficiencies. Other measures may also be applied to reduce the risks from vaccination, although these risks may be acceptable in view of the risks of smallpox re-introduction [by bioterrorists]."

"The time has come," Michaeli concludes in his editorial article, "for governments and health ministries to sit down, prepare plans and implement them without delay, especially in countries already exposed to terrorism and/or heavy international traffic."

"The methods of smallpox outbreak control are known and can be implemented – in fact they were successfully carried out in Israel [to deal with a natural outbreak] in 1949," write Health Ministry chief epidemiologist Dr. Paul Slater and colleagues in the same *IMAJ* issue.

"The economic cost of preparation is relatively small.... A smallpox outbreak in Israel must not be regarded as a doomsday event. If it occurs, it can and will be overcome."

"If we make the necessary commitment now to vaccine production and stockpiling,

laboratory preparation, planning, professional training and public education, the losses – although substantial – can be minimized. Moreover, the reinstitution of routine smallpox vaccination in Israel must be given serious consideration, now and in the future, as improved vaccine [with a lower mortality rate] becomes available."

But the Health Ministry, by order of the Defense Ministry, has remained mum about its actual plans and programs, refusing to say if it already has manufacturing capabilities here and access to enough vaccine for all Israelis, or whether it's planning to reintroduce routine smallpox vaccination or booster shots.

A foreign expert who during the past seven months has created an epidemiological model for coping with smallpox bioterror is Prof. Edward Kaplan, the William N. and Marie A. Beach Professor of Management Science at the Yale School of Management and a professor of public health at Yale Medical School.

Kaplan, who speaks Hebrew, is a frequent visitor to Israel and twice received a Lady Davis Visiting Professorship at the Hebrew University, spent over a week lecturing to experts in the field at the Technion in Haifa, Rafael (Israel Arms Development Authority), Hebrew University-Hadassah Medical School, Sheba Hospital, Weizmann Institute of Science and other institutions. He found time during his visit for an interview with *The Jerusalem Post* on the Hadassah Ein Kerem campus.

Earlier this month, he testified before a panel in Washington to oppose a federal advisory panel plan for "ring vaccinations," in which health workers isolate infected patients and vaccinate people who have been in close contact with them, forming a "ring of immunization" around an outbreak and a barrier to its spread.

In theory, such a strategy can work because the vaccine, if given within four days of exposure to the virus, protects people from the disease, and is relatively inexpensive. But Kaplan and colleagues argue in a major article in the latest *Proceedings of the [US] National Academy of Science* that what might begin as 1,000 infections at a train station or airport could spiral out of control over subsequent weeks and months into nearly 100,000 deaths if the outbreak were fought with ring vaccination alone. This would compare with only around 500 deaths resulting from mass vaccinations after an attack.

"Comparing the results to mass vaccination from the moment an attack is recognized, we find that mass vaccination results in both far fewer deaths and much faster epidemic eradication over a wide range of disease and intervention policy parameters, including those believed most likely, and that mass vaccination similarly outperforms the existing policy of starting with traced vaccination and switching to mass vaccination only if required," Kaplan's team wrote.

He explains that it takes time to question people who are known to have been infected.

"If you put a message on TV and radio, asking all people who were at a certain train station at a certain time, will you get all of them and only them, or will you create a panic?"

And those infected, he continues, are likely to be unaware of many people who were in "sneezing or coughing distance" from them. Then you have to find these endangered contacts and vaccinate them, while precious time is wasted.

Initially, the US government planned to vaccinate only a few thousand public-health workers – "early responders" who would deal with any bioterrorism attack – added to the 11,000 American lab workers and scientists who work with the virus and have been vaccinated since 1983. More recently, the US decided to give smallpox shots to as many as half a million health-care and emergency workers to be on the safe side, but it has not abandoned its post-attack strategy of ring vaccination.

But Kaplan suggests the possibility of pre-attack mass vaccination be considered in both the US and Israel. "Some 350 million doses will become available by the end of next year."

Diluting doses to lower strength has been shown not to harm their effectiveness. "There are those who argue that having mass vaccination would deter the terrorists from using smallpox as a weapon, but I argue that they could use it anyway to sow a great deal of panic," he says.

Despite the World Trade Center and Pentagon disasters, Kaplan thinks Americans still



Prof. Kaplan: Pre-attack mass vaccination should be considered to minimize casualties.



Smallpox, once seen as a Divine curse, is now a possible bioterror weapon.

remain in the dark about protecting themselves from terrorism.

"Israelis, exposed for decades to actual threats on their lives, would be much more able to cope with a biological-warfare threat," Kaplan said. Not only did they survive the sealed rooms during Saddam Hussein's Scud missile attacks on Israel, the health authorities acquitted themselves well in the 1988 mass vaccination against polio among all adults under the age of 40, which brought an end to an outbreak.

"I don't say that Israel has to mass-vaccinate its population even if a bioterror attack is not clearly on the horizon, but it should be considered – especially as a voluntary effort to raise the population's immunity, which has been greatly reduced in the past two decades."

"It would be great if there were an effective, fast and cheap screening test to see who had immunity and who has been exposed, but I suppose this is impractical."

Kaplan was asked by the US National Institutes of Health to design his model and decide what strategy to use in the event of a bioterror attack.

"I entered the research without having my own preconceived opinion. But now it's clear to me that if such an attack involved quite a number of people, each of whom were in contact with dozens of others, trying to hold it in control with just ring vaccination would not be enough."

In any case, while most researchers who have created models are eager to see them tried in real life, the Yale scientist declares: "I will be perfectly happy never to see my model on smallpox actually implemented by bioterrorists."

**Global Security Newswire**
by National Journal GroupDaily news on nuclear, biological and
chemical weapons, terrorism and
related issues.

Global Security Newswire is produced independently for the Nuclear Threat Initiative by National Journal Group, Inc. Global Security Newswire is published Monday thru Friday by 2 pm and is available exclusively on the NTI website, www.nti.org.



Monday, July 29, 2002

Smallpox: Administration, Critic Trade Fire Over Smallpox Vaccination Strategy

By David Ruppe
Global Security Newswire

WASHINGTON — A senior Bush administration health official and a critic are publicly debating a pending government decision on whether to vaccinate the U.S. population against smallpox.

An expert advisory panel, the Advisory Committee on Immunization Practices (ACIP), last month recommended to Health and Human Services Secretary **Tommy Thompson** against mass vaccination (see [GSN](#), June 21). Instead, the panel favored vaccinating certain U.S. healthcare workers and using selective vaccination through a containment strategy in the event of an outbreak (see [GSN](#), July 8). Thompson's decision is pending.

The debate centers on whether that "ring vaccination strategy," which involves vaccinating an infected person's immediate contacts and household members, would be sufficient to contain the spread of the disease in the event of a smallpox attack.

The strategy was used to eradicate smallpox globally during the 1960s and 1970s and is considered beneficial since it minimizes exposure to the smallpox vaccine's side effects, estimated to kill three people per million vaccinations.

A prominent proponent of that ring strategy is **D.A. Henderson**, who led the successful eradication effort and is now Thompson's principal science advisor for public health emergency preparedness.

"Let's say we've got a case, and that individual is going to be in contact with a lot of people, and what you want to do is to vaccinate those contacts. If you get to them within the first two to three days, you can prevent the disease," Henderson said, speaking on a panel Friday intended to provide information on the pending decision.

The ring strategy was challenged earlier this month when Yale University professor **Edward Kaplan** co-authored a study suggesting a mass vaccination would be a better alternative to deal with a terrorist attack using smallpox.

"Dr. Henderson is treating a bioterror attack as if it were a historical, natural smallpox outbreak. It is not wise to prepare for a smallpox bioterror attack — where terrorists are trying as hard as they can to

Search

Advanced Search

ASSOCIATION FOR PROFESSIONALS IN
INFECTION CONTROL AND EPIDEMIOLOGY, INC.[Members Only](#) | [Catalog](#) | [Home](#) | [Search](#) |[Education](#) | [Products](#) | [Membership](#) | [Resources](#) | [Patient Safety](#) | [Government](#) | [Consumer](#) | [News](#) |ASSOCIATION FOR PROFESSIONALS IN
INFECTION CONTROL AND EPIDEMIOLOGY, INC.1275 K Street NW, Suite 1000
Washington, DC 20005-4006Phone 202/789-1890
Fax 202/789-1899
apicinfo@apic.org
Internet www.apic.org

July 29, 2002

Advisory Committee on Immunization Practices
Centers for Disease Control and Prevention

Re: Draft Supplemental Recommendation of the ACIP on Use of Smallpox (Vaccinia) Vaccine

Dear Sir or Madam:

After reviewing the draft supplemental recommendations put forth by ACIP on June 20, 2002, the Association for Professionals in Infection Control and Epidemiology, Inc. (APIC) would like to offer comments on the proposed recommendations. We are appreciative of the efforts put forth by the CDC's National Immunization Program to facilitate the process in moving forward with the draft recommendations and guiding the effort to a finalized product. We are also appreciative of the opportunity to present our comments on issues of such high importance.

Let us pose our comments within the framework of currently perceived risk. We offer these comments under the assumption that our government does not have reliable intelligence indicating current weaponization of smallpox by any country or group of individuals. If this intelligence does exist, much of the comment included in this document becomes moot.

Comments from APIC involve the two recommendations:

1. Pre-release vaccination of the general population
2. Pre-release vaccination of selected groups to enhance smallpox response readiness.

Pre-Release Vaccination of the General Population

APIC is in agreement with the recommendation not to vaccinate the general population and would like to offer comments in support of this recommendation.

Comments regarding the pre-release vaccination of the general population:

Our recommendations recognize the unique risk for adverse events posed by the smallpox vaccine due largely to the increased and increasing numbers of individuals in the United States population who have the potential to experience those adverse events. The HIV epidemic and other immune compromising

PNAS Online

[HOME](#) [HELP](#) [FEEDBACK](#) [SUBSCRIPTIONS](#) [ARCHIVE](#) [SEARCH](#)
Institution: COPY 2 || [Sign In as Member / Individual](#)

The 50 Most-Frequently-Read Contents

in PNAS during July 2002 -- updated monthly

Most-read rankings are recalculated at the beginning of the month.
Rankings are based on hits received by articles archived on this site only.

1. Marco F. Ramoni, Paola Sebastiani, Isaac S. Kohane
From the Cover: Cluster analysis of gene expression dynamics
PNAS Jul 09, 2002 99: 9121-9126. (In "Genetics") [\[Abstract\]](#) [\[Full Text\]](#)
2. Edward H. Kaplan, David L. Craft, Lawrence M. Wein
Emergency response to a smallpox attack: The case for mass vaccination
PNAS Jul 12, 2002 0: 162282799-. (In "Social Sciences") [\[Abstract\]](#)
3. Jenn-Yah Yu, Stacy L. DeRuiter, David L. Turner
RNA interference by expression of short-interfering RNAs and hairpin RNAs in mammalian cells
PNAS Apr 30, 2002 99: 6047-6052. (In "Cell_Biology") [\[Abstract\]](#) [\[Full Text\]](#)
4. Guangchao Sui, Christina Soohoo, El Bachir Affar, Frederique Gay, Yujiang Shi, William C. Forrester, Yang Shi
A DNA vector-based RNAi technology to suppress gene expression in mammalian cells
PNAS Apr 16, 2002 99: 5515-5520. (In "Genetics") [\[Abstract\]](#) [\[Full Text\]](#)
5. Michael B. Eisen, Paul T. Spellman, Patrick O. Brown, David Botstein
Cluster analysis and display of genome-wide expression patterns
PNAS Dec 08, 1998 95: 14863-14868. (In "Genetics") [\[Abstract\]](#) [\[Full Text\]](#)

[\[Next 5 Citations\]](#)

▶ = from the current issue

[HOME](#) [HELP](#) [FEEDBACK](#) [SUBSCRIPTIONS](#) [ARCHIVE](#) [SEARCH](#)
VIEW LIST BY
SECTION:

▶ [Physiology](#)
▶ [Computer Sciences](#)
▶ [Economic Sciences](#)
▶ [Article](#)
▶ [Colloquium](#)
▶ [From The Academy](#)
▶ [Applied Physical Sciences](#)
▶ [Geophysics](#)
▶ [Astronomy](#)
▶ [Physics](#)
▶ [Chemistry](#)
▶ [Social Sciences](#)
▶ [Developmental Biology](#)
▶ [Ecology](#)
▶ [Anthropology](#)
▶ [Evolution](#)
▶ [Plant Biology](#)
▶ [Engineering](#)
▶ [Statistics](#)
▶ [Genetics](#)
▶ [Population Biology](#)
▶ [Geology](#)
▶ [Immunology](#)
▶ [Psychology](#)
▶ [Applied Biological Sciences](#)
▶ [Medical Sciences](#)
▶ [Psychology-BS](#)
▶ [Biochemistry](#)
▶ [Perspective](#)
▶ [Microbiology](#)
▶ [Mathematics](#)

Front Page News Business In-depth Editorial Page Columns Israeli Life Arab Affairs Sports Books Health Real Estate
Archives JPost Français JPost Store Subscriptions Personals Classifieds Palm Post JPost Radio E-mail Edition

INTERNET
JERUSALEM POST

ORDER JPOST ON CD-ROM

OVER 10 YEARS OF HISTORY AND MORE AT YOUR FINGERTIPS



Search Go [Advanced Search](#)

27 Av 5762, Monday Aug. 5, 2002

Hear 'America
Israel

[Front Page](#) > [News](#) > Enough smallpox vaccine for whole country soon

Sites

[JPost.com](#)
[JPost Radio](#)
[Digital Israel](#)
[JPost Travel](#)
[International JP](#)
[JPost Store](#)
[JRep.com](#)

Main

[Front Page](#)
[Archives](#)

Interactive

[Forums](#)
[Readers' Letters](#)

Sections

[News](#)
[Business](#)
[In-depth](#)
[Editorial Page](#)
[Arab Affairs](#)
[Columns](#)
[Israeli Life](#)
[JPost](#)
[Francais](#)
[Sports](#)
[Literary Supplement](#)
[Tourism](#)
[Real Estate](#)
[Hi-Tech](#)
[Health](#)
[Judaism](#)

[[Printer Friendly](#)]

Aug. 4, 2002

Enough smallpox vaccine for whole country soon

By [JUDY SIEGEL-ITZKOVICH](#)

The Health Ministry has nearly completed the production of enough doses of vaccinia virus to vaccinate the whole country against smallpox if necessary.

But ministry Director-General Boaz Lev said he knows of no Defense Ministry recommendation or decision to vaccinate the whole population or part of it prior to any biological warfare attack.

Ministry officials said in a Jerusalem briefing that about 100 health system personnel had been given a booster of smallpox vaccine to serve as "human factories" to produce plasma with antibodies against the disease. They will undergo several sessions of plasmapheresis the selective removal of plasma and return of the rest of their blood to their bodies and the resulting antibodies could be saved for immunizing some 200,000 Israelis with weak immune systems (due to cancer and other diseases) or pregnant women who could be endangered by ordinary vaccinia vaccination.

In the US, after initially vaccinating 11,000 lab workers and scientists who work with the virus, the government there recently decided to vaccinate half a million health-care and emergency workers just to be on the safe side.

Smallpox as a natural disease was wiped out nearly three decades ago, with the US stopping

Smallpox vaccine policy debate: Government panel proposes conservative guidelines

But *PNAS* study says mass vaccination would save more lives

After evaluating the risk of a bioterrorist attack, the Advisory Committee on Immunization Practices (ACIP) recommended that the general public not be inoculated against smallpox. Rather, in the event of an outbreak, the committee advocated use of ring vaccination and isolation of infected individuals in order to contain a disease outbreak. The recommendations, which still need to be approved by the U.S. government, suggest that vaccinations be offered to health care workers around the country who have been preselected to investigate smallpox cases and provide direct care at predesignated hospitals.

However, in a report posted on the *Proceedings of the National Academy of Sciences (PNAS)* Web site on July 12, researchers indicated that even taking into account the adverse effects caused by the smallpox vaccine, a citywide mass vaccination would save more lives after an outbreak than would ring vaccination.

The panel's recommendations

Because of increased terrorist activity, CDC asked the 15-member ACIP to review recommendations made in 2001 for smallpox vaccination. The panel updated recommendations concerning the general population and persons designated to respond to or care for a suspected or confirmed case of smallpox. Vaccination recommendations for laboratory workers who directly handle the smallpox virus remain unchanged.

Adverse reactions to smallpox vaccine

include sore arms, lymph node swelling, rash, fever, and scarring, but severe skin reactions and encephalitis can also result, at the rate of a few cases per million vaccinations. In a small percentage of people, the vaccine can cause fatal adverse effects.

ACIP determined first that there was not enough risk of a bioterrorist attack to justify inoculating the entire U.S. population. In other words, committee members decided that in the absence of a known smallpox threat, the adverse effects of the vaccine outweigh its benefits.

Instead, the panel recommended vaccination of at least one team of designated health workers in each state. These teams would include a medical team leader, a public health advisor, medical epidemiologists, disease investigators, a diagnostic laboratory scientist, nurses, vaccinators, and security and law enforcement personnel. The teams would also include medical personnel who would assist in the evaluation of suspected smallpox cases. Certain hospitals within each geographic region would be designated for treatment of smallpox victims.

The ring vaccination approach involves giving smallpox vaccine to two sets of people: the face-to-face contacts of infected people and the face-to-face contacts of the first group of contacts (see *Pharmacy Today*, May 2002). Under the ACIP guidelines, the government would proceed with mass inoculations only if this method fails to stem the outbreak.

Study suggests another approach

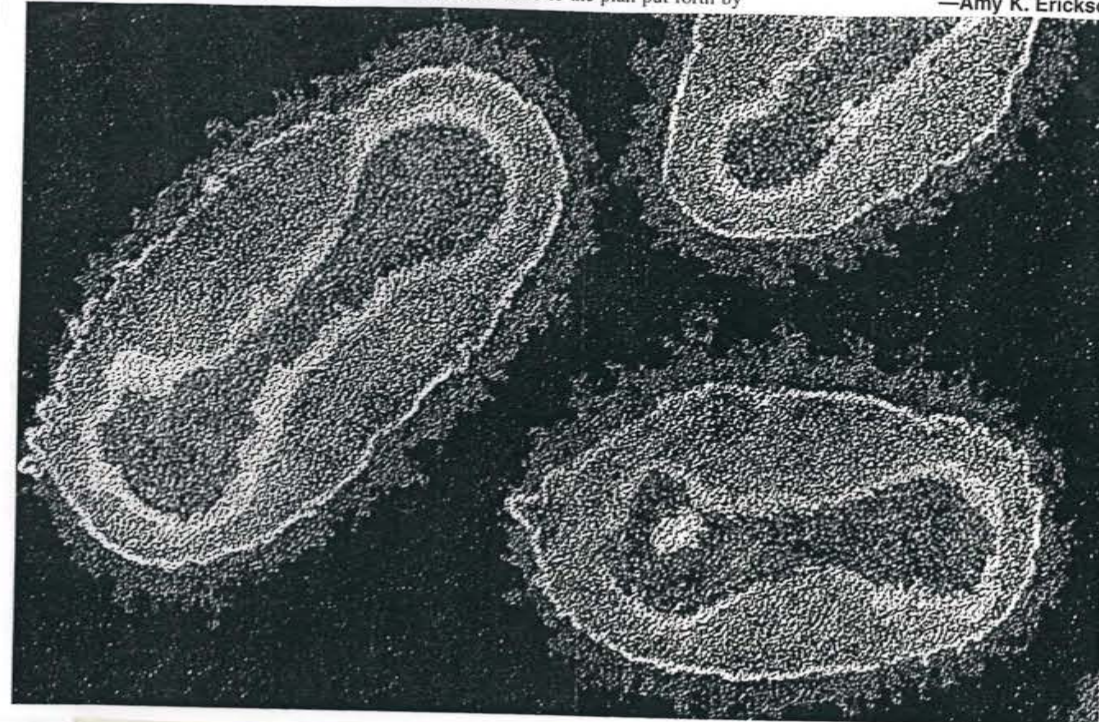
An alternative to the plan put forth by

ACIP is detailed in a study available from *PNAS* at www.pnas.org. The study authors, led by Edward Kaplan of Yale University, suggest that mass vaccination after an attack would be a better way to slow and halt disease transmission. Their conclusions were based on results from a computer simulation designed to show what would happen if a hypothetical attack occurred in a city of 10 million people. The researchers began with the assumption that 1,000 people were initially infected in a bioterrorist attack and calculated that ring vaccination followed by mass vaccination would result in about 4,100 more deaths than would mass immunizations conducted at the first signs of disease.

How pharmacists can help

While debate over the best policy is likely to continue, pharmacists can take several steps to be prepared in the event of a smallpox outbreak. "Pharmacists should be familiar with what smallpox is and what the infection looks like," said Lt. Col. John Grabenstein, PhD, a pharmacist and deputy director for clinical operations of the Anthrax Vaccine Immunization Program Agency at the U.S. Army Medical Command. "In locations where pharmacists can vaccinate, they should learn the technique for vaccinating against smallpox—which is different from most inoculations—and offer to be part of local bioterrorism response units. This is especially important in rural areas because a pharmacist might be the most expert health professional in that area."

—Amy K. Erickson



מעריב

אינטרנט מבזקים

מגוי לעיתון עזרה כתוב לנו פרסם אצלנו הפוך לאתר הבית לדף הפותח

יום ראשון, 4 באוגוסט כ' אב תשס"ב

GO Start המשולב

תחנות

המלצה במערכת הביטחון: לחסן מאבעבועות שחורות



תרגיל טיפול בהתקפת אב"כ בתל השומר.
צילום ארכיון: אלי דסה

מערכת הביטחון ממליצה לחסן את הציבור בישראל נגד אבעבועות שחורות, מחשש למתקפה ביולוגית מצד עיראק. מנכ"ל משרד הבריאות אמר הבוקר ברשת ב', כי בישראל קיים מלאי גדול של חיסונים מפני המחלה הקטלנית, שמרביתם פותחו בארץ וחלקם נרכשו בחו"ל. "ייתכן ובקרוב יחל חיסון של אוכלוסיית ישראל נגד אבעבועות שחורות".

בחודשים האחרונים התקיימו במערכת הביטחון ובדרגי שרים מספר דיונים בסוגיית החיסונים נגד אבעבועות שחורות. הדיונים התקיימו לאור הערכות המודיעין כי עיראק פיתחה נשק ביולוגי, והיא עשויה לשגרור לישראל על-גבי טילים ארוכי-טווח במידה שתותקף על-ידי ארצות-הברית. בישראל סבורים כי סדאם חוסיין מבין שמתקפה כזו מיועדת לחסלו ולהפיל את משטרו, ועל-כן הוא יעשה שימוש בכלי הנשק שעד כה טען בתוקף כי אינם ברשותו, ואנשיו הקפידו להסתירם מפקחי האו"ם.

הדרישה לחסן את כל האוכלוסייה נומקה בעיקר בחשש שישראל לא תקבל התרעה מספקת מהאמריקנים קודם לתקיפה על עיראק, ובפרק הזמן שייוותר לא תספיק מערכת הבריאות לחסן את כלל הציבור, ואפילו לא את האזרחים המתגוררים באיזורי הסיכון העיקריים - במרכז הארץ ובסמוך לבסיסי חיל האוויר.

באחרונה גברו קריאות של בכירים במערכת הבריאות לחסן מחדש את הציבור בישראל נגד אבעבועות שחורות. פרופ' אריה אל דד, מנהל המחלקה לכירורגיה

אקטואליה

חדשות	היום
יומן	דעות
עסקים	
עסקים	אנו ליו
מגזין עסקים	מחשבים
ספורט	
ספורט	
אקשן	
תרבות ופנאי	
פנאי	
סגנון	נשים
ביקורת טלוויזיה	
מוספי סוף שבוע	
מוסף שבת	סוף שבוע
ספרות	תרבות
מגזינים	
את	גורמה
ניולייף	נדלן
להיות הורים	

תיירות

FixTravel	טרמינל
מוספים שבועיים	
אמריקה	ילדים
מדע	הקו הישר
לוחות	
רכב	דרושים
דירות	כללי
מקומות	
זמן ת"א	זמן חולון
זמן ראש"צ	זמן השרון
זמן אשדוד	זמן הנגב
זמן חיפה	כל הזמן
קו למושב	הדף הירוק
זמן אשקלון	

ארכיון

מעריב

לוח מעריב

זירת קניות

FixTravel

הכריות

לוח היימק

jobcenter

מעריב אמריקה

TOWER RECORDS
www.top-10.co.il

כללי

חפש מוצר

חפש

Computers simulate smallpox attack

August 5, 2002 Posted: 10:35 AM EDT (1435 GMT)



The smallpox virus kills 30 percent of those it infects and leaves survivors permanently scarred.

[SAVE THIS](#) [EMAIL THIS](#)
[PRINT THIS](#) [MOST POPULAR](#)

NEW YORK (AP) -- Imaginative minds can conjure horribly apocalyptic consequences from a smallpox attack.

Here is a disease that kills 30 percent of those it infects and leaves survivors permanently scarred. After plaguing humanity for centuries, it was finally eradicated three decades ago so that no one today has any built-up immunity to it. The smallpox vaccinations some people had as children would no longer be effective. Unchecked, smallpox has the potential to sweep through the United States population like the plagues of medieval Europe.

But with the help of computers, many researchers are concluding that a smallpox attack by terrorists need not produce an uncontrollable public health crisis. Computer simulations show that the proper combination of post-attack vaccination, quarantine and other public health measures could stop smallpox in its tracks:

- A model designed by researchers from the Centers for Disease Control and Prevention found that vaccination and quarantine could stop an outbreak within a year and limit the number of smallpox cases to 4,200 -- even if 1,000 people were directly infected by terrorists.
- Researchers from Yale University and the Massachusetts Institute of Technology found through another simulation that a massive vaccination program launched as soon as the first smallpox cases were detected could quickly stop the disease from spreading and limit infections to fewer than two times the initial number.

News

Computer helps attack plan for smallpox ; Simulation shows public-health crisis can be avoided
 Matt Crenson
 The Associated Press

08/05/2002
 The Seattle Times
 Fourth
 A8
 (Copyright 2002)

By MATT CRENSON
 ASSOCIATED PRESS

NEW YORK — Imaginative minds can conjure horribly apocalyptic consequences from a smallpox attack. Here is a disease that kills 30 percent of those it infects and leaves survivors permanently scarred. After plaguing humanity for centuries, it finally was eradicated three decades ago so that no one today has any built-up immunity to it. The smallpox vaccinations some people had as children would not be effective. Unchecked, smallpox has the potential to sweep through the United States population like the plagues of medieval Europe.

But with the help of computers, many researchers are concluding that a smallpox attack by terrorists need not produce an uncontrollable public health crisis.

■ A computer model designed by researchers from the Centers for Disease Control and Prevention found that vaccination and quarantine could stop an outbreak within a year and limit the number of smallpox cases to 4,200 -- even if 1,000 people were directly infected by terrorists.

■ Researchers from Yale University and the Massachusetts Institute of Technology found through another simulation that a massive vaccination program launched as soon as the first

News

Smallpox may pose less threat
 MATT CRENSON Associated Press

08/08/2002
 Tulsa World
 Final Home
 C7
 (Copyright 2002)

NEWS

ATTACK ON AMERICA

Attack of smallpox could be swiftly foiled, research finds | Experts say fast medical response can block its spread

Matt Crenson
 ASSOCIATED PRESS

08/05/2002
 The San Diego Union-Tribune
 1,3
 A-2
 (Copyright 2002)

Computer simulations help epidemiologists plan for bioterrorist smallpox attack

By MATT CRENSON
 AP National Writer

08/05/2002
 Associated Press Newswires
 Copyright 2002. The Associated Press. All Rights Reserved.

FRONT

SMALLPOX COULD BE NIPPED IN BUD, EXPERTS SAY ; MODEL SHOWS THAT A TERRORIST ATTACK SPREADING THE DISEASE CAN BE BLUNTED.
 Matt Crenson AP national writer

08/05/2002
 Wisconsin State Journal
 ALL
 A1
 (Copyright (c) Madison Newspapers, Inc. 2002)

THE HARTFORD COURANT • MONDAY, AUGUST 5, 2002 A3

Studies Focus On Smallpox Attack

boston.com
 Home

widespread vaccination would be a serious cost. The smallpox vaccine is one of the most dangerous ever used. It can cause life-threatening complications in people with eczema and compromised immune systems, and it kills about one person in a million. Given to the entire U.S. population, smallpox vaccine could kill nearly 300 people and permanently injure thousands more. Models show that pre-vaccinating the public isn't necessary, however. If there were a system in place to vaccinate everyone in a city at the first appearance of smallpox, said Edward Kaplan of Yale University, an outbreak could be stopped in a few weeks.

smallpox cases were detected could quickly stop the disease from spreading and limit infections to fewer than two times the initial number. ■ By simulating the daily comings and goings of people in Portland, Ore., and researchers from the Los Alamos National Laboratory found that reasonable public health measures combined with people's natural tendency to stay home when they're feeling sick probably would limit the spread of smallpox after an attack.

The surest way to prevent a smallpox attack from killing more than a handful of people would be to vaccinate a majority of the population in advance of the attack offered by

HEADLINE: Computer simulations help plan for bioterror smallpox attack

Mat Crenson The Associated Press

08/05/2002

Charleston Gazette
 P1A

(Copyright 2002)

Computers show way to respond to a smallpox attack
 By Matt Crenson

AP national writer

08/06/2002

Deseret News
 A03

Copyright (c) 2002 Deseret News Publishing Co.

News

Enough smallpox vaccine for whole country soon

JUDY SIEGEL

08/05/2002

The Jerusalem Post

Daily

04

(Copyright 2002 The Jerusalem Post)

The Health Ministry has nearly completed the production of enough doses of vaccinia virus to vaccinate the whole country against smallpox if necessary. But ministry Director-General Boaz Lev said he knows of no Defense Ministry recommendation or decision to vaccinate the whole population or part of it prior to any biological warfare attack.

Ministry officials said in a Jerusalem briefing that about 100 health system personnel had been given a booster of smallpox vaccine to serve as "human factories" to produce plasma with antibodies against the disease. They will undergo several sessions of plasmapheresis - the selective removal of plasma and return of the rest of their blood to their bodies - and the resulting antibodies could be saved for immunizing some 200,000 Israelis with weak immune systems (due to cancer and other diseases) or pregnant women who could be endangered by ordinary vaccinia vaccination.

In the US, after initially vaccinating 11,000 lab workers and scientists who work with the virus, the government there recently decided to vaccinate half a million health-care and emergency workers just to be on the safe side.

Smallpox as a natural disease was wiped out nearly three decades ago, with the US stopping routine vaccination in 1972 and Israel in 1980. However, there are fears the virus may be in the hands of the Iraqi government or other rogue regimes or be given to terrorist groups, including Palestinian organizations - thus making the US and Israel prime targets.

Vaccinia, a cowpox vaccination, is regarded as safe and effective, Lev said, but experts estimate that one in one million people vaccinated could die from complications caused by the shot itself, especially those with weak immune systems. This was the main consideration in taking a decision on giving preventive vaccinations to the whole population, Lev said.

"If someone dies and there is no biological warfare attack, there would be lawsuits, and somebody has to take responsibility for the decision," he said.

Asked whether Israel is producing enough vaccinia for the Palestinian population in the territories, as well as Israelis, Lev said: "There will be enough for them, too."

About half the Israeli population received a total of two or even three vaccinia shots as infants and when drafted into the Israel Defense Forces. While it is not known for sure how fast this protection wears off, it is believed that a person who received this protection decades ago may take sick with smallpox if exposed to it, but his risk of death would be much lower.

If one person were diagnosed with smallpox due to a hostile attack, the Israeli authorities would not carry out "ring vaccination" to protect all people who had been exposed to the virus by those initially infected, Lev said. "This is a small country, and if there were an attack, we would vaccinate everybody."

Prof. **Edward Kaplan**, a biostatistics expert from Yale University who conducted a major epidemiological and statistical study for the US National Institutes of Health and lectured on this subject in Israel last month, said fewer casualties would result in the US and Israel as a result of mass vaccination after a significant attack compared to those after ring vaccination.

Copyright © 2000 Dow Jones & Company, Inc. All Rights Reserved.

Emergency Response to a Smallpox Attack

By E.H Kaplan (Yale), D.L Craft (MIT),
L.M. Wein (MIT)

פרופ' אד קפלן מאוניברסיטת ייל ירצה על הנושא

ביום א' 21 ביולי בשעה 10:00

בחדר הסמינרים ע"ש ברגמן בבנין הסטודנטים

(ליד אקדמון), קמפוס עין כרם

לפרטים נוספים: עמיר שמואלי 6758514

HA'ARETZ הָאָרֶץ

Ha'aretz English Edition www.haaretzdaily.com



יוחד בתחום העסקי והפוליטי

Print Edition

News

Business

Editorial & Op-Ed

Features

Sports

Art & Leisure

Books

Letters

Food & Wine

Tourism

Real Estate

Cartoon

Friday Magazine

Week's End

Anglo File

Site Search

Select Day

Previous Edition

Google

IN-DEPTH

Hamas: A threat to Israel and to Arafat**Foreign workers: Israel's migrant underclass****Rise of the New anti-Semitism**

HAMMERSITE.COM

The Only Fully Guaranteed OnLine Auctions

soon on auction
Aaron Shaul Schur

Starting Price: \$400

Wednesday, August 14, 2002 Elul 6, 5762

Israel Time: 16:29 (GMT+3)



Print



Send by e-mail



Send response

Back Home

Last update - 14:18
14/08/2002**Health Min.: If needed, all could get smallpox vaccine in days**By [Haim Shadmi](#), Ha'aretz Correspondent, and Ha'aretz Service

Health Minister Nissim Dahan of Shas, speaking after the resignation of the head of the team advising the ministry on readiness for possible biowarfare attack, said Wednesday that Israel could vaccinate its entire population against smallpox within a few days.

Prof. Aryeh Eldad, who heads the team advising the Health Ministry on epidemiological control, resigned this week in the wake of the ministry's decision to reject his team's proposal that the entire population be inoculated against smallpox at present.

Dahan said that there were no current active warnings that would warrant general inoculation, but that preparations were underway to ensure that if the army determined a threat to exist, vaccinations could begin at once.

"Following September 11, we have prepared ourselves for any scenario, including that of smallpox," Dahan told Israel Radio. "The Health Ministry is making every effort to complete the inventories of all the medications needed to vaccinate the population. The moment that we receive such an order, the population of the state of Israel can be vaccinated within a few days."

On Sunday, Eldad sent an e-mail to Dr. Boaz Lev, director-general of the Health Ministry, in which he wrote that he "sees no point to the team continuing its work since the ministry does not attach importance to its decisions."

Eldad charged that no serious discussion had been held on the recommendation to inoculate the population. The epidemiological control team is a central link in the preparations of the health and defense establishments, and the Home Front, for the possibility of a biological attack.

Health Ministry officials said they were not surprised by Eldad's resignation. They said that it would force their hand to inoculate the entire population, since the resignation would cause panic. Lev said that Eldad's opinion was "a minority" one and that the issue had been thoroughly discussed.

The security cabinet was supposed to meet on the subject of smallpox Sunday, but its debate was postponed. The question facing it is whether or not to inoculate medical and security personnel (such as Magen David Adom staff, police, emergency ward staff and Home Front personnel) at this stage, since they would be the first to come into contact with the disease.

Israel Begins Vaccinating Health Workers for Smallpox

By SERGE SCHMEMANN

JERUSALEM, Aug. 16 — With concerns mounting that an American attack on Iraq could provoke some form of retaliatory strike against Israel, the Health Ministry has begun vaccinating about 1,500 health workers against smallpox, a spokesman said today.

The spokesman, Ido Hadari, stressed that the vaccinations were a preliminary measure, involving those who, if Israel decided on broader measures, would be charged with administering the vaccine to others.

He said the security cabinet would meet on Wednesday to discuss whether to extend the vaccinations to "first responders": police officers, soldiers, emergency medical personnel and hospital workers who would be involved in an immediate response to a biological attack. These could number as many as 150,000.

The vaccinations, he said, began early last month. About 700 people have received them, and about 800 more are scheduled. "If in the future, Israel will decide to vaccinate people, they will be the ones to do the vaccination, so it's wise to know that they are already vaccinated," Mr. Hadari said.

They could also, he said, provide vaccinated plasma — "vaccine immune globulin" — which can be used to protect people who cannot take the regular vaccine, like pregnant women and people with compromised immune systems.

Other health precautions are being taken or are under consideration. Israel's Atomic Energy Committee has said that iodine tablets offering limited protection against radiation will be given soon to people living near Israel's two nuclear reactors. The agency linked the measure to the possibility of a radiation leak, but

the Israeli news media has been full of speculation about what Iraq might do if it came under an American attack, which Israel considers increasingly likely.

Yediot Ahronot, a mass circulation tabloid, for example, devoted its first four pages on Thursday to the biological, chemical or radioactive agents that Iraq could launch at Israel, including smallpox, Ebola, anthrax and radioactive "dirty bombs."

Though the United States and other countries are also intensely studying the possibility of biological and chemical attacks, the threat is far more immediate in Israel. During the 1991 Persian Gulf war, Iraq responded to American-led attacks by firing a total of 39 Scud missiles at Israeli cities.

They were armed with conventional explosives and caused little damage, but Israel, concerned about the possibility that they might be charged with chemical or biological agents, distributed gas masks.

With the Bush administration openly weighing a military operation to eliminate the Iraqi leader, Saddam Hussein, the tension is palpable. The most dire speculation has been that Israel, which is known to have developed a nuclear weapon but formally denies having done so, would launch a nuclear strike against Iraq if it came under attack.

So far, the government has sought to avoid worsening the fears by toning down public discussion of the threats. But the smallpox vaccinations, and reports that Israel's Home Front Command intends to include iodine tablets with the gas mask kits that it already distributes, have made clear that serious preparations are under way.

The Israeli military has also confirmed it is deploying a second bat-

tery of Arrow missiles, which destroy incoming missiles by exploding in their path, in the center of the country.

Smallpox, a lethal and highly contagious disease, was declared eradicated in 1980 by the World Health Organization, but small quantities of the smallpox virus were retained in depositories in the United States and the former Soviet Union. Though there is no evidence that Iraq has the

Anticipating retaliation for a U.S. attack on Iraq.

virus, intelligence officials have been unable to preclude the possibility.

The intensity of the concern was made clear this week when Aryeh Eldad, the head of the team advising the Health Ministry on epidemiological control, resigned to protest the ministry's rejection of his recommendation to immediately inoculate the entire population.

The health minister, Nissim Dahan, said on Wednesday that Israel had stockpiled enough vaccine to inoculate the population within a few days. Officials said Mr. Eldad's position was a minority opinion, but they acknowledged that his resignation could force the government's hand.

If Israel does decide on mass vaccination, officials said, the national health system, with its network of clinics, should be able to swiftly accomplish it.

"Following Sept. 11, we have prepared ourselves for any scenario, including that of smallpox," Mr. Da-

han told Israel Radio. "The Health Ministry is making every effort to complete the inventories of all the medications needed to vaccinate the population. The moment that we receive such an order, the population of the state of Israel can be vaccinated within a few days."

Edward H. Kaplan, a specialist of management sciences and public health at Yale who has been working on responses to bioterror attacks and who recently visited Israel, noted that it has a "distinct organizational advantage" over the United States, since most civilian doctors are also reserve military officers. He said he was told that in the event of an attack, the response would be coordinated by a joint team from the Health Ministry and the army.

Mr. Kaplan said Israel had rejected "ring vaccinations" — a plan considered by the United States — in which people would be vaccinated in a ring around a known infection. If the Israelis determine a need, he said, they will vaccinate everyone.

Israeli Troops Raze 2 Homes

JERUSALEM, Aug. 16 (Reuters) — Israel destroyed two homes today that they said belonged to families of Palestinian militants. The Israeli Army said soldiers blew up the home of Iyad Sawalha near the West Bank city of Tulkarm because of his hand in planning a bus bombing in June near the northern town of Megiddo that killed 17 people. Mr. Sawalha is believed to be in hiding.

Troops also razed the house of Morad Abu Asal in Anabta, near Tulkarm. The army said Mr. Abu Asal carried out a January suicide attack in Taibeh, an Arab village in northern Israel, that wounded two security officials.

BusinessNewHaven

AUGUST 19, 2002

www.businessnewhaven.com

\$1.50

SOM Prof: Mass Vaccination Best Response to Smallpox Attack

In the event of a smallpox attack, a mass-vaccination policy would likely result in fewer deaths and faster disease eradication than alternative vaccination strategies, reports a new study published in *Proceedings of the National Academy of Sciences (PNAS)*.

Since the terrorist attacks of September 11, 2001, the best response to a smallpox attack has been the subject of vigorous debate.

The response plan drafted by the Centers for Disease Control and Prevention (CDC) and endorsed June 20 by the government's Advisory Committee on Immunization Practices endorses what is known as "ring" vaccination. This calls for isolation of confirmed smallpox cases and targeted vaccination of only those who have been in contact with infected individuals, with a mass vaccination effort to take place only if the initial vaccination and quarantine methods are unsuccessful.



Kaplan

That policy is highly controversial: The July 10 *Wall Street Journal* editorialized that "Washington is stuck on a response that would result in the most people dying."

Yale School of Management expert Edward H. Kaplan, the William N. and Marie A. Beach Professor of Management Sciences & Professor of Public Health, teamed with colleagues from MIT's Sloan School and Operations Research Center to find a better way. The researchers used a mathematical model to compare a number of different vaccination strategies on disease spread and death resulting from a smallpox attack on a large urban center.

Parameters of this new mathematical model include the number of people initially infected, the transmission rate, the fraction of potential contacts named by infected individuals, and the resources available to track potential contacts and administer vaccinations.

Under several scenarios, the model predicted that mass vaccination would stop the spread of infection faster and result in fewer deaths than targeted vaccination or the CDC plan. In fact, the ring-vaccination plan led to an estimated 4,120 additional deaths compared to a mass vaccination plan implemented from the beginning in a large attack on a city with ten million inhabitants.

Kaplan and his colleagues found that a pre-attack vaccination of a portion of the population lessened the gap between the different strategies.

According to Kaplan, these results suggest that unless a pre-attack vaccination is used to increase immunity within the population, a mass vaccination strategy should be seriously considered. **BNH**

Coordination, cooperation continue to challenge public health system

ELLYN FERGUSON
Gannett News Service

08/20/2002
Gannett News Service
(Copyright 2002)

WASHINGTON -- Until someone sent anthrax-laced mail to Capitol Hill last fall, bioterrorism in the United States seemed the stuff of science fiction.

The public watched a chaotic response from federal, state and local authorities as anthrax killed five people and prompted hundreds of postal workers and Capitol Hill employees who feared they had been exposed to seek antibiotics.

Nearly a year after the attacks, numerous steps have been taken to prepare for a possible biological attack.

More communities are conducting bioterrorism training and drills, more public health departments are getting online capability and laboratories are starting to improve efforts to test for infectious agents.

The government sent more than \$1 billion this year to the states for fire departments, hospitals, public health departments and other state and local groups. It also is assembling a quick-response team of health care personnel who could be sent to the scene of any bioterrorism attack.

"We are better prepared this month, and we will be better prepared next month," said Jerome M. Hauer, who occupies a newly created post at the Department of Health and Human Services -- acting assistant secretary of public health emergency preparedness.

But the network responsible for combating bioterrorism is far-flung and coordination and communication remain weak points. Twenty federal agencies are responsible for dealing with biological attacks. Add to that private and public hospitals, fire and police departments, emergency medical services, disaster managers and approximately 3,000 public health departments.

"There has been incremental change. There are pockets of excellence ... but as far as the country is concerned, the policies and procedures are not in place" for across-the-board improvements in preparedness, said Clark Staten, executive director of the Emergency Response & Research Institute in Chicago.

Jim Bentley, senior vice president for strategic planning at the American Hospital Association, said each professional community -- hospitals, police and fire departments, emergency services and others -- has focused on improving its own area.

"In the next two to three years, there will be knitting together of the communities," Bentley said. "We still have a lot to do."

Where the work most needs to be done, Bentley said, is at the local level, which would be the front line for a terrorist attack.

"Most disasters for the first 12, 24 or 36 hours are local," he said. "You're on your own."

At St. Vincent's Manhattan Hospital, nurse educator Peter Allar and his colleagues took last year's lessons to heart. The hospital, about a mile from the World Trade Center, got more than 200 injured people through the door the first few hours. Hundreds came to St. Vincent's the next month when fear of anthrax gripped the city.

Until last year, anthrax meant nothing to Allar. "It was very esoteric. We had no idea what it was," he said.

Now Allar is part of an 18-member team at the hospital responsible for responding to nuclear, biological and chemical attacks. He also teaches nursing colleagues how to identify diseases such as smallpox.

"If we get somebody exposed to biological agents, the triage nurse is going to find it or let it go by," he said. Allar's goal is to

 LexisNexis™

Home Sources How Do I? Site Map What's New Help

 YALE UNIVERSITY LIBRARY Subscribed Resources

Search Terms: smallpox

FOCUS™

Search Within Results

Edit Search

Print Email

Document List Expanded List KWIC Full

Document 10 of 11.

Copyright 2002 Gannett Company, Inc.
Gannett News Service

August 20, 2002, Tuesday

LENGTH: 1012 words

HEADLINE: When, how to make **smallpox** vaccine available still debated

BYLINE: ERIN KELLY; Gannett News Service

DATELINE: WASHINGTON

BODY:

WASHINGTON -- Federal health officials are stockpiling enough smallpox vaccine for every man, woman and child in America in case the deadly, highly contagious virus is ever used as a weapon. But there is growing debate about who should be vaccinated and when.

Despite calling smallpox "among the most dangerous of all potential biological weapons," the Centers for Disease Control and Prevention's current plan does not offer Americans the option of getting vaccinated before any attack occurs.

The primary reason: The CDC anticipates one or two deaths for every 1 million doses of vaccine given -- or about 280 to 560 deaths nationwide. "If everybody received a vaccine, there are some for whom that vaccine might be fatal," President Bush said in July. "And I worry about that."

Critics of the cautious approach say it could cost tens of thousands of lives if a large urban area were hit. Once a person has the disease, there is no treatment that can stop it from running its course.

"There will be some deaths from the vaccine, and we need to prepare for that," said Dr. William J. Bicknell, a professor at Boston University's Department of International Health. "But you have to compare that to a probable 30 percent death rate of everybody infected in an attack. A smallpox attack would make anthrax look trivial."

In a democracy, citizens must have the power to weigh the risks and make their own decisions, said Sen. Bill Frist, R-Tenn., a medical doctor and influential GOP leader.

"I believe the threat of a smallpox attack outweighs the risks of providing smallpox vaccinations to a well-informed public," Frist wrote in an Aug. 9 opinion piece in The New York Times.

The last naturally acquired case of smallpox was in 1977 in Somalia. Although smallpox was officially eradicated from the globe in 1980, the United States and Russia still have stocks of the virus. The World Health Organization recommended that these stocks be kept to vaccinate laboratory workers who handle

Print Edition

News
Business
Editorial & Op-Ed
Features
Sports
Art & Leisure
Books
Letters
Food & Wine
Tourism
Real Estate
Cartoon
Friday Magazine
Week's End
Anglo File

Site Search

Select Day

Previous Editions

Google

In-depth

**Hamas: A threat to
Israel and to Arafat**
**Foreign workers:
Israel's migrant
underclass**
**Rise of the New
anti-Semitism**

International Online Auctions
HAMMERSITE.COM
 The Only Fully
 Guaranteed OnLine Auctions
soon on auction
Zeev Raban

Starting Price:
\$600

News Updates

Archive

About Ha'aretz

Log

Wednesday, August 21, 2002 Elul 13, 5762

Israel Time: 15:17 (GMT+3)



Print



Send by e-mail



Send response

Back Home

 Last update - 12:42
 21/08/2002

Israel to vaccinate 15,000 emergency workers against smallpox

By Ha'aretz Service and Agencies

The security cabinet, discussing the nation's readiness in the event of a biological warfare threat from Iraq or terrorists, decided Wednesday that Israel would vaccinate some 15,000 emergency security, medical, and rescue personnel against smallpox, Agriculture Minister Shalom Simhon said.

The step was a prelude to a possible later stage in which the entire population would be inoculated, if security circumstances dictated the move, said Simhon, who took part in the security cabinet meeting.

Israeli security officials have stepped up efforts to prepare for the possibility of an unconventional weapons strike by Baghdad in retaliation for a possible U.S. offensive against Iraqi President Saddam Hussein.

Referring to the 15,000 the emergency workers, who would be pressed into service in the event of a biowarfare attack, Simhon told Israel Radio: "At a later stage, if necessary, the vaccinations will be given to the entire population. At the present time there is no threat that demands vaccination of the whole population, but if it becomes necessary, the systems will be ready."

Raanan Gissin, an aide to Prime Minister Ariel Sharon, said Wednesday he did not know when the inoculations would begin. He said the Health Ministry was preparing the vaccines. "It's just part of the overall preparation of a very, very unlikely scenario," Gissin said. "It's a very remote contingency."

Gissin said it was decided to inoculate the rescue workers and security officials in case they would have to be called into action. "We want to be prepared for every type of contingency," he said. "It's not something that has to do with any immediate threat."

The Health Ministry recently announced it has produced enough smallpox vaccine for the entire population of 6.6 million people. The ministry said there was also enough to inoculate tourists and some 300,000 foreign workers.

The Health Ministry has said it would begin inoculating the entire population if the United States attacks Iraq. It said such a campaign would take a week.

Israel stopped vaccinating children against smallpox in 1978. A year later, the World Health Organization said the virus was eradicated from the world.

 Stunning
 for our re
AVIS


Front Page News Business In-depth Editorial Page Columns Israeli Life Arab Affairs Sports Books Health Real E
Archives JPost Français JPost Store Subscriptions Personals Classifieds Palm Post JPost Radio E-mail Edition

INTERNET JERUSALEM POST

NEW ON JERUSALEM POST

Guide To Israeli Products

Search

[Go](#) [Advanced Search](#)

13 Elul 5762, Wednesday Aug. 21, 2002

[Log In](#) | [Log Out](#) | [Print](#)[Front Page](#) > [News](#) > Cabinet approves smallpox vaccination for 15,000 emergency workers

Sites

[JPost.com](#)
[JPost Radio](#)
[Digital Israel](#)
[JPost Travel](#)
[International JP](#)
[JPost Store](#)
[JRep.com](#)

Main

[Front Page](#)
[Archives](#)

Interactive

[Forums](#)
[Readers' Letters](#)

Sections

[News](#)
[Business](#)
[In-depth](#)
[Editorial Page](#)
[Arab Affairs](#)
[Columns](#)
[Israeli Life](#)
[JPost Français](#)
[Sports](#)
[Literary](#)
[Supplement](#)
[Tourism](#)
[Real Estate](#)
[Hi-Tech](#)
[Health](#)
[Judaism Online](#)
[Jewish World](#)
[Maps of Israel](#)
[This Day](#)
[Looking Back](#)
[Good Food](#)
[Dry Bones](#)
[Supplements](#)
[Useful Links](#)

Services

[\[Printer Friendly \]](#)

Aug. 21, 2002

Cabinet approves smallpox vaccination for 15,000 emergency workers

By ASSOCIATED PRESS AND THE JERUSALEM POST
 INTERNET STAFF

Israel's Cabinet decided Wednesday to inoculate 15,000 security and rescue officials against smallpox to prepare for what officials said was a very remote possibility of an Iraqi attack with non-conventional weapons.

The Cabinet decision is part of Israel's overall preparation for a possible US attack on Iraq which, in turn, could trigger an Iraqi strike against Israel. Iraq has biological and chemical weapons, in addition to missiles with conventional warheads.

In the 1991 Gulf War, Iraq fired 39 Scud missiles, all with conventional warheads, at Israel. Most landed in the Tel Aviv area.

The United States has said it wants to topple Iraqi leader Saddam Hussein, although it has not confirmed that it will go to war to do so.

Raanan Gissin, an aide to Israeli Prime Minister Ariel Sharon, said Wednesday he did not know when the inoculations would begin. He said the Health Ministry was preparing the vaccines. "It's just part of the overall preparation of a very, very unlikely scenario," Gissin said. "It's a very remote contingency."

Gissin said it was decided to inoculate the rescue workers and security officials in case

[Front Page](#) [News](#) [Business](#) [In-depth](#) [Editorial Page](#) [Columns](#) [Israeli Life](#) [Arab Affairs](#) [Sports](#) [Books](#) [Health](#) [Real Estate](#)
[Archives](#) [JPost Français](#) [JPost Store](#) [Subscriptions](#) [Personals](#) [Classifieds](#) [Palm Post](#) [JPost Radio](#) [E-mail Edition](#)

INTERNET
JERUSALEM POST

LASK Family
KOSHER WEEKEND



**Rye Town
Westchester**

Search

[Go](#)

[Advanced Search](#)

14 Elul 5762, Thursday Aug. 22, 2002

[Log In](#) | [Log Out](#) | [Print](#)

[Front Page](#) > [News](#) > Smallpox vaccinations for 15,000 emergency workers

Sites

[JPost.com](#)
[JPost Radio](#)
[Digital Israel](#)
[JPost Travel](#)
[International JP](#)
[JPost Store](#)
[JRep.com](#)

Main

[Front Page](#)
[Archives](#)

Interactive

[Forums](#)
[Readers' Letters](#)

Sections

[News](#)
[Business](#)
[In-depth](#)
[Editorial Page](#)
[Arab Affairs](#)
[Columns](#)
[Israeli Life](#)
[JPost Français](#)
[Sports](#)
[Literary](#)
[Supplement](#)
[Tourism](#)
[Real Estate](#)
[Hi-Tech](#)
[Health](#)
[Judaism Online](#)
[Jewish World](#)
[Maps of Israel](#)
[This Day](#)
[Looking Back](#)
[Good Food](#)
[Dry Bones](#)
[Supplements](#)
[Useful Links](#)

Services

[[Printer Friendly](#)]

Aug. 22, 2002

Smallpox vaccinations for 15,000 emergency workers

By JANINE ZACHARIA AND JUDY SIEGEL

Fifteen thousand emergency personnel will be vaccinated against smallpox, security officials decided Wednesday, fearing that Iraqi President Saddam Hussein could use the deadly virus as a biological weapon should the US attack Baghdad. Immunization for the general population is still on hold.

The Ministerial Committee on National Security Affairs comprising of Prime Minister Ariel Sharon and his closest advisers decided to immunize "first response teams" as designated by the health system.

"In light of current situational assessments, there is no immediate danger of a smallpox attack on the State of Israel. Therefore, immunizing the entire population of the state is not called for at present. Additional situational assessments will be carried out as necessary," the Prime Minister's Office said in a statement. Several hundred Health Ministry workers have already been vaccinated.

Those to be vaccinated include firefighters, ambulance personnel, police, and Zaka (Disaster Victims Identification) workers.

Sharon's spokesman, Ra'anan Gissin, played down the smallpox danger. "It is not something that has to do with any



YALE UNIVERSITY LIBRARY Subscribed Resources

Search Terms: **smallpox**[Edit Search](#)[Print](#) [Email](#)[Document List](#) [Expanded List](#) [Full](#)[<<previous](#) **Document 5 of 10.** [next>>](#)

The Associated Press

The materials in the AP file were compiled by The Associated Press. These materials may not be republished without the express written consent of The Associated Press.

August 27, 2002, Tuesday, BC cycle

SECTION: Washington Dateline**LENGTH:** 773 words**HEADLINE:** Nation unprepared for logistics of mass **smallpox** vaccination, advisers say**BYLINE:** By LAURA MECKLER, Associated Press Writer**DATeline:** WASHINGTON**BODY:**

Many American cities are vastly unprepared to deliver lifesaving vaccinations should terrorists attack with **smallpox**, with a slew of logistical and policy problems still unresolved, federal advisers said Tuesday.

Vaccinations are effective against **smallpox** if delivered up to a few days after exposure to the virus. The government has enough vaccine in hand to vaccinate 75 million people, with more on the way.

But many communities have yet to figure out where to set up clinics, who will administer the shots and how to educate masses of people about the health risks that the vaccine carries, members of the Secretary's Council on Public Health Preparedness for the Department of Health and Human Services were told. "We're lagging behind, there's no question on that," said Dr. D.A. Henderson, who chairs the council and serves as HHS Secretary Tommy Thompson's top adviser on bioterror. "We're going to have to push very hard."

Henderson said there was "less sense of urgency" than is needed in some communities. If that doesn't change, he warned, "It's going to be bad news, very serious bad news."

Members of the council, meeting for the first time this week, largely agreed, pointing to a package of unresolved issues at the state and local level.

At the same time, Henderson and others said the country is significantly better prepared to handle bioterror today than it was before last fall's anthrax attacks. Thompson cited distribution of \$1 billion to local and state governments for preparation.

"Every day, every week, every month we are getting a lot stronger," Thompson told reporters after meeting with members of the council.

He said a positive consequence of last fall's attacks is the money now available to upgrade the public health system, including better communications systems, laboratories and planning for disaster. Several officials said the money already has helped states hit by the West Nile virus, a naturally occurring but deadly disease.

At the federal level, most energy is focused on **smallpox**. The disease was declared eradicated in 1980. The



YALE UNIVERSITY LIBRARY Subscribed Resources

Search Terms: smallpox

[Edit Search](#)[Print](#) [Email](#)[Document List](#) [Expanded List](#) [Full](#)[<< PREVIOUS](#) Document 2 of 10. [next >>](#)

Copyright 2002 The Atlanta Journal-Constitution

The Atlanta Journal-Constitution
ajc.com

The Atlanta Journal and Constitution

August 28, 2002 Wednesday Home Edition

SECTION: News; Pg. 9A**LENGTH:** 626 words**HEADLINE:** Smallpox plan in White House hands**BYLINE:** EUNICE MOSCOSO**SOURCE:** Cox Washington Bureau**BODY:**

Washington --- The Department of Health and Human Services has sent a **smallpox** vaccination plan to the White House but no decision has been made on it, the nation's top health official said Tuesday.

"Hopefully we'll have a decision in the near future," Secretary of Health and Human Services' Tommy Thompson said.

In June, a government advisory panel came out against vaccinating all Americans for **smallpox**, instead proposing that the vaccine be given to 15,000 "first responders" --- the health care and law enforcement workers most likely to respond to a biological attack. But in early July, some federal officials said they would vaccinate 500,000 first responders.

On Tuesday, Thompson declined to divulge any details of his plan.

The **smallpox** vaccine was a major topic during the first meeting this week of the Secretary of Health and Human Services' Council on Public Health Preparedness --- a group of 21 health specialists and scientists who will advise the federal government on various aspects of potential public health emergencies.

Many American cities are unprepared to deliver the vaccinations, with many logistical and policy problems still unresolved, federal advisers said Tuesday. Many communities have yet to figure out where to set up clinics, who will administer the shots and how to educate the public about the health risks of the vaccine.

"We're lagging behind, there's no question on that," said Dr. D.A. Henderson, who chairs the council and serves as Thompson's top adviser on bioterror. "We're going to have to push very hard."

The meeting Monday and Tuesday included briefings and discussions on such topics as last fall's anthrax attacks, the growing threat of biological weapons, the national pharmaceutical stockpile and the need for isolation rooms in hospital emergency areas.

Thompson said the focus on **smallpox** stems from health specialists' belief that an outbreak of the disease would be the worst bioterror possibility.

Correspondence



Responses to Smallpox Vaccine

To the Editor: I am alarmed by the high rate of vaccinia-vaccine-associated morbidity (>30 percent) in the study by Frey et al. (April 25 issue).¹ In their study, there were three deviations from prior standard procedures for vaccinia vaccination²⁻⁵ that may account for the unusually high rate of morbidity as compared with the rate at our clinic.⁶ First, their use of 15 scratches (part of the investigational-new-drug [IND] protocol for the vaccine) instead of the previously recommended 5 scratches for persons without prior vaccination results in a higher inoculum, which was previously reserved for persons with a prior vaccination.

Second, their use of an occlusive dressing may retard scab formation, and the resultant increased cutaneous permeability may foster local bacterial invasion.

Finally, as I reported in ProMED on November 1, 2001 (<http://www.fas.org/promed>), at our clinic, my colleagues and I have observed the emergence, since January 2001, of cellulitis — a complication of vaccinia vaccination that was previously rare in first-time vaccinees. This same phenomenon was also observed by the Centers for Disease Control and Prevention during their vaccinia-immunization effort in December 2001. There are several possible reasons for the emergence of this complication,⁶ but its rapid resolution with antibiotic therapy strongly argues for a bacterial cause. At our clinic, the rate of apparent cellulitis as a complication of vaccination jumped from 3.9 percent (in 11 of 279 persons) in 2001 to 10.2 percent (in 12 of 118) after the switch in February 2002 to the IND vaccinia protocol with the use of 15 scratches.

In contrast to the results reported by Frey et al., only 2 of 12 persons at our clinic required one or two days of medical leave. We believe the difference in morbidity rates is primarily due to the fact that we followed the standard procedures for vaccinia vaccination rather than the new procedure.

MICHAEL A. SAURI, M.D., M.P.H.&T.M.
Occupational Health Consultants
Rockville, MD 20850

1. Frey SE, Couch RB, Tacket CO, et al. Clinical responses to undiluted and diluted smallpox vaccine. *N Engl J Med* 2002;346:1265-74.
2. Sauri MA, Sibley C, Monk B, Nichols M, Lai S. Durability of vaccinia immunization based on reaction at the challenge site. *Md Med* 2002;3(2):44.
3. WHO Expert Committee on Smallpox Eradication: second report. WHO Tech Rep Ser 1972;493:5-64.
4. Krugman S, Ward R. Infectious diseases of children: smallpox and vaccinia. 4th ed. St. Louis: C.V. Mosby, 1968.
5. Smallpox. In: Christie AB. Infectious diseases: epidemiology and clinical practice. 2nd ed. Edinburgh, Scotland: Churchill Livingstone, 1974:204-58.
6. Lane JM, Ruben FL, Abrutyn E, Millar JD. Deaths attributable to smallpox vaccination, 1959 to 1966, and 1968. *JAMA* 1970;212:441-4.

To the Editor: How durable are the immune responses after smallpox vaccination? Little direct evidence exists; however, some early studies suggest a long-term effect mediating resistance to fatal disease.¹ There is little or no quantitative evidence of the durability of the cell-mediated response induced by vaccination against smallpox with the standard vaccinia virus.

During the course of other investigations,² we tested the CD8+ T-lymphocyte responses to vaccinia virus in persons who had been recently vaccinated (within the previous five years because of work-related potential exposures), unvaccinated persons, and persons who had been vaccinated 6 to 35 years earlier or more than 35 years earlier. Figure 1 shows the results of intracellular interferon- γ staining of CD8+ lymphocytes from persons in each of these groups, as determined by overnight culture with vaccinia-virus-infected, autologous B-lymphocyte cell lines. Vaccinia induces a robust CD8+ T-lymphocyte response in healthy persons, and this

INSTRUCTIONS FOR LETTERS TO THE EDITOR

Letters to the editor are considered for publication (subject to editing and abridgment) provided they do not contain material that has been submitted or published elsewhere. Please note the following: •Your letter must be typewritten and triple-spaced. •Its text, not including references, must not exceed 250 words if it is in reference to a recent *Journal* article and 400 words in all other cases (please provide a word count). •The letter must have no more than five references and one figure or table. •The letter must be signed by no more than three authors. •Letters referring to a recent *Journal* article must be received within four weeks of its publication. •Include your full mailing address, telephone number, fax number, and e-mail address. •Letters to the editor may be submitted over the Internet at <http://secure.nejm.org/> letters. You may also send us your letter by standard mail or fax.

Our address: Letters to the Editor • *New England Journal of Medicine* • 10 Shattuck St. • Boston, MA 02115

Our Web address: <http://secure.nejm.org/letters>

Our fax numbers: 617-739-9864 and 617-734-4457

We cannot acknowledge receipt of your letter, but we will notify you when we have made a decision about publication. Rejected letters and figures will not be returned. We are unable to provide prepublication proofs. Financial associations or other possible conflicts of interest must be disclosed. Submission of a letter constitutes permission for the Massachusetts Medical Society, its licensees, and its assignees to use it in the *Journal's* various print and electronic publications and in collections, revisions, and any other form or medium.

Information Technology:**Computer simulations help epidemiologists plan for bioterrorist smallpox attack**

09/02/2002

Bio-Terrorism.Info

11

(c) Copyright 2002 Bio-Terrorism.Info via NewsRx.com

2002 SEP 2 - (NewsRx.com & NewsRx.net) -- Imaginative minds can conjure horribly apocalyptic consequences from a smallpox attack.

Here is a disease that kills 30% of those it infects and leaves survivors permanently scarred. After plaguing humanity for centuries, it was finally eradicated 3 decades ago so that no one today has any built-up immunity to it. The smallpox vaccinations some people had as children would no longer be effective. Unchecked, smallpox has the potential to sweep through the United States population like the plagues of medieval Europe.

But with the help of computers, many researchers are concluding that a smallpox attack by terrorists need not produce an uncontrollable public health crisis. Computer simulations show that the proper combination of postattack vaccination, quarantine and other public health measures could stop smallpox in its tracks:

* A model designed by researchers from the Centers for Disease Control and Prevention found that vaccination and quarantine could stop an outbreak within a year and limit the number of smallpox cases to 4200 - even if 1000 people were directly infected by terrorists.

* Researchers from Yale University and the Massachusetts Institute of Technology found through another simulation that a massive vaccination program launched as soon as the first smallpox cases were detected could quickly stop the disease from spreading and limit infections to fewer than two times the initial number.

* By simulating the daily comings and goings of people in Portland, Ore., researchers from the Los Alamos National Laboratory found that reasonable public health measures combined with people's natural tendency to stay home when they're feeling sick would likely limit the spread of smallpox after an attack.

"I think it's apparent that we can control an outbreak of smallpox if we do the right thing," said Stephen Eubank, a researcher in the Basic and Applied Simulation Science Group at Los Alamos.

The simulations are much like those computer games where you play the mayor of a growing city. The choices you make about zoning regulations, tax rates and other issues determine whether your city prospers or collapses into blight.

With the smallpox models you make decisions about whom to vaccinate and quarantine. You decide what to tell the public and when. Then the computer calculates how the disease will spread through the population, illustrating how different strategies might pan out.

"No one can predict the future," said Tara O'Toole, who is director of the Center for Civilian Biodefense at Johns Hopkins University. "Models can help us imagine it and maybe help us respond."

The Los Alamos model, for example, replicates the daily life of every single person in Portland, Ore., to see how trips to school, work, malls and the like would spread smallpox through the community.

Portland residents needn't fear that Big Brother is watching - the Los Alamos researchers use census data and anonymous questionnaires to generalize people's daily comings and goings, not actual surveillance.

Eubank and his colleagues originally designed the program to help planners envision how changes in Portland's transportation system would affect residents' ability to move around the city. By adding a smallpox transmission model Eubank has created a simulation of how the disease moves, too.

Are We Prepared? Interviews With Leading Experts

September 06, 2002

Almost 1 year after the attacks on the World Trade Center and the Pentagon, and nearly 11 months after the anthrax attacks, are we better prepared for possible bioterrorist action in the United States? Medscape spoke with a number of people involved in this field to find out how far we have come, and how much further we need to go.

We spoke with Edward H. Kaplan, PhD, William N. and Marie A. Beach Professor of Management Sciences and Professor of Public Health, Yale School of Management, New Haven, Connecticut; Stanley O. Foster, MD, MPH, Visiting Professor of International Health at Rollins School of Public Health, Emory University, Atlanta, Georgia; Alan P. Zelicoff, MD, Senior Scientist, Center for Arms Control and National Security, Sandia National Laboratories, Albuquerque, New Mexico; Larry I. Lutwick, MD, Director of the Division of Infectious Diseases, Department of Veterans Affairs, New York Harbor Health Care System, Brooklyn Campus, and Professor of Medicine, SUNY-Health Science Center at Brooklyn; Robert A. Weinstein, MD, Professor, Department of Medicine, Rush Medical College, and Chairman, Division of Infectious Disease, Cook County Hospital, Chicago, Illinois; and Jon Temte, MD, PhD, Associate Professor of Family Medicine at the University of Wisconsin, Madison, and a member of the Wisconsin pandemic influenza preparedness executive committee.

Medscape: Is the US healthcare system more prepared to handle a biological or chemical attack now than it was a year ago?

Dr. Weinstein: We are mentally more prepared. Not that such events aren't always a shock, but we at least know that this can happen on our soil. We are getting there administratively and medically.

Dr. Zelicoff: There is no question that we are far from prepared for bioterrorism.

Dr. Temte: The thing that has changed is more awareness of the possibility of bioterrorism. There was a great deal of interest after September 11, but we returned to baseline. Our society has a well-established ability to extinguish new concerns fairly quickly. This comes up every year with the influenza outbreak. Hospitals are full, people are going nuts – and then people forget about it. That's a very predictable phenomenon.

I think one of the big changes is people are more aware of where to get information, and physicians have relatively good information across the country. But what is lacking is training for disaster response. I think hospitals are much better prepared for disasters than are physicians. Hospitals have to go through this as part of their accreditation; physicians don't. Physicians are still very much oriented to the individual patient as opposed to looking at the community or larger areas. I think that perspective needs to change.

Dr. Kaplan: If something happens, when should the population be instructed to get what, and what exactly are the logistics to ensure that the "what" will be efficiently available (as in "where" and "when")? We should be thinking about "broad-spectrum" response policies the same way one thinks about "broad-spectrum" antibiotics, and we should be planning for efficient mass distribution (or mass vaccination or mass prophylaxis) in the event of an attack. While some are starting to put efficient plans together (eg, New York City has a point-of-distribution, or POD system that is coming together), I'm not convinced enough has been done in this area.

Medscape: The current plans in the United States for an attack with smallpox is "ring vaccination" (surveillance containment). Do you think this approach is the best for the United States? Is the ring strategy better than the Israeli plan to vaccinate everyone?

Dr. Foster: There are 3 options – surveillance containment of first responders, voluntary vaccination, and compulsory vaccination. Given that there are types of smallpox that might miss detection in the first 48 hours (early disease or

09.13.02

SOMnews

NEWS AT THE YALE SCHOOL OF MANAGEMENT

MASS VACCINATION MAY BE BEST RESPONSE TO SMALLPOX ATTACK, SAY YALE SCHOOL OF MANAGEMENT AND M.I.T. SLOAN EXPERTS

In the event of a smallpox attack, a mass vaccination policy would result in fewer deaths and faster disease eradication than alternative vaccination strategies, reports a new study published in *Proceedings of the National Academy of Sciences* (article 2827). Since the terrorist attacks of September 11, the best response to a smallpox attack has been a topic of hot debate.

Yale SOM expert Edward Kaplan, the William N. and Marie A. Beach Professor of Management Sciences & Professor of Public Health, and colleagues from M.I.T.'s Sloan School and Operations Research Center, used a mathematical model to compare a number of different vaccination strategies on disease spread and death resulting from a smallpox attack on a large urban center.

The Centers for Disease Control and Prevention's (CDC) current response plan, endorsed by the Advisory Committee on Immunization Practices on June 20 calls for isolation of confirmed smallpox cases and targeted vaccination of only those who have been in contact with infected individuals, with a mass vaccination effort to take place only if the initial vaccination and quarantine methods are unsuccessful. Parameters of this new mathematical model include the number of people initially infected, the transmission rate, the fraction of potential contacts named by infected individuals, and the resources available to track potential contacts and administer vaccinations.

Under several different scenarios, the model predicted that mass vaccination would stop the spread of infection faster and result in fewer deaths than targeted vaccination or the CDC plan. In fact, the currently endorsed plan led to an estimated 4,120 additional deaths compared to a mass vaccination plan implemented from the beginning in a large attack on a city with 10 million inhabitants. The researchers found that a pre-attack vaccination of a portion of the population lessened the gap between the different strategies. These results suggest that unless a pre-attack vaccination is used to increase immunity within the population, a mass vaccination strategy should be seriously considered.

"Emergency Response to a Smallpox Attack: The Case for Mass Vaccination," by Edward H. Kaplan, Yale School of Management, and David L. Craft, Operations Research Center, and Lawrence M. Wein, M.I.T Sloan.

Explore latest faculty research on CampusNet under "Research@SOM"
<http://www.som.yale.edu>

Yale School of Management
135 Prospect Street
New Haven, CT 06511

The Yale School of Management gratefully acknowledges
Bristol-Myers Squibb's In-Part
sponsorship for the
SOMnews.

Mary Ann Green, Editor
Office of Student Affairs
maryann.green@yale.edu
Telephone: 203.432.5351
Fax: 203.432.9916

www.som.yale.edu

The New York Times

A.P.

Se

HOME

- [JOB MARKET](#)
- [REAL ESTATE](#)
- [AUTOMOBILES](#)

NEWS

- [International](#)
- [National](#)
- [Columns](#)
- [Politics](#)
- [Business](#)
- [Technology](#)
- [Science](#)
- [Health](#)
- [Sports](#)
- [New York Region](#)
- [Nation Challenged](#)
- [Education](#)
- [Weather](#)
- [Obituaries](#)
- [NYT Front Page](#)
- [Corrections](#)

OPINION

- [Editorials/Op-Ed](#)
- [Readers' Opinions](#)

FEATURES

- [Arts](#)
- [Books](#)
- [Movies](#)
- [Travel](#)
- [Dining & Wine](#)
- [Home & Garden](#)
- [Fashion & Style](#)
- [New York Today](#)
- [Crossword/Games](#)
- [Cartoons](#)
- [Magazine](#)
- [Week in Review](#)
- [Multimedia/Photos](#)
- [College](#)
- [Learning Network](#)

SERVICES

- [Archive](#)
- [Classifieds](#)
- [Personals](#)
- [Theater Tickets](#)
- [Premium Products](#)
- [NYT Store](#)
- [NYT Mobile](#)
- [E-Cards & More](#)
- [About NYTDigital](#)
- [Jobs at NYTDigital](#)
- [Online Media Kit](#)
- [Our Advertisers](#)

MEMBER CENTER

- [Your Profile](#)
- [E-Mail](#)
- [Preferences](#)
- [News Tracker](#)
- [Premium Account](#)
- [Site Help](#)
- [Privacy Policy](#)

SEARCH [Go to Advanced Search/Archive](#)

Past 30 Days

[GO TO MEMBER C](#)

Welcome, ka

nytimes.com/realstateSign up now [\[click here \]](#)

With our new Real Estate e-mail alerts.

[E-Mail This](#)[Printer-Frien](#)[Most E-Mails](#)

U.S. Develops Smallpox Vaccine Plan

By THE ASSOCIATED PRESS

Filed at 7:46 a.m. ET

WASHINGTON (AP) -- Smallpox vaccine would be offered to all health care workers, starting with emergency room workers and moving to doctors in private practice, and eventually extended to the general public under a Bush administration plan in the final stages of development.

The plan would begin vaccinations for those at the greatest risk of encountering a patient with the highly contagious disease, which experts fear could be used in a bioterrorist attack. The first to be vaccinated would include infectious disease specialists and emergency room personnel, including doctors, nurses, technicians, even security officers working at hospitals and clinics, according to officials familiar with the administration's planning.

Advertisement

The New York Times
PLAN YOUR ESCAPES EVERY FRIDAY

Weekend escape destinations
 Real estate hideaways
 Getaway vehicles

Save 50%
 on Home Delivery
[Click here](#)


TIMES NEW

Track news

y

[Create Your Ow](#)[Take](#)[Sign Up for](#)**DID YOU**

You can now track interest you, with Tracker. [Click here](#) the e-mail and site information on the market.

Stanford Business School Research: Scholars Call for a Change in Government Response to Bioterrorism Attack Scenario

09/17/2002

Business Wire

(Copyright (c) 2002, Business Wire)

STANFORD, Calif.--(BUSINESS WIRE)--Sept. 17, 2002--Three scholars, including a Stanford Graduate **School** of Business professor, argue they can substantially reduce the deaths from a potential smallpox attack on a city by changing the federal government's public health response plan.

The current U.S. government plan would cope with a smallpox attack that infected roughly 1,000 urban Americans in much the same way public health officials have handled natural epidemics in the past. In this case, using the traditional approach of isolating those who are infected and immunizing only those with whom they have been in contact would result in 4,680 deaths and take a full year to extinguish the outbreak, the scholars calculate.

A better plan, they argue, would be to use speedy mass vaccinations after an attack coupled with advance preparations, which would reduce the death toll in their base case to 560 deaths and halt an outbreak in a much shorter time period.

"This would not only save lives, it would minimize the impact on the national psyche, because many people would self-quarantine, panic, flee, or storm hospitals demanding vaccinations; the financial costs of such a shutdown would be immense," says Lawrence Wein, professor of operations, information, and technology at the Stanford Graduate **School** of Business and one of three authors of the study, which was published in the August 6 issue of the Proceedings of the National Academy of Sciences.

Wein's expertise is in the complex logistics of manufacturing, but he also has worked in other medical areas such as treatments for HIV, cancer, and Alzheimer's disease. His coauthors in the smallpox study are Edward H. Kaplan of the **Yale School of Management**, and David Craft, a doctoral student at the MIT Operations Research Center. The key feature of their work is to incorporate the timeliness of the response in addition to the spreading pattern of the disease.

The government's current policy has worked well for containment of natural disease spread in the past, Wein said. "The current interim policy was motivated by the 'surveillance containment' policy that was used to eradicate smallpox worldwide back several decades ago. The people who did this are real heroes; this was one of the great health care accomplishments of the past century."

But applying this policy in a present-day bioterror attack is problematic, Wein says. "The U.S. population lacks herd immunity (this means they are highly susceptible to smallpox because they have never had it and vaccinations ceased decades ago); tracing human contacts is very difficult in a large city; the smallpox strain is likely to be one that the former Soviet Union weaponized and so will be much more infectious than most historical natural outbreaks; and the United States does not have the leisure of waiting the many months it takes for vaccination to eradicate the disease."

Embedded in the existing response plan is a "race to trace" an infected person, he said. A person infected with the disease would need to self-report to a medical facility and then be isolated and interviewed. On average, people can remember 50 others they may have contacted since being exposed to the illness. Those 50-plus people then need to be traced, contacted, and vaccinated.

The problem is time. If a person who is exposed rides the "A" train at 5:15, tracing all those who have been in contact with him is time consuming, if not impossible. And a person is only susceptible to the benefits of the vaccine within about three days of exposure.

The authors are able to calculate the cost in disease spread and added deaths from the lost timeliness by using "queueing theory," an operations theory long favored by fast-food chains like McDonald's to keep their customers coming back. Queueing theory shows that the more people there are in line for tracing and vaccination, the more difficult it becomes to win the race to trace. "It is the first paper to our knowledge that incorporates queueing and operations aspects into a model of an epidemic," Wein says. "And the repercussions of waiting in a long line are more serious than at McDonald's."



ABOUT US/HELP
ARCHIVES
BOOKS
BUSINESS
CLASSIFIEDS
COLUMNISTS
COMMUNITY
CONTACT US
DISCUSSION
DPO BY E-MAIL
ENTERTAINMENT
FOOD/DINING
FRONT PAGE
LIFESTYLES
NATION/WORLD
NEWS
NEWSPAPER ADS
OBITUARIES
ONE YEAR LATER
OPINION
SPORTS
TRAVEL
VOTERS' GUIDE
WAR ON TERROR
WEATHER
DPO HOME

SEARCH DPO:

Enter search
term,
hit enter key
Click here for
advanced search

Smallpox vaccine plan would use po places

**Colo. reacts to U.S. call for mass shots within week o
outbreak**

By Karen Auge and Allison Sherry
Denver Post Staff Writers

Tuesday, September 24, 2002 - Federal health officials want everyone in t
vaccinated within a week if smallpox resurfaces, and in Colorado that would li
a trip to the voting booth.

The state's announcement Monday came as federal health officials unrolled 10
advice for states to inoculate their entire populations in case of an outbreak o
deadly disease as a result of a bioterrorism attack.

The CDC's guidelines did not answer some of the most controversial question:
surrounding smallpox vaccines - namely, should routine vaccinations resume
United States, and how many of the medical and law enforcement workers, w
be the first to encounter a patient infected with the smallpox virus, should get
as a precaution?

In Colorado, "we have decided that the best approach ... would be to have lot
smaller immunization clinics," said Dr. Ned Calonge, the state's acting chief m
officer.

Calonge said using the existing voting precinct system would give the state a
since about half the state's population is registered to vote and those people
know where their polling place is.



Click [here](#)
for video
report.

State officials would rely on media announcements and the Internet to inform
he said.

To make the plan work, about 3,000 nurses would be needed to administer th
injections - one for each of the state's polling places.

Calonge said about 600 nurses have volunteered to administer the vaccine, a
without the state advertising for help.

But bigger, more familiar places would be the best sites for people to go for v
time of panic, said Dr. Edward Kaplan, a smallpox expert at the Yale School o
Health.

"You want auditoriums or other locations that are very well-known, where pe
know exactly where to go," he said.

Colorado and other states have a week to submit plans for mass vaccination

NEWSWISE SciNews MedNews BizNews LifeNews Search
[home](#) · [scinews](#) · [mednews](#) · [biznews](#) · [lifeneews](#) · [search](#) · [contact](#)

University of Minnesota
 26-Sep-02

Math's Role in Biodefense

Library: SCI

Keywords: BIOTERRORISM TERRORISM MATHEMATICS ANTHRAX SMALLPOX VACCINATION ATTACK

Description: Experts who will likely become part of the nation's frontlines in biodefense will meet at the University of Minnesota on Sept. 28 for the first workshop of its kind in the nation.

What: Biodefense Workshop

When: 8:30 a.m. to 5:30 p.m.(CDT), Saturday, Sept. 28

Where: 3-180 Electrical Engineering/Computer Science building,

Contacts: Doug Arnold, director of the University of Minnesota's Institute for Mathematics and its Applications, (612) 624-6066

During the conference, you can call Doug Arnold between 12:35 p.m. and 2 p.m. and from 5:30 p.m. to 6:45 p.m. (CDT) at (612) 308-3251.

Patty Mattern, University News Service, (612) 624-2801, matte016@umn.edu

EXPERTS GATHER AT THE U TO TAKE ON BIOTERRORISM

MINNEAPOLIS / ST. PAUL--Experts who will likely become part of the nation's frontlines in biodefense will meet at the University of Minnesota on Sept. 28 for the first workshop of its kind in the nation.

The select group of mathematicians and scientists, along with health, business, engineering and military experts, will come together to explore the use of math in countering bioterrorism during the workshop "Operational Modeling and Biodefense: Problems, Techniques and Opportunities."

This one-day meeting is the first conference in the nation to highlight the role of mathematical modeling in analyzing the operational and logistical aspects of biodefense planning and response, said Doug Arnold, director of the U of M's Institute for Mathematics and its Applications at the University of Minnesota. The institute, which specializes in advancing the impact of mathematics in dealing with important problems, is hosting the workshop.

Mathematical models along with sophisticated mathematical analysis and computer simulation can help guide thinking and provide insight for policy-makers on bioterrorism response plans as well as predict the consequences of different responses. Models can help determine the best vaccination approach to use in different circumstances. The models can also identify the quickest way to transport medicine or vaccines to areas where needed. But, the use of mathematical modeling techniques in biodefense planning is in its infancy, Arnold said.

"These techniques provide a powerful additional tool for policy-makers, but the people whose job it is to think about biodefense rarely have training in mathematical modeling," Arnold said.

Many of the people coming to the conference have not been involved in biodefense before, but their expertise in areas of operations research, mathematical optimization, differential equations, and discrete mathematics will

<http://www.newswise.com/articles/2002/9/BIODEFNS.UMN.html>

09-30-02

SEARCH
canada.com

Order online. No need to DRIVE.

NATIONAL CHANNELS

Select a city

BUSINESS CENTRE CLASSIFIEDS AUTOS HOMES CAREERS SHOPPING PERSONAL

NEWS SPORTS FINANCE ENTERTAINMENT HEALTH TECHNOLOGY TRAVEL

canada.com » Search

Monday » Sep

SEARCH

- » [Super Search](#)
- » [YellowPages.ca](#)
- » [Canada 411](#)
- » [OnLine Shopping](#)
- » [Careers](#)
- » [Autos](#)

SEARCH RESULTS - STORY

Smallpox plan a shot in the dark

While the U.S. is moving aggressively on a mass vaccination strategy, Canada's defence against biological warfare is still being decided.

Ian MacLeod

The Ottawa Citizen; with files from The Associated Press

Saturday, September 28, 2002

ADVERTISEMENT

FREE Your PC
from harmful files
and errors...



The federal government is refusing to release its detailed logistical plan of how Canada would respond to a smallpox outbreak.

The rebuff of a request to see the Canadian Smallpox Contingency Plan is in sharp contrast to the United States, where the Centers for Disease Control issued a 48-page guide this week with extensive technical details on the vaccination measures state and city authorities will need to have in place to respond to an outbreak if mass inoculations are ordered.

Canada's plan to defend against the smallpox virus, which spreads like wildfire and kills one-third of those it infects, is summarized -- eight sentences, 154 words -- on a Health Canada Web site.

It outlines a "ring" or "search-and-contain" vaccination strategy, in which infected persons and people with whom they've had physical contact are isolated, vaccinated and monitored in the hope of building a firewall around the hot spot. A mass vaccination would be

Not everyone belongs at Yale. It takes a highly self-motivated, organized person to be successful there...

autumn 2002

Medical students are by nature very competitive. The *Yale System* tempers the negative aspect of that kind of competitiveness...

Everyone loves the Yale System. So why can't they all agree?

Abandoning or even eroding the *Yale System* will result in Yale graduates being as devoid of curiosity and as boring as most physicians.

I think the *Yale System* should be abandoned.

I strongly support the traditional *Yale system* established in 1921. It not only sets Yale apart—as a graduate school—from other medical schools that act like “trade schools”—but affords freedom of expression and development of lifetime learning habits that are essential to the practice of good medicine.

The unique quality of the *Yale system* has influenced me profoundly and was a wonderful experience. I applaud your efforts to preserve it.

Smallpox vaccination study places administration's plans for terror response in doubt

In the aftermath of September 11, Yale public health specialist Edward H. Kaplan, Ph.D., started thinking about how to fight bioterrorism. The result was a study on smallpox vaccination that made national headlines, in no small part because it criticized federal government terror reaction plans as being too little, too late.

Using a mathematical model, Kaplan found mass vaccination of the population in the area of an outbreak to be far more effective than “ring vaccination,” the limited immunization strategy the government first recommended as the initial response to a smallpox attack. He published his study in the *Proceedings of the National Academy of Sciences* in July, shortly after the Bush Administration announced its policy.

Working with MIT colleagues David L. Craft, M.S., and Lawrence M. Wein, Ph.D., Kaplan used their model to analyze how different vaccination strategies contain the spread of a smallpox attack that infects 1,000 people in a large city. Their study took key features of guidelines from the Centers for Disease Control and Prevention (CDC) and applied them to a disease transmission model. The least effective method was ring vaccination, which isolates the infected and vaccinates people found to be in close contact with them. Ring vaccination would allow 367,000 cases of smallpox and 110,000 deaths and would take 350 days to end the outbreak.

By contrast, a mass vaccination begun as soon as authorities learned of the attack would result in 1,830 cases and 560 deaths and end the outbreak in 115 days. (It takes two weeks for smallpox to incubate and for symptoms to appear.) The analysis found that switching from ring to mass vaccination on the 33rd day of a crisis would still allow 15,570 cases and 4,680 deaths.

Before smallpox was eradicated in 1980, ring vaccination was the accepted

strategy, because cases were isolated and most people had been immunized. Throughout the history of the disease, the government has been reluctant to undertake mass vaccination, since the vaccine uses a live virus that can cause severe side effects and even death. Still, Kaplan said the fatality risk of mass vaccination—about one person in 1 million—is minuscule compared to the possible death toll of a terror attack.

As *Yale Medicine* went to press in October, the CDC director, Julie L. Gerberding, M.D., M.P.H., and other top bioterrorism officials announced a change in strategy away from ring vaccination, recommending instead that voluntary immunization begin immediately for 1 million military personnel, followed by 10.5 million health care workers and emergency responders. The vaccine would then be offered to the public, most likely in early 2004. As President Bush considered the proposal, physician organizations including the American Medical Association and the American Academy of Pediatrics (AAP) urged caution and a continued policy of ring vaccination.

“The [recommendation] is flexible and could change if there is an actual outbreak of smallpox, or if a safer vaccine becomes available,” said Robert S. Baltimore, M.D., professor of pediatrics and epidemiology at Yale and lead author of the AAP’s policy statement.

Kaplan has found himself in political territory before. His landmark work on the New Haven needle exchange program led some to label him an activist for AIDS patients and drug addicts. But Kaplan rejects any notion that his research has a political dimension. “Many if not most would consider the needle exchange results to come from the political left and the smallpox results to come from the political right,” he said. “The truth is, in both cases, the results came from reasoned analysis.”

TOWN-GOWN TEACHING | DOCTOR DUKE | OLD YALE: SISTERS IN MUSIC

Yale

Alumni Magazine / October 2002 / \$3.50

Cecile Ablack
Sch of Management
56 Hlh (Mail: SOM)
Mail Code 388 Org Number 685101

To Renee

What's wrong with this frog?

The answer could
affect you and me.



How best to respond to a smallpox attack by terrorists? The Centers for Disease Control and Prevention have a plan for targeted vaccinations in the event of an outbreak, but Edward Kaplan, a professor at Yale's School of Management, says mass vaccinations would be more effective. Using a mathematical model, Kaplan and colleagues at MIT determined that mass vaccination could reduce the number of deaths in a city of 10 million by 4,120 people.



YALE UNIVERSITY LIBRARY Subscribed Resources

Search Terms: **smallpox**[Edit Search](#)[Print](#) [Email](#)[Document List](#)[Expanded List](#)[FWS](#)[Full](#)[<< PREVIOUS](#) **Document 2 of 31.**[NEXT >>](#)

The Associated Press

The materials in the AP file were compiled by The Associated Press. These materials may not be republished without the express written consent of The Associated Press.

October 8, 2002, Tuesday, BC cycle

SECTION: Washington Dateline**LENGTH:** 737 words**HEADLINE:** Clues suggest Iraq has **smallpox**, experts say**BYLINE:** By MATT KELLEY, Associated Press Writer**DATELINE:** WASHINGTON**BODY:**

Fearing a biological attack from Iraq, the United States has made new **smallpox** vaccine and readied response plans for the reappearance of the deadly virus, which some experts are convinced is part of Saddam Hussein's arsenal.

Clues include U.N. weapons inspectors' discovery of a machine labeled "**smallpox**" and Iraq's experimenting with a related virus that infects camels. The official U.S. position, shared by some experts, is that the evidence is inconclusive.

"I don't believe the intelligence community has a smoking gun that Iraq possesses the virus," said Jonathan Tucker, a former U.N. biological weapons inspector. "My impression is they're erring on the side of caution on these bits of circumstantial evidence that are troubling but not conclusive." All **smallpox** samples except one in Atlanta and one in Moscow were supposed to have been destroyed more than two decades ago when the disease was declared eradicated. The former Soviet Union reportedly grew tons of **smallpox** as part of its biological weapons program, and experts suspect other countries could be harboring clandestine samples.

Chief among the suspects is Iraq, which has admitted making weapons from anthrax and other germs.

"I have no doubt in my mind that Iraq does have the **smallpox** virus," said Dr. Ken Alibek, a top official in the Soviet biological weapons program before he defected to the United States in 1992.

An attack with **smallpox** could kill millions, a possibility that prompted the Bush administration to order enough **smallpox** vaccine to inoculate the entire U.S. population if necessary.

"We're very worried about Iraq," said Dr. D.A. Henderson, a **smallpox** expert and bioterrorism adviser to the Department of Health and Human Services.

Unlike anthrax, the bacteria used in last year's unsolved mail attacks, the highly contagious **smallpox** virus can be passed from person to person. The virus causes ugly pustules both on the skin and inside the mouth and throat. About a third of unvaccinated people who get the disease die.

The last case of **smallpox** in the United States occurred in Texas in 1949, and routine vaccinations ended in

"All the News
That's Fit to Print"

The New York Times

EARLY EDITION

Sunday: Cloudy with rain, high 68.
Sunday night, breezy and dry, low
47. Monday, sunny and cool, high
57. Weather map is on Page 43.

VOL. CLII . . . No. 52,270

Copyright © 2002 The New York Times

NEW YORK, SUNDAY, OCTOBER 13, 2002

\$3.75 beyond the greater New York metropolitan area.

THREE DOLLARS

October 13, 2002

THREATS AND RESPONSES: THE DISEASE

THREATS AND RESPONSES: THE DISEASE; White House Debate on Smallpox Slows Plan for Wide Vaccination

This article was reported by Lawrence K. Altman, William J. Broad and Denise Grady and was written by Mr. Broad.

Intense debates in the Bush administration over smallpox vaccinations have delayed critical decisions in the nation's program against germ terrorism for months, participants say.

They say officials, including at times Vice President Dick Cheney, have argued that the nation should move quickly to vaccinate widely even in the absence of a bioterrorist attack. But others, including President Bush, have been more cautious, worrying about the vaccine's risk of causing serious illness or death.

The result has been confusion and delay, even as preparations for some immunizations move ahead.

Though state health officials have been asked to prepare to vaccinate health workers who might confront any smallpox cases, they have not been told how many workers they should immunize. Federal health officials said this month that the government should also consider making the vaccine available to everyone who wants it -- an option that would require complex education campaigns and extensive logistical preparations -- but President Bush has announced his decision.

The hesitancy reflects the magnitude of the issue and the difficulty of resolving it, given uncertainties over whether the United States faces a smallpox attack and how the public would respond to the hazardous vaccine, both physically and emotionally.

Still, emergency plans are advancing. The Pentagon is completing plans to vaccinate 500,000 troops. Last month, federal health officials sent the states a detailed blueprint preparing to vaccinate all Americans. Its particulars include two-pronged needles, protocols, medical screeners, security officers and vaccination times per patient of 30 seconds to minutes.

Moreover, the upholding of mass vaccinations as a viable option, which officials from the Centers for Disease Control and Prevention and other health agencies did on Oct. 4, was a late

The Side Effects
Risks That Include
Rashes and Death



Carol T. Powers for The New York Times
Ken Alibek, a germ warfare expert, says Iraq could turn smallpox into a weapon.

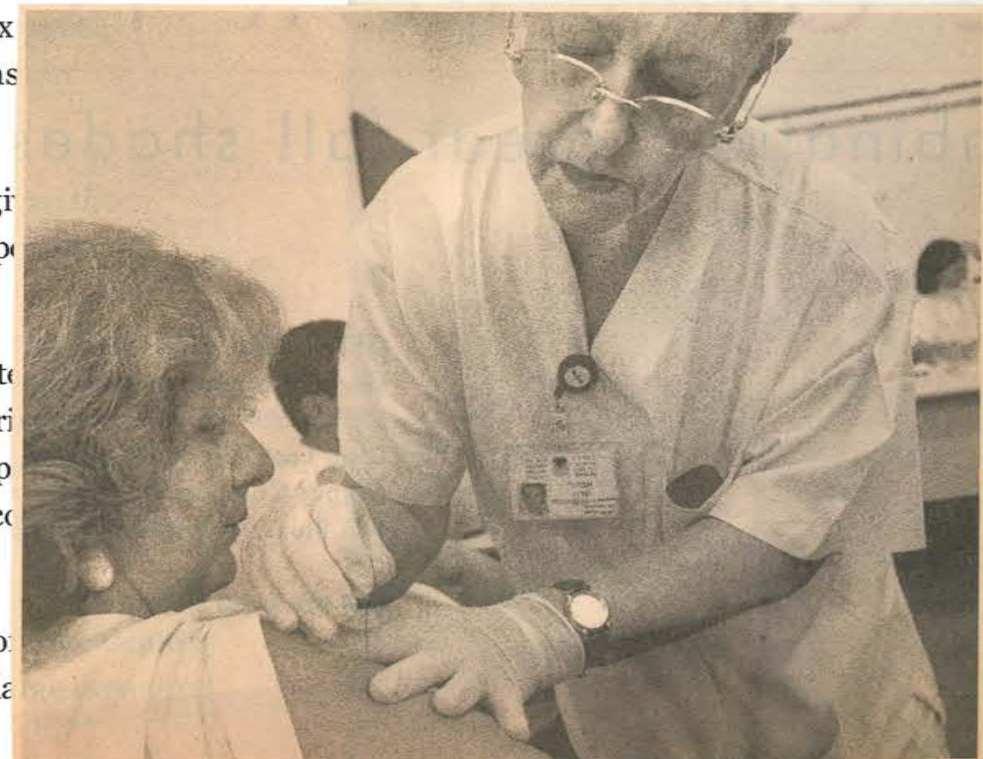
The Defenses

Vaccine Stockpiles
And Outbreak Plans



Richard O. Spertzel says Iraq was probably "messing around with smallpox."

The Scourge
A Deadly Weapon
That Floats in the Air



A hospital worker receiving a smallpox vaccination last month in Tel Aviv. In August,

SADDAM'S PALACES • FDR AND AUSCHWITZ

Newsweek

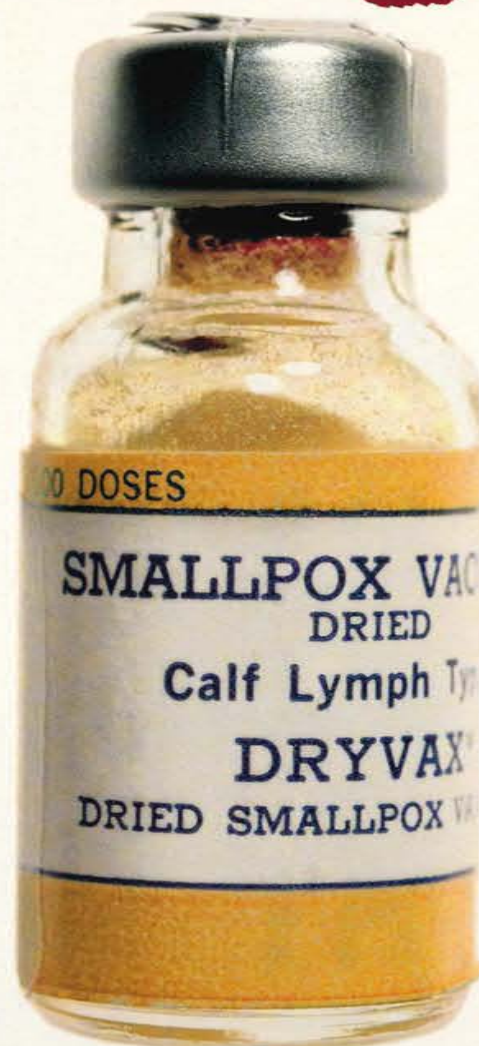
October 14, 2002

newsweek.msnbc.com

Operation: Smallpox

Inside the
Emergency
Plan to
Inoculate
Every
American

How Real
Is the
Threat?



Smallpox:

Scholars make a case for mass vaccination

10/15/2002

Virus Weekly

13

(c) Copyright 2002 Virus Weekly via NewsRx.com

2002 OCT 15 - (NewsRx.com & NewsRx.net) -- **Yale** University researchers say mass vaccination in the event that the smallpox virus is released in the U.S. would result in many fewer deaths and eradicate more quickly any resulting epidemic than the current federal plan.

The interim response policy now, noted E.H. Kaplan and colleagues, **Yale** University's **School of Management**, "is to isolate symptomatic cases, trace and vaccinate their contacts, quarantine febrile contacts, but vaccinate more broadly if the outbreak cannot be contained by these measures."

Kaplan's group ran "this traced vaccination policy in a smallpox disease transmission model to estimate the number of cases and deaths that would result from an attack in a large urban area."

According to the model, "mass vaccination results in both far fewer deaths and much faster epidemic eradication over a wide range of disease and intervention policy parameters, including those believed most likely, and that mass vaccination similarly outperforms the existing policy of starting with traced vaccination and switching to mass vaccination only if required," the researchers wrote.

Kaplan and coauthors published their study in the Proceedings of the National Academy of Sciences USA (Emergency response to a smallpox attack: The case for mass vaccination. Proc Nat Acad Sci USA, 2002;99 (16):10935-10940).

For additional information, contact E.H. Kaplan, **Yale** University, **School of Management**, 333 Cedar St., New Haven, CT 06520, USA.

To subscribe to the journal Proceedings of the National Academy of Sciences USA, contact the publisher: National Academy of Sciences, 2101 Constitution Ave NW, Washington, DC 20418, USA.

The information in this article comes under the major subject areas of Bioterrorism, Biological Warfare, Smallpox, Public Health.

This article was prepared by Virus Weekly editors from staff and other reports.

Copyright © 2000 Dow Jones & Company, Inc. All Rights Reserved.

THE WALL STREET JOURNAL.

© 2002 Dow Jones & Company. All Rights Reserved

TUESDAY, OCTOBER 29, 2002 - VOL. CCXL NO. 85 - ★★ ★ \$1.00

REVIEW & OUTLOOK

Why Not a Smallpox Choice

President Bush will decide any day now how many Americans will be able to get smallpox vaccinations. Let's hope he is guided by facts and freedom, rather than by the zero-risk mentality that dominates today's public health community.

So far the health bureaucracy has focused only on the risks if it allows Amer-

icans to get the vaccine, rather than the risks if it doesn't. Two weeks ago the Advisory Committee on Immunization Practices recommended that Mr. Bush restrict the vaccine to 510,000 hospital workers. This is an improvement from its initial recommendation of 20,000, but barely. What's striking about this is that the people charged with protecting public health are so unwilling to trust the public.

It is true that smallpox is riskier than most other common vaccines. Doctors usually cite a one-per-million death rate and note the serious, if rare, side effects that can accompany the vaccine. Take a closer look at the numbers, though, and the risk to healthy patients looks a lot less severe.

William J. Bicknell, a public health professor at Boston University, recently went back to look at statistics from 1968, the last time the U.S. collected data on mass smallpox vaccination. Of about 14 million people vaccinated, 5.6 million received first-time vaccinations and 8.5 million were re-vaccinated. Of the 14 million, nine died, and another 572 had complications.

When Dr. Bicknell broke out the numbers, however, he found that seven of the nine deaths were in children under the age of 10—a traditionally higher-risk category. As for the other two, one had chronic lymphocytic leukemia and another had aplastic anemia—exactly the sort of people we would expect to screen out in a pre-vaccination program today. As for complications, 81% occurred in kids under age 10.

Dr. Bicknell also notes that 114 of the complications were the result of "contacts," in which those recently vaccinated pass along the virus to unvaccinated people with risk factors. But he notes that medical advances, especially medical dressings that cover the arms, reduce "viral shedding" by 95% to 99%. The former public health commissioner of Massachusetts concludes that by excluding such higher risk categories as younger children or the immuno-compromised, and by utilizing new technologies,

the risks drop sharply.

All of this, of course, must be judged against the risk of doing little or nothing in advance of any smallpox terror attack. The advisory committee is suggesting that just 500,000 people—100 in each hospital—would somehow handle the task of vaccinating more than 280 million citizens. Good

luck with that. The Centers for Disease Control (CDC) recently released its guidelines for coping with a smallpox attack, and 500,000 won't come close to meeting its standard.

Edward H. Kaplan, a professor at the Yale School of Management and School of Medicine, has done some calculating and figures that it would take 1.25 million workers to vaccinate the nation in 10 days under the CDC plan. Make that 2.5 million if you want to vaccinate everyone in five days.

"This is straightforward: If you've decided you are going with a post-vaccination program, rather than a pre-vaccination one, then you need to have adequate people in place to push the button," says Professor Kaplan. "The panel's recommendations seem to be completely independent from the actual response plan."

By contrast, if even a small percentage of Americans agreed to voluntary vaccinations, the public health system would find it easier to protect everyone else in a crisis. Amid the chaos of an attack is also when the immuno-compromised are least likely to be carefully screened. These are among the reasons that Israel's health minister supports vaccinating his country's entire population before any attack.

One current proposal of merit would begin offering the vaccine in stages. First would come hospital and health workers; if all went well the vaccine would then be made available to paramedics and policemen, as well as to those vital to running the economy, such as pilots and truck drivers. Finally, it would be made available to the public. This sounds good to us—so long as it doesn't take years to accomplish.

Mr. Bush has a tough call to make, but he might keep in mind that the U.S. coped with the risk of smallpox vaccine for decades before it was phased out in the early 1970s. Our richer, more educated society ought to be able to handle it again. And a free people ought to be able to assess the risks for themselves.

*Voluntary vaccination
might help deter an attack.*



Hourly News Summary
24-hour Program Stream | Schedule

Search NPR.org

March 3, 2014

[PROGRAMS](#) [STATIONS](#) [TRANSCRIPTS](#) [ARCHIVES](#) [NPR SHOP](#) [ABOUT NPR](#) [CONTACT US](#) [HELP](#)

LOCAL STATIONS



BROWSE TOPICS

[News](#)
[Politics](#)
[Business](#)
[Health & Science](#)
[People & Places](#)
[Books](#)
[Music](#)
[Arts & Entertainment](#)
[Diversions](#)
[Opinion](#)
[Blogs](#)

SERVICES

[RADIO](#)

[PODCASTS](#)

[COMMUNITY](#)

[NEWS FEEDS](#)

[TOOLS / API](#)

[DESKTOP](#)

[MOBILE](#)

[NEWSLETTERS](#)

PROGRAMS

News/Talk Programs

[Morning Edition](#)
[All Things Considered](#)
[Fresh Air](#)
[Talk of the Nation](#)
[Tell Me More](#)
[Wait Wait...Don't Tell Me](#)
[Weekend Edition Saturday](#)
[Weekend Edition Sunday](#)

Music Programs

[All Songs Considered](#)
[From the Top](#)
[JazzSet](#)
[Marian McPartland's Piano Jazz](#)
[Mountain Stage](#)

[E-mail this page](#)

Profile: Smallpox Preparedness Of Israel And The U.S.

All Things Considered: November 1, 2002

④ Israel - Smallpox Vaccine

ROBERT SIEGEL, host:

This is ALL THINGS CONSIDERED from NPR News. I'm Robert Siegel.

JOHN YDSTIE, host:

And I'm John Ydstie.

With a possible war in Iraq looming and the war on terrorism still at the fore of the global agenda, many governments are worried about how to prepare for a chemical or biological weapons attack. In the more-prepared category, Israel. Already Israel issues gas masks to protect residents, and in early October, it began vaccinating thousands of health-care workers against smallpox. In the US, meanwhile, the debate over smallpox is moving more slowly and centers around the question: Who gets the vaccine first? We have two reports tonight, the first from Tel Aviv and NPR's Jackie Northam.

JACKIE NORTHAM reporting:

Given the proximity and relationship to most of its Arab neighbors, Israel has long held the assumption that smallpox is a real threat and that the country needs to be prepared in the event of an attack. As part of that, Israel has launched a program to vaccinate about 15,000 of what it calls first responders, medical and rescue workers who could have contact with smallpox victims. Professor Dan Mahaley(ph) is the chairman of Clalit, Israel's largest HMO. He says prevaccinating health-care workers means they'll be protected while they treat and immunize other Israelis in the event of an attack. But more important, Mahaley says, prevaccination will help build up a badly needed supply of antibodies to the virus.

Professor DAN MAHALEY (Chairman, Clalit): Those antibodies, you can extract them from blood and then inject them to somebody who has a deficient immune system, and then he will be able to act against the side effects of the virus.

NORTHAM: And it's those side effects that are at the core of an ongoing debate in Israel about who to vaccinate and when. It's a question of risk vs. benefit. Smallpox can kill between 30 to 40 percent of unvaccinated people exposed to the disease. The vaccination can kill about one to two people per one million. Professor Mahaley says the highly contagious disease could quickly spread through Israel's population of six million people, so he believes it's better to use a blanket approach when it comes to smallpox.

Prof. MAHALEY: Once you have vaccinated the population, then you can sleep, as they say in French, on both your ears because you're not afraid anymore.

NORTHAM: But many health officials disagree. Professor Manfred Green, the director of Israel's Center for Disease Control, says that if all Israeli residents were vaccinated, then anywhere from six to 12 people could die from the vaccine. Green says even that small death toll could be psychologically damaging if there wasn't a smallpox outbreak at the time.



[latest show](#)

[previous shows](#)

[commentaries](#)

[all songs considered](#)

[recipes](#)

[about ATC](#)

[where can i hear it?](#)

[atc@npr.org](#)
(weekdays)

[watc@npr.org](#)
(weekends)

Heard it?
Own it.
NPR
Series CDs

[object Window]



[More Voices »](#)

Yale SCHOOL of MANAGEMENT

135 Prospect Street P.O. Box 208200 New Haven Connecticut 06520-8200

Contact: Karin Nobile
Director of Media Relations

Tel 203 432 6010 Fax 203 432 9992
karin.nobile@yale.edu
<http://mba.yale.edu>

For Immediate Release

Yale School of Management's Edward H. Kaplan Awarded 2002 INFORMS® President's Award

New Haven, CT, November 11, 2002 – The Institute for Operations Research and the Management Sciences (INFORMS®) announced today that **Edward H. Kaplan**, the William N. and Marie A. Beach Professor of Management Sciences at the Yale School of Management (SOM) and Professor of Public Health at the Yale School of Medicine, is the 2002 recipient of the INFORMS® President's Award. The award will be presented to Professor Kaplan during a ceremony held at the San Jose Conference Center, as part of the INFORMS® annual meeting, on November 18, 2002.

The INFORMS® President's Award recognizes important contributions to the welfare of society. Professor Kaplan was selected for his outstanding contributions to AIDS and HIV research. He has spent more than 15 years developing methods to evaluate policies to manage the AIDS epidemic and prevent the spread of HIV, and conducted an influential series of studies evaluating the impact of needle exchange programs. The INFORMS® distinction also recognizes Professor Kaplan for his recent study on how best to vaccinate the public in the event of a massive smallpox attack.

Upon learning of this honor, Professor Kaplan explained, "Many of us who focus on social and policy issues do so out of a desire to make the world a better place, coupled with a belief that in certain instances we just might pull it off! In this light, I am very pleased to receive the INFORMS® President's Award, but also humbled given the accomplishments of previous recipients."

Among past recipients were several scholars who influenced Kaplan's work. In addition, he stated, "I especially want to thank my Ph.D. mentor Dick Larson from MIT for introducing me to public sector applications of operations research 25 years ago; Alvin Novick from Yale's biology department who encouraged me to pursue the needle exchange studies and HIV/AIDS problems more generally at a time when it was not popular to do so; Rob Heimer from Yale's School of Public Health for collaborating on the key needle exchange studies; and most recently Larry Wein at Stanford's Graduate School of Business for embracing with incredible energy and skill our joint adventure in bioterror policy modeling." He also expressed gratitude for the faculty and administration at the Yale School of Management and the Yale School of Public Health, explaining "while my work is not typical of either setting, I have been warmly supported by both."

In presenting the award, Michael A. Trick, President of INFORMS®, said "Kaplan's work on using the methods of Operations Research and the Management Sciences to address some of the most pressing issues in public health and medicine of our time makes this award particularly deserving." In addition, he credited Kaplan for his work to "improve social welfare through a better understanding of effective prevention and treatment of AIDS and other diseases."

-- more --

Targeted smallpox vaccine could cut deaths

Medical Correspondent

From the [Science & Technology Desk](#)

Published 11/14/2002 3:10 PM

ATLANTA, Nov. 14 (UPI) -- A mathematical model released Thursday suggests vaccinating for smallpox only those infected and their close contacts in the event of a bioterror attack could result in fewer deaths than mass vaccinations, provided people who received vaccinations years ago have retained some immunity to the virus.

"Mass vaccination does somewhat better than targeted vaccination if there's no immunity, (but) targeted is pretty competitive if there is some lingering immunity," Elizabeth Halloran, a professor of biostatistics at Emory University and one of the authors of the mathematical study, told United Press International.

It is uncertain how long the smallpox vaccine confers protection from the virus, which kills approximately one third of those it infects. Some studies suggest people might retain good levels of immunity for 30 years or more.

In the United States, routine smallpox vaccinations usually were given to those age 2 and above, but the practice was stopped in 1972. It is possible people born in that year or earlier who were vaccinated might still retain some immunity. Those who have not been vaccinated -- almost all Americans under age 30 -- have no protection from the virus.

Halloran's model, which is described in the Nov. 15 issue of the journal Science, simulated the spread of smallpox in a community of 2,000 people. It assumes people would spread the virus primarily among their close contact groups, including people in their own household and neighborhood. Other models have operated under the assumption people will randomly mix and the virus may be spread quite easily and not just among close contact, resulting in the conclusion that mass vaccination would be the best way to control an outbreak.

They assumed one to five people would be infected initially, then they modeled a number of different scenarios based on the assumption the community would contain households with one to seven people, with one high school, one middle school, two elementary schools and several small play groups and day care centers.

In the scenario with no pre-existing immunity, mass vaccinations would be more effective after an attack began, the model predicts. Mass vaccination of 80 percent of the population as soon as the 15th smallpox case was detected would result in 9.4 deaths per every 1,000 people. In the case of targeted vaccination in which 80 percent of the people who have close contact with smallpox cases were vaccinated, there would be 19.6 deaths per 1,000 people.

However, if there is some lingering immunity from previous vaccination, the death rate drops to 1.8 deaths per 1,000 people for targeted vaccination, lower than the 2.4 deaths per thousand predicted for mass vaccination.

Targeted vaccination could prove to be even more effective if lingering immunity is higher than predicted -- the researchers assumed people over age 32 would retain about half the immunity of those freshly vaccinated, which Halloran said is "probably conservative." In addition, vaccination of first responders -- a strategy the White House appears to be considering -- also could increase the effectiveness of the targeted response. "The more people that are vaccinated the slower the spread of smallpox could be," Halloran said.

The model also found if people reduced their contacts during an attack alert it could reduce the number of smallpox cases. "A combination of targeted vaccination and people reducing their contacts could possibly be a good containment mechanism," she said.

Another researcher who has constructed a different mathematical model of vaccination strategies contends that mass vaccination still would be the best way to go in the event of an attack. Edward Kaplan, a professor at the Yale University School of Management in New Haven, Conn., told UPI Halloran's model fails to take into account several factors that could affect the outcome.

A major difference between Kaplan's model -- which found mass vaccination to be a more effective containment

The New York Times

HOME
JOB MARKET
REAL ESTATE
AUTOMOBILES
NEWS
International
National
Washington
Business
Technology
Science
Health
Aging
Anatomy
Children
Fitness
Genetics
Men
Nutrition
Policy
Psychology
Women
Columns
Sports
New York Region
Education
Weather
Obituaries
NYT Front Page
Corrections
OPINION
Editorials/Op-Ed
Readers' Opinions
FEATURES
Arts
Books
Movies
Travel
Dining & Wine
Home & Garden
Fashion & Style
New York Today
Crossword/Games
Cartoons
Magazine
Week in Review
Multimedia/Photos
College
Learning Network
SERVICES
Archive
Classifieds
Book a Trip
Personals
Theater Tickets
Premium Products
NYT Store NEW
NYT Mobile
E-Cards & More
About NYTDigital
Jobs at NYTDigital
Online Media Kit
Our Advertisers

SEARCH

Stu

By TE

Filed

WAS

with i

almos

Emory

would

officia

They f

close c

lives a

that so

Dr. M.

in Scie

increas

before

"Incre

respon

you ign

attack."

The req

many /

Hallora

before

public

were at

becomi

disease

Join or Sign In

CNN.com/HEALTH

> NEWS ALERT

Supreme Court refuses to stay execution tonight of Pakistani man who CIA employees. Details to come.

CNN Europe CNN Asia Language: On CNN TV Transcripts Headline News CNN International About CNN.c

SEARCH CNN.COM:

GO

Home Page
World
U.S.
Weather
Business
Sports
Politics
Law
Technology
Science & Space
Health
Entertainment
Travel
Education
Special Reports

make
CNN.com your
Home page
CLICK HERE >>

SERVICES
Video
Newswatch
E-Mail Services
CNN To Go

SEARCH CNN.COM:

GO

Targeted smallpox shots could be enough

Study: Vaccinating those close to infected nearly as good as mass shots

Thursday, November 14, 2002 Posted: 3:42 PM EST (2042 GMT)



Story Tools

SAVE THIS EMAIL THIS
PRINT THIS MOST POPULAR

RELATED

- Interactive: What is smallpox and how does it spread?
- Science magazine

WASHINGTON (AP) -- Vaccinating just the people in close contact with infected smallpox patients after a bioterrorist attack would be almost as effective as vaccinating the entire population, a study found.

Emory University researchers constructed a math model to test which would be the most effective vaccination response of public health officials to a smallpox attack on a community of 2,000 people.

They found that targeted vaccinations -- giving shots to those who had close contacts with infected patients -- was about as effective in saved lives and reduced disease as inoculating the entire community, provided that some in the population had "pre-existing immunity" to smallpox.

advertisement

Worldwic
Showdow
King's Th
Free Issu

Afforda
Heal
Plan
For
Any
Size
Busine

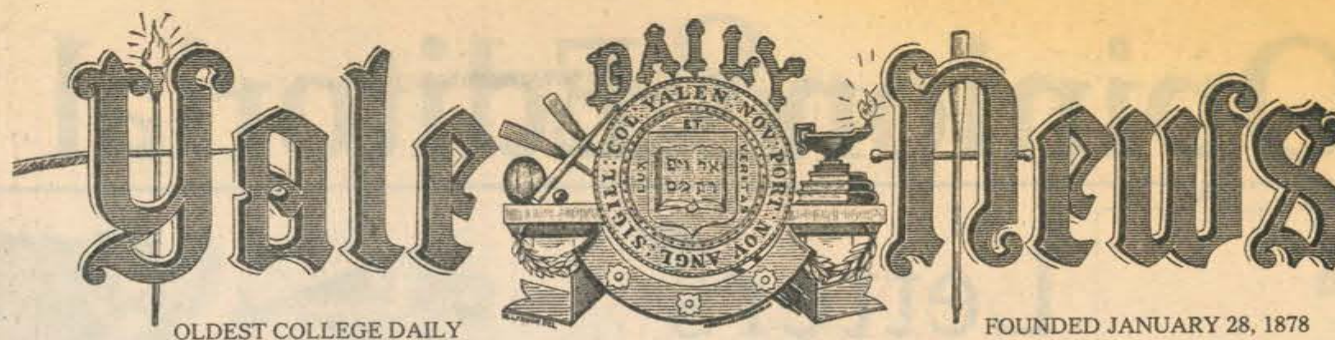
Small - Mid

Oxford Heal



SPORTS

Streak propels field hockey
into playoffs
... See page 12



WEATHER

Today: Sunny, 55
Tonight: Clear, 40
... See page 10

Volume CXXV, Number 53

New Haven, Connecticut — Thursday, November 14, 2002

www.yaledailynews.com

Kaplan criticizes CDC's smallpox prevention plan

By Gabriel Arana
Staff Reporter

As the White House considers the Center for Disease Control's proposal for smallpox prevention and control, Yale School of Management professor Edward Kaplan has joined other critics in asking the Bush administration to revise the CDC's plan.

Kaplan said the CDC's proposal to prevent and control an outbreak of smallpox would prove "inefficient and ineffective" in the event of an attack. Working with Stanford Business School professor Lawrence Wein, Kaplan has been using mathematical models to simulate terrorist-initiated outbreaks and to illustrate how smallpox would spread in a modern urban setting.

The researchers contend that more people should be vaccinated before an

attack and that mass vaccination should be the first response to an outbreak.

Kaplan said the CDC plan assumes that the general population has a high level of immunity, that any outbreak would be small, and that one would easily be able to trace contacts of symptomatic cases. He added that the CDC plan is modeled after the "tail end" of the smallpox vaccination campaign that eradicated the disease.

CDC officials, although aware of Kaplan and Wein's study, said they would not comment on it.

"The issue is being discussed at the highest levels of government," CDC spokesman Curtis Allen said. "It's not our policy to discuss other people's studies."

To prevent the rapid spread of the virus, Kaplan and Wein suggest 1.25 to 2.5 million "first responders" and vaccination

clinic staff be inoculated. The CDC is currently suggesting that far fewer people — 510,000 — be pre-emptively vaccinated.

And if an attack does occur, Kaplan and Lawrence said mass vaccination should be the first response to any confirmed cases of smallpox. The CDC's proposed strategy calls for "ring vaccination" before mass public inoculation.

Ring vaccinations — used during the global crusade against the disease in the 1970s and '80s — isolate symptomatic smallpox victims and inoculate close contacts. The CDC's plan only calls for mass vaccinations if ring vaccinations fail.

"It's ring vaccination that is most helpful for actually cutting out transmission of the virus," CDC National Immunization Program Director Dr. Walter Orenstein said during a teleconference last month.

Kaplan said he disagrees with Orenstein's premise. What is wrong with that plan, he said, is that it presupposes smallpox would spread naturally — without the help of terrorists — as it did during the campaign against the disease two decades ago.

"It is an unbelievable translation of what worked 20, 30 years ago," Kaplan said.

He added that in the time it would take to diagnose, isolate and vaccinate infected persons' contacts, the disease might spread and cause more deaths — 4,102 in his simulation — than it would if everyone were vaccinated immediately.

"The same plan that worked in Bangladesh in the '70s is not going to work in New York City in 2002," Wein said.

The Atlanta Journal and Constitution
November 15, 2002 Friday Metro Edition

SECTION: News; Pg. 6A

HEADLINE: Smallpox immunity prevalent, study says;
Old vaccinations may act as shield to bioterrorism

BYLINE: M.A.J. MCKENNA

SOURCE: AJC

With the White House expected to announce shortly how many Americans will be vaccinated against smallpox to protect against a bioterrorist attack, research by four Atlanta professors says that immunity already present in the population will be a key factor in how fast the disease could spread.

In a paper published today in the journal Science, Dr. M. Elizabeth Halloran and colleagues from Emory University's Rollins School of Public Health say immunity could be left over from childhood vaccinations received by those born before 1972 -- 57 percent of the U.S. population. Or it could be newly created by giving vaccine to health care workers and other first responders likely to come in contact with the first victims.

If the U.S. population has some degree of immunity, the authors say, a strategy of "ring vaccination" will be adequate to protect the population once an attack begins.

The Centers for Disease Control and Prevention, which will oversee smallpox vaccinations, prefers that strategy over a mass vaccination campaign. Ring vaccination limits protective shots to those who have been in close contact with victims, and the contacts of those contacts, creating a bull's-eye-shaped firebreak of immunity that the smallpox virus cannot cross.

Ring vaccination, which the CDC and the World Health Organization used to eradicate smallpox in the developing world in the 1970s, tends to use fewer doses of vaccine. That would be important, the authors say, because fewer Americans would be exposed to the risks of serious side effects -- from skin disorders to encephalitis to death -- that come with the smallpox vaccine.

Today's finding is the latest in a series of complex computer models that have examined different strategies to protect against smallpox. Other studies, by scientists at the CDC, Yale University and the Massachusetts Institute of Technology, have supported mass vaccination, or ring vaccination if a quarantine of infected areas is included.

The Emory study uses a model that assumes people interact with specific groups in their daily lives -- households, neighborhoods and day care center clients, for instance -- rather than roaming freely through the entire population. Because smallpox usually spreads through face-to-face contact, the authors say the risk of acquiring the disease would be highest in the groups where victims spend the most time, and less in places where they spend short amounts of time or do not go regularly.

"The idea is to put vaccination where transmission of a disease is occurring," said Ira Longini Jr., a co-author.

In a key feature, the research assumes that Americans older than 30 retain some immunity to smallpox due to the vaccinations they received in childhood. How long that

[NEWS](#) [SPORTS](#) [ENTERTAINMENT](#) [BUSINESS](#) [HOMES](#) [JOBS](#) [CARS](#) [SHOPPING](#) [Subscribe](#)

Chicago Tribune
 — ONLINE EDITION —
 November 15, 2002

39° F

Seattle Sutton's
 HEALTHY EATING

Healthy Food...Health

Hello, bep118 | [MyNews](#) | [Log out](#)

Story search: Last 7 days



Older than 7 days

Sponsored by
 Seattle Sutton's
 HEALTHY EATING

[Weather / Traffic](#)[Classified](#)[Homes](#)[Shopping center](#)**NEWSPAPER ADS**[Special sections](#)[News / Home](#)[Business](#)[Technology](#)[Sports](#)[Leisure](#)[From Metromix](#)[Dining](#)[Movies](#)[Music](#)[Reviews](#)[Stage](#)[Television](#)[Updated daily](#)[Advice columnists](#)[Horoscopes](#)[KidNews](#)[Tempo](#)[Weekly features](#)[Arts & Entertainment](#)[Books](#)[Friday](#)[Good Eating](#)[Home & Garden](#)[Q](#)[Tribune Magazine](#)[WomanNews](#)[Columnists](#)• [Barbara Brotman](#)• [Bob Condor](#)• [Cheryl Lavin](#)[Travel](#)[Registration](#)[Today's newspaper](#)[Customer service](#)[Special reports](#)

Smallpox study says small-scale vaccinations work best

By Peter Gorner

Tribune science reporter

Published November 15, 2002

[E-mail this story](#)[Printer-friendly format](#)[Search archives](#)

Vaccinating people who come in close contact with smallpox victims may be almost as effective as mass vaccinations in the event of an attack by terrorists, scientists reported Thursday.

Results of a computer model created by researchers at Emory University in Atlanta and published in the journal *Science* offer the latest hypothesis about the size of a smallpox epidemic, how fast it would spread and how best to contain it.

This study is perhaps the most optimistic of the several published within the last year, differing markedly from computer models that suggested the government's smallpox strategy would not work.

The new study, however, supports the government's plan that targeted vaccinations would be the best response.

The results also reflect the hope that as much as 60 percent of the American public may already have some immunity against smallpox.

"We've simulated what we think might be the most likely attack scenario," said Ira M. Longini Jr., a professor of biostatistics at the Rollins School of Public Health.

"It probably would be a small attack, one to five people infecting themselves and then spreading it across the population.

"If that happened, we found that targeted vaccination is nearly as effective as mass vaccinations."

Increasing the level of immunity in as many individuals as possible before an attack would help, said Elizabeth Halloran, the study's first author.

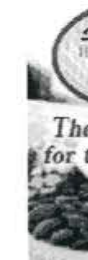
"We could do that by vaccinating first responders or allowing people to be vaccinated if they so choose. It would make a post-attack effort more effective," she said.

An expert advisory panel assembled by the government last summer recommended against vaccinating the public.

The panel favored selectively vaccinating health care workers and using a "ring vaccination strategy"—immunizing an infected person's immediate contacts—after an outbreak.

That strategy was used to eradicate smallpox globally by 1980 and minimizes exposure to the side effects of the live cowpox virus used in the vaccine, which can be fatal.

Advert



Choo

Sel
som

How to

A PART OF CANADA.COM

NATIONAL POST

HEADLINE SCAN | E-MAIL UPDATE | NP MOBILE | SUBSCRIPTIONS | SITE MAP | ADVERTISE | CONFERENCES & EVENTS | USER HELP | CONTACT US

Monday » March 3 » 2014

14-DAY SEARCH:

National Post ▼

GO!

YellowPages.ca Canada 411

- ☐ NATIONAL POST HOME
- ☐ NATIONAL NEWS
- ☐ WORLD NEWS
- ☐ FINANCIAL POST
- ☐ FP INVESTING
- ☐ COMMENTARY
- ☐ COLUMNISTS
- ☐ SCIENCE & TECH
- ☐ ARTS & LIFE
- ☐ SPORTS
- ☐ DIVERSIONS

WEEKLY FEATURES

- ☐ SATURDAY POST
- ☐ POST MOVIES
- ☐ REVIEW
- ☐ TRAVEL
- ☐ DRIVER'S EDGE
- ☐ POST HOMES
- ☐ WEDDINGS

SPECIALS

- ☐ APPOINTMENTS
- ☐ SPECIAL REPORTS
- ☐ INSIDE ENTERTAINMENT
- ☐ NP BUSINESS MAGAZINE
- ☐ FORUMS
- ☐ CONTESTS

FREE SHIPPING
On orders over \$39!
Click here for details.
amazon.ca

canada.com

- ☐ TECHNOLOGY
- ☐ HEALTH
- ☐ CLASSIFIEDS
- ☐ AUTOS
- ☐ SHOPPING
- ☐ PERSONALS

Utilities ▼

SEARCH RESULTS - STORY

U.S. experts question smallpox strategy

More vaccinations needed, doctor says

Tom Blackwell

National Post

Saturday, November 30, 2002

Canada's plan to vaccinate just 500 health care workers against a possible terrorist-spawned outbreak of smallpox is far too limited and courts disaster, two U.S experts said yesterday.

ADVERTISEMENT

The government should be looking at immunizing tens of thousands of hospital workers, ambulance attendants and police officers across Canada, so they in turn could operate mass vaccination clinics if there ever was an attack, the scientists said.

They also believe the general public should be given the choice to be vaccinated once the necessary emergency workers get their shots.

"I don't understand how 500 vaccinations could be enough," said Dr. Ed Kaplan, a Yale University professor of public health who has studied the issue extensively.

"The plan-for-the-worst, hope-for-the-best strategy is much more sensible.... We should not wait to see what smallpox can do to Canada. Rather, the policy should be to see what Canada can do to smallpox."

Their comments fuel a heated debate within the scientific community about who should get the smallpox vaccine, and when. The dispute has been played out prominently in the United States, but received little attention here.

While the U.S. administration appears headed to accepting the advice of such experts as Dr. Kaplan and ordering the immediate immunization of at least 500,000 people, the American Centers for Disease Control are still recommending a more limited response, similar to Canada's.

A Health Canada official rejected Dr. Kaplan's criticism yesterday, saying its strategy is based on analysis of evidence and arguments from the world over.

"We obviously consider this threat seriously, but it does have to be weighed against all the other public health threats that we are dealing with all the time," said Dr. Paul Gully. "We have no reason to believe that the threat of smallpox has increased ... but we thought it best to make prudent plans."

The strategy is based on a balance between the slim threat of

**Bell
zinc
ca**
Trade Directory

☐ Product / Service☐ Company Name

SEARCH

WEATHER

Select a city ▼

TSE □ -58.950 6570.420
Dow □ -35.59 8896.09
S&P 500 □ -2.56 936.31
Nasdaq □ -9.16 1478.78
C\$ (in US\$) □ +0.0033 0.6390
updated 07:52 ET

GET QUOTES

WAKE UP INSPIRED.
NATIONAL POST
SUBSCRIBE TO
NATIONAL POST

"Hot Topics" Workshop Takes a Logistical Look at Biodefense

By Barry A. Cipra

Can mathematical modelers help the United States prepare for a bioterrorist attack? A "hot topics" workshop, sponsored by the Institute for Mathematics and Its Applications at the University of Minnesota and SIAM, held September 28 at the IMA, elaborated on the affirmative answer.

The workshop, organized by IMA director Doug Arnold, Mac Hyman of Los Alamos National Laboratory, and Edward Kaplan of Yale University, highlighted the interface between traditional epidemiological models of infectious diseases and operations research analyses of the logistical aspects of biodefense. The former delineates the likely course of events in a bioattack under various scenarios. The latter aims to identify optimal allocations of resources for a given set of objectives and constraints. Together, they can point toward strategies for dealing with bioterrorism—perhaps by persuading the evildoers, who have resource-allocation problems of their own, to direct their malevolent efforts elsewhere.

The biodefense workshop was held during the IMA's fall quarter on supply chain and logistics optimization. "It's a fascinating area," says Kaplan. "When you're talking about logistics and bioterrorism, very interesting things start to happen."

Epi-queueers

Traditional epidemiological models use differential equations to study the spread of disease in populations of susceptible, infected, and recovered (or dead) individuals. They help policymakers judge the likely costs and benefits of various public health measures, such as needle exchanges for hepatitis and HIV, mosquito control for West Nile virus, or priority ordering for recipients of flu vaccines. However, the models usually assume an instantaneous implementation of whatever policy measures they include as parameters. This isn't normally a problem, either because the time scale of the epidemic is much longer than the ramp-up time of the policy or because preventive measures are (theoretically) in place before the outbreak of disease. In the case of flu, for example, the basic idea is to inoculate a sufficient percentage of the right people before the season starts, to prevent that year's anticipated strain from decimating the population.

But a bioterrorist attack takes place on a swifter time scale. Consequently, efforts to cope with the malicious release of a pathogen will compete with the underlying dynamics of the disease it produces. Moreover, the uncertainties of when, where, what kind, and even whether an attack will occur complicate

unvaccinated and, say, 50% vaccinated populations are inadequate, says Kaplan. "You instead have to say, 'How does the disease spread if you are simultaneously trying to vaccinate the population while it's spreading?'"

Enter logistics. An emergency response of any kind, be it to bioterror or hurricane Floyd, amounts to putting appropriate people and supplies in place to aid a distressed population. In the case of a bioattack, the response includes identifying sick people who need treatment (and possibly isolation) and doling

See **Biodefense** on page 10

Newsjournal of the Society for Industrial and Applied Mathematics

SIAM NEWS

Volume 35/ Number 10
December 2002

10 • December 2002 SIAM NEWS

Biodefense

continued from page 1

out prophylactic measures to those at risk. The trick is to do this as quickly as humanly possible. "With the kinds of worries we face here, we're talking about very fast moving events, where a difference of a day or even, say, six hours, can lead to very different results," Kaplan says.

Queueing theory—picture long lines at a makeshift vaccination clinic—has a lot to say about what's humanly possible, as does supply chain analysis. Among the questions policymakers need to ponder: How many (and what kind of) responders do you need to mobilize in the event of an attack, and what should you have them do?

Calculus of Variations

Take smallpox, for example. The federal government has ordered the stockpiling of smallpox vaccine sufficient to vaccinate the entire country. If the threat of such an attack were clear, the strategy for dealing with it would be simple and effective: Inoculate everyone preemptively. This is essentially how the disease was eradicated in the United States more than fifty years ago. (The last case of smallpox in the U.S. was reported in 1949. Routine vaccinations were discontinued in 1971.) But a "mass" inoculation program comes at a cost. It's estimated that for every million recipients of the vaccine, roughly ten will develop serious complications and one will die.

Given the current, extreme uncertainties about the availability of smallpox to terrorists and "rogue" states, policymakers are loath to recommend preventive measures that would create casualties of their own. (When a natural outbreak of smallpox was still a clear and present danger, the risk was considered worth taking. Besides, back then, the

of magnitude less for mass vaccination than for the ring strategy, reducing the death toll from several thousand to several hundred. (The model also indicates that a pure ring strategy, with no switch to mass vaccination, is a terrible idea. In the base case, it leads to about 100,000 deaths. With no vaccine at all, smallpox, with its 30% mortality rate, would run amok in the model's population, wiping out three million people.)

The model consists of 17 differential equations, four of which are devoted to the flow of people through the vaccination queue. Using estimates from other public health studies, the modelers assume that 5000 vaccinators are working around the clock. With the mass strategy, each vaccinator can treat 200 people per day; the number drops to 50 per day with the ring approach, because the vaccinators spend three quarters of their time locating contacts. These numbers mean that the model's mass vaccination is complete in 10 days. The comparison with the ring strategy assumes that the switch to mass vaccination is made after four weeks of ring vaccination.

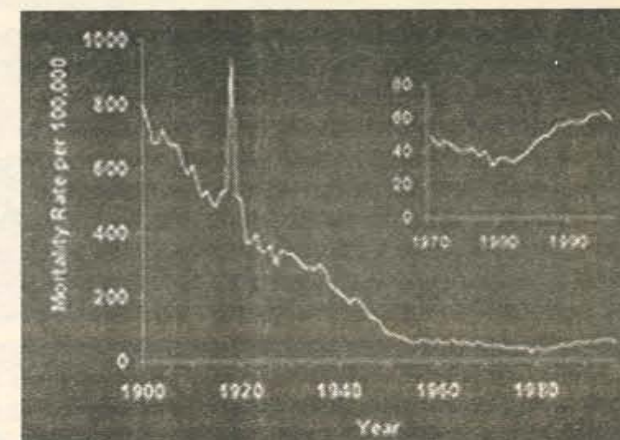
The precise numbers coughed up by the model are less important than the model's robustness. According to the PNAS paper, the superiority of mass vaccination holds over a range of parameter values. Ring vaccination is preferable only if the initial size of the outbreak is small (a dozen cases or so) and the basic reproductive ratio (the average number of people an infected person passes the disease along to early in the outbreak, which in the model's base case is taken as three) is low; neither of those measures is easily determined.

"Sensitivity analysis is important, because you want to be able to come to a policymaker with some robust conclusion," Kaplan says. "We're not claiming we know the numerical answer. We are trying to say we have a very good argu-

Vanderbilt University, described a model he and Martin Blaser of the New York University School of Medicine had devised to analyze mailborne transmission of the bug. Their model, published last May in PNAS, simulates the cross-contamination of mail as bug-laced letters pass through the postal system.

The model distills mail handling down to five stages, from pickup at point of origin (the corner mailbox) to local post office, through a regional center, to the recipient's local post office, and on to the final destination (home or office). Each transition offers each piece of contaminated mail a chance to shed some of its anthrax spores. The model distinguishes four rough categories of contamination: the original letters (of which there were six in the 2001 attack), which are assumed to have in excess of ten billion spores each, and three classes of cross-contaminated letters, with 10^3 – 10^4 , 10^2 – 10^3 , and 10^1 – 10^2 spores, respectively. (Technically, the model violates "conservation of spores," but in simulations the number of shed spores is a tiny fraction of the total supply.) The spread of anthrax is expressed for each transition as a 4×4 matrix. The entries of the matrices are estimated according to the "density" of mail handled, which is highest at regional centers.

The model incorporates estimates of the number of people exposed to contaminated mail at each stage, divided into age brackets, and the odds that exposure will lead to illness as a function of age and exposure level. Handling a piece of mail with ten, or even a thou-



Infectious disease mortality in the U.S., from 1900 to 1996, according to the National Center for Infectious Diseases at the Centers for Disease Control.

more than 20 million people worldwide, including half a million in the U.S. (a quarter of the population here got sick). "In many ways, pandemic influenza is the challenge," Meltzer says.

Meltzer has developed a software package, FluAid, to help public health officials, who operate primarily at state and local levels, analyze their needs for such basics as staff and supplies to handle the next pandemic.

FluAid (described in detail at <http://www2.cdc.gov/od/fluaid/>) is based on a model that Meltzer and colleagues Nancy Cox and Keiji Fukuda developed to study the economic impact of an influenza pandemic. Their model distinguishes three age categories (0–19, 20–64, and 65 and older) and two risk categories (high and low) for each. Using Monte Carlo methods to deal with the uncertainties in key variables, such as the rates of illness and death for the various age and risk groups, the model produces a range of estimates for the death toll, hospitalizations, doctor visits, and workdays missed, depending on the assumed "gross attack" rate (the overall percentage of the population who get sick enough to stay home—i.e., not counting

The New York Times

International

De

HOME
JOB MARKET
REAL ESTATE
AUTOMOBILES
NEWS

International
- Africa
- Americas
- Asia Pacific
- Europe
- Middle East
National
Washington
Business
Technology
Science
Health
Sports
New York Region
Education
Weather
Obituaries
NYT Front Page
Corrections

OPINION
Editorials/Op-Ed
Readers' OpinionsFEATURES
Arts
Books
Movies
Travel
Dining & Wine
Home & Garden
Fashion & Style
New York Today
Crossword/Games
Cartoons
Magazine
Week in Review
Multimedia/Photos
College
Learning NetworkSERVICES
Archive
Classifieds
Book a Trip
Personals
Theater Tickets
NYT Store **NEW**
NYT Mobile
E-Cards & More
About NYTDigital
Jobs at NYTDigital
Online Media Kit
Our Advertisers
MEMBER CENTER
Your Profile
E-Mail Preferences
News TrackerSEARCH [Go to Advanced Search/Archive](#)

Past 30 Days

GO TO MEMBE

Welcome,

E-Mail Th
Printer-Fr
Most E-M
Reprints

ARTICLE TO
SPONSORED

SPECIAL ENCORE
PRESENTATION
**LIVE FROM
BAGHDAD**
SUNDAY DECEMBER 15
9PM/8C
HBO

APPLYING VACCINE

Israel Vaccinates Soldiers and Health Workers

By JUDITH MILLER

TEL AVIV, Dec. 7 — Israel has successfully vaccinated more than 15,000 soldiers and public health workers against smallpox on a voluntary basis since July with virtually no severe side effects, senior Israeli officials say.

In interviews, Israeli military and public health officials said the immunizations had been carried out under a crash program to protect the country from a possible Iraqi attack with smallpox or other lethal germs. As a result, thousands of the country's public health professionals are now prepared to immunize the entire country against the deadly virus within four days should a single smallpox case be diagnosed anywhere in the world.

Advertisement

Your Holiday Tech Headquarters
TECHNOScout
SPECIAL HOLIDAY DISCOUNTS
[Look out Big Foot,
this binocular takes
pictures!](#)

[A portable hard drive
that fits in your
pocket?](#)

[Get a zero impact
workout...while flying!](#)

[Look and feel of
natural
daylight...inside!](#)

[Satellite technology
pinpoints your](#)

Vaccinating
Nation

Complete
coverage of t
smallpox
vaccination.

RELAT

[The Bioterr
Health Wor
of Smallpox](#)
(December

[Local Plans
Seeks Vacc](#)
(December

[2 Killed on](#)
(December

[MSN Home](#) |
 [My MSN](#) |
 [Hotmail](#) |
 [Search](#) |
 [Shopping](#) |
 [Money](#) |
 [People & Chat](#)



MSNBC News

Do you have asthma?



[News](#)
[Business](#)
[Sports](#)
[Tech • Science](#)
[Living](#)
[Travel](#)
[Health](#)
[TV News](#)
[Opinions](#)
[Weather • Local](#)
[Shop@MSNBC](#)
[MSN.com](#)

[QwestDex](#)
[online yellow pages](#)
[Find a Local Business](#)

BIOTERRORISM

[Advertisem](#)
[Shoppin](#)

• Complete coverage



Barry Williams / Getty Images file

An Army soldier at Fort Benning, Ga. wearing Nuclear, Biological and Chemical protection gear. The Bush administration is soon expected to order smallpox vaccination of military personnel and emergency medical workers.

Smallpox response might include quarantine

State and federal authorities could take extraordinary steps to contain an epidemic

By Tom Curry
MSNBC

Dec. 12 — If terrorists using smallpox as a weapon started an epidemic in an American city, public health officials might need to consider imposing a quarantine to stop the spread of the fast-moving deadly disease.

• E-MAIL THIS ✉

• COMPLETE STORY →

ADVERTISING ON MSNBC

RESOURCE GUIDE

- eDiets Diet Center
- Shop at B&N.com
- Auctions at uBid
- Yellow Pages
- lavalife.com Where singles click

Baby Ba
 \$49.95
[Discov](#)

[Free](#)
[More](#)
[Wellne](#)

[drug](#)

[GNI](#)

Bioterror

- Bush: Mil smallpox
- The how smallpox
- Smallpox to know
- Smallpox include q

Health

- Bush: Mil smallpox
- Women i childbirth
- Most Am smallpox
- Stanford cloning d

MSNBC's

- Bush dec smallpox
- Lawmake intelligen
- Bush mo

WELCOME!

- Receive Free Newsletters
- Join a Community



SEARCH FOR:



TOPIC CENTERS

Choose a topic

[Search Tips](#)

- Main
- Top Stories
- Cancer Center
- HIV Center
- Seniors Center
- Allergy Center

[Home](#)» [News](#)

Dr. Dean Edell

Advertisement

Get valuable tools
and info at the HIV
Resource Center



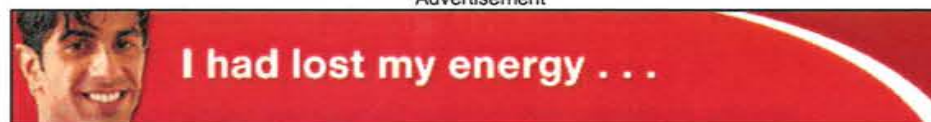
Special Offers

- Allergies
- Inflammation and Pain
- Blood Sugar out of control?
- Help manage your breathing condition
- Acid Reflux Disease Free Trial
- Frequent Heartburn?
- Free diabetes-friendly recipes
- Overactive Bladder
- Do your joints hurt?
- #1 Soy Protein

Top Features

- Liver Disease
- Colds and Flu
- Help for Alzheimers
- Cancer Center
- Parkinsons
- New HIV Test
- Menopause
- Male Hormones
- Women's Health
- Mental Health Center
- Sexual Health
- Headache Center

Advertisement



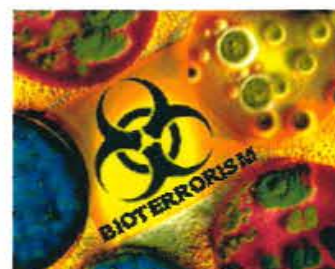
Bush: Smallpox Vaccine Is Your Call

A White House plan, expected tomorrow, calls for mostly voluntary inoculations, leaving the decision up to Americans.

By Adam Marcus

HealthScoutNews Reporter

THURSDAY, Dec. 12 (HealthScoutNews) -- The Bush administration is leaving it up to you to decide if you want to receive the controversial smallpox vaccine.



But by making immunization voluntary, the White House has left Americans in the difficult position of having to weigh the theoretical risks of a smallpox attack with the small but concrete odds of suffering a serious or deadly side effect from the vaccine.

Under the Bush plan, expected tomorrow, as many as a half million soldiers will be required to receive the vaccine. They will be followed by up to about 10 million health and emergency personnel, the so-called "first responders" charged with immunizing others and containing infections in the event of an attack with the frequently deadly virus.

The rest of the nation will have the option of getting vaccinated, possibly beginning in 2004. The smallpox vaccine is effective against the virus, but it can lead to deadly complications in about one in every 1million people who receive it. Another 10 to 15 per million suffer serious side effects, such as severe rashes.

"I think it ought to be a voluntary plan. I don't think people ought to be compelled to make the decision which they think is best for their family," Bush told ABC News in an interview that aired in part yesterday.

Two-thirds of Americans say they'd receive the smallpox vaccine despite the risk of serious side effects, according to a

December

AboutHealth.com

Informing You About Your Health.



Our newest feature!

Alcohol: True Stories

- Young People
- Parents

Our regular features

For Young People

For Parents

About Health TV

Sponsors

Videos & Books

Health Links

Home

About Health with Jeanne Blake Transcript: Smallpox



Harvard Pilgrim
HealthCare Foundation

JEANNE: Thanks to both of you for coming in to talk about this. Dr. Bicknell, let's review some of the basics. There are only official supplies of Smallpox virus, official supplies and I underscore that, in Russia and the United States. Here in the U.S. it's considered to be held securely, many questions about that in Russia. One, if terrorists were to get it, how would that have happened, and two, how concerned are you that that will happen?

DR. BICKNELL: Well, here's the background on that. There are two sources for the Smallpox virus that causes the disease. It kills about 30 percent of the people who get it. It's a highly infectious disease. The Deputy Director of the Russian Weapons Program has revealed – Ken Alaback – that the Russians had at any one time 20 tons of Smallpox virus. You can normally measure it in grams or milligrams, so 20 tons is an incredible amount. The current head of the Russian equivalent of CDC, the Vector Institute says, "I don't think we kept this stuff under control. It's easy to move around. It could go anywhere. We didn't pay our scientists." So he called for a mass vaccination worldwide actually last fall. It was in the mail. The other sources . . . back in the Smallpox years everybody kept memos. Nations had Smallpox so they could compare the virus that was in people through the virus in the laboratory, and everybody reported voluntary destruction. There was no verification of that. So maybe Pakistan, maybe North Korea, maybe France, maybe Israel destroyed it and maybe they didn't. Who's to say? So there are two sources. And it's very possible it's out.

JEANNE: You're very concerned?

DR. BICKNELL: Absolutely.

JEANNE: Did you talk with many experts? You filed

Read The Program Transcript:

- Transcript: Smallpox

Recent Topics In

- Dangerous To
- Depression: A
- Disease
- Boys Develop
- Eli Newberger
- Diabetes - Ty
- Stroke
- Osteoporosis
- Smallpox
- Tattoo Remov
- Alcohol: Binge
- Colon Cancer
- Asthma: In W
- Depression: S
- Ovarian Can

more topics

About Health with
Blake is sponsored
by Harvard Pilgrim
Care Foundation.

Improving Health

- Medical Education
- Clinical Research
- Community Serv

VACCINATIONS

Bush Lays Out His Plan for Smallpox Shots for Millions in the Military and He

Continued From Page A1

duce it into the United States.

The voluntary program will begin in late January, federal officials said, with states opening vaccination clinics, and could end as early as March.

Then the vaccine will be offered to as many as 10 million health care workers, police, firefighters, paramedics and other emergency workers, said Jerome M. Hauer, assistant secretary for emergency preparedness at the Department of Health and Human Services. The voluntary immunizations could be complete by the summer, Mr. Hauer said.

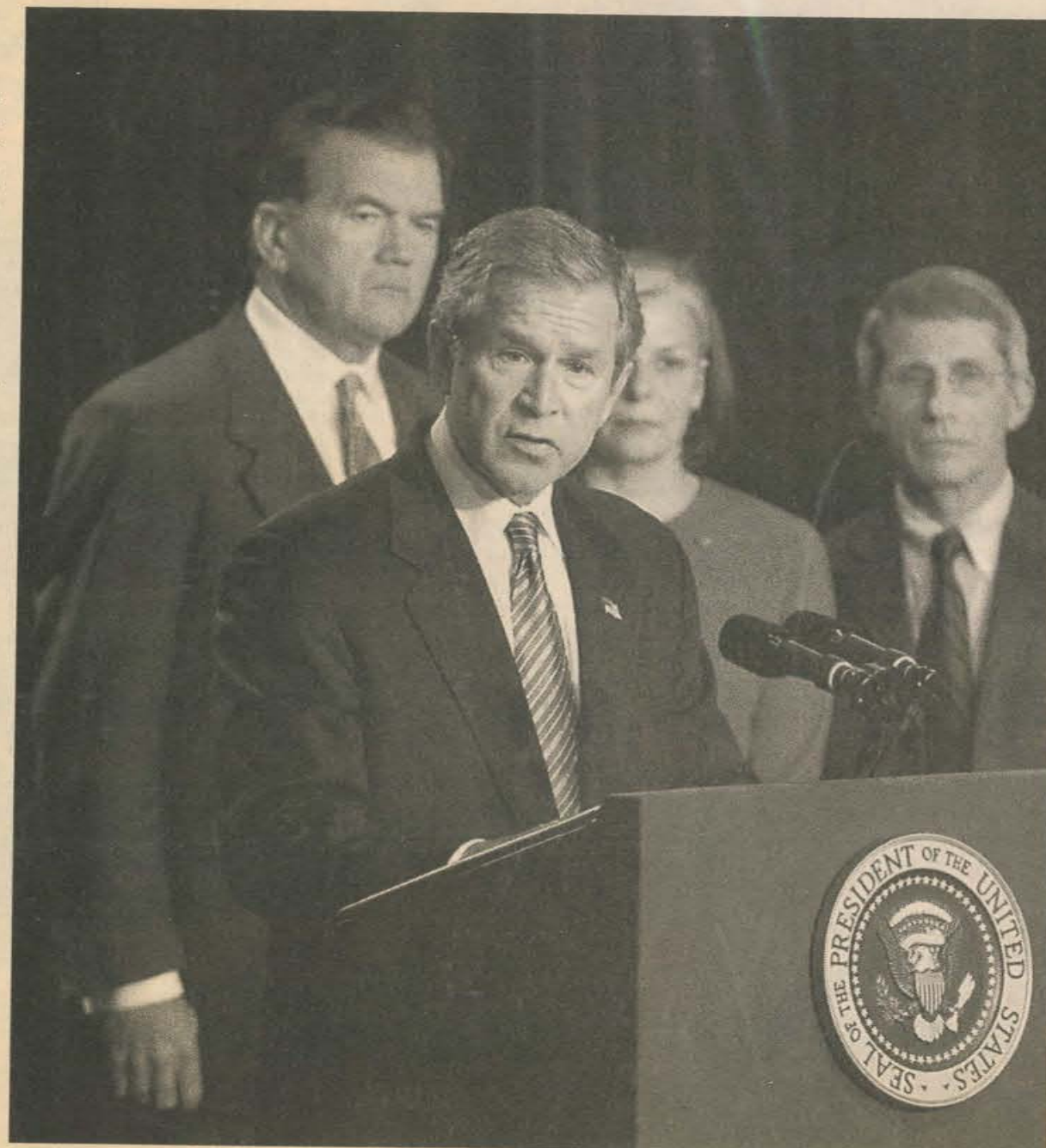
The public will not have easy access to the vaccine, at least until a new version of it licensed, probably in 2004. But Tommy G. Thompson, the secretary of health and human services, pledged to develop an "orderly process" for making vaccine available sooner to adults, possibly as early as the summer, officials said.

One option for people who demand to be vaccinated right away is to enroll in clinical trials of the smallpox vaccine, said Dr. Julie Gerberding, director of the Centers for Disease Control and Prevention in Atlanta. The government is also considering creating a special protocol for the public.

Mr. Bush's announcement today is the culmination of what Tom Ridge, the president's domestic security adviser, called "an exhaustive process that lasted more than nearly 15 months," beginning with the terrorist attacks of last Sept. 11.

It was an extremely delicate decision. Because the risk of an attack using smallpox is impossible to estimate, experts had no way to know if the vaccine's benefits outweighed its risks in the absence of an actual smallpox outbreak. Smallpox is a particularly fearsome biological weapon because the virus is highly contagious and because 30 percent of people infected with it die.

"We had to assess the risk from terrorists or hostile governments, along with the potentially devastating consequences on our people and our way of life," said Mr. Ridge. Those risks, he said, had to be weighed against "the fact that the vaccine itself, a highly protective preventive measure, has potentially serious adverse effects."



President Bush announcing the smallpox vaccination program yesterday. Looking on, from left, were Tom Ridge, the domestic security adviser, and the health officials Dr. Julie Gerberding and Dr. Anthony S. Fauci.

see eye to eye. "In the end, the president took in all the information and made the final decision himself."

The smallpox vaccine is made from a live virus, vaccinia, that is a close cousin of the smallpox virus. People who take it receive a series of pricks on the shoulder with a bifurcated needle that creates an open

throughout the body in people who have a history of the condition.

In addition, Dr. Fauci said, there would be anywhere from 49 to 935 serious but not life-threatening reactions. The studies showed that 1 or 2 people per million vaccinated died as a result of the complications.

In announcing that he would re-

For decades the government has maintained a stockpile of aging smallpox vaccine, called DryVax, that was manufactured in the 1970's, and today has roughly 15 million doses, Mr. Thompson said.

In the wake of last year's terrorist attacks and the anthrax attacks that followed them, Mr. Thompson decid-

Late Edition

New York: Today, cloudy, turning breezy, high 46. Tonight, breezy, partial clearing, low 35. Tomorrow, then some clouds, high 45. Yesterday, high 42, low 36. Details, Page A2

BUSH LAYS OUT PLAN ON SMALLPOX SHOTS; MILITARY IS FIRST

MOVE CALLED PRECAUTION

President Says He'll Get One but Recommends the Public Wait at Least a Year

By RICHARD W. STEVENSON and SHERYL GAY STOLBERG

WASHINGTON, Dec. 13 — President Bush today set in motion his plan for smallpox inoculations for 500,000 frontline military personnel and as many as 10 million civilian health care and emergency workers. But Mr. Bush strongly recommended that the general public not seek vaccination for now.

The president's long-awaited decision, coming as the nation prepares for possible war with Iraq, underscored how seriously the administration takes the threat that smallpox, a disease declared eradicated two decades ago, might be used by terrorists as a biological weapon. But Mr. Bush said there was no evidence that terrorists were planning an immediate smallpox attack.

"These vaccinations are a precaution only, and not a response to any information concerning imminent danger," Mr. Bush said. "Given the current level of threat and the inherent health risks of the vaccine, we have decided not to initiate a broader vaccination program for all Americans at this time."

Public health experts, hospital officials and infectious disease experts generally applauded the decision. But union officials said that Mr. Bush's plan does not adequately protect health care workers who might be injured by the vaccine, which can cause serious complications and even death, particularly among people with immune deficiencies.

Mr. Bush, who as commander in chief will be inoculated, ordered that half a million members of the armed forces, including those most likely to be involved in any war with Iraq, be immunized immediately.

Vaccinations were already under way at the Walter Reed Army Medical Center, moments after Mr. Bush spoke, officials said.

The president also authorized a voluntary program to inoculate as many as 439,000 doctors, nurses and emergency workers who would be the first to respond if terrorists obtain the smallpox virus and intro-

Continued on Page A12

The Return of Smallpox

Routine vaccination against smallpox in the United States began in 1972 and later elsewhere. After that, much of the population was left with little or no immunity against the disease, which killed about one in three victims.

A Disease Conquered, Fresh Worries

1980 The World Health Organization (W.H.O.) declared the worldwide eradication of smallpox.

1990 Vaccination of U.S. military personnel ended.

MARCH 1998 The scientist who led the campaign to eradicate smallpox, Dr. Donald A. Henderson, says the United States is making the vaccine to deal with the threat of bioterrorism.

SEPT. 2000 Government orders 40 million doses of vaccine.

After the 9/11 Attacks

NOV. 2001 The government announces an order to inoculate every American.

JAN. 19, 2002 W.H.O. recommends postponing the deadline for destroying remaining smallpox stocks to give researchers time to develop new vaccines and tests.



The vaccinia virus, used in the vaccine.

MARCH 29 Federal officials announce that the government will have access to much more smallpox vaccine than thought: the 15.4 million doses in the government stockpile can be used without losing potency. Also, the vaccine has more than 10 years of shelf life, which has been stored, frozen.

JULY 7 Federal officials say the government will inoculate 500,000 health care and emergency workers as well as 10 million other people. It also begins preparations for mass vaccinations of the public if there is an outbreak.

SEPT. 24 Federal health officials instruct states to begin vaccinating every American in the event of a smallpox outbreak. The states issued a detailed plan showing how each state would inoculate as many as one million people in the event of an outbreak.

DEC. 7 Israel says it has successfully vaccinated all soldiers and public health workers against smallpox on a basis since July, with virtually no severe side effects.

Plans for Mass Vaccinations

DEC. 13 President Bush announces plans for a mass vaccination program.

JAN. 24, 2003 Vaccination of 439,000 health care workers likely to begin. States have 30-45 days to accomplish it.

Yale SCHOOL of MANAGEMENT

135 Prospect Street P.O. Box 208200 New Haven Connecticut 06520-8200

Contact: Karin Nobile
Director of Media Relations

Tel 203 432 6010 Fax 203 432 9992
karin.nobile@yale.edu
<http://mba.yale.edu>

For Immediate Release:

Extending the Global Smallpox Bioterror Policy Debate:

Yale School of Management's Edward H. Kaplan Questions Empirical Claim for Efficacy of Ring Vaccination; Argues that Vaccination Coverage is the Key

New Haven, CT, December 18, 2002 – The global eradication of smallpox stands among the most critical public health achievements of the last century. Edward H. Kaplan, the William N. and Marie A. Beach Professor of Management Sciences at the Yale School of Management (SOM) and Professor of Public Health at the Yale School of Medicine, continues to argue that in the event of a smallpox bioterror attack, rapid mass vaccination of the population in the area of the attack is preferable to ring vaccination, where only the contacts of smallpox cases would be vaccinated.

His latest research study published in *Epidemiology*, January 2003, Vol. 14 No. 1, co-authored with Lawrence M. Wein of Stanford's Graduate School of Business, is titled "Smallpox Eradication in West and Central Africa: Surveillance-Containment or Herd Immunity?" It describes a case study that some public health officials resurrected during the recent smallpox vaccination debate as an empirical argument favoring ring vaccination. This case has been presented at key meetings addressing smallpox response policy in the United States. Raising difficult questions about the reported analysis and interpretation of these data, Kaplan and Wein confront the conventional wisdom that ring vaccination ended smallpox in this part of the world. Instead, they assert that the decline in smallpox cases observed was a result of increased vaccination coverage, and in particular, that the relationship between smallpox cases and vaccine coverage was the same before and after ring vaccination was introduced.

Kaplan and Wein point out that in the United States and in many other countries today, there is virtually no immunity to smallpox, which could place large populations at great risk.

"Because bioterror-induced smallpox outbreaks would likely lead to cases worldwide," says Kaplan, "planning should begin now to ensure that rapid vaccination could be implemented immediately in inflicted regions around the globe. It is of paramount importance," he added, "that policy makers in developed countries and at the World Health Organization (WHO) formulate a strategy for coping with global outbreaks when devising their vaccine stockpiling and distribution policies."

-- more --

Scientists call for smallpox revaccination campaign

By Steve Sternberg
USA TODAY

A new strategy to be released today for short-circuiting a possible smallpox attack calls for mass revaccination of all healthy people over 31 who were given smallpox vaccine as children and are believed to be immune to its severe side effects.

The proposal by researchers at the Brookings Institute think tank and Johns Hopkins University offers an alternative that differs markedly from the strategy proposed by President Bush. The Bush plan calls for pre-attack vaccinations of about 440,000 of 6 million hospital workers, 510,000 of 1.4 million active-duty troops and as many of the 10 million police officers, firefighters and paramedics who will volunteer.

The new strategy includes:

- Voluntary pre-attack vaccinations of all hospital workers who don't have medical conditions that impair their immunity to the live virus used in smallpox vaccine.
- Voluntary pre-attack vaccinations of all healthy people who were vaccinated before smallpox was wiped out, because they face a lower risk of vaccine side effects.
- Post-attack isolation of all confirmed cases in hospitals and vaccination of all people who have had house-

President feeling 'great' after receiving inoculation



By William Philpott, Reuters

On Saturday: President Bush, with dog Barney, greets reporters.

President Bush woke early, went for a run and attended church Sunday — a day after receiving a smallpox vaccination in his left arm. A spokesman said he was feeling "great."

Bush and his family are at Camp David, the presidential retreat in Maryland, through Christmas.

On Dec. 13, Bush ordered 510,000 service personnel to receive the smallpox vaccination and said that as commander in chief, he would be vaccinated as well.

One or two deaths occur among every 1 million people vaccinated for the first time, experts say. Most people suffer only minor side effects.

Bush was inoculated at 12:15 p.m. Saturday at the White House. An hour later, he used that arm to carry his dog. He watched a movie later Saturday at Camp David and had dinner with his parents.

By Jill Lawrence

the details have not been released.

The new containment strategy is based on a computer model of a county of 800 people that simulates how people behave in epidemics, says Brookings' Joshua Epstein, the lead author of the strategy. It also tested strategies for reducing vaccine side effects while boosting vaccine rates so any outbreaks would simply fizzle out.

"The package we outline is a very robust response, given a credible threat, and it goes beyond vaccinating health workers," Epstein says. "The approaches that do well in our model could form the basis of a national strategy."

Critics say mass vaccination after an outbreak is quicker and more efficient.

"The trouble with (the new proposal) is ... you have to go about looking for people, and the time you spend is time you can't spend vaccinating others," says Edward Kaplan of Yale University.

Epstein counters that mass vaccinations could kill millions, because more than 50 million Americans have skin diseases or weakened immune systems that leave them dangerously vulnerable to the live-virus vaccine. He says the new approach would more safely build up the population's immunity to smallpox while protecting the health workers and family members who would be most likely to get infected.

hold contact with a smallpox patient.

The administration has asked states and major cities to identify health workers and first responders for the pre-attack vaccine program, to be car-

ried out over the next four months. The states and cities submitted post-attack plans that offer a range of options tailored to exploit local medical and emergency systems. For the most part,

Electronic responses to:

EDITORIALS:

Interim smallpox guidelines for the United Kingdom

Richard Harling, Dilys Morgan, W John Edmunds, and Helen Campbell
BMJ 2002; 325: 1371-1372 [\[Full text\]](#)

▶ Rapid Responses: [Submit a response](#) to this article

Electronic letters published:

▼ **Global public health infrastructure to respond to outbreaks, including smallpox**

Cathy E. Roth, Pat Drury, Roberta Andraghetti, Ray R. Arthur, Michael J. Ryan, Guenael Rodier, David L. Heymann (19 December 2002)

▼ **Smallpox Bioterror Response**

Edward H Kaplan, Lawrence M. Wein (25 December 2002)

Smallpox Bioterror Response

25 December 2002 ▲ ▲

Edward H Kaplan,
Beach Professor of
Management Sciences
and Public Health
*Yale School of
Management, 135
Prospect Street, New
Haven, CT 06511-3729,
USA,*
Lawrence M. Wein

Send response to
journal:

[Re: Smallpox Bioterror
Response](#)

Email Edward H Kaplan,
et al.:
edward.kaplan@yale.edu

Harling et al¹ report that the recent smallpox models of Halloran et al² and Kaplan et al³ reach different conclusions regarding the ability of mass versus targeted vaccination (or ?search and containment?) to control a smallpox outbreak, that this is due to a difference in population mixing assumptions, and that Britain has adopted the latter strategy. However, a close read of Halloran et al² reveals that unless one believes that a substantial fraction of the population remains protected from vaccinations received 20+ years ago, post-attack mass vaccination prevents more smallpox deaths than an approach based on case-tracing in their model as well.

While it is true that Halloran et al² report that their ?structured simulator? does not produce the ?two orders of magnitude difference? between the number of deaths under targeted versus mass vaccination that we obtained in modeling emergency response to a smallpox attack, the real explanation for this is not due to the differences in mixing patterns as both Halloran et al² and Harling et al¹ claim. Rather, the results differ due to the different scenarios considered: 1-5 initial infections in a community of 2,000 in Halloran et al² versus 1,000 initial infections in a city of 10 million in Kaplan et al³. To see that

Epidemiology:

January 2003 - Volume 14 - Issue 1 - pp 90-92

Hypothesis Papers

**Smallpox Eradication in West and Central Africa:
Surveillance-Containment or Herd Immunity?****Kaplan, Edward H.¹; Wein, Lawrence M.²****Author Information**

From the ¹Yale School of Management, and Department of Epidemiology and Public Health, Yale School of Medicine, New Haven, Connecticut, and the

²Graduate School of Business, Stanford University, Stanford, California.

Address correspondence to: Edward H. Kaplan, Yale School of Management, Box 208200, New Haven, Connecticut 06520-8200; edward.kaplan@yale.edu

Submitted 4 September 2002; final version accepted 14 October 2002.

Editors' note: An invited commentary on this article appears on page 93.

The global eradication of smallpox stands among the most important public health achievements of the last century.¹ However, fears that smallpox bioweapons^{2,3,4} have fallen into the hands of rogue states or terrorist organizations have rekindled interest in the methods used to control smallpox outbreaks. Surveillance-containment employing ring vaccination (whereby symptomatic smallpox cases were sought and isolated and their surrounding contacts traced and vaccinated) has been widely acknowledged as the key to smallpox eradication,¹ though some have questioned this claim.⁵ In the United States, where the interim policy in the event of a smallpox attack is based on ring vaccination,⁶ we have argued that localized mass vaccination from the moment an attack is recognized would result in far fewer casualties than ring vaccination, including deaths that result from vaccination itself.⁷

In this commentary, we closely examine a figure based on historical data reported by Foege *et al.*^{8,9} documenting smallpox control and eradication in West and Central Africa. This figure has been resurrected as empiric proof of the effectiveness of ring vaccination, and has been presented in important meetings addressing smallpox response policy in the United States.¹⁰ It is important that data offered to garner support for a policy position stand on their own as presented, and indeed it was the public presentation of this figure that prompted our investigation. Contrary to the claim made, we will argue that the reported decline in smallpox cases matches what one would have expected on the basis of increased vaccination coverage alone. Herd immunity, not surveillance-containment, appears to be the real story behind the eradication of smallpox in West and Central Africa.



crossref.org

SCIENCE ONLINE | SCIENCE MAGAZINE | SCIENCE NOW HOME | NEXT WAVE | STKE/AIDS/SAGE | SCIENCE CAREERS

Subscriber: Yale University | Sign In as Individual | FAQ | Access Rights | Join AAAS

Science
now

HELP | SUBSCRIPTIONS | FEEDBACK | SIGN IN | AAAS

SEARCH

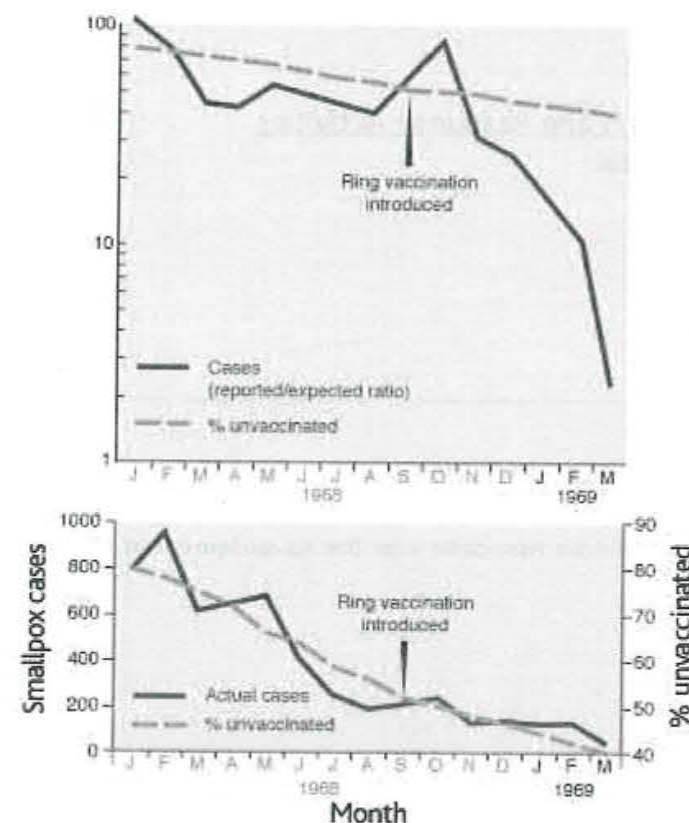
ARCHIVES

▶ NEWS TIPS ▶ HEADLINE

7
January
2003

Ring Vaccination Revisited

A fresh look at 2-decades-old studies could have important consequences for U.S. smallpox policy, according to a paper in the January issue of *Epidemiology*. The study questions a key piece of evidence for the efficacy of "ring vaccination," a cornerstone of the U.S. plan to contain smallpox outbreaks. But the authors of the original papers say that even if the study is right, there's plenty of other evidence that ring vaccination works.



Now you see it ... Ring vaccination seemed to have a dramatic effect in a graph published in 1971 and 1975 (*top*)--but not in Kaplan's new analysis

Last month, the Bush Administration announced it would vaccinate up to 11 million people preemptively against smallpox (*ScienceNOW*, 13 December 2002). But the postattack game plan is still evolving. The current version prominently features ring vaccination--isolating smallpox victims and rapidly immunizing all of their close contacts, as well as those people's contacts.

In the new paper, Yale University mathematician Edward Kaplan and his colleagues take aim at a graph, published in scientific papers in 1971 and 1975, claiming that ring vaccination was extremely effective during the global smallpox eradication campaign. The figure, presented by an official of the Centers for Disease Control and Prevention at several key policy meetings last year, seems to show a sharp drop in new cases just after ring vaccination was introduced in 20 countries in West and Central Africa in September 1968.

01.24.03

SOMnews

NEWS AT THE YALE SCHOOL OF MANAGEMENT

Global Eradication of Smallpox

The global eradication of smallpox stands among the most critical public health achievements of the last century. Edward H. Kaplan, the William N. and Marie A. Beach Professor of Management Sciences at the Yale School of Management and Professor of Public Health at the Yale School of Medicine, continues to argue that in the event of a smallpox bioterror attack, rapid mass vaccination of the population in the area of the attack is preferable to ring vaccination, where only the contacts of smallpox cases would be vaccinated.

His latest research study published in *Epidemiology*, January 2003, Vol. 14 No. 1, co-authored with Lawrence M. Wein of Stanford's Graduate School of Business, is titled "Smallpox Eradication in West and Central Africa: Surveillance-Containment or Herd Immunity?" It describes a case study that some public health officials resurrected during the recent smallpox vaccination debate as an empirical argument favoring ring vaccination. This case has been presented at key meetings addressing smallpox response policy in the United States. Raising difficult questions about the reported analysis and interpretation of these data, Kaplan and Wein confront the conventional wisdom that ring vaccination ended smallpox in this part of the world. Instead, they assert that the decline in smallpox cases observed was a result of increased vaccination coverage, and in particular, that the relationship between smallpox cases and vaccine coverage was the same before and after ring vaccination was introduced.

"Because bioterror-induced smallpox outbreaks would likely lead to cases worldwide," says Kaplan, "planning should begin now to ensure that rapid vaccination could be implemented immediately in inflicted regions around the globe. It is of paramount importance," he added, "that policy makers in developed countries and at the World Health Organization (WHO) formulate a strategy for coping with global outbreaks when devising their vaccine stockpiling and distribution policies."

Under a plan announced earlier last month by President Bush, as many as 500,000 U.S. troops serving around the world will be inoculated, along with Mr. Bush himself as commander-in-chief. The stated goal is for the U.S. government to protect those on the front lines of a bioterror assault. For civilians, the decision to be vaccinated will be voluntary, and not mandatory as is for military personnel. Initially, teams of health-care workers in each state - including the medical professionals who would be expected to treat smallpox cases and investigate any outbreak - will have access to the vaccine this month. Next, the vaccine will be made more widely available and inevitably offered to as many as 10 million local police, firefighters, and emergency rescue workers. Only after emergency responders have been immunized would the general public gain voluntary access to the vaccine in 2004.

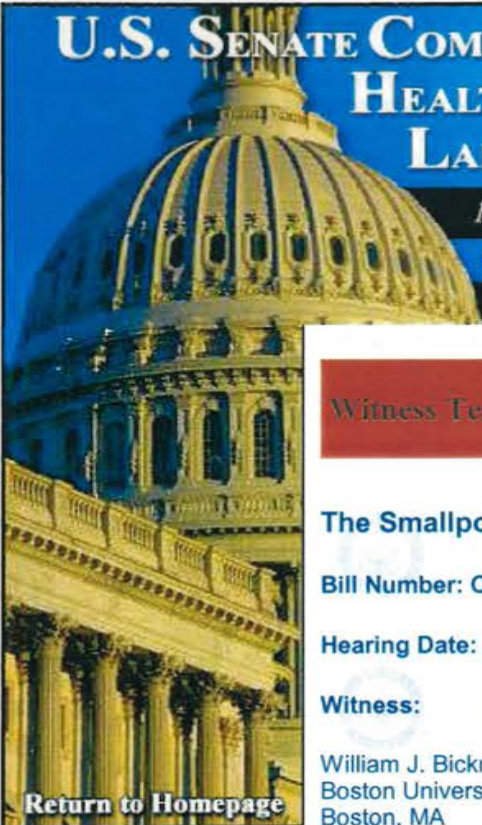
"The President's current plan wisely vaccinates a cadre of first-responders who could rapidly vaccinate the rest of the population in the event of a bioterror attack," Kaplan added. "Ensuring now that such an emergency response would be possible if required is the most immediate feature of the President's plan, for which I commend him and his advisors."

Yale School of Management
135 Prospect Street
New Haven, CT 06511

The Yale School of Management gratefully acknowledges
Bristol-Myers Squibb's In-Part
sponsorship for the SOMnews.

Mary Ann Green, Editor
Office of Student Affairs
maryann.green@yale.edu
Telephone: 203.432.5351
Fax: 203.432.9916

www.som.yale.edu



**U.S. SENATE COMMITTEE ON
HEALTH, EDUCATION,
LABOR, & PENSIONS**

[Members](#) | [Contact](#)

[About the Committee](#) | [Subcommittees](#) | [How the Senate Works](#) | [F](#)

HEALTH | **EDUCATION** | **LABOR** | **PENSIONS** | **VIEW ALL**

[Return to Homepage](#)



Sen. Gregg (R)
Chairman



Witness Testimony

The Smallpox Vaccination Plan: Challenges and Next Steps

Bill Number: Oversight Hearing

Hearing Date: January 30, 2003

Witness:

William J. Bicknell, MD, MPH
Boston University School of Public Health
Boston, MA

Testimony:

Mr. Chairman, members of the committee, colleagues and guests, it is an honor to be invited to testify before the Health, Education, Labor and Pensions Committee. My name is William J. Bicknell, I am a physician with a public health degree, have served as Commissioner of Public Health in Massachusetts, am Board Certified in Public Health and Preventive Medicine and have been a Professor of Public Health and International Health at Boston University's Schools of Public Health and Medicine for over 20 years. Most recently I have been a proponent of careful, selective, progressive and, ultimately, widespread, pre-exposure vaccination as the best way to protect the nation against the threat of a bioterrorist attack using smallpox as a weapon.

Issues of national security, economics and economic disruption, medicine, public health, and labor/management issues often get confused as we discuss smallpox. This is complicated by misunderstanding of the facts, confusion of fact and opinion and, finally, honest disagreements as to the correct course of action. And, as we consider smallpox, it is important to remember that it is just one of a number of bioterrorist threats.

CONTEXT

First let me provide some context. Smallpox (Variola) is very contagious with a 30% overall fatality rate in persons who have not been vaccinated. 60% to 80% of survivors are disfigured. There is no treatment. It is a terrible disease and an excellent weapon. The threat is widely believed to be real but cannot be quantified. However, as the consequences of a terrorist release of smallpox on an unprepared nation have the potential to be devastating, preparation is essential.

Many of us were vaccinated years ago. This decreases the likelihood of vaccine complications and may provide some very limited immunity to smallpox. From a personal or public health perspective the only significant benefit of vaccination 10 or more years ago is a further reduction in the already low rate of vaccine complications in adults. More about this shortly. The important point is anyone who has been vaccinated over 10 years ago cannot count on being protected from smallpox.

The nation is far better prepared today for a smallpox attack than it was even a few

Starting
200
Capitol
audio
Senate
will
[RealF](#)
before
he
[RealPI](#)
find ti
hearir
the W



DEPARTMENT OF THE NAVY
NAVAL POSTGRADUATE SCHOOL
1 UNIVERSITY CIR
MONTEREY CA 93943-5000

IN REPLY REFER TO:

5500

5 Feb 03

Dr. Edward H. Kaplan
Professor of Public Health
Yale School of Management
William N. & Marie A Beach Professor of Management Sciences
Box 208200
New Haven, CT 06520-8200

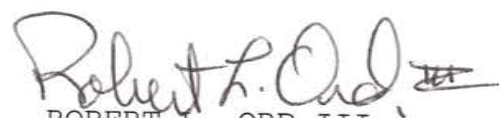
Dear Dr. Kaplan:

I would like to invite you to the Naval Postgraduate School in Monterey, CA to serve as a Distinguished Guest Lecturer in our new Masters Degree program in Homeland Defense and Security. We would be honored if you would accept an invitation to deliver a presentation during our second week of the Spring 2003 course. The suggested topic is, "Smallpox Vaccination Modeling." Your presentation is scheduled on Friday, April 4th, 2003 from 1300-1400. In addition, NPS will arrange for your airfare and lodging as well as providing an honorarium of \$500.00.

This new masters degree curriculum has been developed to provide the present and future civilian and military leadership with the essential graduate level education necessary to strengthen the Homeland Defense and Security for our country and its citizens. The curriculum is the result of an innovative partnership between the Office for Domestic Preparedness, U.S. Department of Justice, and by the Deputy Chief of Operations for Plans, Policy and Operations, U.S. Navy.

The Center for Homeland Defense and Security staff will assist you in all aspects of your visit. Please respond to Karen Flaherty, who can be reached at (831)656-3890 or via email at Flaherty@nps.navy.mil.

Sincerely,


ROBERT L. ORD III
By direction

02.07.03

SOMnews

NEWS AT THE YALE SCHOOL OF MANAGEMENT

FACULTY NEWS

Ed Kaplan's Smallpox Research Called "A National Resource" on Capitol Hill

In a recent Senate hearing, experts testified that the work of our own **Ed Kaplan** -- and his colleagues Larry Wein (Stanford) and David Craft (MIT) -- in the smallpox arena "is exemplary and that their expertise represents a real national resource in this area." Also, Professor Kaplan was interviewed on National Public Radio assessing the risks of the smallpox vaccine as it was being reintroduced into Connecticut.

THE CQ Researcher

PUBLISHED BY CONGRESSIONAL QUARTERLY INC.

WINNER: SOCIETY OF PROFESSIONAL JOURNALISTS
AWARD FOR EXCELLENCE ♦ AMERICAN BAR
ASSOCIATION SILVER GAVEL AWARD

Smallpox Threat

Should Americans get vaccinated?

The worldwide eradication of smallpox — one of the most lethal diseases in history — stands alone in the annals of public-health successes. But since the Sept. 11 attacks, the prospect of terrorists using smallpox as a weapon has become a real possibility. Intelligence officials say enemies of the United States, including North Korea and Iraq, have obtained the killer virus. In December, President Bush announced sweeping plans to immediately begin vaccinating millions of soldiers and health-care workers, and then to make the vaccine available to the population at large, beginning in 2004. Many public-health experts say the president is taking the appropriate steps to protect the nation. But others warn that the vaccine is too dangerous to be given to millions of Americans when there is no immediate threat.



INSIDE THIS ISSUE

THE ISSUES	107
BACKGROUND	114
CHRONOLOGY	115
CURRENT SITUATION	120
AT ISSUE	121
OUTLOOK	123
BIBLIOGRAPHY	125
THE NEXT STEP	126



Feb. 7, 2003 • Volume 13, No. 5 • Pages 105-128

www.cqpress.com

FREE WEB TRIAL
See back cover



14/2/03

שכונת קטן הינו אליהם המרכז
(האליהם) לקקו מהאליהם.

גברת,

לשם קאליהם

המרכז הלאומי לבקרת מחלות
מכון גרטנר, מרכז רפואי שיבא
תל השומר 52621



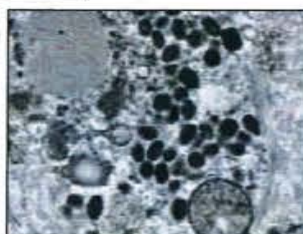
02-6257989
02-6426771
מרכז

אליהם שחיות

Reportage au Point

Le mercredi 19 février

Sommes-nous prêts à nous défendre?



Le virus de la variole a été éradiqué de la surface de la Terre il y a 22 ans. Pourtant, les Américains y voient là une terrible menace. Le front, il n'est pas seulement à des milliers de kilomètres de chez eux, il est aussi dans leur cour. «Smallpox», ou la variole en français, serait l'une des plus dévastatrices de l'immense panoplie d'armes biologiques. Elle a été le tueur le plus violent de l'humanité. Au XXe siècle, il a fait 300 millions de victimes. La forme la plus commune de variole, la variola majeure, tue un tiers de la population infectée. La moitié des enfants de moins d'un an n'y survivrait pas. La maladie est extrêmement contagieuse. La période d'incubation du virus de la variole est d'environ 14 jours, ce qui rend le virus extrêmement difficile à retracer. Les symptômes sont les suivants : on voit apparaître des éruptions cutanées, puis des pustules. Tout cela accompagné de fortes démangeaisons, de fièvre, de maux de tête et souvent de vomissements.



Écoute du reportage

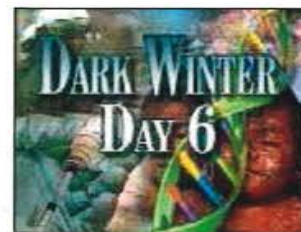
Format WindowsMedia

Si on en guérit, la maladie peut laisser des cicatrices indélébiles. Certains restent aveugles. Pour éradiquer cette maladie terrible, l'Organisation mondiale de la santé a lancé une campagne de titan dans les années 1960 et 1970. En 1980, on criait victoire et déclarait la variole éradiquée. Officiellement, les seuls laboratoires à détenir des souches sont ceux des départements de santé publique de Novosibirsk dans l'ancienne URSS et celui d'Atlanta aux États-Unis. Dans les années 1970, malgré la signature d'un traité qui interdisait la production d'armes biologiques, les Soviétiques ont développé un arsenal et une technologie mortelle.



Ken Alibek a participé au développement de ces armes biologiques en URSS. Il a été l'un des principaux dirigeants du programme. Aujourd'hui, Ken Alibek enseigne à l'université George Mason près de Washington. Il travaille à trouver des façons de se parer contre les armes biologiques. Il s'inquiète de ce qui est advenu de ses collègues en Russie et des souches du virus après l'écroulement de l'URSS. Selon les Américains, la Corée du Nord, le Pakistan, l'Iran et la Chine, entre autres, auraient mis la main sur des souches de la variole. Et puis, il y a l'Irak. Les Nations unies savent que les Irakiens ont eu un programme d'armes biologiques. On soupçonne qu'ils avaient des stocks importants de variole. Les inspecteurs de l'ONU n'arrivent pas à confirmer si les Irakiens ont vraiment détruit ces stocks. Les Américains sont convaincus que non.

La crainte d'une attaque est telle aux États-Unis qu'un groupe d'experts a simulé une attaque bioterroriste de variole. En juin 2001, à Oklahoma City, des politiciens et des scientifiques ont participé à cette simulation. L'exercice s'appelait «Dark Winter» et ils l'ont tous échoué misérablement. Au cours de l'exercice, les politiciens et leurs experts perdent le contrôle, la variole se répand rapidement dans trois villes américaines et, plus tard, dans tout le pays. Les États-Unis ont vécu leur première attaque bioterroriste avec l'«anthrax», qui a semé la panique. On n'a jamais su qui en avait été l'auteur. Si, quelques mois auparavant, le scénario de «Dark Winter» était, pour certains, de la science-fiction, il est maintenant plausible.



Le 13 décembre dernier, George W. Bush annonçait le plan d'urgence le plus audacieux de sa présidence. Le budget pour la défense contre le bioterrorisme pourrait coûter aux Américains 6 milliards de dollars durant la prochaine année. En un an, le gouvernement américain s'est doté d'un stock de vaccins contre la variole suffisant pour inoculer toute sa population. Le plan prévoit la vaccination de 10 millions de personnes qui seront appelées aux premières

Jobs FIND / POST
Cars BUY / SELL
Real Estate BUY / SELL

News Home Page
Nation
World
Metro
Business
Technology
Sports
Style
Education
Travel
Health
Alternative Care
Children & Youth
Chronic Diseases
Fitness
Health Care Issues
Men
Mental Health
Nutrition
Seniors
Women
Columns
Special Reports
Live Online
Photo Galleries
Health Index
Real Estate
Home & Garden
Food
Opinion
Weather
Weekly Sections
News Digest
Classifieds
Print Edition
Archives
Site Index
Help

Bush Smallpox Inoculation Plan Near Standstill

Medical Professionals Cite Possible Side Effects, Uncertainty of Threat

By Ceci Connolly
Washington Post Staff Writer
Monday, February 24, 2003; Page A06

When President Bush issued the call for 500,000 volunteer health care workers to be immunized against smallpox, Health and Human Services Secretary Tommy G. Thompson promised to get the job done in 30 days.

At today's one-month mark, however, the total number of people inoculated nationwide is just 4,200 - less than 1 percent of the administration's target for the first phase of bioterrorism preparations.

"It is as close to stalled as you can get," said William Bicknell, former Massachusetts health commissioner and a professor at the Boston University School of Public Health. "There has not been a sufficient push from senior administration officials."

Although the federal government has shipped 274,000 doses of vaccine to states since the program began Jan. 24, hundreds of hospitals, a half-dozen major unions and even some public health departments have refused to participate. Even the states that are vaccinating volunteers report that they have drastically scaled back their original plans.

Aside from a few pockets of enthusiasm, the vast majority of medical professionals remain unconvinced that the threat of a smallpox attack is serious enough to administer a vaccine known for its serious side effects, especially when federal officials have refused to create a compensation fund for people sickened by the vaccine.

"At this point I'm more concerned about seeing a vaccine complication than a case of smallpox," said Steven Gordon, hospital epidemiologist at the Cleveland Clinic, where fewer than 100 of thousands of eligible employees will be inoculated next month.



enlarge photo

Health care workers Anne Griffin, left, Ivory Clark and Joan Humphrey received their doses of Dryvax vaccine at the West Tennessee Regional Health Department in Jackson, Tenn. (Cara Eastwood - Jackson Sun Via AP)

Special Reports

- **County To Start Smallpox Shots**
(The Washington Post, Feb 20, 2003)
 - **Pr. William Takes Precautions**
(The Washington Post, Feb 20, 2003)
 - **Uncertainty is Sea Where All Swim**
(The Washington Post, Feb 16, 2003)
 - **More on Smallpox**
- E-Mail This Article
Printer-Friendly Version
Permission to Republish
Subscribe to The Post


Global Security Newswire

by National Journal Group

Daily news on nuclear, biological and chemical weapons, terrorism and related issues.

Global Security Newswire is produced independently for the Nuclear Threat Initiative by National Journal Group, Inc. Global Security Newswire is published Monday thru Friday by 2 pm and is available exclusively on the NTI website, www.nti.org.



Wednesday, February 26, 2003

Smallpox: CDC Says It Never Aimed For 500,000 in First Phase

By David McGlinchey
Global Security Newswire

WASHINGTON — The U.S. smallpox immunization plan, which has been slowed by a lack of volunteers, was never intended to reach an often-reported, 30-day goal of inoculating 500,000 health workers, a spokesman from the Centers for Disease Control and Prevention said today (see [GSN](#), Feb. 6).

On Dec. 13, 2002, U.S. President George W. Bush announced an initiative to prepare the United States for a possible smallpox attack (see [GSN](#), Dec. 13, 2002).

That day, U.S. health officials described a two-part program in which an estimated 500,000 smallpox response personnel would first receive the vaccine followed by up to 10 million emergency responders.

In that briefing, Health and Human Services Secretary Tommy Thompson said, "There are 439,000 individuals that we've designated right now in order to receive the vaccination in the first tranche," adding that the plan was "a voluntary program and not every one of those individuals will receive it."

CDC Director Julie Gerberding added that she was encouraging states to implement the first wave quickly. "In our planning guidance, we recommended that they try to accomplish this in 30 days from the point at which they actually open the clinics and begin the immunization," she said.

The program began Jan. 24 and the [Washington Post](#) reported that participation has been limited to 4,200 people, as of Feb. 24. Potential volunteers are concerned about sicknesses associated with the vaccine and several medical unions have delayed endorsing the plan until a compensation plan is provided for patients who experience the vaccine's side effects.

CDC spokesman Tom Skinner told *Global Security Newswire* that the "the 500,000 number was floated around," but that the immunization plan's sole goal was to prepare the United States to respond to a smallpox attack.

"We're trying to do a better job of clarifying what the purpose of this program is, and the purpose of this program is to better prepare our country to respond to a bioterrorism event involving smallpox,"

It exist, he said, but they are "seamless."

nine when to begin immunizing firefighters, police and other emergency and the progress of the plan will not depend on passing a fixed number of a set date, according to Skinner.

icials had set 500,000 immunized first responders as a target for the first separate vaccination scenarios, states and major cities collectively estimated 400,000 and 500,000 inoculated personnel in phase one, but federal health at number as a target, according to Skinner.

ount of backpedaling. This is very embarrassing for them, and it should be," essor Ed Kaplan, a vocal critic of the CDC's smallpox vaccination plans (see

ncing themselves from the 500,000 figure in early February, when it became 1 was plagued by low turnout.

no one receives the vaccine, but we offered this opportunity to all the right son, CDC associate director for terrorism preparedness, at a Feb. 5 hosted by the National Governors Association.

id it was reasonable to work without using the 500,000 figure as a

planning number and somehow it became the goal," said Patrick Libbey, National Association of County and City Health Officials.

's discussion of readiness, instead of numbers, "is not throwing me a curve."

been about readiness, the 500,000 was a number out of the air," said itive director of the American Public Health Association.

is a moving target," he added.

not solely to blame for the low turnout, or the slowly moving immunization are stuck with the shortfalls in the plan.

ich senior discussion of this plan since it was discussed in December," he

Goal

ness is the ultimate goal, and they said that the United States is not yet

been strengthened by the

n program has not been widely accepted despite strong White House support, he Philadelphia Children's hospital's infectious diseases section and a


Global Security Newswire

by National Journal Group

Daily news on nuclear, biological and chemical weapons, terrorism and related issues.

Global Security Newswire is produced independently for the Nuclear Threat Initiative by National Journal Group, Inc. Global Security Newswire is published Monday thru Friday by 2 pm and is available exclusively on the NTI website, www.nti.org.



Friday, February 28, 2003

Smallpox I: Congress Attempts to Solve Smallpox Compensation Dilemma

By David McGlinchey
Global Security Newswire

WASHINGTON — Public health experts said this week that the single largest factor preventing implementation of the U.S. smallpox immunization plan is the lack of compensation for those sickened by the vaccine, but legislation is now being drafted to address the problem, according to congressional sources (see [GSN](#), Feb. 26).

Medical workers have stayed away from the program in droves over fears of the well-advertised and potentially dangerous side effects of the vaccine. Over a month into the immunization campaign, fewer than 7,500 emergency workers nationwide have received the vaccine (see related *GSN* story, today).

On Feb. 13, Representative Henry Waxman (D-Calif.) introduced the Smallpox Vaccine Compensation and Safety Act and staffers are negotiating a bill in the Senate to provide compensation for those who suffer adverse vaccine side effects.

"I have heard from public health officials and vaccination experts that many health care workers are understandably reluctant to accept a vaccine to protect the public while being forced to face the consequences of an adverse reaction alone. These consequences can include large medical bills, lost income, pain and suffering, and death. There can be no doubt that a compensation plan is urgently needed," Waxman said.

Senator Judd Gregg (R-N.H.), chairman of the Health, Education, Labor and Pensions Committee, and Senator Edward Kennedy (D-Mass.), the committee's senior Democrat, are drafting legislation to address obstacles to the smallpox immunization plan, according to their staff.

"We need to reassure people that need to receive the vaccine that they will be protected," said Christine Iverson, a spokeswoman for the Gregg's committee. Legislation will be brought to the Senate "hopefully in the next month," Iverson said.

Gregg, Kennedy, Senate Majority Leader Bill Frist (R-Tenn.) and other lawmakers are negotiating to produce a bill that resolves the vaccine compensation issue, according to Kennedy aide Jim Manley.

bipartisan proposal," Iverson said. Although it is not she said that Gregg and Kennedy have been "working

to accept the vaccine surprised experts, some of whom possible side effects.

the vaccine. Wildly," said Ed Kaplan, a Yale University smallpox vaccine plans. He said that sensationalized reports

tactics being used," according to Kaplan.

ring vaccine side effects are remote, they also said that

the impact of the compensation issue," said Georges in Public Health Association. Benjamin said that issues of slowstoppers," and Congress still has "a huge way to go."

sation program modeled on the existing childhood the purpose of this bill is to compensate people ... for their ges."

of medical leave for emergency and medical workers who The bill calls for Washington to reimburse employers for

the smallpox immunization program, which has been a large state and local officials. Waxman's proposal would send the education and screening for potential vaccines," as well g.

to help fund state immunization efforts and establishes a aid aide Manley.

medical treatment ... free medical care" if they suffer side

he is willing to support it, we have to wait and see,"

compensation for smallpox vaccine patients as well as liability nister other vaccines, according to Iverson, the committee

the law in November, does not provide sufficient liability in smallpox, Iverson said (see [GSN](#), Nov. 25, 2002). This is

Newsweek

'The Government Must Plan For Mass Vaccinations'

By Arlene Getz | 3/13/10 at 6:05 PM

How best to cope with fears of a smallpox terror attack? Proposals to carry out mass public inoculations, a policy dropped 30 years ago, are controversial because of the potential side effects from the live vaccine.

The disease, however, is dangerous: one in three sufferers died before it was declared eradicated in 1980. Its contagious nature, coupled with renewed talk about a possible American war against Iraq—a country suspected of maintaining secret supplies of the virus—have led to questions about the viability of government plans to deal with the threat.

Until last month, federal officials said they would offer limited vaccinations to only a few thousand first-response emergency staff. Last week, officials announced a new plan to start inoculating as many as 500,000 health-care workers who will be on the front lines if new cases develop. Scientists, however, have criticized the government's plans for "ring vaccinations," which would involve isolating infected patients and vaccinating people in close contact with them. One study, written by Edward H. Kaplan, a public-health specialist at Yale University, and the MIT's David L. Craft and Lawrence M. Wein used a mathematical model to determine that mass vaccinations would save thousands more lives than the limited ring vaccinations favored by the government. Their analysis was published this month in the online edition of the Proceedings of the National Academy of Sciences. Kaplan spoke to NEWSWEEK's Arlene Getz about the study and his views on the need for inoculation.

Edward H. Kaplan: Actually, the recommendations from June 20 and the new recommendations to vaccinate half a million first-responders were not issued by the same government bodies. The Advisory Committee on Immunization Practices [ACIP] issued the former recommendations while the latter idea comes from elsewhere in [the Department of] Health and Human Services. So it's not exactly that the same group of people changing their position. The ACIP recommendations are under review by an interagency group. So the final policy is still being debated and shaped at higher levels of government than the ACIP panel, which is basically housed at the Centers for Disease Control.

I would recommend that the government start planning for efficient, local mass vaccinations in the event of an attack. Think of Election Day as an analogy—people know which precinct to vote in, have registered ahead of time, undertake absentee balloting if they know they will be away, etc.

Millions vote on election day. Similarly, vaccination centers need to be located, the population needs to learn their center assignments, informed consent to be vaccinated must be obtained, prescreening for conditions that could lead to vaccine complications could take place. In short, plan now so that if there is an attack, mass vaccination can take place efficiently.

I believe there is an argument for voluntary pre-attack vaccination, though frankly, I am not sure I would choose to do so—unless I was told that without question, ring vaccination would be employed, then I probably would consider getting in line for a smallpox shot. It is true that pre-attack vaccination will make any postattack policy work better by reducing the number of susceptibles in the population.

It is also true that different people have different tolerances for risk. While there is a one in 1 million chance of death from receiving a smallpox vaccine shot, there is also in the United States a 145 in 1 million annual risk of death from a road accident. Those of us who drive do not worry about this risk, and consequently to many an incremental one in a million risk does not seem significant. To others, though, it might be unacceptable. So this is an argument for voluntary vaccination pre-attack.

Our study does not portray smallpox transmission from one or two initial infections in a country where 50 percent to 75 percent of the population is already immune. Our study does portray what would happen in a large city where nobody is immune. It deliberately worries about large outbreaks; the whole point is to find a policy that can contain the consequences of a large-scale bioterror attack. I should point out that ACIP has not conducted an actual analysis of ring vaccination—they have not actually investigated the consequences of their own policy recommendations.

I teach a graduate course at the Yale School of Management called Policy Modeling. In that class, we learn that one does not evaluate the efficacy of a policy by assuming that it works. But those calling our study unrealistic are simply assuming that ring vaccination will work based on historical analogy. The analogy is flawed, both because of the differences in population immunity then and now and also

10:30 a.m. *Inflammation modifies racial difference in survival in end-stage renal disease* – Neil Powe, Yongmei Liu, Nancy Fink, Michael Klag, Josef Coresh

11:10 a.m. *Public health decision making about vaccines in the face of uncertainty: Insights from the thimerosal episode* – Roger Bernier

11:50 a.m. *Remembering "Abe": Observations on the career and accomplishments of Abraham M. Lilienfeld* – Warren Winkelstein, Jr.

12:20 p.m. Lunch

Afternoon Session

Moderator: Philip Brachman

1:20 p.m. Debate: *Is localized mass vaccination the best response to a smallpox bioterrorist attack?*
Yes: Edward Kaplan
No: Michael Lane

3:00 p.m. Adjourn



76th Annual Meeting

**AMERICAN
EPIDEMIOLOGICAL
SOCIETY**

March 27 - 28, 2003

Jointly Sponsored by:

The Rollins School of Public Health
Emory University
and
Centers for Disease Control and Prevention (CDC)
Atlanta, Georgia

Officers: 2002-2003

President:

Allen Wilcox, MD, PhD

President-Elect:

William Foege, MD

Secretary-Treasurer:

Arthur Reingold, MD

FORUM ON PHYSICS & SOCIETY

of The American Physical Society

April 2003

[APS HOME](#)

[FPS HOME](#)

[Previous
Newsletters](#)

[CONTENTS
this issue](#)

[Contact the
Editors](#)

NEWS

Controversy: Log vs Linear Plots

The news section of Science magazine, Volume 299, January 10, 2003 contains an article (page 181) about alleged data reporting distortion concerning smallpox eradication by Donald A. Henderson, now a senior adviser to the Bush Administration. For close to a year, Yale University mathematician Edward Kaplan has reanalyzed small pox incidence data that were originally published in 1971 by William Foege (now a consultant to the Bill and Melinda Gates Foundation)

and in 1975 by Foege and Henderson. Foege and Henderson claimed in their papers that an eradication strategy called ring immunization is very effective and, in fact, essential for eradication. Kaplan has argued that the original data show that ring immunization is far less effective than mass immunization, and that only by means of graphical sleights-of-hand could Foege & Henderson make it appear that ring immunization is effective.

In ring immunization, smallpox victims are isolated, followed by the immunization of everyone with whom the victims came in contact. In mass immunization, everybody is immunized. A graph published in the 1971 and 1975 papers purports to show a precipitous decline of smallpox cases following commencement of ring immunization. Kaplan claims that the following tricks only make it appear that a sharp decline occurred as a result of ring immunization: 1) The use of a semi-log plot (of #cases vs. time and of % unvaccinated vs. time), which had the effects of masking the extent of immunization and of exaggerating the decline in smallpox incidence, and 2) the reporting of ratio of reported to "expected" cases based on years, before 1968, when vaccination coverage was much lower. Kaplan re-plotted the original data using a linear-linear plot of the number of actual cases, and it appears that the decrease in the number of cases falls in lockstep with the decrease in the unvaccinated fraction of the population. In Kaplan's graph, the effect of the introduction of ring-immunization, in 1968, appears unnoticeable.

Interestingly, Henderson is reported in the article to have said, regarding his semi-log plot, "I've always had difficulty with that graph myself." as well as, regarding Kaplan, "Kaplan doesn't understand what he's talking about."

According to Kaplan, others in the Bush Administration are interested in his results from analysis of the smallpox eradication battle in India. He claims that those results support his claim that ring vaccination is not as effective as mass immunization.

Vaccination Policy in the Large and in the Small(pox)

BY EDWARD H. KAPLAN
AND LAWRENCE M. WEIN

On Dec. 13, 2002, following months of often acrimonious debate, President George W. Bush announced his decision to vaccinate 500,000 military personnel against smallpox, and also to begin vaccinating civilian first-responders as a step toward preparing for the possibility of a smallpox bioterror attack in the United States. That vaccinations were ordered against a disease eradicated from the planet more than 25 years ago speaks to the risk the president and his advisors must perceive regarding the possible use of smallpox as a weapon of bioterror.

The civilian plan was to proceed in three phases, with all vaccine recipients participating on a voluntary basis. Phase I would vaccinate roughly 500,000 doctors and nurses across the country, with the goal of providing a cadre of hospital staff who could handle initial cases should an attack arise while also vaccinating a pool of persons who could themselves vaccinate the public in case of an emergency. Originally, Phase I was to have been completed by the end of February of this year. The idea behind Phase II was to expand this initial vaccinated reserve by immunizing another 10 million first-responders, including police officers and firefighters, as well as additional medical personnel. Phase II was intended to be completed over the duration of 2003. Only with Phase III, slated for next year, would the public gain access to the smallpox vaccine.

At the time this column is being written, however, fewer than 25,000 first-responders have agreed to be vaccinated, and many observers and would-be participants agree that the vaccination program is virtually stalled. Why is this the case?

There are at least three reasons that volunteers have been reluctant to come forward. First and perhaps most notably, would-be participants are wary of the very small risks of serious medical conse-

We agree that **someone** who actually **experiences** a vaccine **complication** should be **compensated**, but we **disapprove** of the scare **tactics** that have been **employed** in **service** of this **argument**.

quences, including a one-in-a-million chance of death, that accompanies vaccination. While the vaccination plan does screen out those with contraindications such as immune deficiency or eczema who would be at an elevated risk, as formulated the plan did not provide compensation assurances in the event of a vaccine complication. Given that a police officer injured in the line of duty would be compensated for economic loss as well as medical expenses, why shouldn't those "injured" by the smallpox vaccine receive equivalent guarantees?

We agree that someone who actually experiences a vaccine complication should be compensated, but we disapprove of the scare tactics that have been employed in service of this argument. The risks of serious vaccine complications are very, very low, yet one routinely hears the argument that vaccinia, the live virus used in smallpox vaccination, is the "world's most dangerous vaccine." This is perhaps a true statement, but it is also like saying that Boeing 747s are the world's most dangerous commercial jets (or, for that matter, that Fruit Loops are the world's most dangerous cereal – terrible things can happen if you stick Fruit Loops in your eye!).

People routinely take death risks that greatly exceed the one-per-million historical death rates from smallpox vaccine without worry. For example, the annual number of deaths from road accidents in the United States is 145 per million (so the risk of death from a single vaccination is about the same as the risk of a road death over two-and-a-half days), while at a one-in-eight million

death risk per enplanement, only five return flights carries about the same absolute risk as vaccinia. It is not that we feel vaccination is without risk, but over and over again we have heard this risk dramatically overstated. Such distortion, while perhaps politically useful in winning a deserved compensation plan (and indeed legislation for such a plan is currently being created), ultimately is a disservice. We worry that even with a compensation plan in place, many intended vaccine recipients will simply be too scared to volunteer. This does not bode well for the rest of us in the event of an emergency.

A second reason people give for not getting vaccinated is that they feel there is simply no need for such widespread preparation. Those arguing in this way refer to the historical eradication of smallpox where, supposedly, only the close contacts of smallpox cases were vaccinated (so-called ring vaccination). Such a focused vaccination plan, the argument goes, could succeed in snuffing a smallpox outbreak while vaccinating only a small fraction of the population, and therefore widespread preparatory vaccination is simply not needed.

Old ideas die hard. Without even getting into whether the claimed approach was actually implemented as described (simply looking at the ratios of the number of persons vaccinated to the number of smallpox cases in different countries suggests otherwise), we have argued elsewhere that there are many differences between the last endemic smallpox regions of the 1970s and the almost completely susceptible U.S. (and,

The Last Word is continued on page 71

Special Operations Research Department Seminar
Co-Sponsored by MORS and the Homeland
Security Program at NPS

Thursday April 3, 15:00
in Glasgow 109

Modeling Bioterror Response Logistics

Professor Edward H. Kaplan
Yale School of Management

ABSTRACT

Because deterrence and counterproliferation are largely ineffective at combating terrorism, our security from a bioterror attack rests primarily on a strong logistical response. For the two most feared biological agents - smallpox and anthrax - we formulate and analyze new models to compare various response strategies. In both cases, key operational features of interventions, such as queues for tracing, vaccinating, distributing antibiotics or providing hospital care, are combined with traditional biological models - a disease transmission model for smallpox and an atmospheric dispersion model for anthrax. The use of probabilistic reasoning within an otherwise deterministic epidemic framework is featured throughout. Policy implications will be highlighted.

This is joint work with Lawrence M. Wein, Graduate School of Business, Stanford University, and David L. Craft, Operations Research Center, MIT.

Upcoming Seminar:

Wed. 4/9/03: Prof. Jack Kleijnen, Tilburg University, Netherlands

SCIENCE NEWS

THE WEEKLY NEWSMAGAZINE OF SCIENCE

after the shuttle



8XBDLJ *****AU10** 5-DIGIT 06517
0651716E130H007# SCNM497 EXP 02-05-05
RS CLAIRE INGERSOLL
ANDEN
30 DAVIS ST
EM HAVEN CT 06517-3521

THE VACCINIA DILEMMA

Smallpox shot poses modest danger, uncertain benefit

BY BEN HARDER

Consider two troubling scenarios. First, imagine that the government's current smallpox vaccination campaign peters out before even a million people are vaccinated. Then, a month or perhaps a decade from now, terrorists cause simultaneous smallpox outbreaks in several cities. Within days, cases of the once-eradicated disease pop up across the country and around the world. The epidemic burns for months and leaves many thousands dead before it's extinguished.

Here's a second possibility: Government workers vaccinate some 10 million healthcare workers, emergency responders, and citizens. A dozen of those vaccinated die of side effects, and hundreds more suffer serious life-threatening complications. Moreover, even without receiving the shot, scores of people at high risk for the vaccine's side effects become fatally infected with its live virus accidentally imparted by vaccinated friends or family members. A decade later, no smallpox epidemic has appeared, but the country is peppered with memorials to these victims of a terrorism event that never occurred.

Someday, with the luxury of hindsight, the current wrenching debate over smallpox vaccination may appear to have had an unambiguous answer. But for policy makers, health-care professionals, and other individuals who must make decisions today, the fog of alternative scenarios lies thick.

At the heart of the controversy is the uncertain likelihood that smallpox, which vanished a quarter-century ago, will reappear. "The key factor is the one factor that no one knows," says infectious-disease physician Kent A. Sepkowitz of Memorial Sloan-Kettering Cancer Center in New York.

The risk of a smallpox strike isn't the only important unknown. Others include how much mortality and illness will come with widespread public vaccination and whether, in the event of an outbreak, the protection afforded by vaccination will save more lives than the campaign itself destroys.

In spite of those uncertainties, a phalanx of researchers is developing scientifically informed recommendations on who should and shouldn't be vaccinated and when immunization should take place. The scientists' tools include hard-won knowledge from combating smallpox in the 1960s and 1970s, data from current vaccination campaigns, and mathematical models. Different approaches are yielding conflicting results. With so much potentially at stake, this politically charged issue is fanning a fiercely emotional debate.

POPULATION AT RISK British surgeon Edward Jenner launched the practice of vaccination in 1796 by using live, transmissible vaccinia or cowpox virus to protect his patients from closely related smallpox. Immunization has since become one of the safest public-health strategies. Yet because it uses a live virus, the smallpox shot is among the vaccines with the most severe side effects.

When vaccinia was widely used in the past, it caused 1 or 2 deaths and several dozen serious side effects per 1 million recipients. Those risks pale in comparison to the 20 to 40 percent of victims that smallpox infections killed.

The few deaths from the vaccine weren't evenly spread throughout the population. Vaccine-related deaths in healthy adults were "virtually unheard of," says William J. Bicknell of Boston University, a former Massachusetts state health commissioner.

However, large segments of today's population may be highly vulnerable to the worst effects vaccinia can dish out. Individuals at elevated risk include those with certain skin conditions, such as eczema, and those with suppressed immune systems, which today include people with HIV and recipients of cancer therapies or transplanted organs. People in these risk categories were few in the 1960s and 1970s during the last major smallpox vaccination campaigns.

"The certainty of harm [from preemptive mass vaccination] outweighs the small chance of a net benefit."

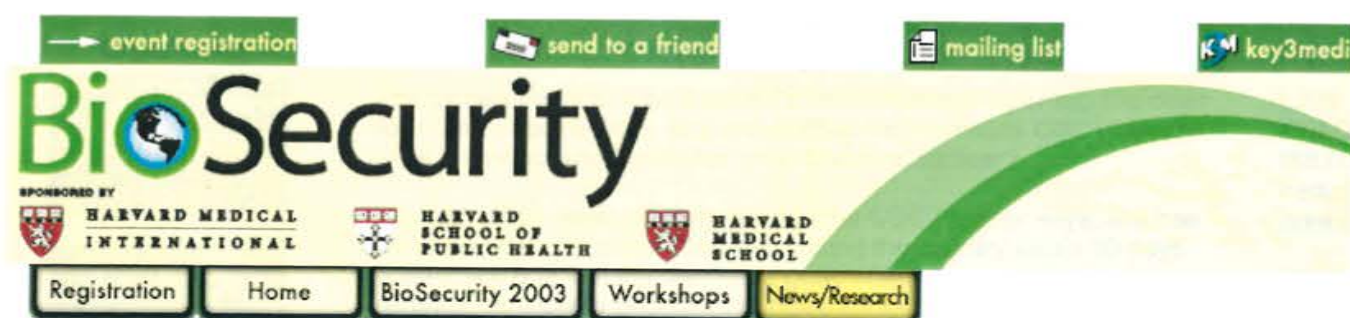
—SAMUEL A. BOZZETTE

he, John M. Neff of Children's Hospital and Regional Medical Center in Seattle, and their colleagues report that 20 to 60 cases of accidental infection occurred in the United States for every million people vaccinated. However, they predict today that the frequency would be higher, primarily because of HIV and increased incidence of eczema.

At least 125 deaths would result from vaccinating everyone in the United States, Lane and his colleague Joel Goldstein of the Children's Clinic in Morrow, Ga., estimate in the March 18 *Annals of Internal Medicine*.

Current experiences with the vaccine are consistent with a low incidence of side effects and accidental infection. The Bush administration in late January launched an effort to vaccinate initially 500,000 and as many as 10 million people. So far, the U.S. government has given vaccinia inoculations to more than 200,000 members of the armed forces and some 25,000 civilian health care workers. Ongoing monitoring indicates only a few dozen serious reactions among vaccinees and a handful of cases of secondary vaccinia infections among nonvaccinees. However, some vaccine recipients appear to have developed heart disease as a result of the shot, raising the possibility of previously unknown side effects.

Secondary transmission of vaccinia—and its health consequences—could be a considerably more serious problem in hospitals than in the general population, says Sepkowitz, who has



[About the Organizers](#) [Supporting Organizations](#) [Biosecurity Community](#) [Press Releases](#) [2002 Archive](#)

BioSecurity 2003



News/Research

- [Medical](#)
- [Intelligence](#)
- [Law Enforcement](#)
- [Legislation](#)
- [Academia](#)
- [Military](#)
- [Spending](#)
- [Business](#)

Recent Stories

- [Smallpox Compensation Deal Reached](#)
- [Smallpox plan hurting public health](#)
- [Substance Found in Train Station Was Not Ricin, French Say](#)
- [Q Fever microbe's genome is deciphered](#)
- [Experts Say SARS Has Potential to Become Major Health Threat](#)
- [Archives](#)

Supporting

Q&A: Yale's Dr. Ed Kaplan

Posted 04.22.03

Dr. Ed Kaplan is the William N. and Marie A. Beach Professor of Management Sciences at the Yale School of Management; a Professor of Public Health; Director of the school's Methodology and Biostatistics Core; and an Investigator in the Law, Policy and Ethics Core. But what Kaplan is probably best known for is showing to that a needle exchange program in New Haven, Connecticut helped limit the spread of HIV. (His findings survived reviews by the General Accounting Office, the Centers for Disease Control and Prevention, and the National Research Council.) In February 2003, Kaplan was elected to the National Academy of Engineering "for assessment of needle-exchange programs and for generally bringing engineering perspectives to the design of public health policies."

In addition, Kaplan is the Area Editor for Policy Modeling and Public Sector Operations Research at Operations Research, and on the editorial boards of the Journal of AIDS, Journal of Mathematics Applied in Medicine and Biology, and Health Care Management Science. He also served on the Institute of Medicine's Committee on HIV Prevention Strategies. Professor Kaplan is an expert in operations research and statistics who has developed novel methods for quantitatively evaluating HIV intervention programs.

You gained some notoriety for reporting that contrary to the CDC's previous ring policy, a mass vaccination program would be the best way to respond to a smallpox outbreak. For the record, why does this beat other methods?

Given that there is essentially no immunity in the country at present, and given that at the time an attack is detected, one would not know whether it was big or small (in the sense that a large versus a small number of persons were initially infected), our analysis suggests that fewer deaths would result from post-attack mass vaccination than ring vaccination. Furthermore, mass vaccination could be completed swiftly -- the time required is determined by the number of personnel available to perform the vaccinations, whereas an approach based on tracing contacts would proceed more slowly at the pace of the epidemic, since new contacts in need of vaccination would only be reported as new cases are detected. Thus, a mass vaccination program could reach a very large percentage of the population in a short period of time -- say 10 days -- whereas a tracing approach would continue for several generations. Given that the Council of Economic Advisors as estimated that a smallpox attack could cost the U.S. about \$177 billion per week, a rapid response is certainly in order.

Li

GOVE
Cente
Contri
Preve

Enviro
Protec

Feder
Manag

Nation
Health

U.S. D
Office
Prepa

U.S. F
Admir
Cente
Evalu
Resea

White

Assoc
and T
Health

Counc
Territ
Epidem

Nation
of Co
Health
Bioter
Emerg
Respo

Nation
of Loc
Health



Analyzing bioterror response logistics: the case of smallpox

Edward H. Kaplan ^{a,*}, David L. Craft ^b, Lawrence M. Wein ^c

^a *Yale School of Management, and Department of Epidemiology and Public Health, Yale School of Medicine,
Box 208200, New Haven, CT 06520-8200, USA*

^b *Operations Research Center, MIT, Cambridge, MA 02139, USA*

^c *Graduate School of Business, Stanford University, Stanford, CA 94305, USA*

Received 8 July 2002; received in revised form 16 April 2003; accepted 3 May 2003

Abstract

To evaluate existing and alternative proposals for emergency response to a deliberate smallpox attack, we embed the key operational features of such interventions into a smallpox disease transmission model. We use probabilistic reasoning within an otherwise deterministic epidemic framework to model the ‘race to trace’, i.e., attempting to trace (via the infector) and vaccinate an infected person while (s)he is still vaccine-sensitive. Our model explicitly incorporates a tracing/vaccination queue, and hence can be used as a capacity planning tool. An approximate analysis of this large (16 ODE) system yields closed-form estimates for the total number of deaths and the maximum queue length. The former estimate delineates the efficacy (i.e., accuracy) and efficiency (i.e., speed) of contact tracing, while the latter estimate reveals how congestion makes the race to trace more difficult to win, thereby causing more deaths. A probabilistic analysis is also used to find an approximate closed-form expression for the total number of deaths under mass vaccination, in terms of both the basic reproductive ratio and the vaccination capacity. We also derive approximate thresholds for initially controlling the epidemic for more general interventions that include imperfect vaccination and quarantine.
© 2003 Elsevier Inc. All rights reserved.

Keywords: Bioterror response logistics; Contact tracing; Queueing; Traced vaccination; Mass vaccination; Smallpox

1. Introduction

The threat of bioterrorism, that is, the deliberate use of viruses, bacteria, toxins, or even insects to harm civilian populations, existed before the September 11 terrorist attacks in the United

* Corresponding author. Tel.: +1-203 432 6031; fax: +1-203 432 9995.

E-mail addresses: edward.kaplan@yale.edu (E.H. Kaplan), dcraft@mit.edu (D.L. Craft), lwein@stanford.edu (L.M. Wein).

LETTERS

Letters to the Editor

Letters (~300 words) discuss material published in *Science* in the previous 6 months or issues of general interest. They can be submitted by e-mail (science_letters@aaas.org), the Web (www.letter2science.org), or regular mail (1200 New York Ave., NW, Washington, DC 20005, USA). Letters are not acknowledged upon receipt, nor are authors generally consulted before publication. Whether published in full or in part, letters are subject to editing for clarity and space.

Smallpox Bioterror Response

IN THEIR REPORT "CONTAINING BIOTERRORIST smallpox" (15 Nov., p. 1428), M. E. Halloran *et al.* state that their "structured simulator" does not produce the "two orders of magnitude difference" between the number of deaths under targeted vaccination and the number of deaths under mass vaccination that we obtained in modeling an emergency response to a smallpox attack (1). Although Halloran *et al.* attribute this finding to our use of homogeneous (or free) mixing versus their structured pattern of population interactions, the real explanation lies in the different scales of the scenarios considered: Halloran *et al.*'s scenario is one to five initial infections in a community of 2000, whereas our scenario is 1000 initial infections in a city of 10 million (1). The table (at right) compares the number of deaths per thousand that result from Halloran *et al.*'s model (as reported in the first column of Table 2 in their Report) with the number of deaths per thousand that result from our model when we supply the same model inputs used by Halloran *et al.* in their Report: a population of 2000, a single initial infection, an average of 3.2 secondary infections per initially infected person (i.e., $R_0 = 3.2$), 80% vaccination coverage, and response delays of 7, 27, and 37 days to match the detection of smallpox after the first, 15th, and 25th case, as in Halloran *et al.*

Once the models are compared on the same scale, the results are very similar. Because newly identified cases are required to trigger contact tracing, targeted vaccination proceeds with the pace of the epidemic, and the number of deaths scales with the population size, independently of the number of initial infections. By contrast, mass vaccination operates on its own timetable—10 days in the examples above—and thus the number of deaths, although dependent on how many are infected initially, is largely independent of the population size. Consequently, the ratio of deaths from targeted vaccination to mass vaccina-

tion increases with the size of the population.

The most important factor in the control of smallpox or any other contagious disease is the level of population immunity against the infectious agent. Postattack mass vaccination provides the most efficient method for rapidly increasing such immunity in the unlikely event of a smallpox bioterror attack.

EDWARD H. KAPLAN¹ AND LAWRENCE M. WEIN²

¹School of Management and School of Medicine, Yale University, New Haven CT, 06520-8200, USA.

²Graduate School of Business, Stanford University, Stanford, CA 94306, USA.

Reference

1. E. H. Kaplan, D. L. Craft, L. M. Wein, *Proc. Natl. Acad. Sci. U.S.A.* **99**, 10935 (2002) (published online 12 July 2002; 10.1073/pnas.162282799).

Comparison of results of Halloran *et al.* and Kaplan *et al.*

80% MV after:	Deaths per 1000	
	Halloran <i>et al.</i>	Kaplan <i>et al.</i> (1)
1st case	0.9	0.4
15th case	9.4	6.4
25th case	13.7	17.8
80% TV after:	Deaths per 1000	
	Halloran <i>et al.</i>	Kaplan <i>et al.</i> (1)
1st case	10.9	8.8
15th case	19.6	12.0
25th case	28.2	33.9

MV, mass vaccination; TV, targeted vaccination.

Response

WE APPRECIATE THE OPPORTUNITY TO emphasize that dynamic models are useful tools to guide and to structure our thinking, but their results should not be accepted uncritically. Kaplan and Wein demonstrate that, on a small scale under a particular scenario, the two models produce similar results. Thus, they confirm our conclusion that mass vaccination is not that much better than targeted vaccination under some circumstances. However, this does not mean that their second claim is correct. That is, in a heterogeneous population, it may not be true that with targeted vaccination, the number of deaths scales with population size, whereas with mass vaccination, it is independent of population size. When we scale up the heterogeneous model, mass vaccination will not necessarily be 200 times better than targeted vaccination, as in their results. The

complexity of the heterogeneous stochastic model precludes being certain of what will happen when it is scaled up to 10 million or more. This requires further research.

Many choices are available in scaling up the heterogeneous model, such as how to structure the interconnectivity among smaller communities and how people move among them, as well as the various attack scenarios. For example, a large, focal introduction would need to disperse among smaller communities to cause extensive geographic spread, whereas several smaller, dispersed introductions might tend to die out. The ratio of transmission attributed to close contacts versus casual contact is crucial. None of these choices are available in Kaplan *et al.*'s homogeneous mixing model (1).

Differences between the two current models could also become more manifest when scaled up. In our structured model, people know with whom they live and with whom they have close contact, such as in the schools, corresponding to reality. Thus, our simulated targeted vaccination differs essentially from Kaplan *et al.*'s simulated tracing in their homogeneous model. Even apparent similarities in the models harbor subtle differences. We set minimums followed by uniform distributions on critical epidemiologic parameters such as the latent period and the prodromal period, i.e., the period of influenza-like symptoms, whereas Kaplan *et al.* use exponential distributions. Thus, although both models have a mean latent period of 11 to 12 days, the median in ours is also 12 days, whereas in theirs it is much shorter. Thus, epidemics move more quickly in their model than in ours. Also, epidemics in homogeneous models generally move more quickly than in heterogeneous models.

Assumptions common to both models that deserve revisiting include the following: (i) that the prodromal period is the highly infectious period and (ii) that the period of postinfection sensitivity to vaccination is just 3 days. Many researchers now believe that most of the infectious period falls after the onset of recognizable rash and that postinfection sensitivity to vaccination is longer than 3 days in many people. Under these changed assumptions, both models could possibly show an improved performance of the targeted (tracing) strategy compared with mass vaccination.

Further research will reveal which aspects of the models produce particular results, laying the assumptions open to critical examination. We hope that smallpox is never reintroduced, so that we never have

American Medical Association

Physicians dedicated to the health of America

[Privacy Statement](#)[Physicians](#)[Patients](#)[Doctor Finder](#)[Join](#) | [Renew](#) | [My AMA](#) | [Site Map](#)[AMA Home](#) > [Science](#) > [CSA](#) > [CSA Reports](#)

Commentary on CSA Report 2 (I-02): "Smallpox: A Scientific Update"

by Edward H. Kaplan, PhD

[more articles](#) ▶▶ [E-Mail Story](#) [Print Story](#)

My colleagues and I believe that Council on Scientific Affairs Report 2 (I-02), "Smallpox: A Scientific Update," inaccurately portrays our smallpox disease transmission model¹ and therefore its potential validity in evaluating the relative merits of *traced* versus *mass vaccination* in the event of a smallpox bioterrorist attack in a large U.S. city.

The Kaplan model assumes that disease transmission derives from free mixing among available susceptibles and asymptomatic infectious individuals in the population, and this approach *deliberately* addresses the worst case scenario. R_0 , the reproductive rate of infection, governs the actual number of infections transmitted per infected individual. In our base case studies, this number is equal to 3, which is at the lower end of published smallpox transmission rates. In sensitivity analyses, we considered values much lower than this (and also higher values). The most important result of our model is that even if all contacts of all smallpox cases are found (ie, perfect contact tracing), the number of deaths under traced vaccination will exceed the number of deaths under mass vaccination for any reproductive number $R_0 > 2$. The advantage of mass vaccination increases as the initial number of those infected in a smallpox attack increases.

In comparing mass and traced vaccination, the CSA report argues that mass vaccination receives an unfair advantage over traced vaccination because mass vaccination does not require the time necessary to trace and locate persons. However, this is not an artifact, but rather is at the very heart of the tradeoff between mass and traced vaccination! Tracing is all about locating "higher yield" subjects to vaccinate (ie, contacts), while mass vaccination is about rapidly building the level of immunity in the population. The tradeoff is the relatively slow vaccination rate of targeted contacts versus the relatively quick vaccination of untargeted individuals. Our analysis clearly demonstrates that for large attacks, speed is more important than specificity, although for small outbreaks the reverse may well be true. Indeed, there is a fundamental difference between mass and traced vaccination that stems from response logistics.

The rate with which a population can be immunized via mass vaccination depends on the resources available. If there are sufficient personnel, the population of a city can be vaccinated in 10 days. If there are fewer, the vaccination takes longer. However, the time required to complete the operation depends on the vaccination resources available. Such is not the case for traced vaccination. With tracing, vaccination proceeds at the pace of the epidemic and requires the identification of new cases to trigger the vaccination of new contacts. The time required to complete vaccination is thus much greater than the time needed for mass



Jobs FIND / POST
Cars BUY / SELL
Real Estate BUY / RENT

News Home Page

• Nation
 National Security
 Science
 Courts
 Columns
 Search the States
 Special Reports
 Photo Galleries
 Live Online
 Nation Index
World
 Metro
 Business
 Technology
 Sports
 Style
 Education
 Travel
 Health
 Real Estate
 Home & Garden
 Food
 Live Online
 Opinion
 Weather
 Weekly Sections
 News Digest
 Classifieds
 Print Edition
 Archives
 Site Index
 Help / Feedback

Toolbox
 On the Web
 Census Information

Federal Crime Data
 Economy by Region

Stateline.org

Focus on Smallpox Threat F Experts Say Immunization Progra Security

By Ceci Connolly
 Washington Post Staff Writer
 Thursday, July 17, 2003; Page A03

National security experts inside and outside the Bush administration, fearing the president's smallpox immunization program is all but dead, have begun a major public relations campaign to inject new life into a project they describe as vital to homeland protection.

In a series of interviews and published articles, Pentagon officials, conservative thinkers and a few public health officials argue that without a sizable network of inoculated health care workers, the United States remains ill-equipped to respond to a smallpox attack. And, they contend, anxiety about the dangerous side effects of the vaccine should be quelled by the success of the military in immunizing nearly a half-million personnel with few serious complications.

"Our goal at this point should be to meet [President Bush's] plan and to vaccinate the number of people originally targeted in the health care community of

been immunized. And despite Bush's promise to make vaccine shots available to the general public this summer, Gerberding said yesterday that a new vaccine will not be ready for another year. Nearly 50,000 doses of smallpox vaccine have been discarded because the opened vials had passed their expiration dates.

All of that frightens William Bicknell and Kenneth Bloem, two smallpox experts who drafted a position paper for the libertarian Cato Institute warning that the United States has not done enough to prepare.

"We should be well on our way to protecting the nation's civilian population by vaccinating up to 10 million health, emergency and public safety workers. However, we are stalled," the pair wrote. "We call on CDC to do a far better job in publicizing the safety of vaccination for healthy adults and we call on the Bush administration to revitalize our preparations for a smallpox bioterrorist event."

The sharpest criticism of the vaccination campaign has been that Bush and his deputies failed to articulate -- and continually reinforce -- a rationale for using a vaccine known for its side effects. Though she is well-versed and plugged-in, even O'Toole said: "To this day, I don't know what the purpose was."

Some now fret that Bush's declaration that hostilities in Iraq have ended left the mistaken impression there is no longer a threat.

"We know that the former Soviet Union had large quantities of weaponized smallpox or smallpox that could be used in an offensive manner," Winkenwerder said. "All of those stores are not accounted for, to our knowledge."

He and Army Col. John D. Grabenstein, a physician overseeing Pentagon vaccinations, published an article in the Journal of the American Medical Association detailing the results of the military program in an attempt to encourage participation in the civilian program.

"It is our hope and desire that in relating our experience to the broad general public the point can be made that what we accomplished can be accomplished by others in the civilian sector," he said. "There is nothing unique in what we did."

The CDC calculated last year that it would take 1.25 million immunized health workers to run enough emergency clinics to immunize the U.S. population within 10 days in the event of an attack. Yale University professor Edward Kaplan said he has seen no evidence the country is near that capability.

"If you believe it's a serious threat -- and plenty of credible folks do believe it is a threat -- then it makes sense to be ready to push the button" on mass immunization, Kaplan said. "We are not in a position to



VIEWS

[Sign up to be a FOX Fan](#)

FNC SHOWS
TOP STORIES
POLITICS
BUSINESS
FOXLIFE
VIEWS
FOX POLLS
WEATHER
FOX SPORTS

SEARCH
GO Today's Features
JOB SEARCH
REAL ESTATE
O'REILLY FACTOR
CREDIT REPORTS
FOX Fans Log on Here or Register Now.

CATO

The Citizen as First Responder

[RESPOND TO EDITOR](#)
[EMAIL THIS ARTICLE](#)
[PRINTER FRIENDLY](#)
[BECOME A FOX FAN](#)

Wednesday, August 13, 2003

By Edward H. Kaplan, William J. Bicknell, and Lawrence M. Wein

FOX NEWS

Defending against bioterror ([search](#))--the deliberate release of biological agents such as anthrax, botulism, plague, ricin, or smallpox with intent to kill--is not an easy task. The damage caused by such an event depends upon the time required to distribute antibiotics ([search](#)), medicines or vaccines ([search](#)) to the affected population--the faster the better.

ADVERTISEMENT

[Complete survey for a chance to WIN a Flat Screen TV!](#)

I smoke cigarettes:

☒ Yes ☐ No

I'm 21 or older

☒ Yes ☐ No

How many TV's do I own:

☐ One

☐ Two

☐ Three+

SUBMIT

Yet, although our security today rests with government's ability to respond quickly to a bioterror event, unfortunately, current bioterror preparedness plans in the United States fail to recognize how crucial rapid response ([search](#)) can be.

Take anthrax ([search](#)), for example. While plans exist to ship medications from the strategic national pharmaceutical stockpile to any location required within 6-12 hours, as many as four additional days could be required to get pills into people's mouths. Now consider that an airborne release of just 1 kilogram of weapons-grade anthrax in a large city could infect 1.5 million people. Even if the attack were recognized as soon as the first symptomatic cases occur, the call to the national stockpile would not happen until two days after the attack. From this point, each additional day of delay in distributing the required antibiotics to the population would cost an additional 10,000 lives.

Smallpox ([search](#)) is another case. The time from infection until a physician might suspect smallpox could span 15 to 20 days, while confirming the diagnosis in the laboratory and beginning vaccination adds another day or two. Vaccination would be too late to prevent any first generation cases, but could, if implemented rapidly, prevent some second generation cases and most third generation cases, controlling the outbreak within a month. However, such rapid vaccination is only possible if a sufficient number of already vaccinated personnel are ready to respond immediately upon the detection of the attack. With only 36,000 doctors and nurses immunized thus far in the current smallpox vaccination plan ([search](#)), we are far from a comfortable state of readiness.

The question is, what do we do until better plans for bioterror preparedness and protection are created, and how to make them as bulletproof as possible?

A new approach is needed. Consistent with the principles of robustness and

RELATED INFORMATION

[CATO Archive](#)

[Views Home](#)

COMING UP ON FNC

FOX Fan Central

FREE online video is waiting for you at FOX Fan Central. Sign up now!

[FNC Schedule](#)

20

DECISION MAKING FOR BIOTERROR PREPAREDNESS: EXAMPLES FROM SMALLPOX VACCINATION POLICY

Edward H. Kaplan¹ and Lawrence M. Wein²

¹ Yale School of Management, and
Department of Epidemiology and Public Health, Yale School of Medicine
Yale University
New Haven, CT 06520

² Graduate School of Business
Stanford University
Stanford, CA 94306

SITUATIONAL AWARENESS IN A BIOTERROR ATTACK VIA PROBABILITY MODELING

Edward H. Kaplan

William N and Marie A Beach Professor of Management Sciences

Yale School of Management

Professor of Public Health

Yale School of Medicine

Professor of Engineering

Yale Faculty of Engineering

Johan Walden

Assistant Professor of Finance

Haas School of Business

University of California, Berkeley

1. Introduction

Following the events of September 11, 2001 and the subsequent anthrax mailings in the United States, the threat posed by bioterrorism has received renewed attention by governments across the globe. Though no large-scale attacks have occurred as of the date of this writing, several scenarios have been studied in detail, including deliberate releases of smallpox [1, 2], anthrax [3], plague [4], and botulinum [5], among others. While the specifics of these scenarios differ in terms of the dispersion mechanisms of the infectious agents and the resulting casualties that could result, all such analyses emphasize the importance of early detection and rapid response in mitigating the consequences of a bioterror attack.

There have been many different suggestions to detect a bioterror attack, ranging from the use of biosensors [6] to syndromic surveillance [7], to screening blood donors [8], to case identification. Once an attack has been detected and the agent has been identified, however, the key concerns become establishing the scale of the attack and forecasting how casualties will emerge over time. Such forecasts can guide the allocation of response resources; for example, is it necessary to add "surge capacity" to hospitals in the impacted area or are existing facilities adequate for expected caseloads. The real-time aspect of this approach enables rapid reassessment