Correction: Strategic biodefense: A call to reinvent the hospital ship
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Forum

Due to a technical printing error, the last portion of the article below was not printed in the Jan-Feb '02 issue. We have reprinted the entire article here and encourage all to reread it with the missing portion. We apologize for the error.

Strategic Biodefense
A Call to Reinvent The Hospital Ship

Over the past few years, *Navy Medicine* has been host to a refreshingly wide-ranging and frank debate about future hospital ship development.(*1, 2*) Unfortunately, an important issue, the potential role of hospital ships in biological defense, was overlooked. Do hospital ships have a place on the biological battlefield?

Serious biodefense challenges loom on the horizon. By changing the traditional role of Navy medicine and promptly reinvigorating the somewhat tired "hospital ship" concept, the Navy has an opportunity to accelerate development of viable large-scale biowarfare defenses.

Though present day illicit biological agents are, for the most part, an array of balky, relatively ineffective "prestige" terror weapons, new technologies and the proliferation of technical expertise make development of increasingly lethal second-generation bioweapon delivery systems a viable option for several countries and non-state entities. Both infectious and non-infectious bioweapons have proliferated, and some infectious microbes, weaponized through illegal, clandestine research, have gained strategic utility as asymmetric, destabilizing tools.(*3*) The Navy has an opportunity and obligation to serve on the biodefense front line, protecting America from germs manipulated to serve as strategic weapons.

Today, America's primary floating medical assets, the *Mercy* class hospital ships (T-AH 19 and T-AH 20), are well-equipped trauma facilities but poor disease-fighting platforms. A few other highly capable, multi-mission ships have the ability to confront basic, first-generation bioweapons, but consignment of these ships to biodefense duty may threaten the integrity of Marine amphibious units. The time has come to develop a class of small, simple ships dedicated to biodefense. A set of public health platforms, focused on fighting disease, can fill an emerging defensive niche and, in addition, supplement America's floating trauma-based medical care infrastructure.

If challenged by an infectious disease crisis, the Navy's two hospital ships, USNS *Mercy* (T-AH 19) and *Comfort* (T-AH 20) can offer relatively little to stricken communities. Design shortcomings and biodefense-related vulnerabilities, evident since the Gulf War, plague the *Mercy* class and limit the utility of these enormous floating hospitals. In 1998, Pietro Marghella summarized several problems, and his searing *U.S. Naval Institute Proceedings* hospital ship review, entitled, "Replacing the Great White Elephants with LSTs" prompting a variety of improvements.(*4*) Small isolation units and other biodefense-related modifications were added to the hospital ships, but the *Mercy* class remains an imperfect medical asset on the biological battlefield.(*5*) Accidental or unknowing admission of infectious or infected casualties to bunks outside the tiny isolation wards poses a particular risk to patients and the large crew required to staff *Mercy* class hospital ships.(*6*) The Navy needs better tools to confront infectious biological agents.

Biodefense requires easily utilizable equipment and flexible doctrine. Widely dispersed, active duty disease fighting assets only make a good foundation for large-scale biodefenses if they are permitted to engage emergent disease problems. As diseases become increasingly effective strategic tools, Navy medicine must peer beyond limited tactical issues like battlefield trauma care, local force protection and medical infrastructure management to consider a larger and rather ambitious defensive role. The Navy, if interested in biodefense, can help protect the continental United States by supporting prompt, worldwide disease detection and control. This concept, strategic biological defense, needs a champion in Navy medicine and support from the larger

national security community. Departure from the traditional, behind-the-scenes support role of Navy medicine may prove difficult, but a struggle for a flexible set of forward-deployed biomedical defense elements, coupled with a vigorous effort to change the strategic role of Navy medicine will, over the long term, make America a stronger and safer nation.

Smaller, less complex, "street fighting" hospital ships, if used aggressively, can confront asymmetric biowarfare by supporting two simple disease control tactics: disease detection and prompt disease containment. For the Navy, these defensive approaches are problematic since disease detection and disease control responsibilities are dominated by non-military public health and policy organizations.

Both civilian and military actors recognize that community-wide disease control failures have major strategic consequences, yet traditionalists on either side are discomfited at the prospect of enhancing civil-military collaboration. Terrorists and other entities interested in developing infectious biological weaponry will try to exploit the vulnerable "seams" that are exposed by cultural gaps and bureaucratic turf battles. Unless civilian and military groups agree to overcome their animosities, the all-to-hesitant and, at this point, relatively inadequate efforts at implementing joint civil-military disease control operations will only encourage biological adventurers. A new type of hospital ship, built to serve a biodefense role, can, at a minimum, act as an incubator to test what will certainly be a contentious evolution toward enhanced civil-military partnerships.

By departing from the established, trauma-based "hospital ship" concept and embracing a public health or disease control orientation, the Navy will be better prepared to confront a future rife with asymmetric conflict. A ship built for the biological battlefield requires few of the expensive features necessary for survival on an "overt" front line; biological agents are primarily tools of a more subtle and crafty way of fighting war. Dedicating a large, complex ship like the *San Antonio* Class (LPD- 17), or committing portions of a Marine Expeditionary Unit (MEU) to biodefense duties during peacetime is a good idea, but those ships and personnel are tasked to serve and survive relatively conventional, overt conflicts. These important resources will likely be needed elsewhere during disease crises.

A set of small, economical ships dedicated to biodefense is a sensible option. First, a specialized biodefense ship gains a measure of tactical flexibility. After the USS *Cole* disaster, few political or military leaders will risk exposing transport and supplies for a large Marine contingent to an uncontrolled, complex harbor environment. At the moment, even vague indications of terrorist activity suffice to rush large, strategically important ships to the open sea. An inexpensive, less sophisticated, and smaller disease control ship is a much lower-profile terrorist target, and even a successful terrorist attack is unlikely to have immediate national security ramifications. Second, a handful of very tightly focused, specialized personnel, modeled after Centers for Disease Control and Prevention Epidemic Intelligence Service teams, can move faster, offer more substantial assistance, and be less vulnerable during disease emergencies than a relatively unspecialized group of combat-ready Marines. MEUs might be useful to handle problems ignited by grave, out-of-control disease outbreaks, but as a tripwire mechanism to quickly bolster local disease fighting "first-responders," Marine combat units are a poor choice.

Some biodefense advocates envision using pre-deployed land-based or airborne assets as a means to quickly examine and evaluate disease outbreaks. Though those options initially appear economical and quite capable, a ship-based laboratory and logistical facility provides added flexibility during what will be, in most cases, a delicate diplomatic situation and a deteriorating operating environment. Permanent disease monitoring centers are "soft targets," vulnerable to social unrest or political disturbances.(7) Admittedly, Navy Medical Research Units are incredibly valuable facilities, but potential interruption of regional disease monitoring, epidemiological consulting efforts and the limiting of laboratory use is unacceptable, especially during crises that offer perfect cover or justification for the dissemination of infectious disease weapons. Airborne disease control assets are both faster to deploy and necessary for inland regions, but their insertion requires extensive interaction with a host government, a government that may be unwilling or unable to respond quickly during a biotech crisis.

A ship is an interesting compromise. By offering safe, relatively robust laboratory facilities, supportive medical care and basic tactical intel-

ligence, forward deployed biodefense ships permit in-depth and vigorous action by disease-fighting "first-responders," be they local medical providers, Centers for Disease Control and Prevention investigators, or non-governmental disease control organizations. Disease fighters are usually at the end of a very long, tenuous, and fragmented biomedical support chain. They will, as bioweapons enter more and more arsenals, need the extra assistance.

What type of ship can serve in a biodefense capacity? A version of Australia's inexpensive High Speed Vessel (HSV) might be a robust yet relatively frugal starting point for design discussions.(*8*) Ambitious, longer-term solutions might evolve from the trimaran R/V *Triton* or from ultra-stable, small-waterplane-area-twin-hull (SWATH) ships.(9, *10*) Any basic, small-crew, high-endurance platform, able to operate for long periods in unimproved harbors will make a good foundation for a new class of disease control ships. Coupled with a well-appointed, possibly modular research lab/infectious disease hospital and some modest amphibian, helicopter, and UAV capabilities, a rapidly arriving disease control support craft can direct a pulse of aid and information to struggling local doctors, epidemiologists, or other disease control teams. A medical ship can securely coordinate needed logistics and communications for further deployment of disease fighting personnel, or, perhaps, elements of a larger security force. Even limited assistance delivered in a timely fashion to key local medical leaders or crucial facilities can go a long way toward hardening local public health infrastructure and halting small, nearby disease outbreaks.

Would a set of disease control ships fit into America's fledgling biodefense efforts? Who knows? Homeland Defense, a still-evolving defensive concept, focuses upon protecting the U.S. mainland from asymmetric threats. Though a valuable initiative, Homeland Defense is inwardly focused, and, given the panic over Anthrax-laced mail and the prospect of more terrorist activity, hurried efforts to implement domestic security programs may drain resources and even hinder efforts to create effective, forward deployed, strategic biodefenses. America needs an overseas biodefense element; diseases, thanks to global trade links, better transport and high international travel rates, can easily "escape" from far-off battlefields, illicit bioweapon laboratories, or even tiny, isolated villages and spread into naive, vulnerable population centers. The Navy, by developing and supporting forward deployed, active duty disease control assets, can supplement control efforts abroad before a disease grows into an imminent threat to the continental United States. Stopping a fulminating, raging epidemic at the border is a much more risky, difficult, and costly endeavor than the alternative, containing isolated disease outbreaks overseas. Such efforts are also useful in advancing long-term disease control strategies that may, in the future, prove valuable to America.

In a world where natural disease events and acts of war are increasingly indistinguishable, the ability to rapidly project substantial medical and scientific support into the littorals will prove a useful resource. The stakes are high. Experts from a disease control ship can help soothe panicked command and control elements during a disease crisis; in certain nuclear-armed countries like Pakistan or India, the attendant confusion and social disruption might easily spark a miscalculation and, potentially, an unwarranted nuclear response. As fear of biowarfare grows, biodefense ships might serve to assure potentially targeted countries and even deter biotech attackers. Asymmetric efforts to disrupt America's far-flung logistical, intelligence, and alliance base can occur at any moment, diverting attention before an overt crisis or entangling operations after hostilities commence. The realistic economic, political and military consequences of infectious bioweaponry used overseas pose an often un-discussed, un-publicized and under-appreciated strategic threat that America, reeling from domestic bio-assault, can ill afford to ignore.

"Consequence management" is the obvious mission for sea-borne assets detailed to strategic biological defense. Most littoral regions of interest to the Navy already over-extend their medical resources and are unlikely to successfully undertake large-scale, rapid, and coordinated disease identification and control efforts. The heavily urbanized littorals are a particular problem; these regions are likely targets for epidemics, natural and intentional alike, and the possibility for rapid international dissemination is quite high. The occasional crisis response mission, however, is only a single, albeit high-profile facet of strategic biological defense. The real defensive contribution, quite simply, stems from routine and unexcit-

ing public health tasks. Every deployment and each regular biodefense patrol offers an opportunity to help emphasize and note glaring public health and other economically important crop-based or livestock-based disease-detection deficiencies before a real crisis strikes.

One routine biodefense task is disease tracking. Biotech crisis response will work only if biological threats are rapidly detected and assessed. Infectious diseases and other biological weaponry, unlike conventional strategic dangers, are somewhat difficult to monitor from afar without a strong regional and global disease-monitoring infrastructure. Maintaining high quality, military grade disease "surveillance," or disease monitoring, is a tedious, hands-on endeavor—local doctors, veterinarians and others need to know where, how, and when to report suspicious outbreaks. The work is unglamorous and repetitive, but encouraging this sort of cooperation on both national and regional levels is important; without better disease detection efforts, diseases will be tough to control.

Disease monitoring is a high-maintenance affair. Even the best disease surveillance system withers without constant encouragement and tending. Regular port visits are ideal opportunities to invigorate disease surveillance activities by permitting regional medical providers and disease control experts to mix and train with their American counterparts. This personal contact is critical because good disease surveillance is founded upon strong, slow-to-develop personal and professional relationships. Informal contacts are valuable too. The recent domestic outbreak of West Nile virus, for example, graphically demonstrated that personal relationships often circumvent and bypass bureaucratic logjams inherent in centralized and nationalized disease surveillance. The existence of West Nile in America was only confirmed after concerns raised by Tracy McNamara, a civilian veterinary pathologist, were spurned by civilian agencies. She turned to acquaintances at a military research institution, and, after a few days, her hunch, backed by concrete laboratory data, forced public health agencies to recognize that West Nile virus had reached the United States.(*11*) A single, persistent doctor or veterinarian, if given a means to contact a well-equipped American peer, can accelerate disease recognition and jump-start outbreak control efforts.

The conventional warrior has several reasons to question strategic biodefense. The first and most trivial point is ideological; the idea that military personnel are to fight in the "traditional" fashion is seductive, and the belief that military medicine must solely serve warfighters remains pervasive. The second grows from fallout over the looming anti-terrorism campaign. Terrorist threats only encourage a risk-averse and hard-pressed Navy to foster a much lower overseas profile. Far-flung medical missions, primed, in most cases, to intervene before a disease outbreak becomes an imminent, obvious threat might be considered an overly risky and inappropriate use of military personnel. Finally, the political complexities of crafting a cohesive biodefense strategy are daunting; too many players are fighting for a role in what will probably become a multi-agency, multi-country, civil-military ballet, or, depending on the point of view, a multi-agency, multi-country, civil-military quagmire.

Most concerns can be met. Clausewitz, the great military philosopher whose tome, *On War,* graces the bookshelves of many professional career officers, stands as a grim reminder that military forces have a history of fighting disease threats. Long before public health emerged as a discipline and before infectious disease epidemiology was invented, the military was called to confront disease and community-wide public health failures. Clausewitz himself was an early and fatal casualty of a poorly planned, static version of homeland defense. Sent to stop a cholera epidemic from crossing the German border, Clausewitz, on 16 November 1831, lost his life after a 24-hour struggle with the very disease he was ordered to defeat.(*12*)

Soldiers and Sailors traditionally fought disease threats by promoting public health and sanitation initiatives. Only after antibiotics and vaccines began to insulate warriors from the scourge of infectious disease did the importance of military sanitarians and public health specialists fade. Basic public health practice has atrophied; on the biological battlefield, practitioners of these seemingly archaic disciplines must recover their place as an important component of military medicine.

The military has, through past public health efforts, earned a long, rich disease control legacy, a legacy that is under-appreciated and has fallen into disrepair. Like hospital ship doctrine, this forgotten legacy needs reinvigoration outside the pages of

"trade" publications like *Navy Medicine*.

Failure to promptly embrace and publicize the American military's public health legacy will only serve to compromise future domestic civil-military disease control initiatives, and, in turn, complicate efforts to spark overseas cooperation with disease surveillance projects. Time is short. As disease outbreak detection and response becomes a national defense concern for an increasing number of countries, the American government will encounter great difficulty encouraging international disease control cooperation. By acting now, the Navy can help cement fledgling international disease control alliances and support American biosecurity for decades to come.

There are other, less tangible benefits to reinvigorating Navy-based public health resources. Medical missions are great image-makers; disease control drills and public health coordination exercises pay large foreign policy dividends. During the 5-day Edged Mallet '99 exercise at Mombassa, Kenya, American and local Kenyan personnel treated over 1,300 patients at the Port Reitz Chest and Infectious Disease Hospital.(*13*) What better and more cost-effective way to defuse seething anti-American resentments and stymie terrorist efforts to prey on anti-Western sentiment? Medical care and public health infrastructure support can become the new, 21-century "candy bar" and be used by the Navy and Marine Corps to strengthen bonds of international goodwill, build an image, and burnish a legacy.

One caveat remains unanswered. Biodefense remains a complex, multifaceted, and thankless task rife with political risks, interagency conflict and even possible constitutional entanglements. That said, domestic homeland-oriented biodefenses are likely to be even more contentious and difficult to implement than overseas biodefense efforts. The Navy and Marine Corps can sidestep these domestic difficulties, and, by testing different collaborative structures or disease monitoring schemes overseas, become key players as strategic biodefenses are gradually integrated with homeland defense efforts. No agency or bureau can counter the bioweapon threat alone, but the Navy, by redefining and re-engineering the traditional hospital ship role, can begin building a collaborative foundation for a cohesive, in-depth national biodefense strategy. These newly strategic weapons force strategic, large-scale defensive responses.

Biological weapons are weapons of the future; Navy medicine requires better tools and tactics to protect fighters and civilians from this emerging defense challenge. A new strategic framework, coupled with a reinvigorated sense of mission is no final answer, but merely a first step in confronting future biotech arsenals. The role of Navy medicine is changing and this evolution requires aggressive and novel "think-out-of-the-box" approaches. A new, "street-fighting" hospital ship is just one of many ways Navy medicine can help engage emerging biotech threats. By contacting local actors, probing the nearby disease fighting infrastructure, and determining likely communications and logistical support needs, simple hospital/disease oriented ships and medical personnel can leave behind an under-appreciated, rarely utilized role as solely "crisis-oriented" white elephants to become effective defensive assets.

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