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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.

FROM THE COMMANDING OFFICER

Our goal in publishing the Naval Medical Surveillance Report (NMSR) is to supply you with valuable information on the health of the U.S. Naval forces. We believe this information can assist you in the development of local policy, the allocation of resources, and the promotion of health among the communities you serve. Collection, analysis, and communication of information enhances our ability to "Think Populations, See Individuals." When we promote health and prevent disease among our communities, we will help to ensure the highest quality of life for each of us. As the Navy's "Population-Based Medicine Command," we at the Navy Environmental Health Center are committed to working with you to achieve this goal.

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SURVEILLANCE AND THE DISSEMINATION OF INFORMATION

Submitted by Commander R. W. Rendin, MSC, USN, Director, Preventive Medicine, NEHC

Dissemination of information completes the triad of surveillance components described by A. D. Langmuir[1]. Collection and analysis of disease information is useless if not disseminated to those who need to know. If you are reading this, then you probably need to know. The Preventive Medicine Directorate at NEHC is committed to disseminating this information on a regular, on-time basis. Special thanks to the team led by Dr. Bob Morrow for assembling and producing this first edition of the Naval Medical Surveillance Report (NMSR).

NMSR is an integral part of the DoD Global Emerging Infectious Disease Surveillance and Response System. With the increased national and international interest in emerging disease, the new Naval Disease Reporting System (NDRS), and the fine efforts of the Navy and Marine personnel using NDRS, we are excited about the value of this publication for you in the field, fleet, and headquarters.

Even with dissemination, epidemiologic "surveillance" is not truly complete without taking effective action. We at the NEHC "home office" and at our Navy Environmental and Preventive Medicine Units (NEPMUs) and Navy Disease Vector Ecology and Control Centers (DVECCs) around the world are in place to work with you in designing and implementing successful preventive medicine programs and interventions. Please do not hesitate to call or E-mail. Also, we actively seek your comments for improving this publication.

References:

1. Langmuir AD. 1963. The Surveillance of Communicable Diseases of National Importance. New England Journal of Medicine 268: 182-192.

GLOBAL SURVEILLANCE OF EMERGING DISEASES

The Global Emerging Infectious Disease Surveillance and Response System applies to a world-wide set of surveillance, diagnostic, and response activities which have the aim of detecting and containing newly emerging disease threats. These threats may be diseases such as hantavirus, Ebola virus, and human immunodeficiency virus, which have newly appeared in the past few years. Or, they may be new strains of previously known organisms, such as penicillin-resistant Neisseria, penicillin-tolerant Streptococcus, chloroquine-resistant Plasmodium, or methicillin-resistant Staphylococcus. They may be newly pathogenic organisms of previously known classes, such as legionnaires disease, or Lyme disease, or new strains of well known diseases, such as new types of influenza.

Military and national civilian surveillance activities are mandated by Presidential Decision Directive NSTC-7 "Emerging Infectious Diseases," which directs the enhancement of the infrastructure through the establishment of an electronic reporting

network. The NDRS and this publication are part of that effort. The designated Navy hub for emerging infectious disease is the Naval Health Research Center. Future issues will include contributions from some of the military and civilian collaborators in this national and international effort.

Interested readers may browse the following websites, which relate to the global emerging infection surveillance and response effort:

- http://www.who.ch/programmes/emc/emc_home.htm
- http://www.cdc.gov/ncidod/EID/eid.htm
- http://pc176.nhrc.navy.mil
  http://www-nehc.med.navy.mil/prevmed.

NAVAL DISEASE REPORTING

Deployed in 1997, the NDRS is the new program and electronic communication system for the surveillance of reportable disease. Activities are presently installing the NDRS program, and in the next issue of this publication we shall report data from this new system.

For the present issue, we offer data reported to NEHC in the old Disease Alert Report (DAR) format for the years 1994 through 1996 (Tables 1 and 2).

1. Data characteristics and limitations.

The data represent only a portion of the disease burden in the Navy and Marine Corps. A disease is included on the "reportable" list in these services only if the disease meets the following criteria:

- Urgency: potentially affects a large number, is clinically severe, has high transmission rates, and is mission compromising.
- Intervention: a preventive activity exists for its control.
- Mandated: commonly mandated by other authorities, such as state health departments.
- Definable: a case definition exists with a specific ICD-9 code.
- No other source for tracking.

Therefore, there may be diseases of epidemiologic interest which are not included in this list. This is not an exhaustive list of communicable diseases which occur in the Navy, only those which meet the above criteria.

2. Validity and reliability.

In 1996 NEHC received DARs from at least 46 branch medical clinics, 26 hospitals, and 35 individual vessels. These data, therefore, represent a diverse, widely scattered, and complex population. There was expansive participation in the reporting system. However, it must be with caution that these aggregate figures are extrapolated to represent the entire naval population.

The old system was a passive reporting system in which there was no systematic comprehensive testing of the validity or reliability of data. We know that these represent real cases which occurred in active duty personnel. We do not know how many unreported cases occurred nor do we know what errors may have occurred in recording or transmission of data. Also, there have been some changes in the requirements for the reporting of some diseases during the three-year period.

3. Utility of data.

Given the above caveats, there is still value in reporting the1994-1996 data. First of all, the data represent real cases in the care of

a clinical service. Second, these cases represent real risk of transmission to others in the naval community. Third, the reported cases represent real, serious, and occasionally tragic, health outcomes (see Case Report in this issue for an example from 1997–Ed.) Fourth, and most important, these are the data with which we work; and we are committed to sharing with you what we have, giving you certain cautions about interpretation.

.

Table 1. DARs 1994-1996, Navy & Marine Corps, Combined Case Frequencies

Disease	1994	1995	1996	Disease	1994	1995	1996
Amebiasis	4	3	3	Measles	2	0	0
Anthrax	0	0	0	Meningitis (viral)	39	36	37
Bites, Non-venomous rabies vax given	43	42	47	Meningitis (bact/other)	5	3	5
Bites, Venomous	9	5	5	Meningococcal Disease	4	1	3
Botulism	0	0	0	Mumps	13	6	3
Brucellosis	0	2	0	Onchocerciasis	0	0	0
Campylobactor	8	1	8	Paratyphoid Fever	0	0	0
Chancroid	2	4	1	Pertussis	1	0	2
Cholera	0	0	0	Plague	0	0	0
Coccidioidomycosis	9	3	10	Poliomyelitis	0	0	0
Cryptosporidiosis	0	0	0	Psittacosis	0	0	1
Dengue Fever	1	9	1	Q Fever	0	0	0
Diphtheria	0	0	0	Rabies	0	0	0
E. coli 0157 Infection	1	0	1	Relapsing Fever	0	0	0
Encephalitis	0	1	3	Rheumatic Fever	1	0	0
Ehrlichiosis	0	0	1	Rift Valley Fever	0	0	0
Filariasis	0	0	0	Rocky Mountain Spotted Fever	0	3	1
Giardiasis	23	11	19	Rubella	1	0	0
Guillain-Barre' Syndrome	3	1	1	Salmonellosis	34	31	25
Hantavirus	0	0	0	Schistosomiasis	0	0	0
Hepatitis A	47	30	39	Shigellosis	40	23	12
Hepatitis B	46	35	29	Smallpox	0	0	0
Hepatitis C	6	7	10	Syphilis (all stages)	102	78	65
Influenza (Outbreak only)	0	0	2	Tetanus	0	0	0
Lassa Fever	0	0	0	Toxic Shock Syndrome	2	0	1
Legionellosis	1	1	1	Toxoplasmosis	0	0	0
Leishmaniasis (all)	0	2	0	Trichinosis	0	0	0
Leprosy (Hansen Disease)	0	0	0	Trypanosomiasis	1	0	0
Leptospirosis	3	0	5	Tuberculosis (Pulmonary)	7	11	11
Listeriosis	0	0	0	Tularemia	0	0	0
Lyme Disease	12	21	44	Typhoid Fever	0	0	0
Lymphogranuloma Venereum	15	7	9	Typhus (all)	0	0	1
Malaria (all types)	20	7	13	Varicella	400	381	*
				Yellow Fever	0	0	0

*Not reportable

Table 2. Top Ten Diseases Reported by DAR 1994-1996, # Cases/100,000						
	1994		1995		1996	
	USN 468,662	USMC 174,158	USN 434,617	USMC 174,659	USN 416,735	USMC 174,883
Varicella	52	35	70	41	*	*
Syphilis	19	10	15	7	13	6
Hepatitis B	8	4	6	4	5	5
Hepatitis A	8	4	6	2	8	4
Meningitis, viral	6	6	6	6	7	6
Meningitis, bact.	2	2	2	0.5	1	6
Salmonellosis	7	5	6	6	7	4
Shigellosis	6	6	6	7	3	1
Giardiasis	5	3	2	2	3	5
Malaria (all types)	2	7	1	2	2	3
TB	2	2	3	2	5	0.6
*not reportable						

Hospitalization data offer a different perspective on the health of the forces (Table 3). These data are available through the Defense Medical Epidemiologic Database (DMED) program, accessible on the internet at http://amsa.army.mil/dmed/.

Table 3. Leading Cause of Hospitalizations, 1994-1996, Navy and Marine Corps Combined Rate # Cases/100,000 Per Year*			
Diagnosis	1994	1995	1996
Internal derangement of knee	401	442	419
Alcohol dependence syndrome	366	390	391
Inguinal hernia	270	265	238
Adjustment reaction	253	231	223
Other derangement, joint	192	192	195
Personality disorders	172	144	120
Other disorders, joint	149	183	155
Trauma during delivery	142	156	190
Deviated septum	119	119	125
Chronic disease of tonsils	118	129	134
*Active duty only: all grades, ages, and ethnicities			

Further information on disease categories and geographic distribution through DARs submitted to NEHC is contained in Figures 1 through 4.

Figure 1. DARs by Gender, 1994-1996
Percentage of Reports

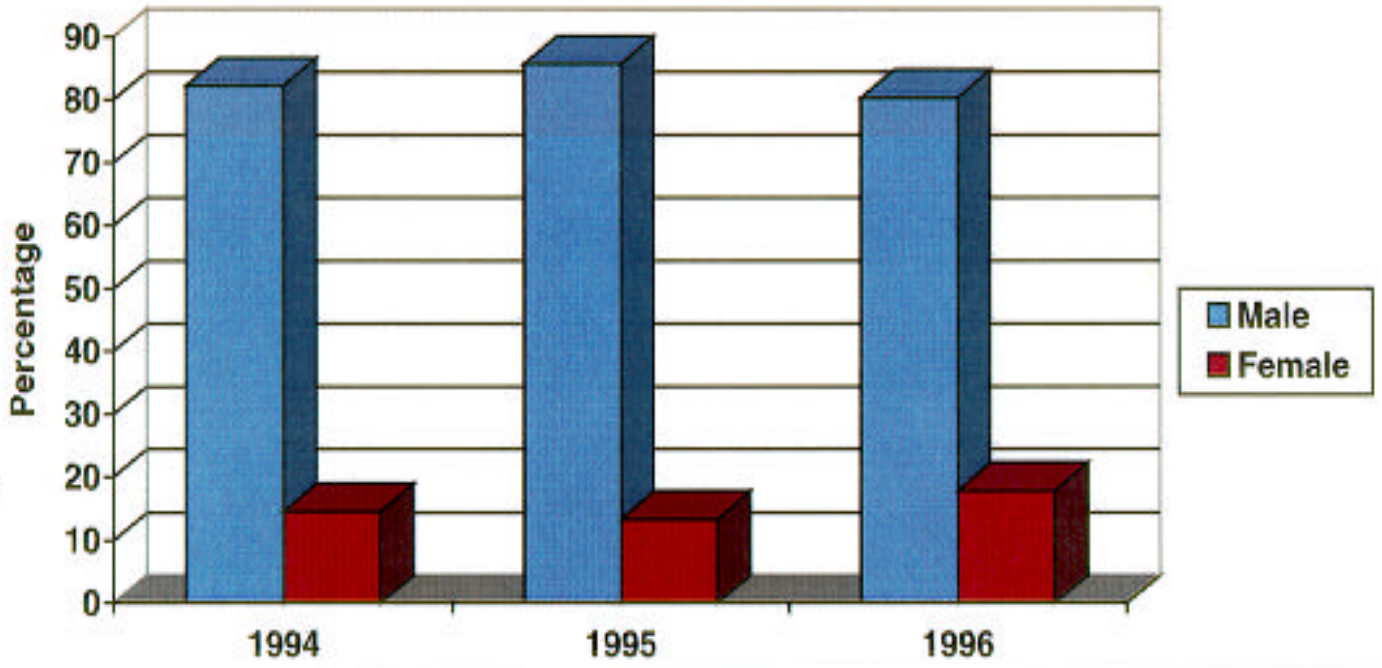


Figure 2. DARs by Age Group, 1994-1996
Percentage of Reports

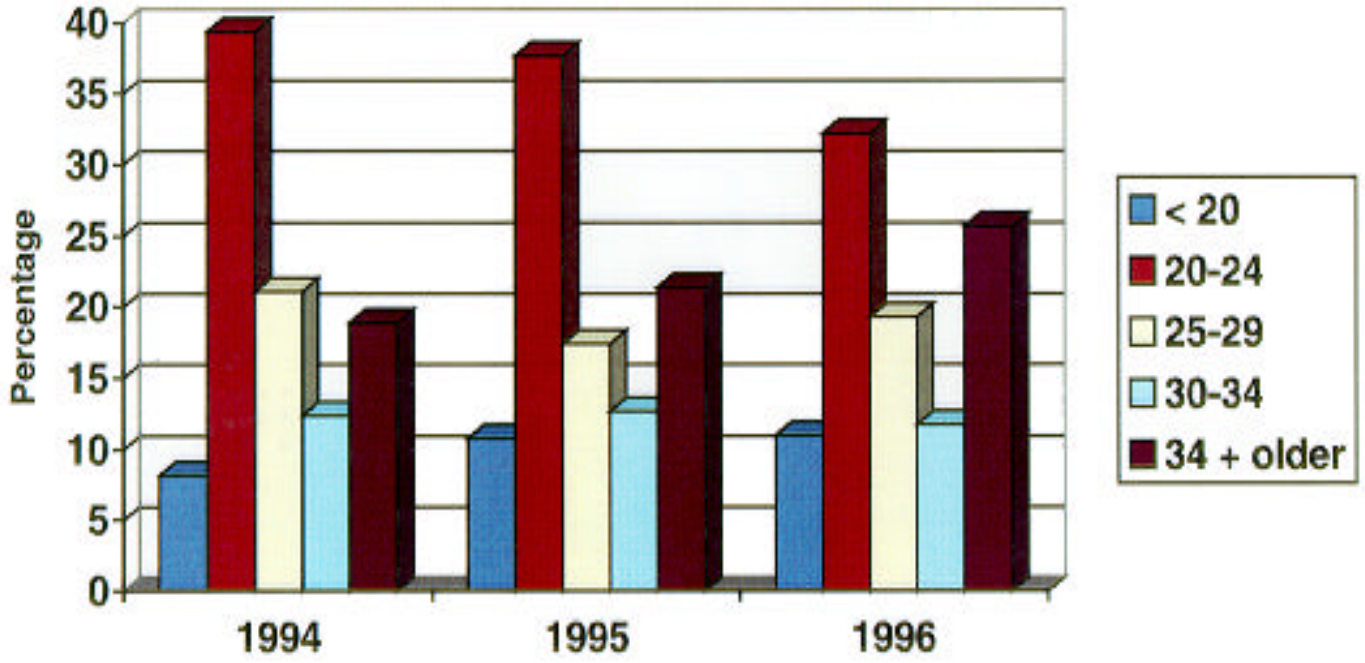
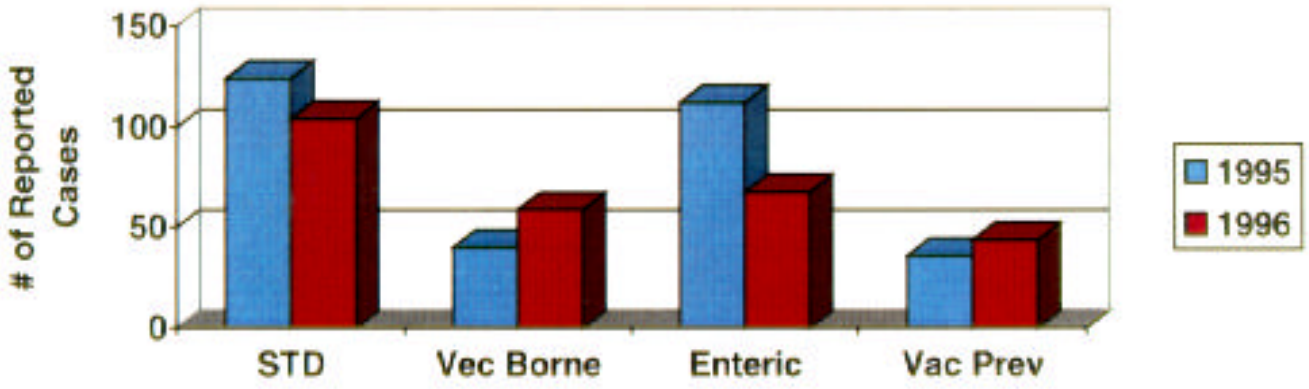
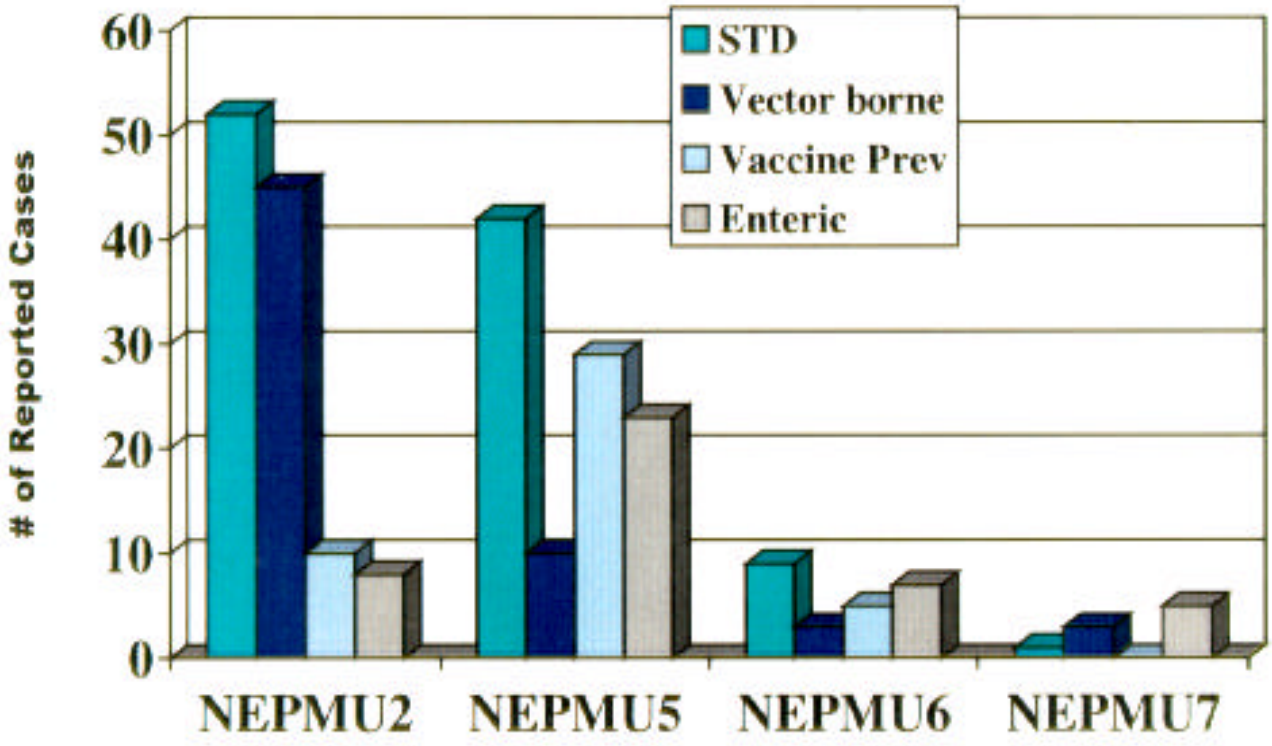


Figure 3. Selected DARs by Disease Classification, 1995-1996



STD= Chancroid, Hepatitis B, LGV, Syphilis
Vector Borne= Dengue, Ehrlichiosis, Lyme Dis., Malaria, Typhus, R.M.S.F.
Enteric= Amebiasis, Campylobacter, Giardia, Salmonella, Shigella
Vaccine preventable = Hepatitis A, Mumps, Pertussis

Figure 4. Selected DARs by NEPMU, 1996



NEPMU2 – Norfolk VA
NEPMU5 – San Diego CA
NEPMU6 – Pearl Harbor HI
NEPMU7 – Sigonella IT

OUTBREAKS

Shipboard Outbreak of Diarrhea

Submitted by Captain H. James Beecham, III, MC, USN, and Commander A. J. Yund, MC, USN, NEPMU6, Pearl Harbor, HI

NEPMU6 was notified in September 1997 by the senior medical officer (SMO) of a Navy aircraft carrier of an increase in the number of persons presenting to sick call with diarrhea. Diagnostic assistance was requested.

Between 19-25 September 1997, approximately 450 persons of a 4,200 crew (11%) presented to the ship's sick call with symptoms of vomiting, diarrhea, and headache. Over 220 Sailors were placed "sick in quarters" as a result of their illness. No obvious geographic, work space, dining facility, or other clustering of cases was noted by the SMO.

Efforts were undertaken to coordinate laboratory support from Navy Medical Research Unit No.2, Jakarta, Indonesia, (NAMRU2), which sent a Chief Hospital Corpsman to the ship to collect stool samples from affected individuals, as well as shipboard water specimens.

NAMRU2 reported that 21 of 31 stool specimens (68%) were positive by RT-PCR (reverse transcriptase polymerase chain reaction) for Norwalk virus. All stools were negative for ova and parasites, and all water specimens were negative for enteric coliforms. Only 2 of 31 stools were positive for Salmonella species.

Ed. Note. This case illustrates the challenge of outbreaks among large populations who live and work in close quarters for long periods of time. We reviewed the Disease Alert Reports for this vessel and discovered one outbreak (organism unknown) in the previous year, none for the previous ten years. We do not believe this to be a vessel or personnel specific problem, but the type of outbreak which some unique naval epidemiologic environments make more likely. The occurrence of Norwalk virus is of note because there are special efforts underway to characterize Norwalk as an agent of outbreaks in the Navy.

COMMUNICABLE DISEASE

Anthrax and Leather

Bacillus anthracis is a hardy bacteria requiring special attention for disease prevention in the Navy. A preventive medicine technician on a carrier recently posed a question regarding risk of anthrax from leather goods in the eastern Mediterranean.

Anthrax is an ancient disease. It occurs primarily in livestock, but humans can contract it in skin, lung, or intestinal forms. An outbreak among horses, cattle, and sheep was described over 2000 years ago by Virgil, and in the late 19th century severe animal pandemics in Europe led to intense research by Pasteur and Koch into its transmission. A vaccine against anthrax has been available for decades. While anthrax is treatable with penicillin, untreated disease, especially from inhalation, has a high mortality.[1, 2]

Anthrax, like tetanus, produces an infective spore that can last for long periods in soil, animal skins or hides, and is highly resistant to even harsh environmental conditions. The most common human infection is via the skin. The spores may be contracted

by handling "contaminated hair, wool, hides, flesh, blood, and excreta of infected animals and from manufactured products such as bone meal. "[3] Initially a lesion develops at the site infected by the spore. This sore becomes a blister, then scabs over. The scab is characteristically coal black, hence the name "anthrax" which is Greek for "coal." The organism may spread from this initial sore to the rest of the body. Once dissemination occurs, the disease develops rapidly. The cutaneous form may have a mortality rate as high as 25%. When the spores are inhaled, a much more virulent disease results.

Anthrax is present in most parts of the world and its control depends primarily on veterinary practices. According to epidemiologists at the World Health Organization, Turkey reported 457 human cases of anthrax in 1996 although it had an active animal immunization program. Anthrax is also prevalent in central Asian regions and tends to emerge when vaccination programs are not properly carried out. The spores from an infected animal can be transported in its treated hide, that is, leather. Risk of human infection exists from infected hides, wool, and skins.

According to Dr. Ottorino Cosivi, who is responsible for anthrax surveillance in the Division of Emerging and other Communicable Disease Surveillance and Control at the World Health Organization, "no hazard need be expected in situations where hides being processed come from regular and supervised slaughtering. Dry hides of uncertain origin within enzoonotic countries must, on the other hand, be regarded as being of high risk in terms of anthrax." [personal communication, November 5, 1997].

- anthrax exists in cattle in Turkey and in central Asia;
- anthrax exists in a sporulated form which can infect humans via improperly treated leather;
- Turkey has a control program;
- control programs in central Asia may not have been effective recently;
- leather from central Asia is sold in some ports in Turkey; and
- anthrax, even in its cutaneous form, is a very serious disease that is to be avoided.

Therefore, it is possible that anthrax may be transmitted via improperly treated leather. There are no data to estimate the specific risk for a particular item bought in a particular port.

Leather produced in Turkey itself is deemed to be low risk, but we recommend that Sailors be made aware of risks if they choose to purchase leather goods. Although opinions differ on the exact amount of risk, the Epidemiology Department at NEPMU7 believes the regional safeguards to be adequate. To promote force protection, we recommend that medical departments educate Sailors about signs and symptoms of anthrax.

References:

1. Kaufman AF, 1986. "Anthrax," in Last J, ed. Maxcy-Rosenau Public Health and Preventive Medicine, Twelfth Edition, Norwalk, CT, Appleton-Crofts, p 405.
1. Friedlander, AM, Welkos SL, Pitt MLM, et.al., 1993. Post-exposure prophylaxis against experimental inhalation Anthrax. JID 167: 1239-42.
3. US Army Medical Research Institute of Infectious Diseases, Medical Management of Biological Casualties: Handbook. Second Edition, Ft Detrick, Frederick, MD, August, 1996, p.16.

CASE REPORTS

Meningococcemia in a Recruit

Submitted by Lieutenant Commander Mark Malakooti, MC, USN, NEPMU2, Norfolk, VA

On 14 November 1997, at approximately 0630, Recruit A was found difficult to arouse and unable to stand. This occurred during a 2-day endurance exercise, at the end of a mandatory 3 hour rest period.

He was transported to the Branch Medical Clinic. At the clinic he was somnolent, disoriented, and incontinent; temperature was 39.4°C and blood pressure was 86/34.

Laboratory tests showed hypoglycemia. He was treated with intravenous fluids, and transported to the naval hospital at about 1000 due to his deteriorating condition. In the emergency department an ecchymotic rash was observed. His condition continued to worsen, and respiratory distress necessitated intubation and mechanical ventilation. He was transferred to the intensive care unit, but did not respond to interventions: Recruit A died at 1330, 14 November 1997. Blood cultures were positive for Neisseria meningitidis, later identified as Type B, and an autopsy confirmed the cause of death as meningococcemia.

Chemoprophylaxis of the recruit's company was subsequently carried out, using a single 500 mg oral dose of ciprofloxacin per person. Recruit A arrived for training in August 1997, and received the usual immunizations, including the meningococcal vaccine. Past medical history was unremarkable. He was seen at sick call on 04 November 1997 for upper respiratory symptoms, where he was treated with acetaminophen and pseudoephedrine and told to return if not improved. Prior to the start of the exercise he had not voiced any complaint when the recruits were questioned about current medical problems.

Discussion.

This was a classic case of fulminating meningococcemia, a disease associated with high mortality rates despite aggressive treatment: case fatality rates for meningococcal disease in the U.S. are roughly 12%. Type B currently accounts for approximately 45% of all cases of meningococcemia in the U.S., with type C accounting for an additional 45%. The disease is transmitted from person to person via pharyngeal secretions; however, the vast majority of those exposed do not develop invasive disease (although they may become asymptomatic carriers), and most patients with meningococcal disease have not had direct contact with a symptomatic patient. Asymptomatic carriers are thought to be the major source of transmission of pathogenic strains: N. meningitidis is carried in the nasopharyngeal flora of about 25% of Americans (percentages range from 4% to 80% depending on the season, locale, and degree of crowding). Screening or treatment for asymptomatic carriers is not recommended.

The strategy for the prevention of meningococcal disease includes vaccination of high risk groups, and chemoprophylaxis of close contacts of newly identified cases. Protective antigens of N. meningitidis type B are not included in the current quadrivalent vaccine; however, efforts to develop a type B vaccine are underway. All Navy and Marine Corps recruits receive the quadrivalent meningococcal vaccine early in the course of recruit training. This practice is intended to prevent epidemics of the disease in recruit training centers where, historically, such epidemics have occurred. Isolated cases of meningococcal disease may still appear,

particularly when caused by N. meningitidis Type B.

References:

1. Control and Prevention of Meningococcal Disease: Recommendations of the Advisory Committee on Immunization Practices. MMWR 1997, Feb 14; 46(RR) 1-10.

2. Benenson AS. Meningitis. In, Control of Communicable Diseases Manual, 1995, APHA, Washington D.C. 303-307.

Ed. Note- At a recent meeting of the Navy Epidemiology Board, LCDR M Ryan, MC, USN, gave an overview of meningococcal disease in the U.S. military, 1980-1990. The U.S. incidence is 1/100,000 per year (higher for children) with a case fatality rate of 12%. The rate in the U.S. military ranged from 1/100,000 in 1983-85 to a high of 4/100,000 in 1989. The highest incidence of meningococcal disease occurs within the first few months of service. Vaccines against types C, A, Y, and W135 have been developed and a tetra-valent vaccine is being given to recruits as mentioned in this article. There is no vaccine against type B, which was the organism type in this case report.

INJURY DATA

A Task-Based Approach to Back-Injury-Prevention Training: An Independent Duty Corpsman's Perspective

Submitted by HMCS(SS) Bill Irwin, USN, Naval Safety Center, Afloat Safety Programs

OPNAVINST 5100.19C, NAVOSH Program Manual for Forces Afloat, requires annual back-injury-prevention training for all hands. The latest statistical data show no improvement in the prevention of back injuries among our Sailors assigned to ships. In fact, the number of back injuries reported by the fleet has increased from 162 in 1993 to 236 for the year ending December 31, 1997. The number and rates of back injuries per 100,000 Sailors has increased each year despite a shrinking afloat population. Over the same period, the Navy has decreased from 152,416 afloat personnel to 136,023. See Figure 1.

As ship's medical department representatives, have we really attacked back injuries at the deckplate level? Have we provided adequate training to our shipboard Sailors based upon the task at hand? Are we fully involving ourselves in operational risk management? By using statistical data and work reviews, we can create a healthy work environment through process improvement at the job site.

Of the forty-seven tasks involving back injuries for 1996 and 1997, the top three resulting in back injury were:

- Loading or unloading stores,
- Installing or removing equipment,
- Normal transiting of passageways or ladders.

There were 502 back injuries reported during 1996 and 1997. Figure 2 shows that nearly a third of back injuries occur during stores loading.

WHAT CAN WE DO?

Medical department representatives can use this information to target problem areas, perform on-site surveys of job procedures, and on-site training of ship's force to prevent back injuries. We can not wait to check the block for back injury prevention training. We need to keep Sailors constantly aware of the proper lifting techniques. One method is a short

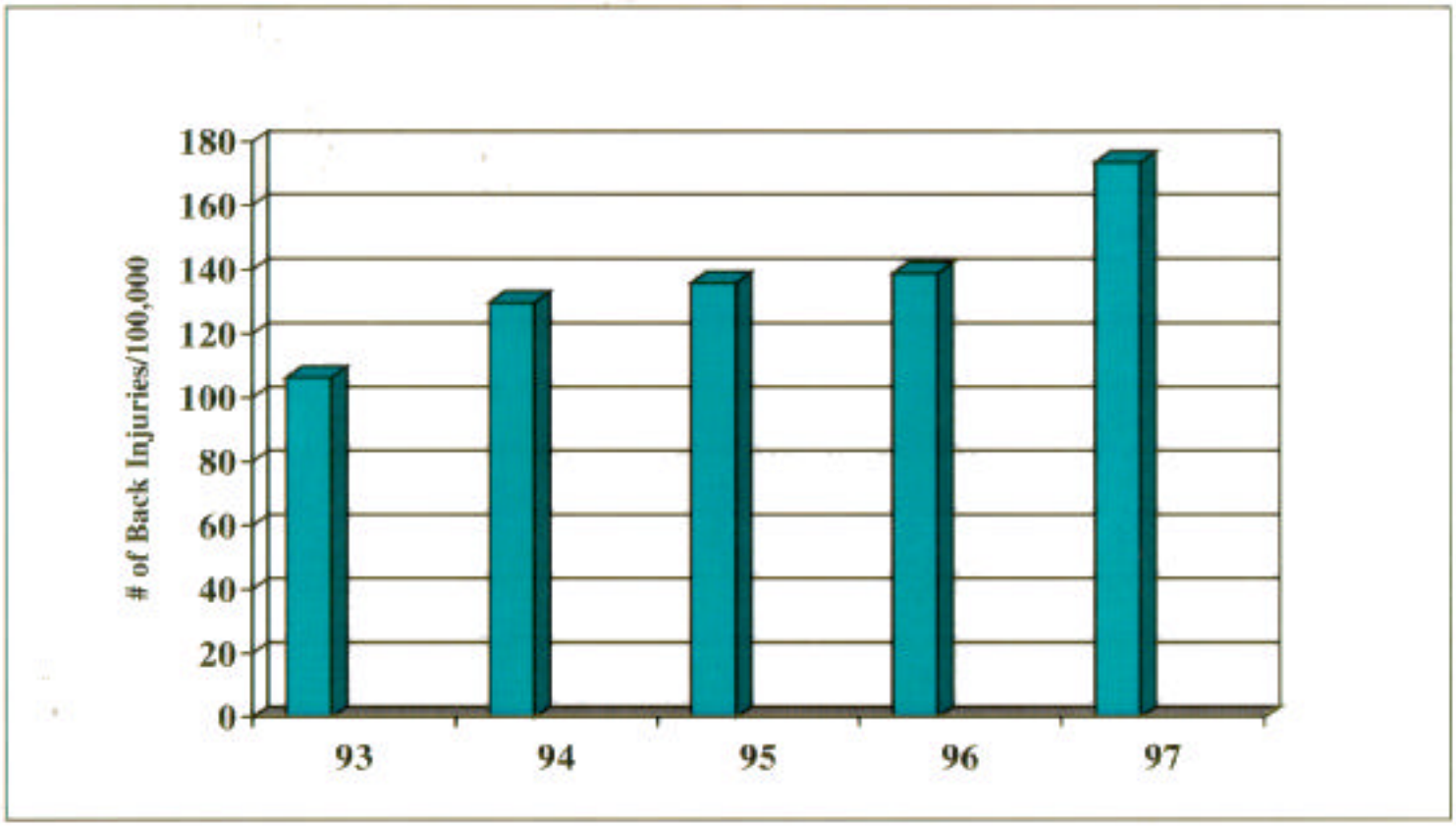
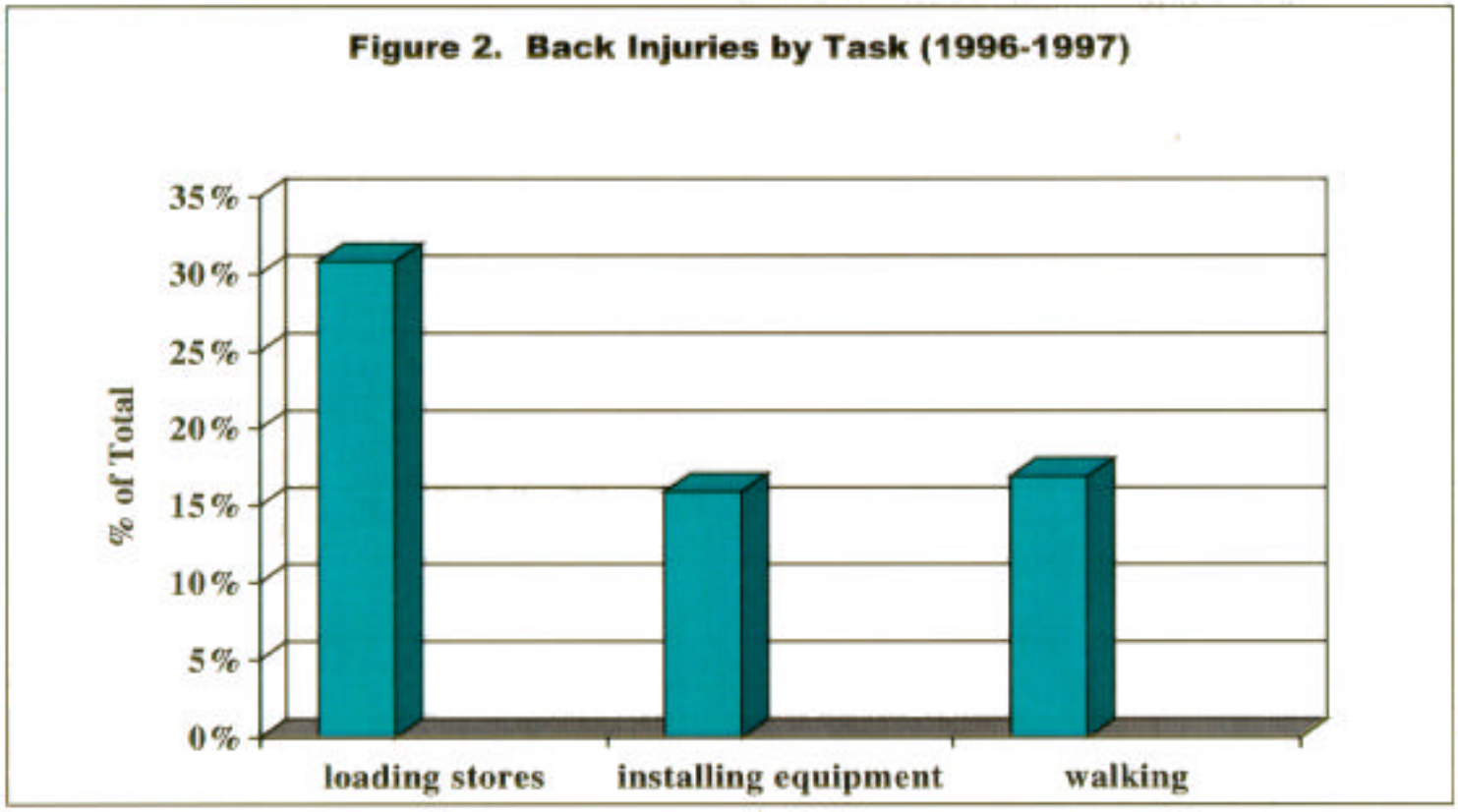


Figure 1. Back Injury Rate Per 100,000 Sailors

Figure 2. Back Injuries by Task (1996-1997)



back-injury-prevention session as part of the pre-working party brief. This is a valuable way to ensure Sailors use proper lifting techniques.

HIV Seroconversion Rates

Human Immunodeficiency Virus is of concern to all preventive and clinical medicine practitioners. Tables 1 and 2 give the general trend in rates of seroconversion in the U.S. Navy and Marine Corps during the past few years. We are grateful to the Navy Central HIV Program for these data.

Table 1. Incidence of HIV Seroconversion, 1990-1997, Active Duty U.S. Navy

Year	No. HIV Seroconverters	Number Tested	Incidence Rate per 1000	% Force Tested
1990	249	454253	0.55	73.6
1991	186	375243	0.50	65.9
1992	183	385446	0.47	70.8
1993	161	423950	0.38	77.8
1994	118	388255	0.30	82.3
1995	87	384573	0.23	89.8
1996	94	357477	0.26	87.5
1997	61	363779	0.16	93.9

Table 2. Incidence of HIV Seroconversion, 1990-1997, Active Duty U.S. Marine Corps

Year	No. HIV Seroconverters	Number Tested	Incidence Rate per 1000	% Force Tested
1990	49	178103	0.28	89.5
1991	37	140513	0.26	72.5
1992	29	143976	0.20	81.1
1993	41	165974	0.25	93.5
1994	28	161539	0.17	91.0
1995	18	167662	0.11	96.0
1996	22	160239	0.14	92.1
1997	22	168892	0.13	97.1