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NAVAL MEDICAL SURVEILLANCE REPORT

N M S R

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Data in the NMSR are provisional, based on reports and other sources of data available to the Navy Environmental Health Center. Notifiable conditions are classified by date of report. Only cases submitted as confirmed are included.

COMMUNICABLE DISEASE

EPIDEMIOLOGY – WHO NEEDS IT?

Jay M. Fleisher, Ph.D.
Navy Environmental Health Center, Norfolk, VA

The classical definition of epidemiology goes something like this: "Epidemiology is the study of the occurrence and distribution of disease and other health related conditions in populations." Although technically correct, such a definition really never really told me very much about what epidemiology really is or what it is that the epidemiologist does in the real world. Basically epidemiology is a set of tools used to study the occurrence, distribution and/or cause of disease. Epidemiology is not a basic science. We learn much about disease through the basic sciences by conducting animal and other laboratory experiments. A laboratory experiment using animals for instance can control for most factors in the environment in which the animals are contained. Further, one can conduct experiments directly on animals. When studying most of the diseases that effect humans however, we can neither control for the many environmental factors that vary between human subjects, and obvious ethical considerations prohibit direct human experimentation. Epidemiology provides us with a set of methods with which we can minimize various sources of bias that can arise from our failure to control for all the factors that are normally controlled for in a true laboratory experiment.

Epidemiology in the Navy today has two major functions: 1) Descriptive Epidemiology, which in the Navy means surveillance; 2) Analytical Epidemiology, which involves the use of various study designs to identify risk factors for disease, ailments or injuries and to develop and test appropriate preventive measures.

SURVEILLANCE: The modern concept of surveillance dates back to the late 1600's when a physician named von Leibnitz called for the recording of mortality reports for use in health planning. It wasn't until the mid to late 19th century that methods of formal data analysis and interpretation with the results disseminated to policy makers in England and Wales, moved data collection from beyond the role of merely archiving information to that of public health advocacy. In the late 19th and early 20th centuries health authorities began to require physicians to report specific communicable diseases to enable local prevention and control activities, such as quarantine measures. Eventually local reporting activities coalesced into broader systems on the local, state, and even national levels. Thus the term "surveillance" was born. Surveillance activities gradually became more refined in response to specific information needs. For example, in the late 1940's concern was raised that malaria was being over reported in the southern states. This led to the requirement that case reports be confirmed before submission. Aside from showing that malaria was indeed being over reported and was really no longer endemic in the southern United States, it led to the development of more improved and refined

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Submissions and inquiries regarding content or material to be considered for publication should be directed to the Editor, Naval Medical Surveillance Report, Navy Environmental Health Center, Preventive Medicine Directorate, 2510 Walmer Ave., Norfolk, VA 23513-2617. E-mail washburnb@nehc.med.navy.mil. To be added to the mailing list, contact the Navy Environmental Health Center at DSN 253-5603, Comm: (757) 462-5603

surveillance systems within the United States. Today, the U.S. Navy routinely uses sophisticated surveillance systems to identify broad areas of deployment health concerns ranging from outbreaks of infectious illness, to identification of biological weapon threats, to injury prevention. Data gathered from these surveillance activities are analyzed with an eye toward developing appropriate interventions where needed and also serve to formulate hypotheses in regard to emerging health threats within the Navy to be evaluated using analytical epidemiology.

ANALYTICAL EPIDEMIOLOGY:

Historically, analytical epidemiology was initially concerned with providing a methodological basis for the study and control of population epidemics. In this context epidemiology can be viewed as an opportunistic discipline. Since it is usually unethical to conduct experiments on human subjects, epidemiologic methods historically relied on what is termed a " Natural Experiment." Simply put a natural experiment is a group of circumstances that occur without any intervention by the investigator but can be manipulated by the investigator to study disease etiology. Since the investigator cannot assign exposure to human study subjects in natural experiments, he/she must rely on the only remaining element of the natural study available for use, the selection of study subjects. By far the most renowned example, the prototype of all natural experiments and thus of all analytical epidemiology, is the elegant study of cholera in London conducted by John Snow in 1860.

In London during the mid – nineteenth century, there were several water companies that piped drinking water to residents of London. Snow took advantage of a "naturally" occurring situation in the study of cholera. Snow observed that there were two different and separate sources of drinking water supplying London; one source, the Southwark and Vauxhall Company, pumped impure Thames River water contaminated with domestic sewage while the other source, the Lambeth Company, supplied water free of sewage contamination. As Snow described it:

> …The intermixing of the water supply of the Southwark and Vauxhall Company, with that of the Lambeth Company, over an extensive part of London, admitted of the subject being sifted in such a way as to yield the most incontrovertible proof on one side or the other. In the sub districts supplied by both companies, the mixing of the supply is of the most intimate kind. The pipes of each company go down all the streets, and into nearly all the courts and alleys. A few houses are supplied by one company and a few by the other, according to the decision of the owner or occupier at the time when the Water Companies were in active competition. In many cases a single house has a supply different from that on either side. Each company supplies both rich and poor, both large houses and small; there is no difference in either the condition or occupation of the persons receiving the water of the different companies. It is obvious that no experiment could have been devised which would more thoroughly test the effect of water supply on the progress of cholera than this. The experiment, too, was on the grandest scale. No fewer than 300,000 people of both sexes, of every age and occupation, and of every rank and station, from gentle folks down to the very poor, were divided into two groups without their choice, and, in most cases, without their knowledge; one group being supplied with water containing the sewage of London, and amongst it, whatever might have come from the cholera patients, the other group having water quite free from impurity. To turn this experiment to account, all that was required was to learn the supply of water to each individual house where a fatal attack of cholera might occur…

By comparing rates of cholera mortality among households that differed in water supply, Snow was able to link cholera mortality to the contaminated source of drinking water (and as we now know, indirectly to the underlying pathogen). Snow, a truly 'take action sort of guy" simply removed the handle to the pump and watched the epidemic subside. He then obtained the necessary permission to have the well shut down.

(Cont. on page 6)

NAVY DISEASE REPORTING SYSTEM (NDRS)

SUMMARY OF 2000 DATA

Tables 1 and 2 display the Medical Event Reports (MERs) received at Navy Environmental Health Center (NEHC) as of 30 Sep 2000. Interested readers may calculate rates by dividing the frequencies by estimated mid-year strength of 373,193 for USN and 173,321 for USMC. Table 1 shows active duty only. Table 2 shows non active duty beneficiaries.

Table 1. Reportable Medical Events, Combined Navy & Marine Corps Active Duty, Case Frequencies, 1 Jan - 30 Sep, 2000

Disease	Total	USN	USMC	Disease	Total	USN	USMC
Amebiasis*	2	2	0	Lyme Disease	5	4	1
Anthrax*	0	0	0	Malaria (specify type) *1	5	2	3
Biological warfare agent exposure	0	0	0	Measles*	0	0	0
Bites, rabies vaccine & human rabies immune	6	2	4	Meningitis (aseptic, viral)	6	0	6
Bites, venomous animal	1	0	1	Meningitis (bacterial other than Meningococcus)	9	9	0
Botulism*	2	2	0	Meningococcal disease*	0	0	0
Brucellosis	0	0	0	Mumps	1	1	0
Campylobacteriosis*	3	2	1	Occupational exposure to blood borne pathogens	12	12	0
Carbon Monoxide poisoning*	0	0	0	Onchocerciasis	0	0	0
Chemical warfare agent exposure	0	0	0	Pertussis*	0	0	0
Chlamydia	912	463	449	Plague*	0	0	0
Cholera	0	0	0	Pneumococcal pneumonia	1	1	0
Coccidioidomycosis	1	0	1	Poliomyelitis*	0	0	0
Cold injuries	0	0	0	Psittacosis (Ornithosis)	0	0	0
Cryptosporidiosis*	0	0	0	Q Fever*	0	0	0
Cyclospora*	0	0	0	Rabies, clinical human*	0	0	0
Dengue fever*	0	0	0	Relapsing fever	0	0	0
Diphtheria	0	0	0	Rift Valley fever	0	0	0
E. Coli 0157:H7 infection*	2	2	0	Rocky-Mountain Spotted Fever	2	2	0
Ehrlichiosis	0	0	0	Rubella*	0	0	0
Encephalitis*	0	0	0	Salmonellosis*	9	6	3
Filariasis	0	0	0	Schistosomiasis	0	0	0
Giardiasis	9	9	0	Shigellosis*	0	0	0
Gonorrhea	280	177	103	Smallpox*	0	0	0
Haemophilus influenza, type b	0	0	0	Streptococcal disease, Group A	3	2	1
Hantavirus infection*	1	1	0	Syphilis	10	10	0
Heat injuries	12	3	9	Tetanus	1	1	0
Hemorrhagic fever*	0	0	0	Toxic shock syndrome	0	0	0
Hepatitis, A (acute, symptomatic only)	0	0	0	Trichinosis	0	0	0
Hepatitis, B (acute, symptomatic only)	11	4	7	Trypanosomiasis	0	0	0
Hepatitis, C (acute, symptomatic only)	3	0	3	Tuberculosis, pulmonary active*	4	4	0
Influenza (confirmed)	0	0	0	Tularemia*	0	0	0
Lead poisoning	0	0	0	Typhoid fever*	0	0	0
Legionellosis*	0	0	0	Typhus*	0	0	0
Leishmaniasis	0	0	0	Urethritis (non gonococcal)	234	40	194
Leprosy (Hansen's disease)	0	0	0	Varicella	10	7	3
Leptospirosis*	0	0	0	Yellow fever	0	0	0
Listeriosis	0	0	0				

*Reportable within 24 hours

Table 1. Reportable Medical Events, Combined Navy & Marine Corps Beneficiaries, Case Frequencies, 1 Jan - 30 Sep, 2000

Disease	Total	USN	USMC	Disease	Total	USN	USMC
Amebiasis*	0	0	0	Lyme Disease	9	4	5
Anthrax*	0	0	0	Malaria	0	0	0
Biological warf are agent exposure	0	0	0	Measles*	0	0	1
Bites, rabies vaccine & human rabies immune	3	2	1	Meningitis (aseptic, viral)	18	10	8
Bites, venomous animal	0	0	0	Meningitis (bacterial other than Meningococcus)	5	3	2
Botulism*	0	0	0	Meningococcal disease*	0	0	0
Brucellosis	0	0	0	Mumps	1	1	0
Campylobacteriosis*	10	8	2	Occupational exposure to blood borne pathogens	0	0	0
Carbon Monoxide poisoning*	0	0	0	Onchocerciasis	0	0	0
Chemical warfare agent exposure	0	0	0	Pertussis*	1	1	0
Chlamydia	289	161	128	Plague*	0	0	0
Cholera	0	0	0	Pneumococcal pneumonia	5	4	0
Coccidioidomycosis	2	2	0	Poliomyelitis	0	0	0
Cold injuries	0	0	0	Psittacosis (Ornithosis)	0	0	0
Cryptosporidiosis*	0	0	0	Q Fever*	0	0	0
Cyclospora*	0	0	0	Rabies, clinical human*	0	0	0
Dengue fever*	0	0	0	Relapsing fever	0	0	0
Diphtheria	0	0	0	Rift Valley fever	0	0	0
E. Coli 0157:H7 infection*	1	1	0	Rocky-Mountain Spotted Fever	0	0	0
Ehrlichiosis	0	0	0	Rubella*	3	3	0
Encephalitis*	0	0	0	Salmonellosis*	34	28	6
Filariasis	0	0	0	Schistosomiasis	0	0	0
Giardiasis	0	0	0	Shigellosis*	1	1	0
Gonorrhea	6	6	0	Smallpox*	0	0	0
Haemophilus influenza, type b	12	10	2	Streptococcal disease, Group A	0	0	0
Hantavirus infection*	0	0	0	Syphilis	0	0	0
Heat injuries	0	0	0	Tetanus	0	0	0
Hemorrhagic fever*	0	0	0	Toxic shock syndrome	0	0	0
Hepatitis, A (acute, symptomatic only)	2	1	1	Trichinosis	0	0	0
Hepatitis, B (acute, symptomatic only)	0	0	0	Trypanosomiasis	3	2	1
Hepatitis, C (acute, symptomatic only)	0	0	0	Tuberculosis, pulmonary active*	3	1	2
Influenza (confirmed)	1	1	0	Tularemia*	0	0	0
Lead poisoning	0	0	0	Typhoid fever*	1	1	0
Legionellosis*	0	0	0	Typhus*	0	0	0
Leishmaniasis	0	0	0	Urethritis (non gonococcal)	0	0	0
Leprosy (Hansen's disease)	0	0	0	Varicella	0	0	0
Leptospirosis*	0	0	0	Yellow fever*	0	0	0
Listeriosis	0	0	0				

*Reportable within 24 hours

Editor's Note: *The reason for the high increase in number of Chlamydia, Gonorrhea, and Urethritis compared to the previous reporting period was due to a delay in receipt of Medical Event Reports*.

(Cont. from page 3)

Perhaps of greater importance lies in the very nature of Snow's natural experiment, for it laid the foundation for all of today's methods used in the Analytic Epidemiological Studies. Today, with the advent of powerful computers, sophisticated statistical methods, and refinements of epidemiological study designs, we have vastly improved upon the basic foundation laid down by Snow back in 1860. The basic concept however, remains the same: to study illness using a good measure of scientific rigor and common sense supplemented by today's "bag full" of sophisticated epidemiological and statistical tools, to overcome the inevitable bias caused by our inability to conduct true human experiments.

Today's Navy has benefited enormously through the marriage of the use of sophisticated surveillance of both infectious and noninfectious illness with the application of sophisticated analytical epidemiologic techniques to continue to identify risk factors for diseases, the type of ailments or injuries that effect all Naval personnel, and the implementation of preventive measures where appropriate.

Who needs Epidemiology? We All Do !!

ANTHRAX VACCINE IMMUNIZATION PROGRAM (AVIP)

ANTHRAX VACCINE ADVERSE EVENT REPORT SYSTEM (VAERS) UPDATE

HM1 Barbara Cooper, USN
Navy Environmental Health Center, Norfolk, VA

Table 1 displays the total Anthrax Vaccine Adverse Event Reporting System (VAERS) reports submitted through 29 Sep 2000. The source of this data is the Army Medical Surveillance Activity (AMSA).

***Editor's Note**: In the last issue of NMSR, we commented that the Air Force was researching the cause of the disproportionately high numbers reports at a specific location. Results of the study are still pending.*

Table 1. Cumulative Data (date 28 Aug 1998 - 29 Sep 2000)

	VAERS Report		Classification				
Service	Required		Local Reaction			Systemic Reaction	Cum. Totals
	Yes	No	Mild	Moderate	Severe		
USA	12	90	14	18	13	57	102
USN	4	69	6	7	8	52	73
USAF	30	393	28	45	27	323	423
USMC	2	26	1	6	2	19	28
USCG	0	1	0	1	0	0	1
Excludes 4 ODS/DS VAERS Reports on Anthrax and Non-DoD Reports							

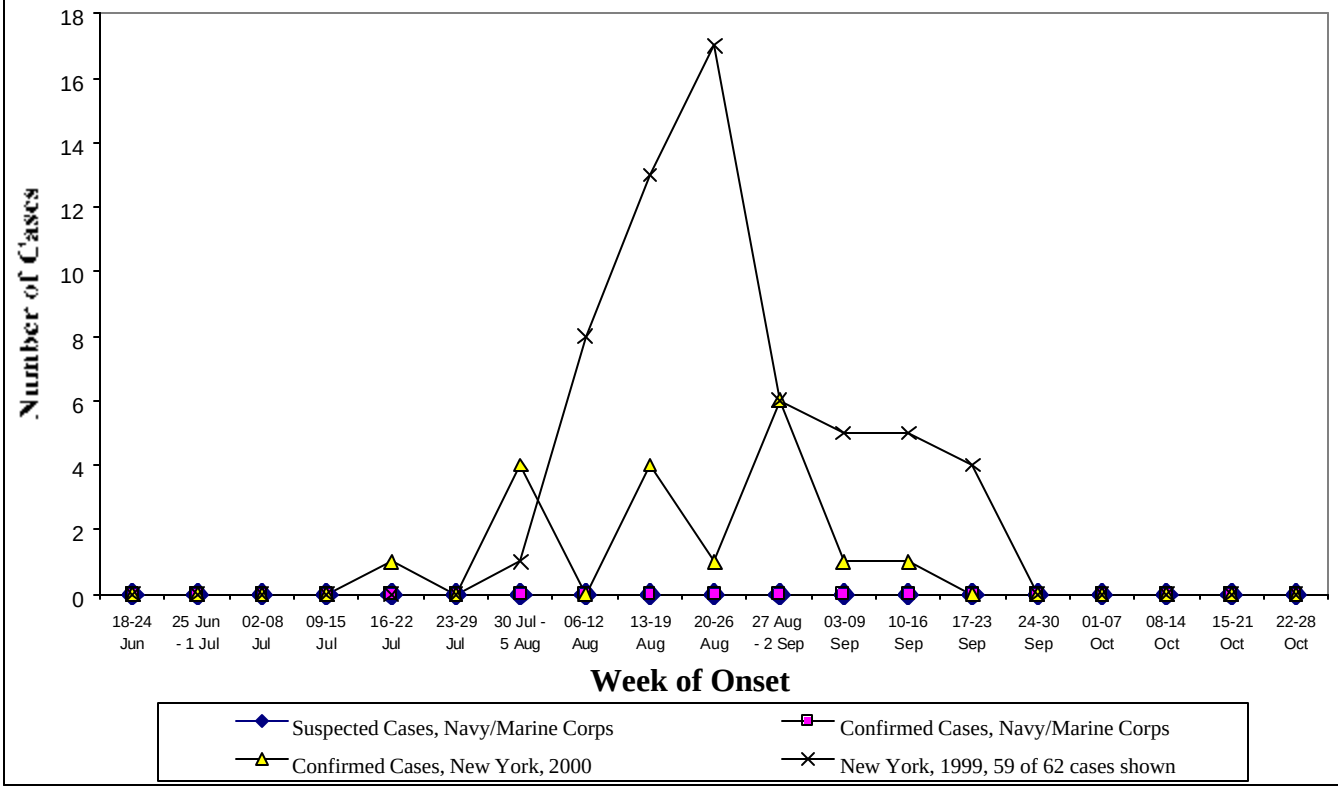
GLOBAL SURVEILLANCE OF EMERGING DISEASES

WEST NILE VIRUS
A GRAPHIC VIEW OF WEST NILE VIRUS IMPACT ON ACTIVE DUTY FORCES

CDR Michael O. Mann, MSC, USN
Navy Environmental Health Center, Norfolk, VA

Over the 19-week period during which active surveillance was given increased emphasis, no cases of West Nile Virus (WNV) were diagnosed or suspected in Navy/Marine Corps active duty members, dependents, or retirees who were seen in Navy MTFs. Eighteen human cases were reported; 13 in New York (Staten Island 10, Brooklyn 2, Queens 1), four (one fatal) in New Jersey, and one in Connecticut. Most victims are elderly (range 37-87, mean 63). Virus activity increased steadily in bird and mosquito populations throughout August and September. Tendency toward late summer or early fall incidence in humans is demonstrated by including CY99 human cases in New York (Figure 1). Though risk of severe illness in the active duty population is low, preventive measures should be continued during periods when mosquitoes are active to minimize exposure to this and other better-known risks such as eastern equine encephalitis and St. Louis encephalitis.

Figure 1. Reported Human WNV Cases by Week of Onset



DEPARTMENT OF THE NAVY
Commanding Officer
Navy Environmental Health Center
2510 Walmer Avenue
Norfolk, VA 23513-2617

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