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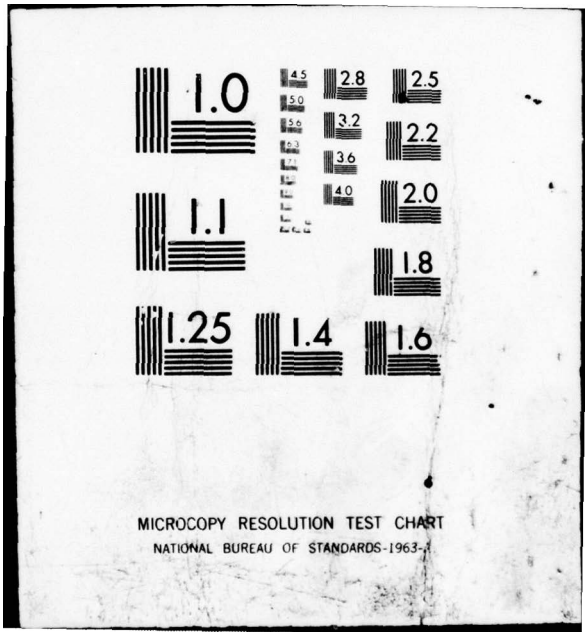
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DA Project 3A061102B71Q - Communicable Diseases and Immunology

PROPHYLACTIC METHODS IN THE PREVENTION OF DISEASES AMONG ARMY PERSONNEL

ANNUAL PROGRESS REPORT

DECEMBER 1978

by

Col. Creed D. Smith, Ph.D., MSC
Cpt. Robert S. Stewart, Ms., MSC
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IMMUNOFLUORESCENCE: 1. Identification of acute respiratory disease (ARD)
(Contd. see reverse)

20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*
Upper respiratory disease surveillance studies to determine the etiologic agents in basic combat trainees (BCTs') were accomplished during FY '78. A total of 4,930 individuals hospitalized with acute respiratory disease (ARD) at 9 training stations including the Navy, and 31 non-training stations were included in these studies. Special influenza surveillance procedures were conducted to signal an early warning of pending outbreaks of A/Vic, A/Russ, A/Tex, A/Swine, or B/Hong Kong. Virus isolations and serological studies indicated that 7.7% of ARD hospitalizations were caused by Adenoviruses, 8.2% by Influenza

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19. KEY WORDS (Contd.)
COXSACKIEVIRUS: 1. Etiologic Agent of ARD 2. Serological ID
MENINGOCOCCUS : 1. Carrier rates 2. Disease Surveillance 3. New Serogroups.
URETHRITIS : 1. PPNG 2. Etiology 3. Chlamydial.

20. ABSTRACT (Contd.)
0.8% by Mycoplasma and other viruses e.g., coxsackievirus A21, parainfluenza, and polioviruses; and 83.3% by agents that were not determined. Adenovirus isolates totaled 315, 74.4% (195) were type 21, 13.4% (35) type 7, and 12.2% (32) were type 4 strains. Adenovirus 4 and 7 vaccines were administered from 1 Oct. thru Apr. at all Forts except Dix (1 Sept-30 Apr) and Wood (Continuously thru the year). Laboratory titrations of virus in the vaccine pills indicated acceptable potency, $10^{6.0}$ $TCID_{50}$ for adeno 7, and $10^{5.0}$ for adeno 4. Adeno 21 vaccine was not administered during the year. The influenza vaccine that was administered during the year was a bivalent product containing A/Victoria/3/75 and B/Hong Kong/5/72 250 CCA units each. Influenza hospitalizations totaled 540, 89% (476) were Flu A, and 11% (64) were Flu B infections, Mycoplasma infections totaled 36.

Field studies to determine the immunogenicity of Adenovirus vaccines were conducted utilizing paired sera collected from 256 individuals at 4 BCT Forts. Accumulative results indicated the type 4 vaccine to be 89.1% immunogenic and the type 7 was 43.8% immunogenic.

During the year a study was conducted to determine if there was serologic evidence of Coxsackievirus A21 infections during the period when no Coxsackieviruses A21 were isolated. Coxsackie serologies have not previously been routinely performed on adenovirus surveillance samples. Microtiter serum neutralization tests for Coxsackievirus A21 indicated only one 4-fold serologic rise among 569 pairs tested. Twenty-nine (29) patients demonstrated antibody titers of $\geq$20 in both the acute and convalescent sera.

A direct immunofluorescence (FA) procedure was performed on 98 cell cultures that had been innoculated with retro-uvular samples acquired through the Adenovirus Surveillance Program. The results indicated a high degree of correlation (91.8%) between routine cell culture and FA procedures. This test would provide an accurate and more rapid method for the identification of viral agents.

Monthly meningococcal carrier surveys were conducted at Fort Ord during the year in order to monitor the distribution of serotypes, the frequency of carriers, and to search for new serotypes. An annual total of 1200 AITs' were included in this study. Carrier rates peaked in December at 58% positive (100 surveyed), and reached a low point of 18% positive (100 surveyed) in August. The predominant serotype was B 58.4%, C 0.5%, 29E 9%, Y 16.2%, X 0.7%, W135 7%, non-typeables 0.7%, and multiple agglutinators were 7.5%. The non-typeables and multiple agglutinates will require research to rule out possible new serotypes. There were no meningococcal disease cases during the year. Meningococcal polysaccharide C vaccine had been administered earlier during basic combat training.

Over a 13 month period 66 urethritis patients were studies for penicillinase-producting N. gonorrhoeae (PPNG) and other causative agents that could be responsible for treatment failures. Of 18 gonococcal organisms isolated, 6 were resistant to penicillin, 1 of which was a PPNG. 1 Chlamydiae was isolated.

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DA Project 3A061102B71Q - Communicable Diseases and Immunology

PROPHYLACTIC METHODS IN THE PREVENTION OF DISEASES AMONG ARMY PERSONNEL

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ABSTRACT

Upper respiratory disease surveillance studies to determine the etiologic agents in basic combat trainees (BCTs') were accomplished during FY '78. A total of 4,930 individuals hospitalized with acute respiratory disease (ARD) at 9 training stations including the Navy, and 13 non-training stations were included in these studies. Special influenza surveillance procedures were conducted to signal an early warning of pending outbreaks of A/Vic, A/Russ, A/Tex, A/Swine or B/Hong Kong. Virus isolations and serological studies indicated that 7.7% of ARD hospitalizations were caused by Adenoviruses, 8.2% by Influenza, 0.8% by Mycoplasma and other viruses e.g., coxsackievirus A21, parainfluenza, and polioviruses; and 83.3% by agents that were not determined. Adenovirus isolates totaled 315, 74.4% (195) were type 21, 13.4% (35) type 7, and 12.2% (32) were type 4 strains. Adenovirus 4 and 7 vaccines were administered from 1 Oct thru 30 Apr at all Forts except Dix (1 Sept - 30 Apr) and Wood (continuously thru the year). Laboratory titrations of virus in the vaccine pills indicated acceptable potency, $10^{6.0}$ $TCID_{50}$ for adeno 7, and $10^{5.0}$ for adeno 4. Adeno 21 vaccine was not administered during the year. The influenza vaccine that was administered during the year was a bivalent product containing A/Victoria/3/75 and B/Hong Kong/5/72 250 CCA units each. Influenza hospitalizations totaled 540, 89% (476) were Flu A, and 11% (64) were Flu B infections, Mycoplasma infections totaled 36.

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Over a 13 month period 66 urethritis patients were studied for penicillinase-producing N. gonorrhoeae (PPNG) and other causative agents that could be responsible for treatment failures. Of 18 gonococcal organisms isolated, 6 were resistant to penicillin, 1 of which was a PPNG. 1 Chlamydiae was isolated.

FOREWORD

The results of studies reported in this progress report reflect the efforts of this study group to forecast, detect and prevent acute respiratory and infectious diseases before they gain in-roads to military populations, especially troop training units. Our greatest attention has been given to those diseases that (1) cause the greatest loss of training days among recruits and (2) those that have the potential of costing the government the greatest amount for hospitalizations, e.g., infections caused by the adenoviruses, influenza, coxsackieviruses, N. meningiditis and urethritis agents. The variety of approaches described herein will hopefully suggest other pathways for even more efficacious studies.

We owe profound thanks to individuals in the Mircobiology Reference Laboratory at Fort Baker, California, the Microbiology Staffs at the three other Area Reference Laboratories at Ft. Sam Houston, Ft. Gordon and Ft. Meade, and the Preventive Medicine Teams at Forts Ord, Dix, Knox, Wood, Jackson, Bliss, Gordon, McClellan and the Navy Training Center-San Diego, without whose help all or portions of these investigative efforts could not have been accomplished. Very special gratitude is owed to our Secretary Mrs. Joy Griffin, who endured the unenviable tasks of assisting in the preparation of tables and figures, and typing drafts leading to this final manuscript.

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ACUTE RESPIRATORY DISEASE SURVEILLANCE

INTRODUCTION

Acute respiratory disease (ARD) surveillance studies as conducted during fiscal year 1978 and for the past 15 years before at CONUS training Forts indicate that ARD continues to be the principal cause of morbidity at military training units in CONUS. These studies have been effective in revealing the first signs of oncoming epidemics to provide early warnings as indicators for vaccine administration (1). Vaccine prophylaxis has been our most efficacious tool.

These surveillance studies were performed on hospitalized basic combat trainees (BCTs) at 9 BCT Forts, and on hospitalized and quartered patients at 1 Navy Training Center-San Diego, and 1 Advance Individual Training Fort (AIT).

MATERIALS AND METHODS

Basic combat trainees hospitalized with ARD, totaling 4,930 at 9 BCT Forts throughout CONUS were subjects for this surveillance. Within 12 hours following hospitalization for ARD retro-uvula swabs and acute-phase sera were obtained from each individual. Convalescent-phase sera were collected 14 to 21 days later. Paired sera were obtainable on 2,293 individuals. A number of individuals completed BCT and transferred before convalescent serum collection dates. Some were lost because of short discharges and AWOLS. The swabs were placed in charcoal viral transport media and held at 5°C until examined (usually 2-4 days) at the Medical Laboratory. Virus isolations were accomplished in tissue culture utilizing human embryonic (HEK) and rhesus monkey embryonic kidney (MEK) monolayers, and embryonated chicken eggs. Study sera were received as pairs after the convalescent collections, and they were used for detecting diagnostic rises in antibody titer by the complement fixation test to adenovirus, influenza A and B, Coxsackievirus and Mycoplasma. Adenovirus sero-types were identified by microtiter neutralization tests utilizing Hela cell cultures. Influenza isolates were tested for by guinea pig erythrocyte hemadsorption, and sero-types were identified using specific anti-sera. Mycoplasma infections were identified by seroconversions; isolations and species determinations were accomplished only on those individuals who were also included in studies reported elsewhere in this report. Other viral serologies and isolation techniques were employed when indicated by isolated outbreaks, unusual isolates or for other diagnostic aids.

ACUTE RESPIRATORY DISEASE SURVEILLANCE

RESULTS AND DISCUSSION

Acute respiratory disease hospitalization rates per hundred per week during FY 78 at 9 Forts are indicated in Figure 1. Causative agents are discussed in a later paragraph. The highest rate during a single week occurred at Fort Bliss, 25/100/week during the third week in February. Forts Dix and Gordon experienced ARD rates of 10.9 and 10/100/wk during the 2nd week in February and 4th week in March respectively. The high rate at Fort Gordon was among female persons who also experienced high rates of 6.6/100/wk the 2nd week in February and 9/100/wk the 2nd week in March as is indicated by the dotted line in Figure 1. The highest rate reached by male trainees at Fort Gordon was 4.8/100/week during the 2nd week in February, as indicated by the solid line. Female and male BCT training was also conducted at Forts Jackson and McClellan. Peak ARD rates of 2.7/100/wk for females and 1.9 for males at Jackson; and 0.5/100/wk for females and males at McClellan are also indicated with a dotted line for females and a solid line for males in Figure 1. The largest number of ARD hospitalizations (1223) were experienced by Fort Leonard Wood during the year. As shown in Figure 1, the peak ARD rate of 7.9/100/wk occurred during the last week in December. Both Forts Knox and Sill experienced peak rates of 6.5 during the 2nd week in February. There were significant ARD hospital admissions at Fort Ord among AIT and permanent party persons when rates reached 2.4 during the second week in February. Adenovirus 4 and 7 oral vaccine pills containing $10^{5.0}$ and $10^{6.0}$ $TCID_{50}$ of virus respectively, and Influenza bivalent vaccine containing A/Victoria/3/75 and B/Hong Kong/5/72 250 CCA units each were administered during the dates indicated in Figure 1. Females did not receive adenovirus vaccines.

Figure 2 indicates the ARD hospitalization rate per hundred per month, and etiologic agents at Fort Dix during FY 78. The same information is shown for FY 77 on this figure for comparison. Fort Dix was the second hardest hit BCT Fort, with weekly ARD hospitalization starting at 0.3 in October 77 and reaching 10.9/100/wk in February. The monthly peak in February was 4.7/100/month. These hospitalizations were caused mostly by influenza. In comparison, during FY 77 the monthly rate reached 3.2/100/month in February 1977. Adenovirus 4 and 7 vaccines were administered from 1 September 77 to 30 April 78, and influenza vaccine was given November through December 78. During the year 5.3% ARD hospitalizations were caused by adenovirus infections (9 adeno 21's, 3 adeno 4's, and 3 adeno 7's were isolated), 11.9% were caused by influenza (74 Flu A's, and 1 B), 0.4% (18) by Mycoplasma, and 82.5% ARD etiology was not determined.

The male and female combined ARD hospitalization rates at Fort Jackson rose from approximately 0.2 to 2.3/100/wk, which is a monthly peak of

>1.5/100/month in February as indicated by Figure 3. As indicated by Figure 1 females contributed the greatest amount to these hospitalizations. A peak of 2.1/100/month last year occurred in late March 77 as indicated in Figure 3. Adenovirus 4 and 7 vaccines were administered from 1 October 77 to 1 May 78, and influenza vaccine was given December through May. Adenoviruses (33 adeno 21's, 2 adeno 4's and 14 adeno 7's were isolated) caused 9% of ARD hospitalizations, 8.5% were caused by influenza (83 Flu A's, and 6 B's), 0.6% (2) by Mycoplasma, and 81.9% of the causes were not determined.

The greatest number of male ARD hospitalizations at Ft. Gordon, 4.8/100/wk, occurred in February, while the greatest number of females going into the hospital with ARD, 10/100/wk, occurred in March. The male-female BCT combined ARD hospitalization rate of 6.6/100/wk peaked during the first week in March. As indicated by Figure 4, the greatest monthly average ARD hospitalization rate was 2.3/100/month in February. Figure 4 also indicates there were fewer ARD hospitalizations during FY 77. Adenovirus 4 and 7 and influenza vaccines were administered November 77 through April 78. During the year, 18.2% of ARD hospitalizations were caused by adenoviruses (51 adeno 21's, 8 adeno 4's, and 1 adeno 7 were isolated), 14.2% were caused by influenza (82 Flu A's and 10 B's), 1.1% (5) by Mycoplasma, and 66.5% ARD etiology was not determined.

As Figure 5 indicates, ARD hospitalization rates were low during the year for both males and females at Ft. McClellan. However, there were 19 Influenza A infections to cause 9.9% of ARD admissions. Adenoviruses caused 7.4% of ARD admissions, only 6 adeno 21's were isolated; 2.5% were caused by mycoplasma, and 80.2% etiology was not determined. Adenovirus 4 and 7 vaccines were given to males only, and Influenza vaccine was given to male and females as indicated in Figure 5.

Figure 6 indicates ARD hospitalizations at Ft. Knox during FY 78. A peak rate of 3.3/100/month was reached in February. The highest rate of 3/100/month occurred last year in February also. Adenovirus 4 and 7 vaccines were administered from 1 October to 1 May, and influenza vaccines were from the middle of November to 1 May as indicated in Figure 6. During the year 7.3% ARD hospitalizations were caused by Adenoviruses (37 adeno 21's, 6 adeno 4's and 2 adeno 7's), 3% by Influenza (36 Flu A's, and 13 Flu B's), 0.7 (5) by Mycoplasma, and 89.1% of etiology was not determined.

Fort Leonard Wood experienced the greatest number of ARD hospitalizations (1223) throughout the year of any of the BCT Forts. This ARD was caused by Adeno and Influenza Viruses. The peak ARD rate of 7.9/100/wk translates to a monthly average of 4.8/100/month as indicated in Figure 7.

ACUTE RESPIRATORY DISEASE SURVEILLANCE

Last year the peak rate of 4/100/month was reached. Adenovirus 4 and 7 vaccine which had been administered continuously since October 1973 was stopped on 1 May 1975, began again 1 October 1976 and administered continuously again since that time. Influenza vaccine was given from November 77 to September 78. Adenoviruses (47 adeno 21's, 6 adeno 4's, and 5 adeno 7's were isolated) caused 6.2% of ARD hospitalizations, 6.4% were caused by Influenza (121 Flu A's and 27 Flu B's), 0.6% (11) by Mycoplasma, and 86.7% were not determined.

Figure 8 indicates ARD hospitalization rates at Ft. Sill where there were few admissions until February when a significant number (6.5/100/wk) of BCT's became ill. The average monthly rate was 2.7/100/month. Adenovirus and Influenza vaccines were given during the dates indicated by Figure 8. Unlike the previous year, Influenza infections cause the majority of hospitalizations. Adenoviruses (2 adeno 21's were isolated) caused 13% of the ARD, 16.7% was caused by Influenza (9 Flu A's and 2 Flu B's), 3.7% (2) by Mycoplasma and 66.7% of causes were not determined.

Fort Bliss had the highest ARD hospitalization rate during a single week (25/100/wk) of all of the BCT Forts as indicated in Figure 9. The average monthly high was 8.85/100/month. Even though etiologic agents were not isolated from many patients, the isolations and seroconversions that were obtained were for the most part Influenza (35 Flu A's and 3 Flu B's), 8.4%. Adenoviruses were identified from 1.8% of admissions (1 adeno 21 and 2 adeno 7's). Etiology that could not be determined amounted to 89.8%. The Adeno and Influenza vaccination dates are indicated in Figure 9.

Figure 10 indicates the ARD picture at Fort Ord, the only AIT Fort that was surveyed. A weekly ARD hospitalization rate of 2.4/100/wk in February averages to slightly above >0.5/100/month. This can be compared to the previous year on the top portion of this same figure. Influenza vaccine was administered from the middle portion of November to 1 December. Adenovirus 4 and 7 vaccines had been given at a previous BCT Fort. Influenza (17 Flu A's and 2 Flu B's) caused most of the identifiable ARD admissions, 8.8%, Adenoviruses (1 adeno 21 and 1 adeno 7) cause 2.8%, 3.7% (8) were caused by Mycoplasma, and 84.7% was not determined.

Hospitalized and quartered patients totaling 472 with ARD at the US Navy Training Center, San Diego were included in the surveys. From 472 isolation samples received, 8 adeno 21's, 7 adeno 7's and 7 adeno 4's were isolated.

SUMMARY

Figure 11 is a summary of the total ARD picture among all of the BCT Forts that were surveyed during the year, and indicates the average ARD hospitalization rate per hundred per month FY '78. Fiscal year '77 is shown at the top of this figure for comparison. The highest average ARD hospitalization rate was approximately 2.6/100/month in February. Influenza admissions

occurred for the most part January thru March. Most stations administered adenovirus vaccines from October to May. Influenza vaccine was usually begun in October or November, but Forts differed extensively in their stopping dates. Including all of the Forts, an average of 7.7% of ARD was caused by the Adenoviruses, 8.2% by Influenza, 0.8% by other agents, e.g. Mycoplasma, Herpes and Polioviruses; and 83.3% were caused by agents that were not determined.

Table 1 summarizes causative agents by isolations and seroconversions obtained from the total samples taken from individuals hospitalized with ARD at the nine Training Forts and one Naval Training Center that were surveyed. From 4,786 individuals 492 virus isolations were made (10%). Of the isolations, 262 (53%) were Adenoviruses; 74.4% (195) were Adenovirus type 21, 13.4% (35) type 7, and 12.2% (32) type 4. All of the Influenza isolates were the A's (73). Various other isolates can also be seen in Table 1. Of the 2,293 serum pairs studied, 840 (36%) indicated seroconversions. 264 (31%) were to Adenoviruses, 476 (56%) to Influenza A, 64 (7%) to Influenza B, and 36 (4%) to Mycoplasma. The Influenza agents were predominantly A/USSR/77 and B/Hongkong/72. It could not be determined if the 146 poliovirus isolates were infection or vaccine viruses.

Table 2 indicates other Military Stations across CONUS that were involved with A/USSR Influenza infections. From 144 samples, 1 Adenovirus type 4 and 37 Influenza type A's were isolated. From 36 serum pairs received 15 seroconversions to Flu A were obtained. With rare exception the Influenzas were A/USSR/77.

REFERENCE

1. Smith, C.D., Col., et al. Prophylactic Methods in the Prevention of Diseases Among Army Personnel. Annual Progress Reports 1970-1978.

FIGURE 1

ACUTE RESPIRATORY DISEASE HOSPITALIZATIONS AT BCT FORTS – FY '78

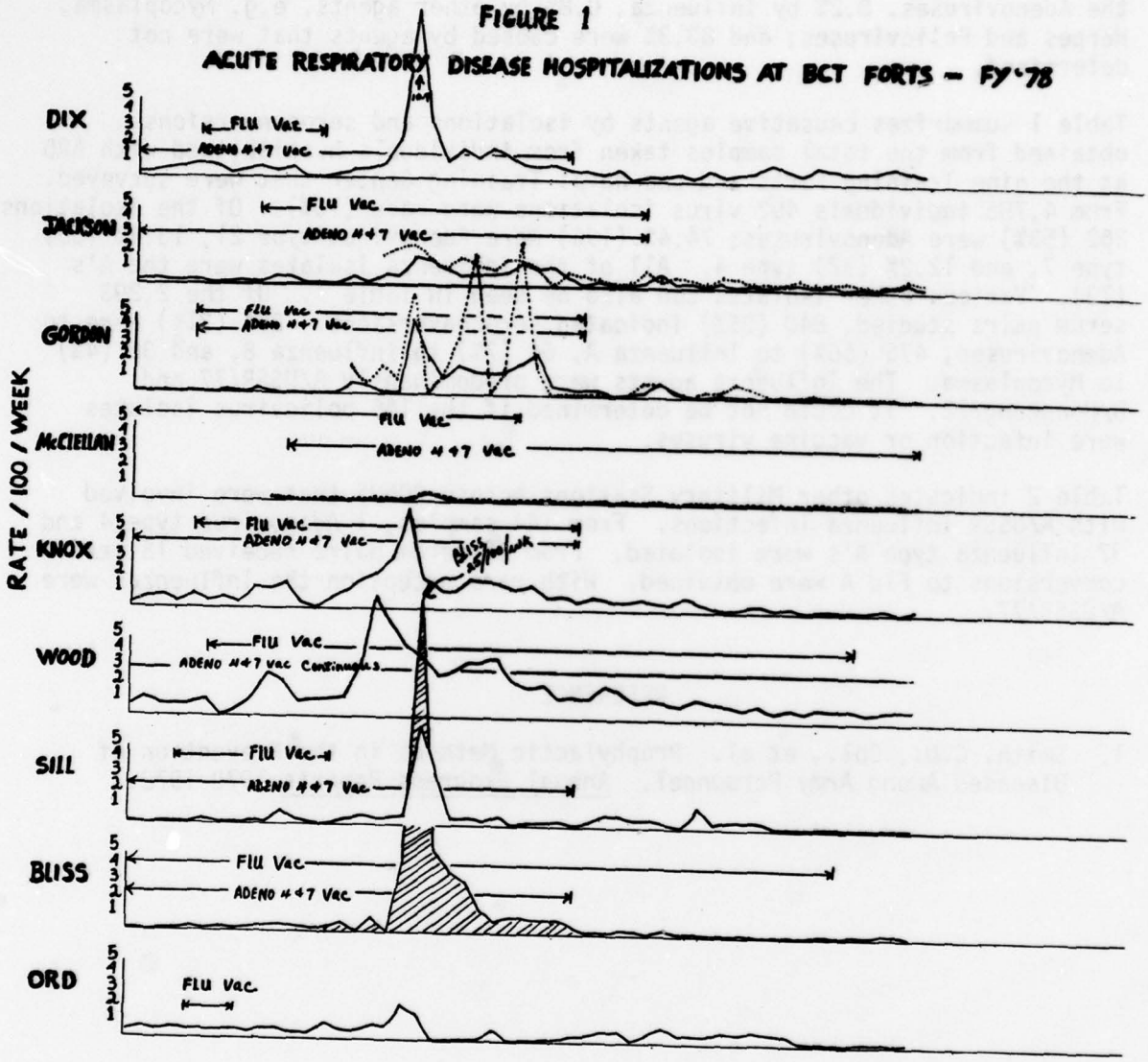
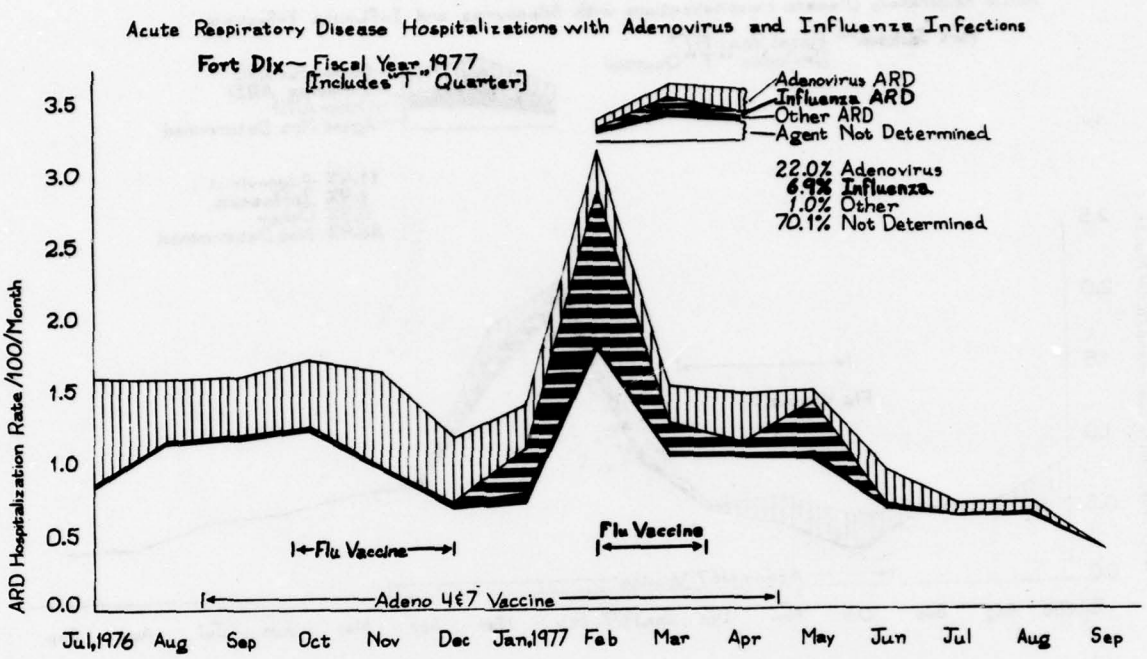


FIGURE 2


Acute Respiratory Disease Hospitalizations with Adenovirus and Influenza Infections
Fort Dix — Fiscal Year 1977
[Includes "1" Quarter]
Adenovirus ARD
Influenza ARD
Other ARD
Agent Not Determined
22.0% Adenovirus
6.9% Influenza
1.0% Other
70.1% Not Determined
ARD Hospitalization Rate /100/Month
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Flu Vaccine
Flu Vaccine
Adeno 4&7 Vaccine
Jul, 1976
Aug
Sep
Oct
Nov
Dec
Jan, 1977
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep

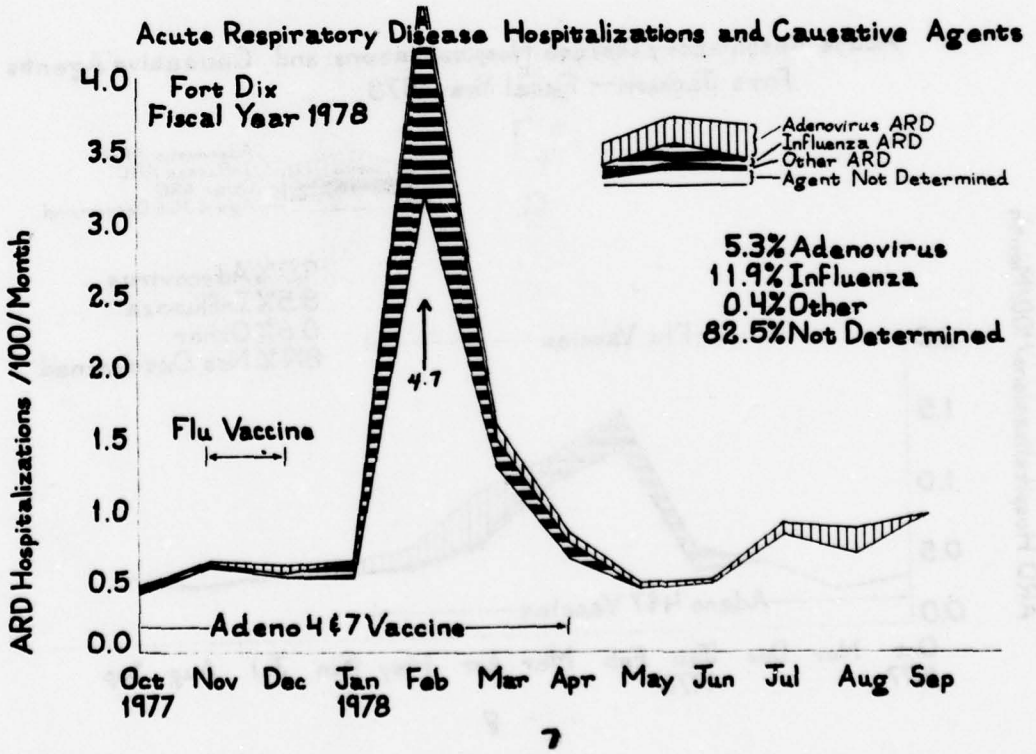
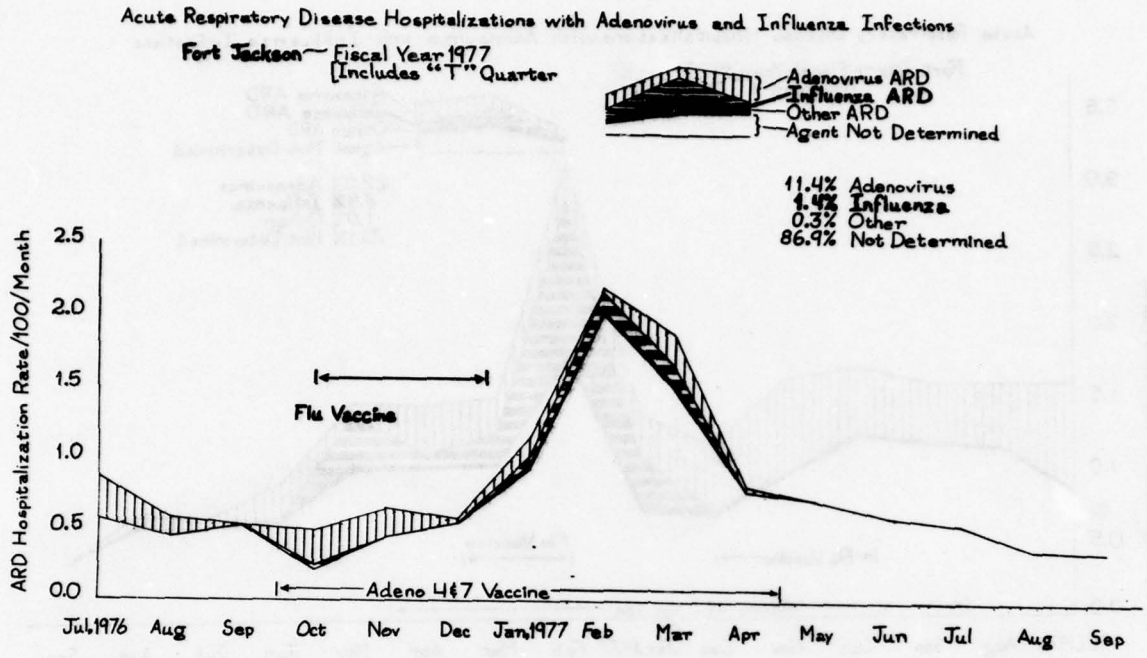

Acute Respiratory Disease Hospitalizations and Causative Agents
Fort Dix
Fiscal Year 1978
Adenovirus ARD
Influenza ARD
Other ARD
Agent Not Determined
5.3% Adenovirus
11.9% Influenza
0.4% Other
82.5% Not Determined
ARD Hospitalizations /100/Month
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
4.7
Flu Vaccine
Adeno 4&7 Vaccine
Oct 1977
Nov
Dec
Jan 1978
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep

FIGURE 3


Acute Respiratory Disease Hospitalizations with Adenovirus and Influenza Infections
Fort Jackson— Fiscal Year 1977
[Includes "T" Quarter
Adenovirus ARD
Influenza ARD
Other ARD
Agent Not Determined
11.4% Adenovirus
1.4% Influenza
0.3% Other
86.9% Not Determined
ARD Hospitalization Rate/100/Month
2.5
2.0
1.5
1.0
0.5
0.0
Flu Vaccine
Adeno 4&7 Vaccine
Jul 1976
Aug
Sep
Oct
Nov
Dec
Jan 1977
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep

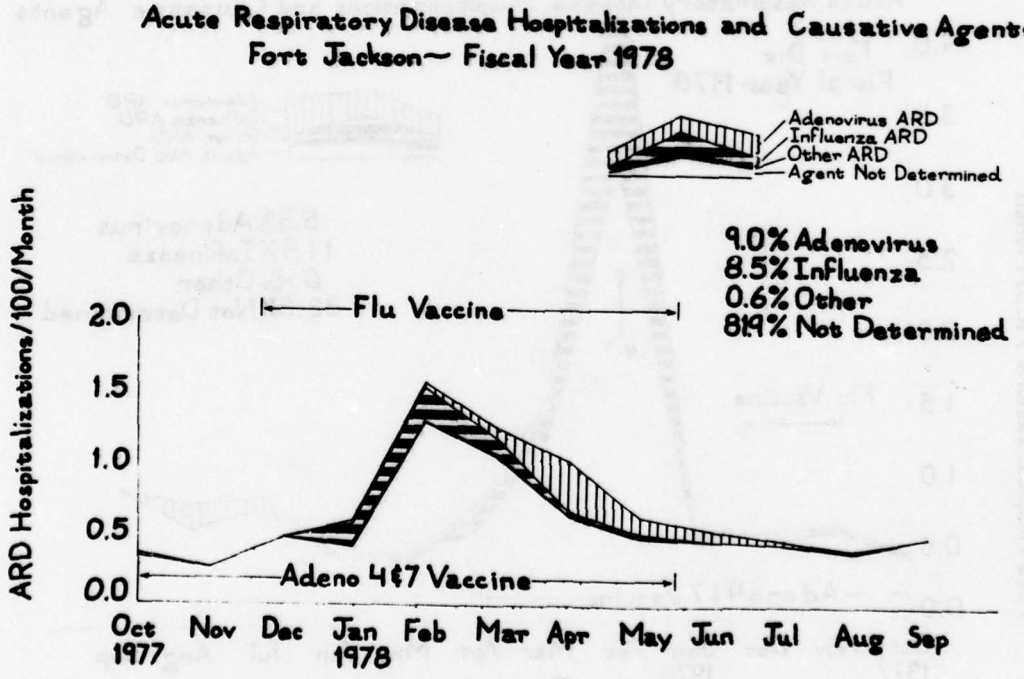
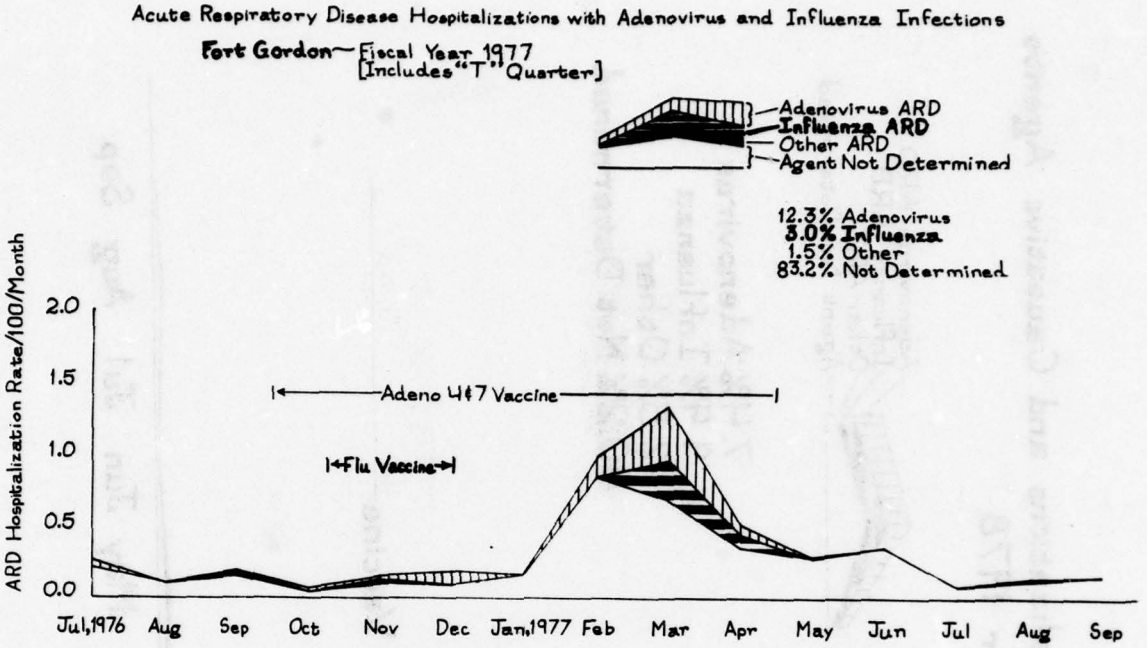

Acute Respiratory Disease Hospitalizations and Causative Agents
Fort Jackson— Fiscal Year 1978
Adenovirus ARD
Influenza ARD
Other ARD
Agent Not Determined
9.0% Adenovirus
8.5% Influenza
0.6% Other
81.9% Not Determined
ARD Hospitalizations/100/Month
2.0
1.5
1.0
0.5
0.0
Flu Vaccine
Adeno 4&7 Vaccine
Oct 1977
Nov
Dec
Jan 1978
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep

FIGURE 4


Acute Respiratory Disease Hospitalizations with Adenovirus and Influenza Infections
Fort Gordon— Fiscal Year 1977
[Includes "T" Quarter]
Adenovirus ARD
Influenza ARD
Other ARD
Agent Not Determined
12.3% Adenovirus
3.0% Influenza
1.5% Other
83.2% Not Determined
ARD Hospitalization Rate/100/Month
2.0
1.5
1.0
0.5
0.0
Adeno 4&7 Vaccine
Flu Vaccine
Jul,1976 Aug Sep Oct Nov Dec Jan,1977 Feb Mar Apr May Jun Jul Aug Sep

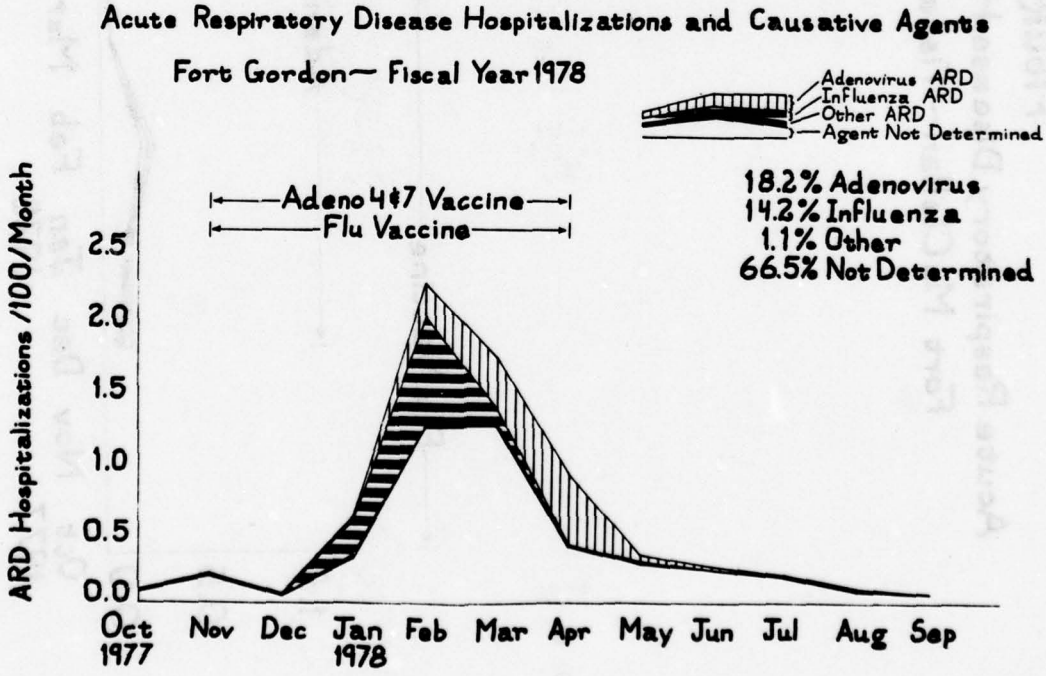
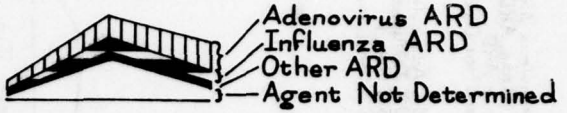

Acute Respiratory Disease Hospitalizations and Causative Agents
Fort Gordon— Fiscal Year 1978
Adenovirus ARD
Influenza ARD
Other ARD
Agent Not Determined
18.2% Adenovirus
14.2% Influenza
1.1% Other
66.5% Not Determined
ARD Hospitalizations /100/Month
Adeno 4&7 Vaccine
Flu Vaccine
2.5
2.0
1.5
1.0
0.5
0.0
Oct 1977 Nov Dec Jan 1978 Feb Mar Apr May Jun Jul Aug Sep

FIGURE 5

Acute Respiratory Disease Hospitalizations and Causative Agents
Fort McClellan— Fiscal Year 1978



7.4% Adenovirus
9.9% Influenza
2.5% Other
80.2% Not Determined

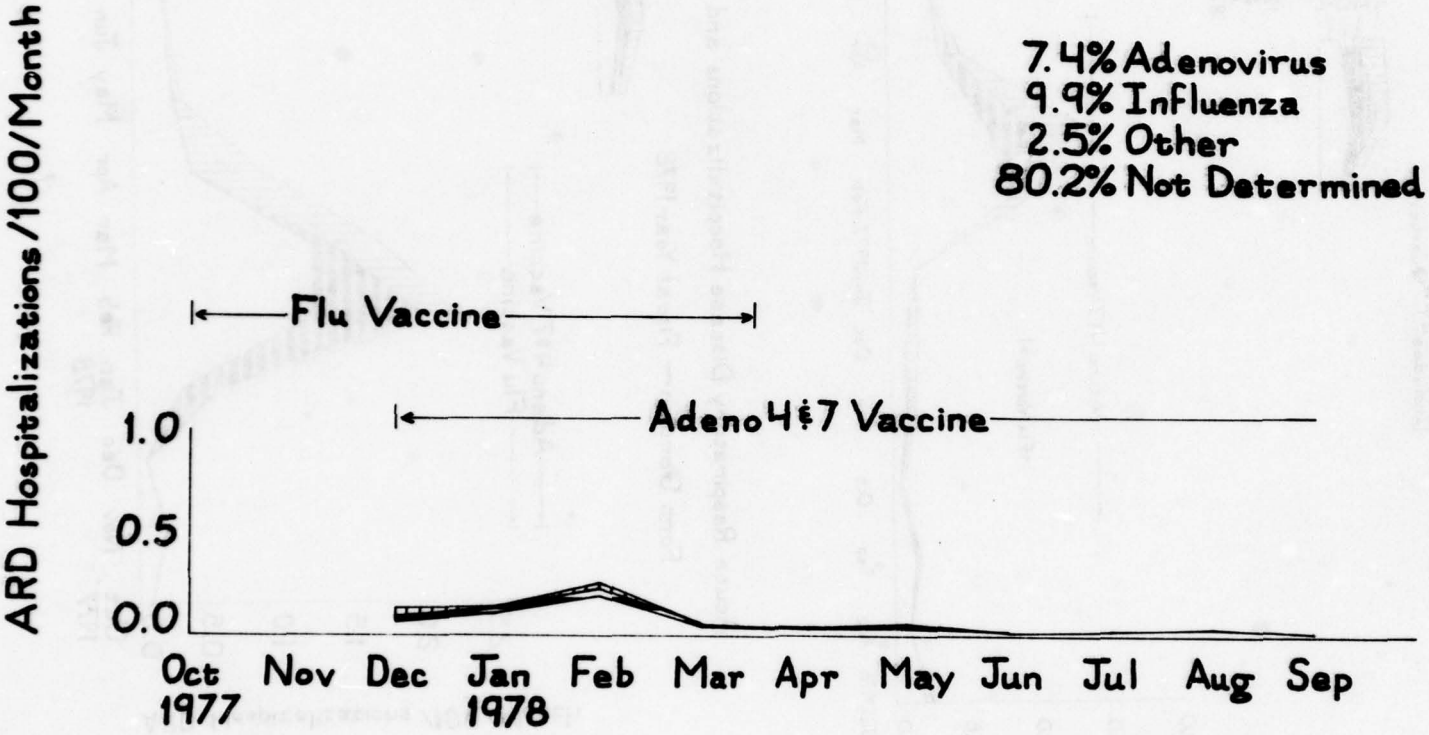
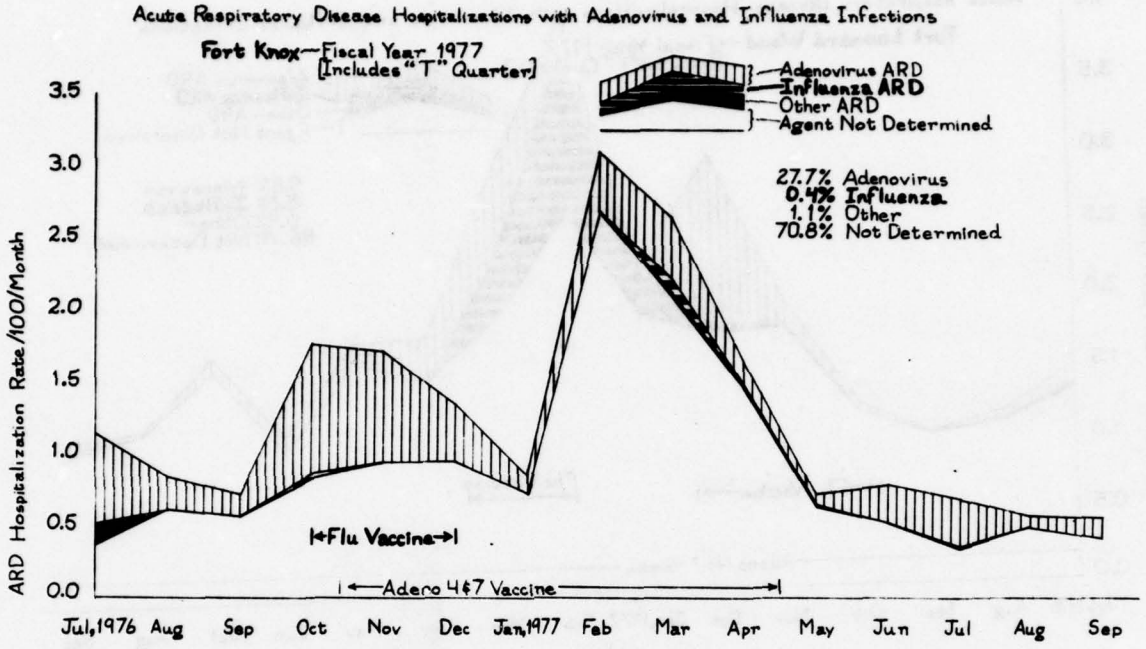


FIGURE 6


Acute Respiratory Disease Hospitalizations with Adenovirus and Influenza Infections
Fort Knox—Fiscal Year 1977
[Includes "T" Quarter]
Adenovirus ARD
Influenza ARD
Other ARD
Agent Not Determined
27.7% Adenovirus
0.4% Influenza
1.1% Other
70.8% Not Determined
ARD Hospitalization Rate/100/Month
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Flu Vaccine
Adeno 4&7 Vaccine
Jul, 1976
Aug
Sep
Oct
Nov
Dec
Jan, 1977
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep

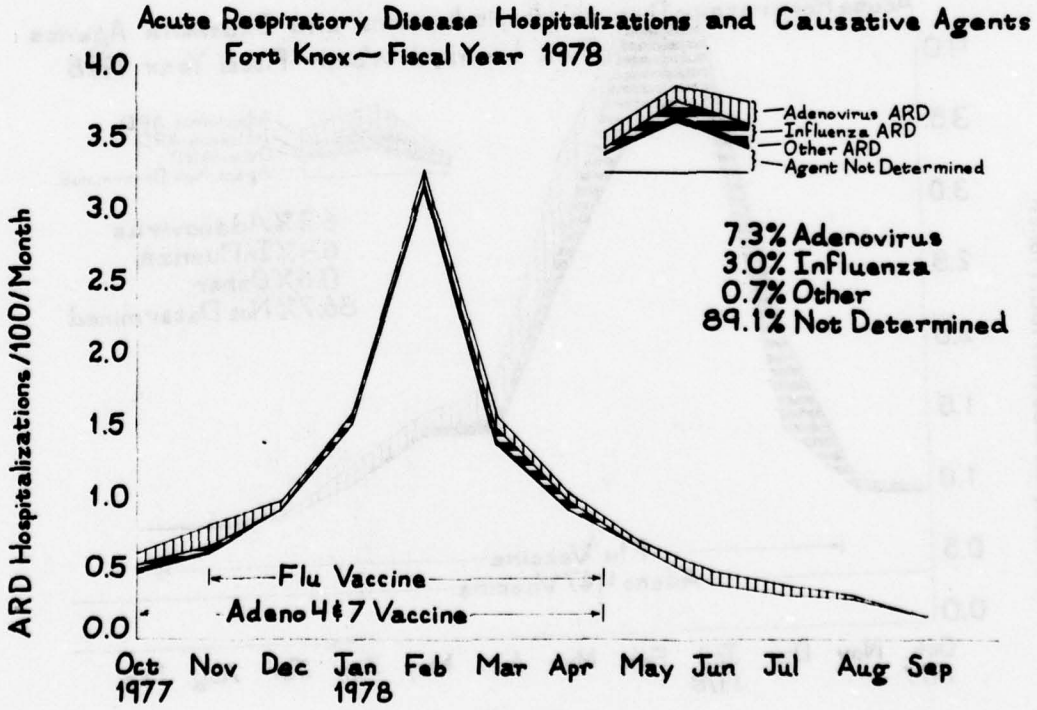
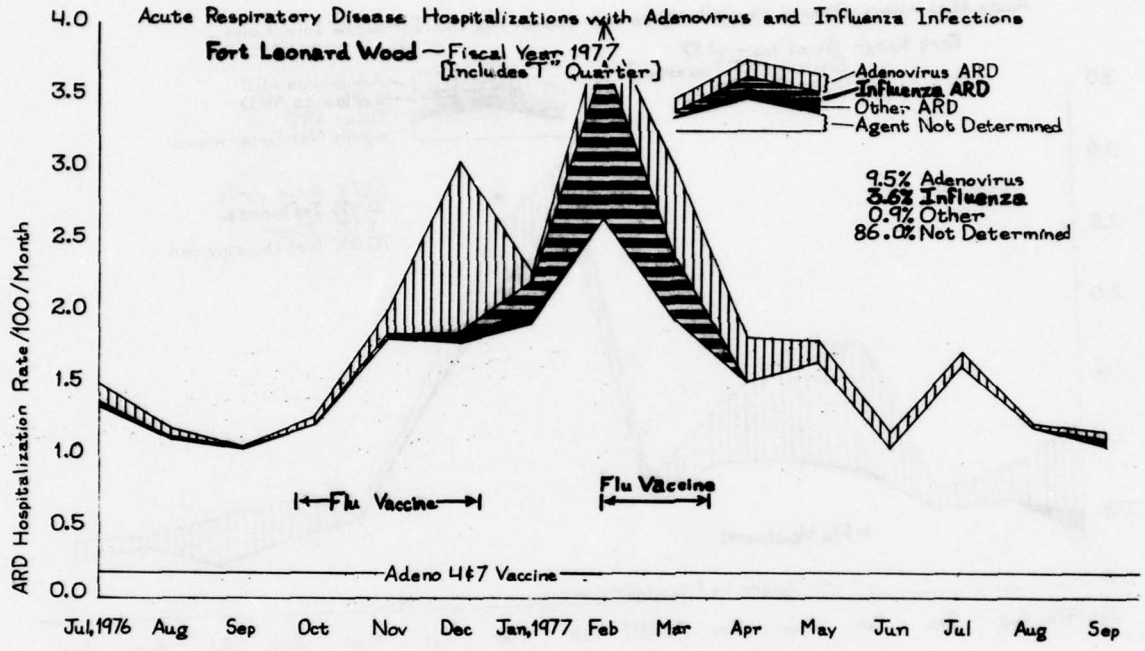

Acute Respiratory Disease Hospitalizations and Causative Agents
Fort Knox — Fiscal Year 1978
Adenovirus ARD
Influenza ARD
Other ARD
Agent Not Determined
7.3% Adenovirus
3.0% Influenza
0.7% Other
89.1% Not Determined
ARD Hospitalizations/100/Month
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Flu Vaccine
Adeno 4&7 Vaccine
Oct 1977
Nov
Dec
Jan 1978
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep

FIGURE 7


Acute Respiratory Disease Hospitalizations with Adenovirus and Influenza Infections
Fort Leonard Wood — Fiscal Year 1977
[Includes 1st Quarter]
Adenovirus ARD
Influenza ARD
Other ARD
Agent Not Determined
9.5% Adenovirus
3.6% Influenza
0.9% Other
86.0% Not Determined
ARD Hospitalization Rate/100/Month
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Flu Vaccine
Flu Vaccine
Adeno 4&7 Vaccine
Jul, 1976
Aug
Sep
Oct
Nov
Dec
Jan, 1977
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep

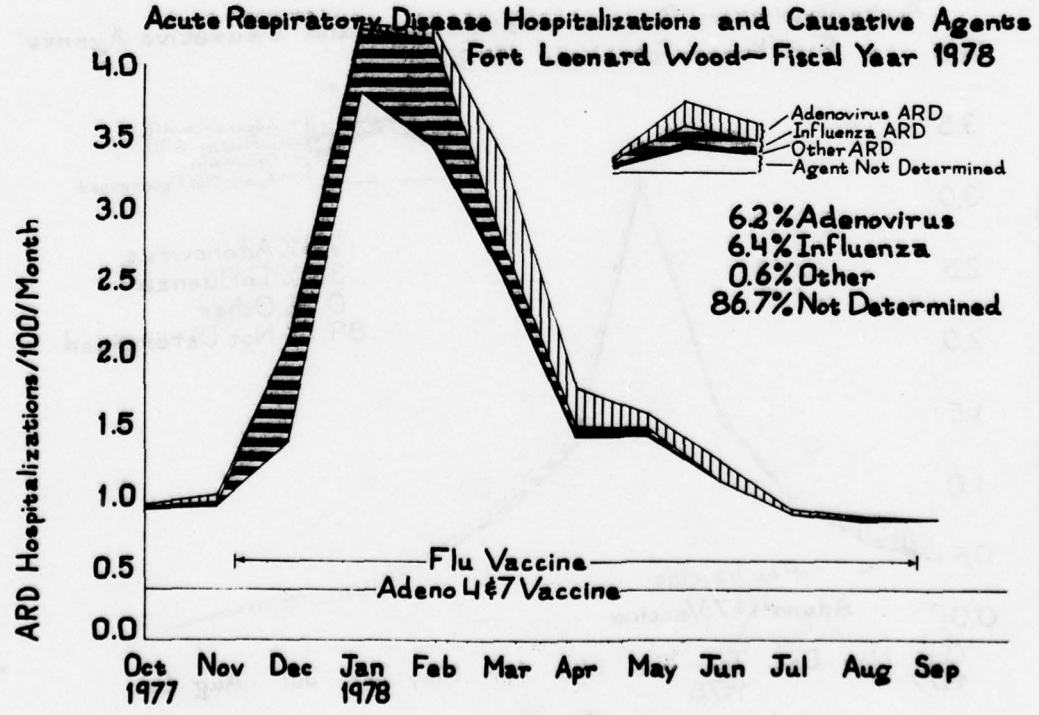
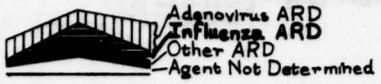

Acute Respiratory Disease Hospitalizations and Causative Agents
Fort Leonard Wood — Fiscal Year 1978
Adenovirus ARD
Influenza ARD
Other ARD
Agent Not Determined
6.2% Adenovirus
6.4% Influenza
0.6% Other
86.7% Not Determined
ARD Hospitalizations/100/Month
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Flu Vaccine
Adeno 4&7 Vaccine
Oct 1977
Nov
Dec
Jan 1978
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep

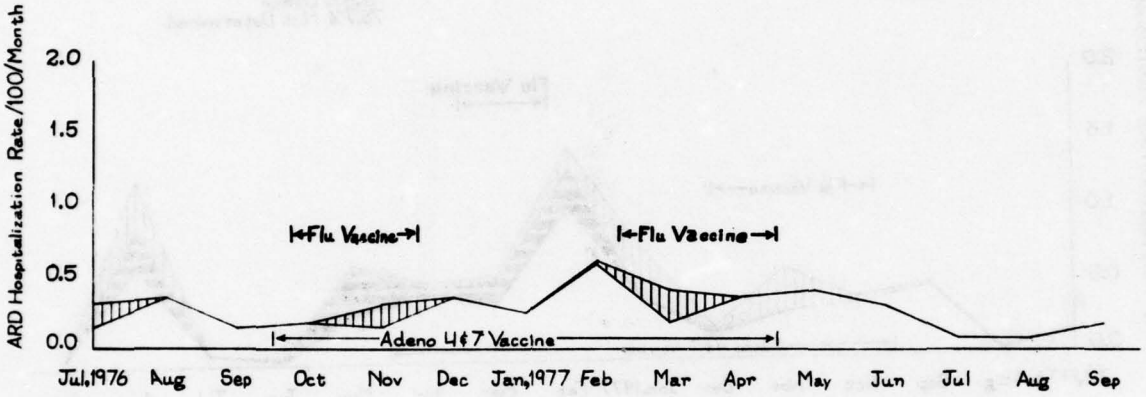
FIGURE 8

Acute Respiratory Disease Hospitalizations with Adenovirus and Influenza Infections

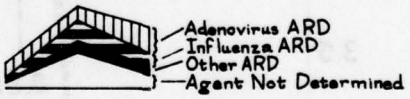
Fort Sill — Fiscal Year 1977
[Includes "T" Quarter]

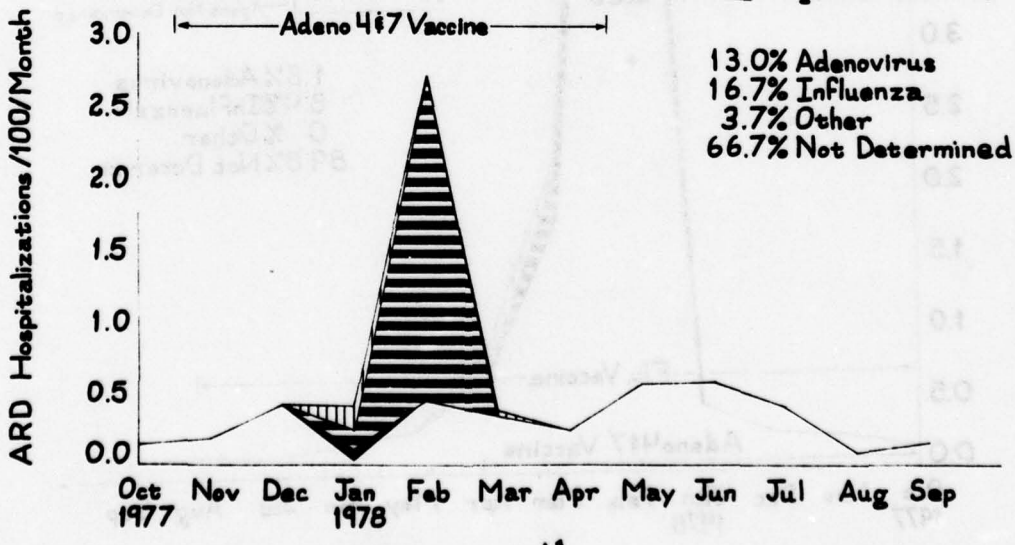


10.8% Adenovirus
0 % Other
0 % Influenza
89.2% Not Determined



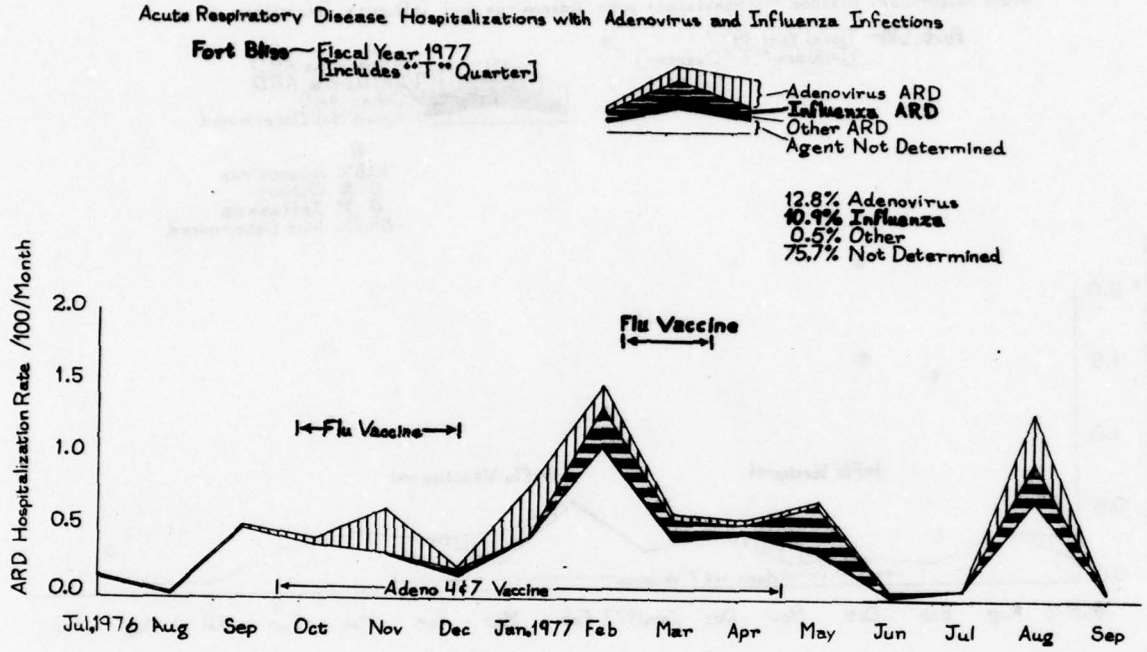
Acute Respiratory Disease Hospitalizations and Causative Agents
Fort Sill — Fiscal Year 1978





13.0% Adenovirus
16.7% Influenza
3.7% Other
66.7% Not Determined

FIGURE 9


Acute Respiratory Disease Hospitalizations with Adenovirus and Influenza Infections
Fort Bliss — Fiscal Year 1977
[Includes "T" Quarter]
Adenovirus ARD
Influenza ARD
Other ARD
Agent Not Determined
12.8% Adenovirus
10.9% Influenza
0.5% Other
75.7% Not Determined
ARD Hospitalization Rate /100/Month
2.0
1.5
1.0
0.5
0.0
Flu Vaccine
Flu Vaccine
Adeno 4&7 Vaccine
Jul, 1976
Aug
Sep
Oct
Nov
Dec
Jan, 1977
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep

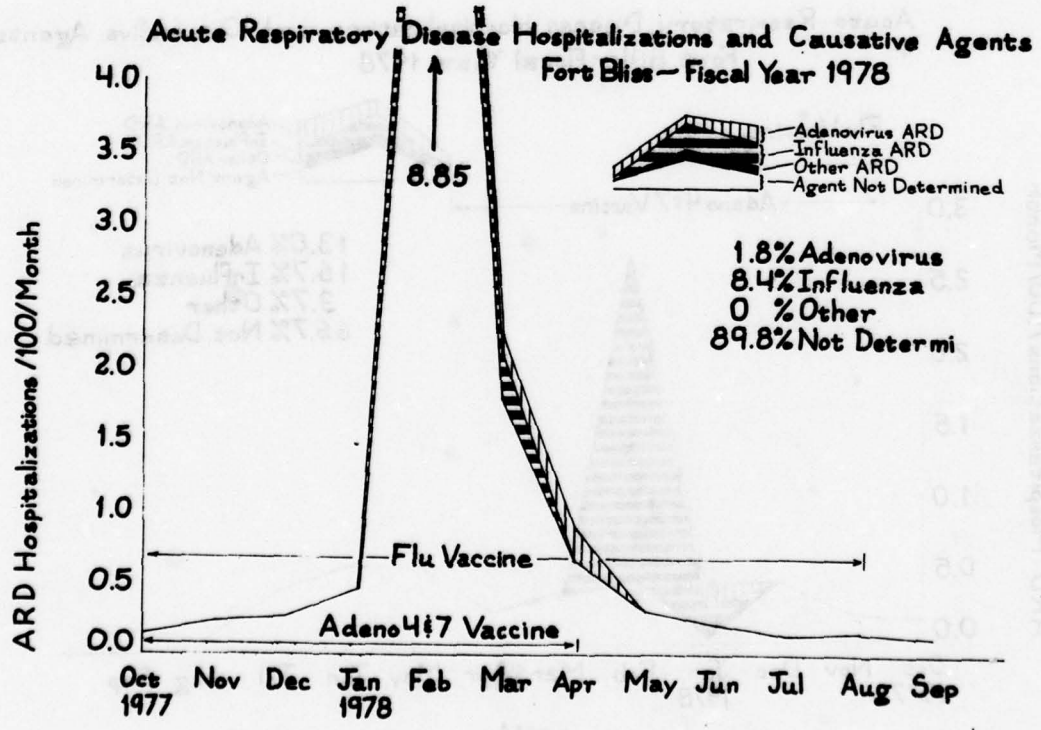
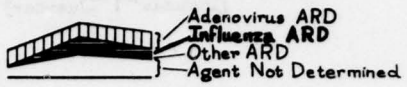

Acute Respiratory Disease Hospitalizations and Causative Agents
Fort Bliss — Fiscal Year 1978
Adenovirus ARD
Influenza ARD
Other ARD
Agent Not Determined
1.8% Adenovirus
8.4% Influenza
0 % Other
89.8% Not Determi
8.85
ARD Hospitalizations /100/Month
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Flu Vaccine
Adeno4&7 Vaccine
Oct 1977
Nov
Dec
Jan 1978
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep

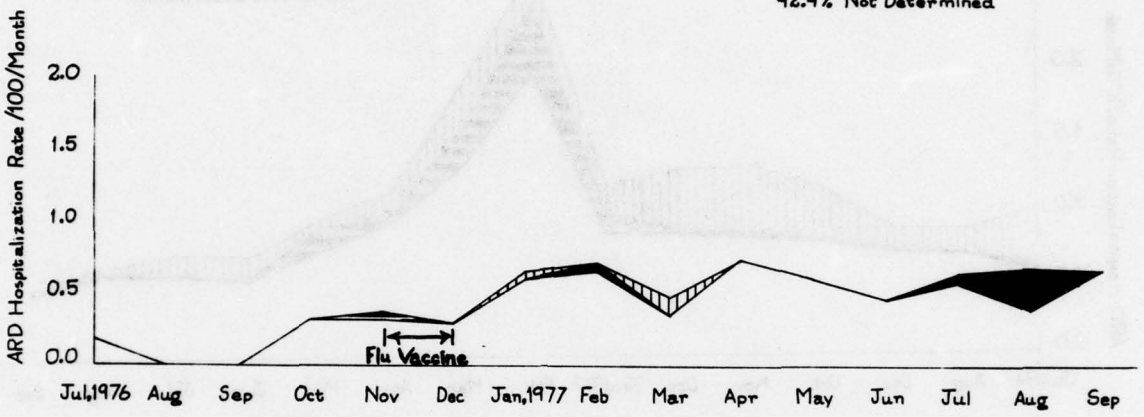
FIGURE 10

Acute Respiratory Disease Hospitalizations with Adenovirus and Influenza Infections

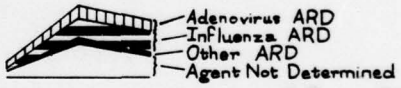
Fort Ord—Fiscal Year 1977
[Includes "T" Quarter]



2.2% Adenovirus
1.0% Influenza
4.5% Other
92.4% Not Determined



Acute Respiratory Disease Hospitalizations and Causative Agents
Fort Ord—Fiscal Year 1978



2.8% Adenovirus
8.8% Influenza
3.7% Other
84.7% Not Determined

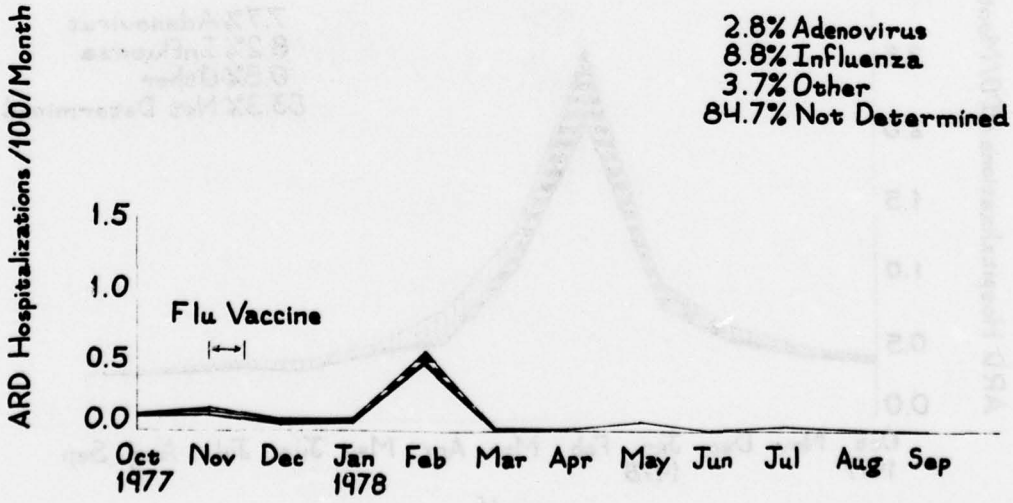
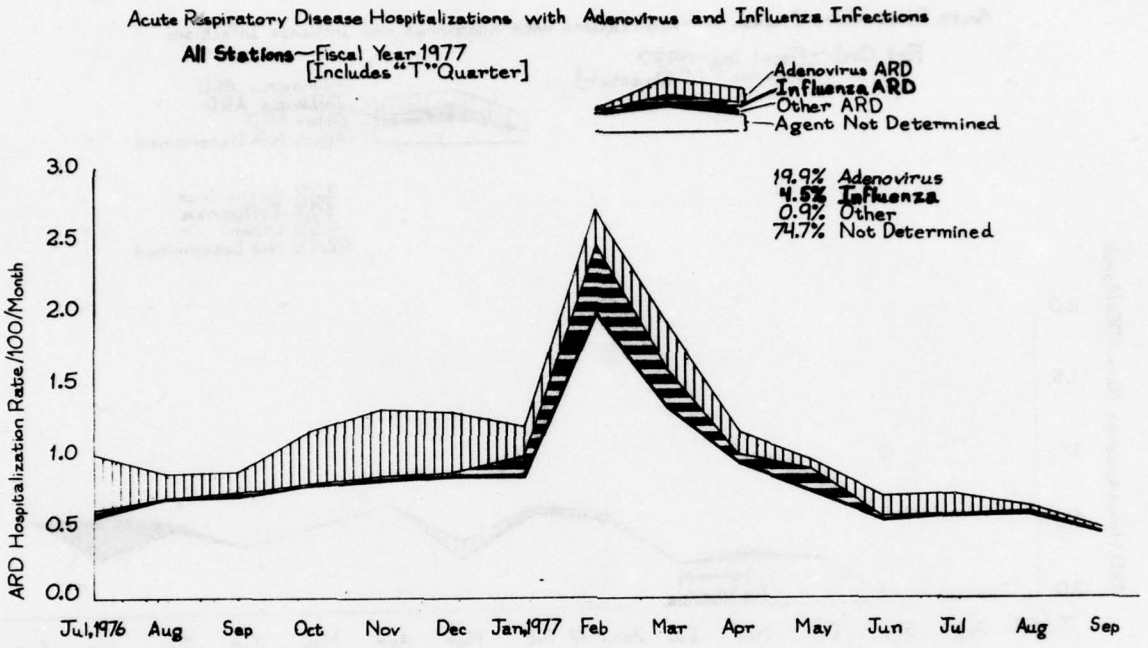


FIGURE 11


Acute Respiratory Disease Hospitalizations with Adenovirus and Influenza Infections
All Stations—Fiscal Year 1977
[Includes "T" Quarter]
Adenovirus ARD
Influenza ARD
Other ARD
Agent Not Determined
19.9% Adenovirus
4.5% Influenza
0.9% Other
74.7% Not Determined
ARD Hospitalization Rate/100/Month
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Jul, 1976
Aug
Sep
Oct
Nov
Dec
Jan, 1977
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep

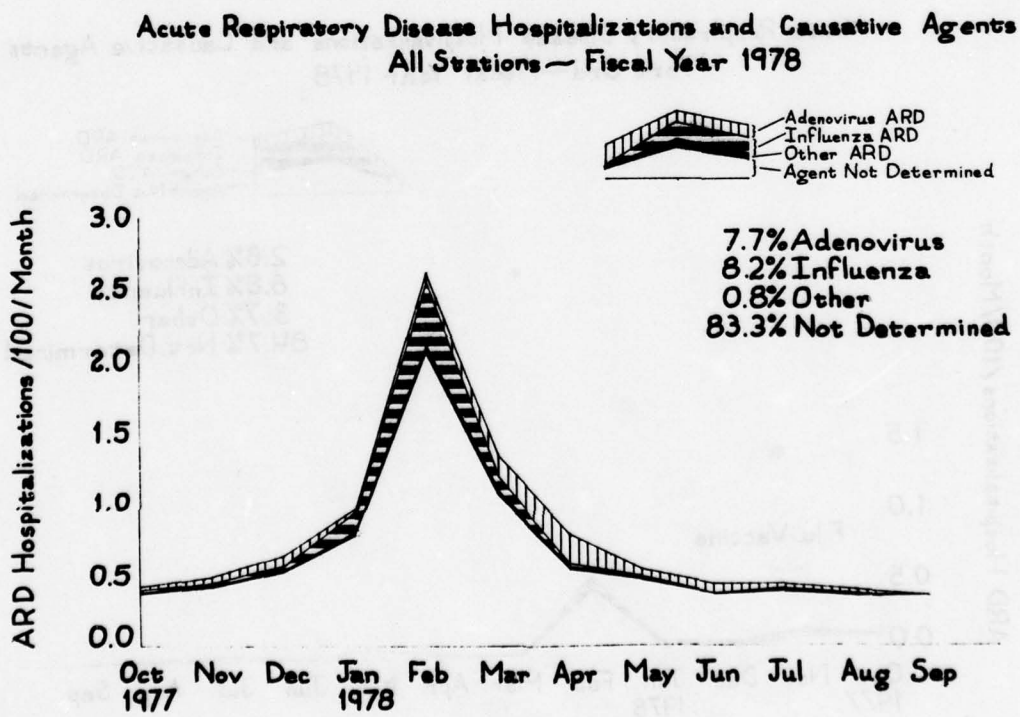

Acute Respiratory Disease Hospitalizations and Causative Agents
All Stations — Fiscal Year 1978
Adenovirus ARD
Influenza ARD
Other ARD
Agent Not Determined
7.7% Adenovirus
8.2% Influenza
0.8% Other
83.3% Not Determined
ARD Hospitalizations /100/Month
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Oct 1977
Nov
Dec
Jan 1978
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep

Table 1. Causative Agents of ARD, Isolations and Seroconversions

1 OCT 77 - 30 SEPT 78

STATION	TOTAL ISOL SPEC	ISOLATIONS												TOTAL PAIRS RECD.	SEROCONVERSIONS						
		Ad 2	Ad 3	Ad 4	Ad 7	Ad 21	FLU A	FLU B	VAC	POLIO POOL	HSV	COX	ECHO	HERPES ZOSTER		ADENOVIRUS <1WK	ADENOVIRUS >2WK	FLU A <1WK	FLU A >2WK	FLU B <1WK	FLU B >2WK	MYCO PNEU
DIX	568			3	3	9				5				1	296	14	15	41	33	1		1
KNOX	743			6	2	37				24					209	4	17	23	13	8	5	5
WOOD	1223			6	5	47	4			20	1				959	49	29	88	33	23	4	11
JACKSON	741			2	14	33	26			12	2				297	9	41	74	9	6		2
BLISS	229				2	1				8					107	3	1	28	7	1	2	
GORDON	461			8	1	51	37			12					337	46	26	44	38	6	4	5
McCLELLAN	76					6	6			2					43		2	19				2
SILL	45					2				3					23		5		9		2	2
ORD(AIT)	228				1	1				1	2				122		3		17		2	8
USN-NTC	472			7	7	8				59	5				0							
TOTALS	4786			32	35	195	73			146	10			1	2293	125	139	317	159	45	19	36
%				12.2	13.4	74.4													89%		11%	
% LAST YEAR		.28	.37	3.6	8	87.7													44%		56%	

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Table 2. Other Military Stations Involved in the A/USSR Influenza Infections
1 OCT 77 - 30 SEPT 78

STATION	TOTAL ISOL SPEC	ISOLATIONS													TOTAL PAIRS RECD.	SEROCONVERSIONS					
		Ad 2	Ad 3	Ad 4	Ad 7	Ad 21	FLU A	FLU B	VAC	POOL	HSV	COX	ECHO	HERPES ZOSTER		ADENOVIRUS <1WK	ADENOVIRUS >2WK	FLU A <1WK	FLU A >2WK	FLU B <1WK	FLU B >2WK	MYCO PNEU
Carlisle Barracks, PA	21						3								0							
Ft Belvoir	13						10								0							
Ft Bragg	7														15			5				1
Ft Carson	20														13				7			
Ft Detrick	2														0							
Ft Meyer	14						4								0							
Ft Meade	14						6								0							
Ft Monmouth	7														0							
Tripler AMC	34						12								0							
Loring AFB	21						2								0							
AF Med Ctr Camp Springs	3														0							
NRMC Oak Knolls	22				1										8			3				
TOTALS	144				1		37								36			8	7			1

ANTIGENIC EVALUATION OF ADENOVIRUS VACCINES FY'78

DESIGN:

Types 4 and 7 live enteric-coated Adenovirus vaccines containing $10^{5.1}$ and $10^{6.1}$ logs $TCID_{50}$ of virus were evaluated for immunogenicity during the year on the first recruits who received new vaccine lots distributed to Forts Knox, Dix, Jackson and McClellan. No sera revelant to this study were received from Forts Wood, Bliss, Sill or Gordon. Serum neutralizing antibody titers were determined at this laboratory on 256 serum pairs consisting of pre-vaccine and 3 weeks post-vaccine samples. The microtiter homologous neutralization test which is routinely used in this laboratory was employed.

RESULTS:

Seroconversion rates ranged from 28.6% to 69.8% for Adenovirus type 4 Wyeth Lot #67401 vaccine, and from 63.1 to 100% for Adenovirus type 7 Wyeth Lot #67501 vaccine. The accumulative results at the bottom of Table 1 indicate that the type 4 vaccine was 50% immunogenic, and the type 7 vaccine was 91.1% immunogenic. Susceptables before vaccination were 89.1% to type 4 Adenovirus and 43.8% to type 7.

TABLE 1

ANTIGENIC EVALUATION OF ADENOVIRUS VACCINES FY '78

FORT KNOX

Vaccine #	Pairs Tested	Conversions/Susceptibles	Percent Conversions
Adenovirus 4, # 67401	25	9/24	37.5
Adenovirus 7, # 67501	25	16/17	94.1

FORT DIX

Adenovirus 4, # 67401	47	30/43	69.8
Adenovirus 7, # 67501	47	20/20	100.0

FORT JACKSON

Adenovirus 4, # 67401	34	8/28	28.6
Adenovirus 7, # 67501	34	7/11	63.6

FORT McCLELLAN

Adenovirus 4, # 67401	22	10/19	52.6
Adenovirus 7, # 67501	22	8/8	100.0

FORTS WOOD, BLISS, SILL, & GORDON

- NO SERA RECEIVED -

ACCUMULATIVE RESULTS

Adenovirus 4	Vaccine	128	57/114	50.0
Adenovirus 7	Vaccine	128	51/56	91.1

% Susceptable to Adenovirus 4 = 89.1
% Susceptable to Adenovirus 7 = 43.8

PREVALENCE OF INFLUENZA H_1N_1 and $HswN_1$ ANTIBODIES IN AIT'S AT FORT ORD, CALIFORNIA, FY 78

INTRODUCTION

Influenza A/USSR/77 was responsible for major outbreaks of respiratory disease among young adults in Europe and the USA in 1977-1978. Although the disease was relatively mild, the attack rate was extremely high and caused significant disruption of civilian and military communities (1).

In anticipation of additional H_1N_1 disease in 1978-79. New inactivated vaccines containing H_1N_1 antigens have been prepared. Several field trials using the H_1N_1 vaccine were to be performed to determine which combination of vaccines and doses would provide at least 70% seroconversion by hemagglutination inhibition (HI) antibody. It was initially hypothesized that few Americans under 25 years have antibody to H_1N_1 and that the A/NJ/76 ($HswN_1$) vaccine would not confer immunity. This hypothesis was based on the assumption that individuals born after the H_1N_1 decade (1947-57) would lack antibody and therefore be susceptible to H_1N_1 infection. A preliminary study performed by Dr. Gordon Meiklejohn in Lowry AFB personnel under 23 years of age indicated that a significantly larger percentage of individuals in this group did in fact have pre-existing antibody to H_1N_1 (personal communication).

As a result of Dr. Meiklejohn's findings, a preliminary screening study was initiated at Fort Ord to determine susceptibility of military personnel to H_1N_1 and $HswN_1$. The number of susceptibles will be a major factor in determining the feasibility of conducting an Influenza A/USSR/77 vaccine field trial.

METHODS AND MATERIAL

During the period 10 April to 10 October 1978, advanced individual trainees (AIT's) and permanently assigned military personnel totaling 496 individuals at Fort Ord were randomly selected for this prevalence of H_1N_1 antibody study. Serum specimens were collected at Fort Ord, they were separated from clots by centrifugation and refrigerated at $5^{0}C$ until transported to the Reference Laboratory, Fort Baker twice weekly. Hemagglutination inhibition (HI) antibodies to Influenza A/USSR/77 and A/New Jersey/76 were determined by the HI procedure(2) routinely used by this laboratory. Initially the CDC (A/USSR/90/77) antigen was used in HI tests; however, it was reported at the June 16, 1978 NIH meeting that the Parke Davis A/USSR/92/77 antigen was more sensitive than the CDC antigen (personal communication). A study comparing the sensitivities of the CDC and Parke Davis antigens was performed on all sera which had previously been tested with the CDC antigen.

PREVALENCE OF INFLUENZA H_1N_1 AND $HswN_1$ ANTIBODIES IN AIT'S AT FORT ORD, CALIFORNIA, FY 78

RESULTS AND DISCUSSION

The comparison of the CDC and Parke-Davis (PD) Hemagglutination (HA) antigens is presented in Table I. Two hundred sixty-two individuals were studied of which 217 (sera collected up to that time) were less than or equal to 25 years of age. The sensitivity of the PD antigen is evidenced by the 15.3% decrease in the number of susceptibles ≤25 years and a 11.2% decrease in those over 25 years of age. As a result of this preliminary evaluation, all sera to be examined for H_1N_1 antibodies would be tested using the Parke Davis antigen.

As indicated in Table II, 411 individuals were ≤25 years and 85 were over 25 years of age. A total of 176 (34.3%) individuals of all ages were susceptible to $HswN_1$. This figure was expected considering the massive immunization of military personnel to $HswN_1$ in 1976. The 23.6% susceptibility to both antigens for individuals≤25 years is of interest, since consideration was given at one time that susceptibility to both H_1N_1 and $HswN_1$ would be a criteria for acceptance into a Flu vaccine immunogenicity study. With the exception of August (28.9%) and September (26.3%), the monthly rates of susceptibles to H_1N_1 were fairly consistant between 37.0 and 46.8%. The total of 163 (39.7%) H_1N_1 seronegative individuals (≤25 yrs) was a surprisingly low figure considering the initial belief that at least 70% of individuals ≤25 years would be seronegative. It must be concluded that the extent of Influenza A/USSR/77 infections was considerable (during the winter of 1977-78 at Fort Ord).

TABLE I

COMPARISON OF CDC VS. PARKE DAVIS INFLUENZA A/RUSSIAN/77
HI ANTIGENS

	<25 YRS <10/TOTAL	%	< 5 YRS <10/TOTAL	%	ALL AGE <10/TOTAL	%
A/Russian/90/77 CDC #77-0155	98/217	45.2	16/45	35.6	114/262	43.5
A/Russian/92/77 PD#RX-43242	83/217	38.3	11/45	24.4	94/262	35.9
% Decrease		15.3		11.2		17.5

TABLE II

PREVALENCE OF INFLUENZA H_1N_1 and $HswN_1$ ANTIBODIES
IN AIT's AT ORD, CA

Month Of		$HswN_1$ A/NJ/8/76 Suscept/Total	%	H_1N_1 A/USSR/92/77 Suscept/Total	%	SUSCEPTIBILITY TO BOTH ANTIGENS Suscept/Total	%
APR	<25	22/68	32.4	27/68	39.7	8/68	11.8
	ALL AGES	27/85	31.8	27/85	31.8	11/85	12.9
MAY	<25	36/77	46.8	29/77	37.7	14/77	18.2
	ALL AGES	39/89	43.8	29/89	32.6	15/89	16.9
JUN	<25	52/120	43.3	52/120	43.3	36/120	30.0
	ALL AGES	54/144	37.5	54/144	37.5	39/144	27.1
JUL	<25	28/62	45.2	29/62	46.8	23/62	37.1
	ALL AGES	30/79	38.0	35/79	44.3	27/79	34.2
AUG	<25	4/38	10.5	11/38	28.9	3/38	7.9
	ALL AGES	4/45	8.9	11/45	24.4	3/45	6.7
SEP	<25	3/19	15.8	5/19	26.3	3/19	15.8
	ALL AGES	4/24	16.7	7/24	29.2	4/24	16.7
OCT	<25	12/27	44.4	10/27	37.0	10/27	37.0
	ALL AGES	12/30	40.0	10/30	33.3	10/30	33.3
TOTAL	<25	157/411	38.2	163/411	39.7	97/411	23.6
	≥25	13/85	15.3	10/85	34.9	12/85	14.1
	ALL AGES	170/496	34.3	173/496	34.9	109/496	22.0

PREVALENCE OF INFLUENZA H_1N_1 AND $HswN_1$ ANTIBODIES IN AIT'S AT FORT ORD, CALIFORNIA, FY 78

SUMMARY

Plans to conduct an Influenza A/USSR/77 vaccine immunogenicity and reactogenicity field trial at Fort Ord, California were in progress during FY '78. An initial criteria for admittance to the study was the absence (<10) of antibodies to H_1N_1. However, a study at Lowry AFB indicated that the number of seronegative individuals under the age of 25 was less than anticipated. Therefore, a preliminary study to determine the presence of H_1N_1 and $HswN_1$ antibodies in military personnel at Fort Ord was initiated. It was decided that the study would yield valuable information if susceptibles ranged between 45-50% among the ≤25 persons. The results indicated that only 39.7% of individuals (≤25 year) were susceptible to H_1N_1 infection. The low number of susceptibles to Influenza A/USSR/77 and the lack of time necessitated the cancellation of a vaccine immunogenicity and reactogenicity field trial at Fort Ord for FY '78. Valuable information was obtained on the prevalence of H_1N_1 and $HswN_1$ antibodies in the Fort Ord population.

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RAPID DIAGNOSIS OR UPPER RESPIRATORY VIRUSES IN CELL CULTURE UTILIZING THE DIRECT IMMUNOFLUORESCENCE PROCEDURE

INTRODUCTION

Routine cell culture procedures for virus isolation and identification require six days or longer to definitively identify an etiological agent. Fluorescence antibody procedures have been demonstrated to be a rapid method for the identification of various viral agents (1,2,5). Several approaches utilizing this technique have been attempted here at Fort Baker, but with limited success. Specifically, these studies related to the use of the indirect FA procedure and ciliated epithelial cells from nasopharyngeal smears (3).

There have been several reports of success in the identification of influenzavirus by the staining of ciliated epithelial cells (1,6,7). However, the specificity of staining using this technique has been questioned (8). Thus, there is a necessity for further research and accumulation of data on the staining of nasopharyngeal smears.

The initial research application submitted by Fort Baker pertained specifically to the indirect immunofluorescence test and the examination of nasopharyngeal smears. However, a change in protocol has been necessitated by the questions of specificity related to nasopharyngeal swabs and the availability of commercially produced specific conjugates to a variety of viral agents.

The emphasis will now be placed on the use of the direct immunofluorescence procedure with the utilization of prepared infected cell cultures. Use of the direct procedure will provide clearer staining and optimal resolution of morphologic localization of viral antigens (4). Prepared cell cultures provide a substrate in which the level of infectivity can be regulated and proper quality control measures can be incorporated.

METHODS

Specific fluorescein conjugates were purchased from Microbiological Associates and Flow Laboratories for Adenovirus, Influenzavirus A and B, Parainfluenza 1, 2, 3, Respiratory syncytial, mumps, cytomegalovirus and Herpes I and II. All conjugates were titrated to determine the optimal working dilutions. Methods and results are presented in a previous report (9).

Specimens were collected and placed in charcoal viral transport media (CVTM) or tryptose phosphate broth with gelatin (TSB). Upon receipt clinical

specimens were inoculated into primary human embryonic kidney (HEK), primary rhesus monkey kidney (RMK), amnion, vero monkey kidney (VMK), and human diploid fibroblasts (IMR-90).

The fluorescence antibody test was not performed until cytopathogenic effect (CPE) was observed. The cells were allowed to go to 2+ CPE, Trypsinized with a .05% trypsin - .025% versone solution and combined with two tubes of trypsinized normal cells: The combined tubes were thoroughly mixed and 8 smears were prepared along with 2 smears of normal cell suspension. Printed slides purchased from Cel-Line Associates (CL-100) were utilized. The slides were fixed in cold acetone ($4^{o}C$) for 10 minutes and stored ($-60^{o}C$) until use. Control slides using known positive viral cultures for each conjugate were also prepared in a similar manner. The direct immunofluorescence test as described by Lin (4) was performed for all FA procedures.

The direct immunofluorescence test was performed on all positive cultures suspected of adenovirus, influenzavirus A and B, parainfluenza 1,2,3, herpes, mumps, CMV and rubeola virus infections. All positive cultures were also identified by the standard cell culture neutralization procedures.

RESULTS AND DISCUSSION

A total of 98 specimens were evaluated by the direct immunofluorescence procedure. Sixty-five patients were tested for Herpes I and II. There was a 90.8% correlation between the FA and cell culture identification procedures. As experience was gained in observing Herpes virus fluorescence, it was possible to differenciate between conjugated Herpes type I from II using the specific conjugated antisera. Herpes type I produced a diffuse pattern, whereas Herpes type II demonstrated a nucleolar pattern. This differentiation was not totally accurate, but was remarkably consistent for a large number of specimens. A total of 12 specimens were tested for adenovirus using a conjugated, group antisera. There was a 83.3% correlation between FA and cell culture techniques. The results for Parainfluenzavirus 1,2,3, CMV, Mumps, Influenzavirus A and B were basically the same with excellent correlation between the two identification procedures. These results are indicated in Table I.

The quality of staining using the commercially prepared antisera was very good. Background fluorescence was at an acceptable level and cross reactivity between related conjugates was minimal. The titers of the conjugates were very low (1:5 - 1:10) resulting in relatively high costs per test due to the initial expense in purchasing the conjugates.

SUMMARY

The direct immunofluorescence antibody test is a rapid, sensitive and practical method for the identification of viral agents. Current cell culture neutralization tests require three to five days to identify agents after the appearance of CPE. The direct FA procedure can be completed within two to three hours after initial observation of viral activity. Rapid diagnosis is particularly required in cases of Herpes involvement in pregnant women near term.

The results of this study indicate that there is a high level of correlation (91.8%) between routine cell culture and FA procedures. The direct immunofluorescence procedure performed with suitable quality control measures and by an experienced technologist will provide rapid and accurate identification of viral agents.

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TABLE I

	TOTAL TESTED	FA POS	FA NEG	TC POS	POS BOTH TC-FA	% CORRELATION FA-TC
Herpes Conjugate Flow Labs I R848103F II R848205F	65	59	6	65	59	90.8
Adenovirus Conjugate Flow Labs R860501F	12	10	2	12	10	83.3
Parainfluenza I Flow R822102F	3	3	0	3	3	100
Parainfluenza II Flow R822102F	3	3	0	3	3	100
Parainfluenza III Flow R822102F	3	3	0	3	3	100
CMV Flow R846101F	3	3	0	3	3	100
Mumps Flow R828101F	3	3	0	3	3	100
Influenzavirus A Flow R825101F	3	3	0	3	3	100
Influenzavirus B Flow R826101F	3	3	0	3	3	100
	98	09	8	98	90	91.8

THE PREVALENCE OF COXSACKIEVIRUS A21 ANTIBODIES DURING A PERIOD WHEN FEW AGENTS WERE OBSERVED

INTRODUCTION

The Adenovirus Surveillance Program was established to monitor the presence of infectious agents of acute respiratory disease (ARD) among basic combat trainees (BCT's) (1). Prior to 1974, Adenovirus four (4) and seven (7) represented the major cause of ARD in army recruits. However, since 1974, primarily due to the production and use of highly immunogenic Adenovirus 4 and 7 vaccines, the percentages of adenovirus infections has been greatly reduced (2). A major concern and objective of the Adenovirus Program has been to detect the presence of viral agents which may have emerged due to the biologic void created by the suppression of Adenovirus 4 and 7. In fiscal year 1976, Adenovirus 21 was observed to be a major cause of ARD among BCT's (3). An Adenovirus 21 vaccine has been developed and will be subsequently used in the near future.

Coxsackievirus A21 was first isolated in 1958 from a recruit, hospitalized with ARD at Fort Ord, California (4). Sporatic outbreaks of Coxsackievirus A21 have been reported in military recruit centers in Scandinavia, England and in the United States (5,6,7). During the winter of 1966, this study group determined that Coxsackievirus A21 played a significant role as a causative agent of ARD. In the years 1966 through 1974, Coxsackievirus A21 has only been infrequently observed in the Adenovirus Surveillance Program; however, in fiscal year 1976, 41 cases of Coxsackievirus A21 were recovered from BCT's (3).

In order to provide background information for this investigation, a preliminary study was performed to determine the prevalence of Coxsackievirus A21 antibodies during a period (1976) when significant numbers of these organisms were recovered (8).

The objective of this study is to provide information on the prevalence of Coxsackievirus A21 antibodies during a period when no virus had been isolated.

METHODS AND MATERIAL

During the period June through Devember 1977, five basic training forts submitted 968 throat swab specimens in Charcoal Viral Transport Media for virus isolation. Human embryonic kidney, primary rhesus monkey kidney and WI 38 cell cultures were selected for isolation studies.

THE PREVALENCE OF COXSACKIEVIRUS A21 ANTIBODIES DURING A PERIOD WHEN FEW AGENTS WERE OBSERVED

Isolation and identification procedures as described by Melnick were followed (9). A total of 562 paired sera were collected and tested by complement fixation (10) for adenovirus, mycoplasma pneumoniae, Influenza-virus A and B. The microtiter serum neutralization test as described by Melnick was used to determine the presence of Coxsackievirus A21 antibodies (9). Prototype Coxsackievirus A21 (coe strain) was grown and titrated in Vero monkey kidney cells (VMK). All sera were titrated against 100 $TCID_{50}$ of the virus. The media utilized in the serum micro-neutralization test was L15 supplemented with 10% fetal calf serum. The plates were read daily and final readings were made after three days.

THE PREVALENCE OF COXSACKIEVIRUS A21 ANTIBODIES DURING
A PERIOD WHEN FEW AGENTS WERE OBSERVED

RESULTS AND DISCUSSION

As indicated in Table I, during the period June through December 1977, a total of 968 specimens were received for virus isolation and identification studies. Only 73 (7.5%) adenoviruses were isolated, as were 23 (2.4%) miscellaneous viruses such as herpes and polioviruses. There were no Coxsackievirus A21 isolates recovered during this period. A total of 569 paired sera were collected from 968 patients who were selected for the Adenovirus Surveillance Study. A total of 101 (17.8%) four-fold rises in antibody titers were detected by complement fixation. The majority of these rises were due to adenovirus (72) and Influenzavirus A and B (20). It may be concluded that the majority of upper respiratory infections were caused by agents of unknown etiology.

Microtiter serum neutralization tests were performed for Coxsackievirus A21 against the 569 paired sera submitted for the study. As shown in Table II only one four-fold rise to Coxsackievirus A21 was observed from a recruit at Ft. Dix and 29 (5.1%) patients demonstrated antibody titers of $\geq$20 to Coxsackievirus A21 for both sera. The accumulative rated GMT was calculated to be 1.02 which indicates very little difference in titers when comparing the antibody responses to Coxsackievirus A21. If an $\geq$20 antibody titer to Coxsackievirus A21 is considered to be suggestive of recent infection, there was no statistically significant difference when comparing the acute and convalescent antibody response to Coxsackievirus A21 (*chi-square*, $P>.05$).

SUMMARY

The objective of this study was to determine if there was serologic evidence of Coxsackievirus A21 infection during a period when no Coxsackievirus A21 were isolated. June through December 1977 was selected for this study. There were relatively few viruses isolated (101/968) and complement fixation tests resulted in only 101 (17.0%) $\geq$4-fold rises to adenovirus, Mycoplasma pneumoniae, Influenzavirus A and B.

Microtiter serum neutralization tests for Coxsackievirus A21 resulted in only one 4-fold serologic rise and 29 recruits with $\geq$20 titers for both acute and convalescent sera. The rated GMT (1.02) and chi-square comparison of paired sera ($P>.05$) indicates that Coxsackievirus A21 played an insignificant role as a causative agent of upper respiratory disease during June through December 1977.

The data gathered by this study is in contrast to the preliminary study performed which indicated that Coxsackievirus A21 caused a significant number of upperrespiratory disease in basic combat trainees during a

TABLE I

ADENOVIRUS SURVEILLANCE
ISOLATION AND SEROLOGY STUDIES
JUNE - DECEMBER 1977

	ISOLATION					SEROLOGY (CF)							
	No. Isol Spec	Adeno Virus	Other	Total	% Isol Rate	No. Paired Sera	Adeno CF	Influ. CF	Myco Pneu CF	Total Rises	% Total Rises	Pat Neg Isol and Serol	%
WOOD	343	14	8	22	6.4	292	18	0	1	19	6.5	263	90.1
KNOX	238	31	7	38	16.0	57	31	9	4	44	77.2	21	36.8
DIX	216	26	7	33	15.3	102	19	4	1	24	23.5	67	65.7
ORD	114	1	3	4	3.5	82	3	7	3	13	15.9	75	91.5
GORDON	57	1	3	4	7.0	36	1	0	0	1	2.8	34	94.4
TOTAL	968	73	28	101	10.4	569	72	20	9	101	17.8	460	80.8

TABLE II

COXSACKIEVIRUS A21
MICROTITER SERUM NEUTRALIZATION
JUNE - DECEMBER 1977

A/C	Total # of Pairs	<10	10	20	40	GMT A/C	Rated GMT C/A	# of Rises	≥20/≥20
WOOD	292	270/267	6/11	15/13	1/1	5.5/5.5	1.00	0	14
KNOX	57	53/51	3/6	1/0	0/0	5.3/5.4	1.01	0	0
DIX	102	93/92	2/3	6/6	1/1	5.7/5.7	1.00	1	6
ORD	82	73/69	5/3	2/8	2/2	5.7/6.2	1.09	0	7
GORDON	36	31/31	2/3	3/2	0/0	5.7/5.7	1.00	0	2
TOTAL	569	520/510	18/26	27/29	4/4	5.6/5.7	1.02	1	29

period July to December 1975 (8). Coxsackievirus A21 represented 25% (36/144) of the total number of viruses isolated and microtiter serum neutralization tests demonstrated that 44 individuals had ≥4-fold rises in antibody titer or ≥20 titers to Coxsackievirus A21 in the paired sera. There was a significant difference when comparing the antibody responses between the acute and convalescent sera to Coxsackievirus A21 (chi-square $P<.05$).

In summary serologic testing for Coxsackievirus A21 is not necessary when few agents are isolated; however, when large numbers of Coxsackievirus A21 are being recovered, information resulting from serologic testing for this agent may provide valuable epidemiologic data.

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MENINGOCOCCAL CARRIER SURVEILLANCE

INTRODUCTION

Monthly meningococcal carrier surveys were carried out at Fort Ord in order to monitor frequency of carriers and distribution of serotypes among permanent party personnel. **New serotypes were searched for.**

MATERIALS AND METHODS

Retro-uvula swabs were obtained at messhalls on post just prior to the noon meal. No attempt was made to select individuals to be sampled; the first one hundred individuals willing to participate were taken. The swabs were streaked directly onto Columbia Chocolate Agar (CCA) plates containing 5% sheep blood, 1% Isovitalex, and a lincomycin (6mcg/ml) - polymixin B (25 units/ml) mixture. After incubation overnight at 37°C in a 5-10% CO_2 atmosphere, the plates were transported to this laboratory where standard methods were employed for isolation, identification and serogrouping.

RESULTS AND DISCUSSION

Table 1 summarizes the carrier rates and distribution of serogroups for FY 1978. The carrier rate of 34.4% is comparable to the rate found in Basic Combat Trainees (BCT's) at Fort Ord during the last two years of training, FY 1975 and FY 1976, when the rates were 36.6% and 24.8% respectively. Group B strains were the most frequently isolated (58.4%) as was the case in FY 1975 (46.7%) as well as FY 1976 (51.0%) when the populations under study were BCT's. Y isolates, at 16.2%, followed by 29E (9.0%) and W-135 (7.0%) were the only other serogroups to equal or exceed 1% of the strains isolated. Figure 1 shows the percent by serogroup of these most frequently isolated groups on a month by month basis. Group W-135 continues to be isolated at a much higher rate than was true prior to February of 1977.

There were four messhalls which were sampled twice during the year. Very few individuals, 2-3 for each messhall, were included in more than one survey. The carrier rates and distribution of serogroups did not appear to be different from one messhall to the next. As had been the case with BCT's, the carrier rates tended to be higher during cold weather

months and lower during the summer with the peak in December at 58% and the low point in August at 18%.

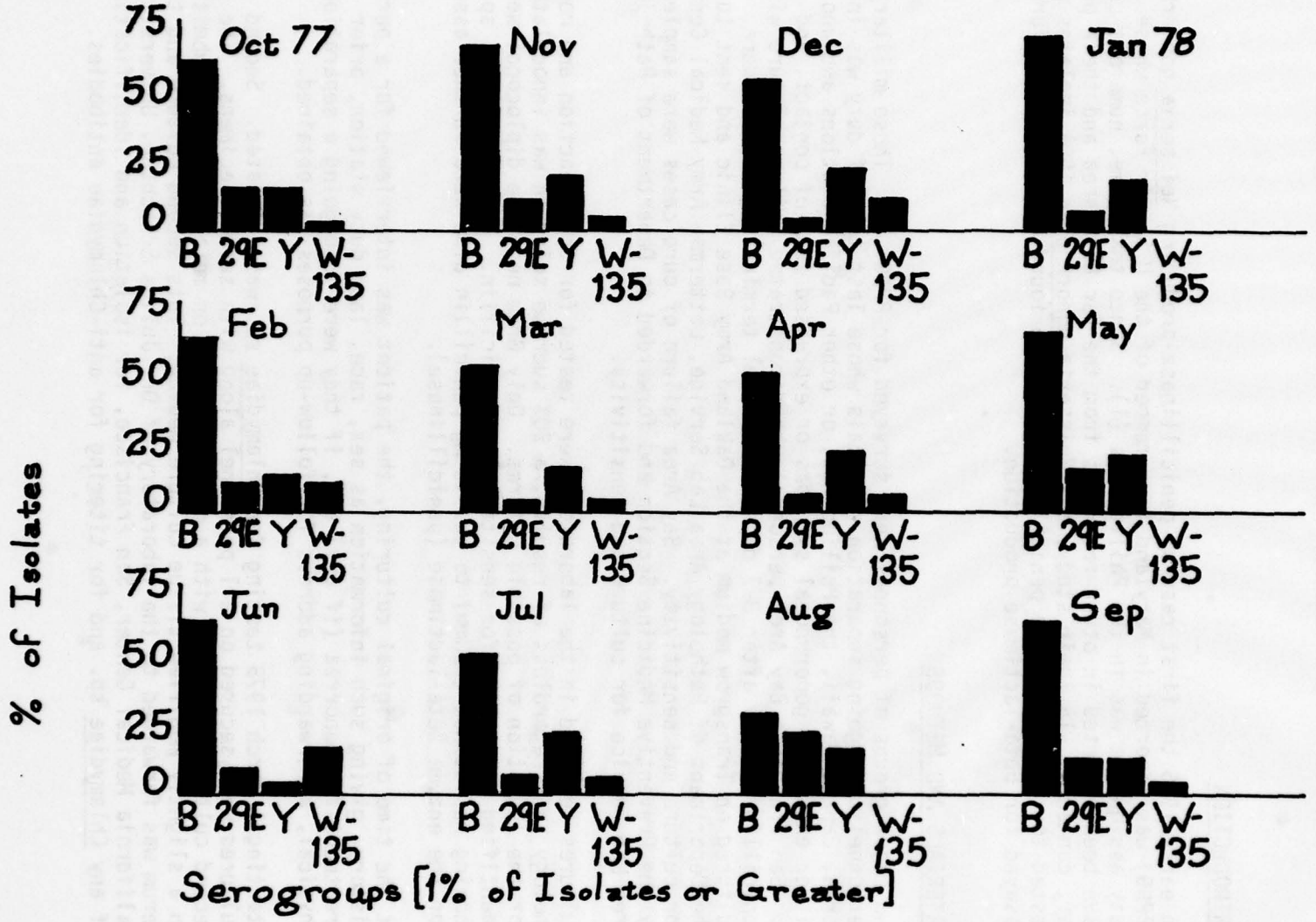
No meningococcal disease occurred at Fort Ord among active duty military personnel during FY 1978. No new serotypes were identified.

TABLE I

MENINGOCOCCAL CARRIER SURVEILLANCE FY 1978

	OCT 77	NOV	DEC	JAN 78	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL	% OF ISOLATES
Number of Specimens	100	100	100	100	100	100	100	100	100	100	100	100	1200	
Number Positive	38	39	58	49	29	25	36	19	47	32	18	23	413	
% Positive													34.4%	
Serogroup:														
B	25	26	31	34	18	13	18	12	29	16	5	14	241	58.4%
C	0	0	0	0	0	1	0	0	0	0	0	1	2	0.5%
29E	6	4	2	3	3	1	2	3	4	2	4	3	37	9.0%
Y	6	7	13	9	4	4	8	4	2	7	0	3	67	16.2%
X	0	0	1	0	0	0	1	0	0	1	0	0	3	0.7%
W-135	1	2	6	0	3	1	2	0	8	2	3	1	29	7.0%
NT	0	0	0	0	0	0	1	0	2	0	0	0	3	0.7%
Multiple and Saline Agglutinator	0	0	5	3	1	5	4	0	2	4	6	1	31	7.5%

Figure 1— % Meningococcal Isolates by Serogroup



PENICILLINASE-PRODUCING NEISSERIA GONORRHOEAE SURVEILLANCE

INTRODUCTION

In early 1976 the first case of penicillinase-producing Neisseria gonorrhoeae (PPNG) was reported in Maryland in a member of the U.S. Air Force whose last duty assignment was in the Philippines (1). Since that time, numerous cases have been reported in other returnees from the Far East area and their primary contacts. In their study, all Neisseria gonorrhoeae (GC) isolates were tested for sensitivity to penicillin, and those found resistant were further assayed for beta-lactimase production.

MATERIALS AND METHODS

Two major groups of personnel were surveyed for PPNG: 1. Those military personnel undergoing separation physicals whose last tour of duty was in Korea, Japan, Hawaii, the Philippines, or other Pacific stations and who either exhibited gonorrhoeal symptoms or expressed fear of contact, and 2. San Francisco Bay Area personnel who demonstrated failure of cure with penicillin therapy after 3-7 days. Personnel terminating service were cultured on Transgrow medium at the Oakland Army Base Clinic and sent to the Department of Pathology Area Lab Service, Letterman Army Medical Center, for culture and sensitivity. Bay Area failure of cure cases were sampled by the Preventive Medicine Section and forwarded to Department of Pathology Area Lab Service for culture and sensitivity.

Cultures received in the laboratory were tested for Gram reaction and morphology and, regardless of results, a 20% sucrose solution was innoculated for the isolation of possible L-forms. Only Gram negative diplococci were identified and tested for sensitivity to penicillin. Those Neisseria sp. showing resistance (<20mm) to the 10 mg penicillin disc were further assayed for the enzyme beta-lactimase (penicillinase).

At the time of original culturing, the patient was interviewed for a personal history, giving such information as sex, race, last duty station, prior treatment for gonorrea (if any) and, if they were undergoing a separation physical, a forwarding address for follow-up purposes was obtained.

Starting 1 March 1978 testing for Chlamydiae sp. was initiated. Second cultures were secured on all personnel along with serum specimens. The second culture was taken with a calginate swab on metal stems and submitted in a slightly modified tissue culture medium. This second culture and the serum was forwarded to the laboratory of Dr. Julius Schachter, University of California Medical Center, San Francisco, for isolation and identification of any Chlamydiae sp. and for titering for anti-Chlamydiae antibodies.

RESULTS AND DISCUSSIONS

Over a 13 month period, 66 cultures were taken, 18 of which were positive for GC (see summary). Of these 18, 12 were sensitive to penicillin and 6 were resistant. Of the 6 resistant cultures, 5 were ascertained to be negative for beta-lactimase production while 1 was confirmed to be a PPNG.

Of those 21 specimens submitted for Chlamydiae testing, 1 was positive.

All except 2 of the positive GC cultures were from male personnel. All were symptomatic. 8 of these were from Korea, 6 from the Bay Area, 1 from Hawaii, and 3 from unknown stations. The one PPNG was from the Bay Area, was female, and was a treatment failure. There were no L-forms isolated.

SUMMARY

Over a thirteen month period 66 patients were screened for PPNG and 21 for Chlamydiae, both those arriving from the Far East and local Bay Area treatment failures. One PPNG was isolated and identified, as well as one Chlamydiae. Five other GC cultures proved resistant to penicillin but did not produce beta-lactimase.

SUMMARY OF SURVEY RESULTS OF PPNG STUDY FROM 1 NOVEMBER 1977 TO 30 NOVEMBER 1978

Sex: Male - 55
Female - 11

Race: Caucasian - 27
Negro - 22
Oriental - Ø
Unknown - 17

Last or Current Duty Station: Japan - Ø
Korea - 34
Hawaii - 3
Bay Area - 18
Other - 11

Culture Results:	PPNG	CHLAMYDIAE
Negative:	49	20
Positive:	17	1

GC Penicilin Sensitivity: Sensitive: 12
Resistant: 6

Resistant Culture Assay for Beta-lactimase: Positive - 1
Negative - 5

Number Positive L-form isolates - Ø

Total cultures tested - 66

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