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LETTER

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Armed Forces Institute of Pathology
Washington, DC 20306-6000

Vol. 159, No. 5
October 2001

Operation Noble Eagle:

AFIP Responds to September 11th Pentagon Terrorist Attacks

by Christopher C. Kelly
AFIP Public Affairs Director

A multidisciplinary team of over 50 forensic specialists, scientists, and support personnel from the Armed Forces Institute of Pathology (AFIP) played a major role in one of the most comprehensive forensic investigations in US history following the September 11, 2001 terrorist attack at the Pentagon. Code named *Operation Noble Eagle*, AFIP's team of forensic pathologists, odontologists, a forensic anthropologist, DNA experts, investigators, and support personnel worked for over 2 weeks at the Dover AFB (Delaware) Port Mortuary to identify the 188 victims of the attack. "Our staff represented every branch of the service," said AFIP Director Glenn N. Wagner, CAPT, MC, USN, who served as the senior officer during the operation. "We also received tremendous support from the doctors, nurses, and technicians stationed at Dover who participated in the investigation."

AFIP Director Glenn N. Wagner, CAPT, MC, USN (center) describes the forensic investigations taking place in the morgue during Operation Noble Eagle *to the Army Surgeon General, James B. Peake, LTG, MC, USA. Looking on are Florabel G. Mullick, MD, SES, ScD, AFIP Principal Deputy Director and Col Joe Drobezko, the 436th Support Group Commander, Dover AFB. On the far right facing the autopsy table is Andrew Baker, Maj, USAF, MC, chief deputy medical examiner. Also at the table is Tom Holland (in the beard), a forensic anthropologist from the Army's Central Identification Laboratory, Hawaii (CILHI).*



The investigation mobilized AFIP assets in many ways. In the hours following the crash of American Airlines Flight 77 into the Pentagon, the acting Armed Forces Medical Examiner, AbuBakr Marzouk, Col, USAF, MC, worked with FBI and local Virginia law enforcement officials to create an effective plan for recovering and identifying the victims. At the same time, personnel from the Office of the Armed Forces Medical Examiner (OAFME) positioned and staged equipment to begin operations at Dover. Bruce Ensign, Maj, USAF, MC, served as AFIP's team leader at the site. "We immediately called in regional medical examiners from as far away as San Diego to participate," he said. A total of 12 forensic pathologists, assisted by two AFIP staff pathologists, headed the OAFME investigation team.

Also arriving at Dover during those early critical hours were two other key AFIP groups: forensic scientists from OAFME's Armed Forces DNA Identification Laboratory (AFDIL) and oral pathologists from the Department of Oral and Maxillofacial Pathology. AFDIL scientists ensured that data systems and records were available to make DNA identifications, while the oral pathology group created a triage area to conduct positive dental identifications. Contacts were also made with family services personnel in each branch of

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Director's Message



AFIP's Response to September 11

This issue of the Letter is focused on the efforts of the AFIP to respond to the tragedy of September 11, 2001 at the Pentagon, and secondarily to identification efforts at the Somerset, Pa site. The Institute's timely response to these incidents underscores the importance of an intact infrastructure to support such activities, especially when they become extended. The medicolegal death investigation of the Pentagon incident has extended over 2 months and has involved around-the-clock laboratory testing. All avenues of forensic investigation were explored and deployed with zero defects. I am very proud of the effort and the success of this multidisciplinary and multifactorial investigation. In such federal investigations, the Office of the Armed Forces Medical Examiner is the spear point for the AFIP's 911 response. The OAFME is the headquarters of the global Armed Forces Medical Examiner System (AFMES) and the only federal medical examiner system. It is routinely used by other federal agencies, including State, Justice, Treasury, and Transportation, as well as by Veterans Affairs and DoD.

The Pentagon investigation highlighted the importance of a multidisciplinary effort. Forensic anthropology was a significant component; made up of physical anthropologists from the AFIP, the Smithsonian Institution, and the US Army Central Identification Laboratory-Hawaii. A comprehensive dental team was formed with expanded capabilities in digital imaging and comparative analysis. The medical radiographic section included full-time, fully trained radiologists assisting the dentists, anthropologists, and pathologists in the identification and characterization of all specimens received. Where appropriate, both toxicology and DNA specimens were obtained in each case. This was the first time that military nursing staff was incorporated to assist the forensic pathologist in the postmortem physical examination and recording of findings. This medical team was paired with forensic anthropologists, dieners, photographers, and evidence technicians. The entire operation remained under the watchful eye of the FBI, which had two teams on-site—a fingerprint team and a trace evidence team. All activities were coordinated between the FBI, AFIP/AFMEO, Dover AFB Base, Service Personnel Offices, Dover Port Mortuary, and DoD assets.

The success of this investigation and similar past experiences underscores the importance of a collaborative, cooperative enterprise where consensus, commitment, and communication are prized.

Glenn N. Wagner
CAPT, MC, USN
The Director

Atlas of Tumor Pathology, Third Series, Fascicle 31

Tumors of the Liver and Intrahepatic Bile Ducts

Kamal G. Ishak, MD, PhD, Zachary D. Goodman, MD, PhD
Armed Forces Institute of Pathology, Washington, DC,
and J. Thomas Stocker, MD
Uniformed Services University of the Health Sciences, Bethesda, MD

Armed Forces Institute of Pathology, Washington, DC • 2001
ISBN: 1-881041-69-7

In the 12 years since publication of the second series fascicle on this subject, there have been many advances in epidemiologic, histogenetic, pathogenetic, and clinicopathologic aspects of tumors and tumor-like lesions of the liver and intrahepatic bile ducts. This third series fascicle is divided into 14 chapters:

- Embryology, histology, and anatomy
- Benign hepatocellular tumors
- Benign cholangiocellular tumors
- Benign mesenchymal tumors and pseudotumors
- Miscellaneous benign tumors and pseudotumors
- Hepatoblastoma
- Putative precancerous lesions
- Hepatocellular carcinoma
- Fibrolamellar hepatocellular carcinoma
- Intrahepatic cholangiocarcinoma and other malignant biliary tumors
- Miscellaneous malignant tumors
- Malignant mesenchymal tumors
- Primary hepatic lymphomas and suspected lymphomas
- Metastatic tumors
- and an appendix on the TNM classification of malignant tumors of the liver.

Several tumors and tumor-like lesions are extensively discussed, commensurate with increased knowledge about them, such as peribiliary gland hamartoma (bile duct adenoma), hepatobiliary cystadenoma, biliary papillomatosis, lymphangioma, angiomyolipoma, miscellaneous heterotopias, hepatoblastoma, hepatocellular carcinoma, intrahepatic cholangiocarcinoma, epithelioid hemangioendothelioma, and primary hepatic lymphomas (including a section on diagnosis of suspected lymphoma).

Tumor entities not covered in the previous fascicle include ciliated foregut cyst, peribiliary gland cysts, hereditary hemorrhagic telangiectasia, myelolipoma, focal fatty change, Langerhans' cell histiocytosis, solitary fibrous tumor, miscellaneous benign mesenchymal tumors (such as plexiform neurofibromatosis), hepatic pregnancy, putative precancerous lesions, malignant rhabdoid tumor, and two hitherto undescribed tumors: ossifying stromal-epithelial tumor and kaposiform angiosarcoma.

The 511 gross photographs and photomicrographs (most in color) are of outstanding quality. Only a few electron micrographs are included, in keeping with the authors' belief that they are of limited diagnostic value. The chapters are extensively referenced. Imaging studies of most of the tumors are briefly covered but only rarely illustrated. This 356-page fascicle should be an essential reference for residents, oncologists, hepatologists, gastroenterologists and pathologists in practice.

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Operation Noble Eagle:
Museum experts respond to Pennsylvania crash

On behalf of the staff and volunteers at the National Museum of Health and Medicine of the Armed Forces Institute of Pathology, I would like to share our deep sadness over the abrupt and tragic losses endured in the recent terrorist activities at the Pentagon, in New York, and in Pennsylvania. We extend our most heartfelt sympathies to the families, friends, and colleagues of the victims. But, we are proud to be part of an organization that can and does respond to these unique challenges to our nation. The following article describes some of the Museum's contributions. We do this as a museum with personnel of exceptional talents and backgrounds. We also respond as a component of the Armed Forces Institute of Pathology, which provided forensic specialty services, under the leadership of the Institute Director, Captain Glenn N. Wagner, MC, USN, at the Dover Air Force Base Port Mortuary. Dr. Wagner assembled a team including civilians and members of every branch of service to perform forensic pathology, forensic odontology, anthropology, photographic work, and DNA service for the individuals killed at the Pentagon. Their experiences, in turn, become part of the collective memory of the Institute, to be documented by the Museum for lasting value to our nation and to the world.

Dr. Adrianne Noe
Director
NationalMuseum of Health and Medicine of the AFIP

The final terrorist event of September 11 was the crash of United Airlines Flight 93. The Boeing 757, carrying 38 passengers and a crew of 7, departed Newark International Airport at 8:01 a.m. and headed for San Francisco. After crossing into Ohio, terrorists apparently took control of the plane and redirected the flight back into Pennsylvania.

Using cell phones and onboard airfones, the hijacked passengers learned of the earlier crashes at the World Trade Center and the Pentagon. After a struggle between the passengers and the terrorists for control of the plane, it crashed into an abandoned strip mine in Somerset County, Pa, shortly after 10 a.m. All aboard were killed.

On September 13, Paul Sledzik, curator of Anatomical Collections at the National Museum of Health and Medicine of the Armed Forces Institute of Pathology (AFIP), was asked by the US Department of Health and Human Service's Office of Emergency Preparedness to command the Region III Disaster Mortuary Operational Response Team (DMORT) in providing victim identification services for the UA Flight 93 crash. Sledzik has been team commander of Region III DMORT since 1997.

As part of the National Disaster Medical System, DMORT is composed of private citizens and federal employees who are asked to provide forensic, mortuary, and family support services following disasters. The teams (there are 10 throughout the nation) are made up of forensic scientists, medicolegal investigators, mortuary officers, logistics and administrative support personnel, and others.

In addition to Sledzik, Lenore Barbian, PhD, the assistant curator of Anatomical Collections at the Museum and a DMORT team member, was also asked to respond. Barbian and Sledzik spent the next 2 weeks in Somerset, Pa. The main focus of their work was to support the local coroner in identifying the victims of the crash and to aid the FBI in collecting evidence to be used when the terrorists are brought to justice.



Paul Sledzik and Lenore Barbian, PhD, review museum documents.

The DMORT team organized a morgue, set up the morgue operation, interviewed victim's families, and collected antemortem and postmortem information. The morgue facility was located in the National Guard Armory outside Somerset, Pa. With the FBI as the lead agency in the investigation, access to the morgue was strictly controlled.

Sledzik views the combined DMORT and AFIP response to such incidents as a great benefit to the families of those killed in disasters. As part of a package of federal resources, DMORT and AFIP have worked together in previous incidents, particularly in the area of DNA identification.

"In my estimation, the AFIP managed two of the three incidents following the September 11 attacks: the Pentagon crash and the Somerset crash. My AFIP credentials opened more doors during the activation than my DMORT association. Medicolegal disaster responders respect the AFIP name," Sledzik said.

In fact, the Office of the Armed Forces Medical Examiner provided forensic

Museum *to page 14*

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Operation Noble Eagle:

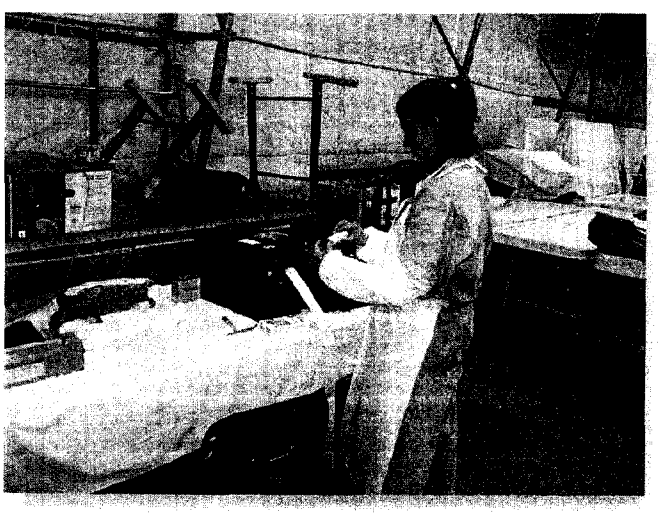
DNA Laboratory plays key role in Pentagon, Somerset County victim identifications

By Michele Hammonds and Christopher C. Kelly
AFIP Public Affairs

For weeks following the September 11 terrorist attack on America, one of the leading DNA laboratories in the world focused its efforts on bringing closure to the families of the victims. The Department of Defense DNA Registry, which constitutes the Forensic DNA Division of AFIP's Office of the Armed Forces Medical Examiner (OAFME), provided DNA identifications of victims in two of the terrorist attack plane crashes: American Airlines Flight 77 at the Pentagon and United Airlines Flight 93 in Somerset County, Pennsylvania. "Identifying victims is a humanitarian issue," said Army Colonel Brion Smith, chief deputy medical examiner and head of the Department of Defense DNA Registry. "Families need confirmation," he said, "and we have a duty to assist them in every way possible."

The DoD DNA Registry has two operational branches: the Armed Forces DNA Identification Laboratory (AFDIL), which performs the forensic DNA testing, and the Armed Forces Repository of Specimen Samples for the Identification of Remains (AFRSSIR). The AFRSSIR, which has been collecting DNA references since 1992 for Department of Defense personnel, has over 3.5 million samples — filter paper cards containing a small amount of blood collected from active-duty and reserve component servicemembers. They are carefully stored in freezers and left undisturbed, unless they are required for human remains identification. Such was the case, when DoD authorities turned to DNA analysis to establish the identification of victims from the terrorist attacks.

On September 12, COL Smith deployed a two-person team to Dover to establish connectivity for AFDIL's computerized evidence-tracking program known as the Laboratory Information System Application, or LISA. According to James Ross, the chief information officer for the DoD DNA Registry, forensic scientists in the Dover morgue and at the DNA laboratory relied on LISA's barcoded chain of custody system to quickly and efficiently process evidence. "Every tissue sample used for DNA analysis received a chain-of-custody number," Ross said, "and this number remained intact during the entire identification process. It allowed us to track evidence taken from victims throughout the operation, and saved AFDIL staff hundreds of man-hours by eliminating the need for hand-labeling materials."



At Dover, Asst. Technical Leader Amanda Blanchard uses automated evidence program to log samples into database and generate labels.

Two-member teams from AFDIL rotated from Rockville to Dover every 72 hours to work alongside the forensic pathologists, odontologists, and anthropologists in coordinating the appropriate sampling of bone, teeth, and tissue. This arrangement insured the establishment of a proper chain of custody and expedited the overall identification process. Since many of the Pentagon victims were active-duty or reserve personnel, most had DNA reference cards already on file in AFRSSIR. "We had a total of 50 reference specimens on file for military service members who died in the Pentagon crash," said David Boyer, the director of Operations at AFRSSIR. "That expedites the DNA identification process, because immediately we have a known reference from which we can reliably generate a DNA profile. And because many blood-stain cards also have the individual's fingerprints, we were able to provide FBI experts with another tool for obtaining a positive identification."

As specimens arrived from the Dover Mortuary back to AFDIL in Rockville, Md, teams of forensic scientists, under the direction of Demris Lee, technical leader of the Nuclear DNA Section, took over the difficult chore of generating a DNA profile of the victims. Their work included not only the Pentagon crash victims, but the victims of the Somerset County, Pennsylvania crash as well. Every one of the organization's 102 DNA analysts, sample processors, logistics staff, and administrative personnel were involved— from collecting, tracking, analyzing DNA samples, and gathering and logging DNA reference material to preparing DNA reports. For 18 days following the terrorist attacks, AFDIL employees worked on 12-hour shifts, 7 days a week to meet the mission requirements.

The laboratory prepared to expand its operation to include the Somerset County crash almost immediately. Boyer, who is a nationally recognized expert in coordinating tissue collection services following aircraft disasters, traveled to Somerset County directly after the incident. There, he discussed AFDIL's potential role in identifying the Flight 93 victims with federal and local officials, including the FBI and the National Transportation Safety Board.

AFDIL played a major role in identifying victims of previous major airline disasters, including Egypt Airlines Flight 990 in 1999 and Alaska Airlines Flight 261 in 2000, and was a logical choice to

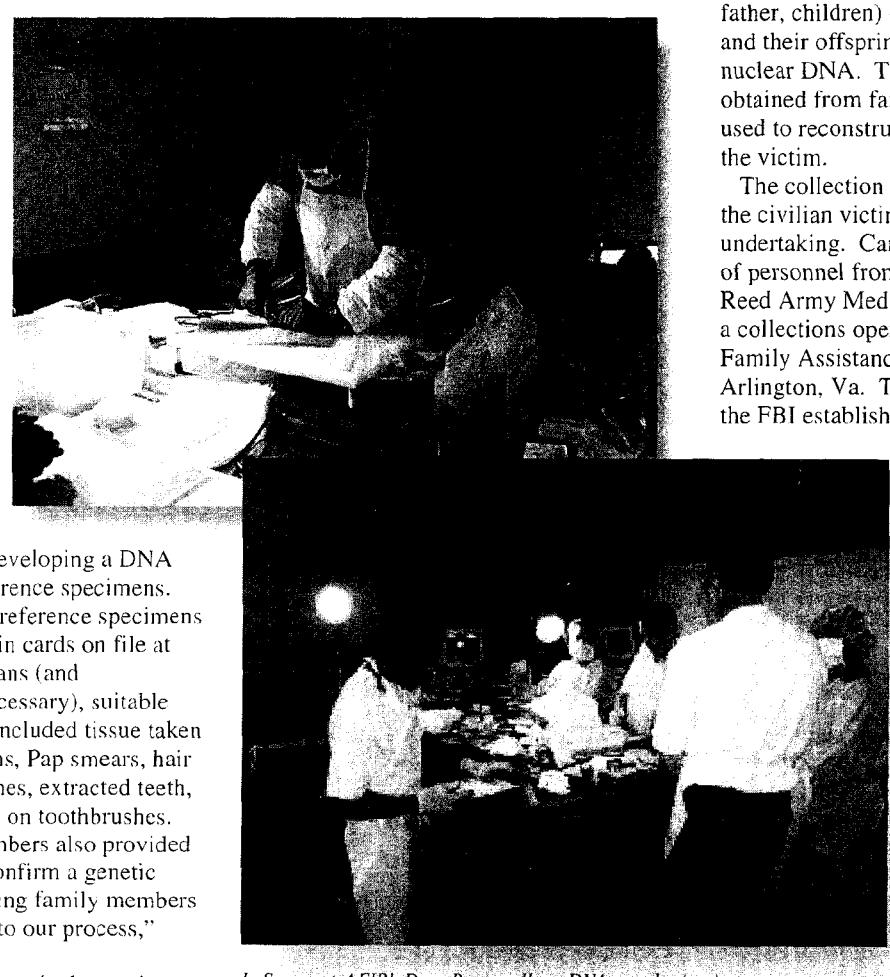
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provide DNA services to federal investigators in Pennsylvania. Once the lab received approval to conduct DNA testing, Ross established the LISA program there as well, and by September 17 collections were underway in the temporary morgue at Somerset.

Only a few months before, Boyer, Lee, and James Canik, AFDIL's deputy director, trained regional Disaster Mortuary Operational Response Team (DMORT) members in DNA collecting procedures. Those same officials—forensic pathologists, anthropologists, and dentists, along with Boyer and DNA analysts from AFDIL—worked together following the Pennsylvania crash. "We actually had the DNA station set up as part of the DMORT operation, and it went very well for being put into practice for the first time."



In Somerset, AFIP's Dave Boyer collects DNA samples (top). Below: FBI fingerprint station.

At AFDIL, DNA scientists divided into teams to handle the Pentagon and Somerset County cases. The AFDIL experts worked to generate a DNA profile on each tissue specimen received, as well as developing a DNA profile on known reference specimens. For servicemembers, reference specimens included the bloodstain cards on file at AFRSSIR. For civilians (and servicemembers if necessary), suitable reference specimens included tissue taken from biopsy specimens, Pap smears, hair from combs and brushes, extracted teeth, and even saliva found on toothbrushes. Surviving family members also provided blood specimens to confirm a genetic identity. "The surviving family members are an important link to our process," Boyer said.

DNA is isolated from the bone, tissue, hair, and teeth specimens by a commonly used organic extraction process. This step is followed by use of the polymerase chain reaction (PCR), which makes millions of copies of DNA identical to the original copy. PCR is often described as being like a DNA photocopy machine. PCR is particularly advantageous for samples that are minute or highly degraded. These conditions are the norm in cases that are either very old, or that have been exposed to severe environmental challenges such as heat and high impact forces. The PCR products are analyzed using short tandem repeat (STR) analysis. STRs are short stretches of a specific DNA sequence that are tandemly repeated throughout the nuclear genome. An individual's "DNA type" is determined by the number of repeats an individual has at a given locus in the genome. AFDIL utilizes a STR system that analyzes nine loci on the DNA simultaneously. This system also provides the capability to determine gender.

In a like manner, DNA is also isolated from the reference specimens and undergoes the same PCR and STR analysis processes as the unknown samples from the crash site. Direct references are samples taken directly from the victim, such as the bloodstain cards from the repository. Unknown samples that produce the same DNA profile as the victim's direct reference are considered a "DNA match." Indirect references are reference samples collected from immediate family members (mother, father, children) of the victim. Parents and their offspring share half of their nuclear DNA. The DNA profile obtained from family members can be used to reconstruct the DNA profile of the victim.

The collection of reference samples for the civilian victims proved to be a major undertaking. Canik led a combined team of personnel from AFIP and Walter Reed Army Medical Center to establish a collections operation at the Pentagon Family Assistance Center (PFAC) in Arlington, Va. The county coroner and the FBI established a similar family assistance center at Somerset, Pa. For those families not immediately available, Canik worked closely with the FBI and local law enforcement agencies to identify and collect these critical references. The AFIP team at the PFAC collected over 176 family references.

Scientists then analyzed the DNA profiles for a potential match and reported their findings back to the forensic pathologists at Dover, or to the Somerset County coroner. AFDIL developed a computerized search program that compares the DNA profiles generated from the reference specimens against the DNA profiles generated from the unknown specimens, and provides the best fit match. AFDIL laboratory staff are hopeful that nearly all DNA identifications will be complete in the coming weeks.

Boyer was extremely pleased with the total team effort, both at the morgues and in the laboratory. "It was invaluable for laboratory people to experience the front end of the DNA identification program," he said, "and I was impressed with the amount of professionalism and dedication everyone from the AFIP exhibited during this whole event."

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Operation Noble Eagle:

Forensic anthropologist provides expertise following September 11 attack

One of the AFIP investigators who deployed to Dover was Dr. William C. Rodriguez, III, an internationally recognized forensic anthropologist whose skills are often utilized to help solve the most difficult criminal cases. Rodriguez, who serves as chief deputy medical examiner in charge of special investigations, is one of 35 board-certified forensic anthropologists in the nation, and the only one assigned full-time to a medical examiner's office. His help was invaluable following the Pentagon attack.

"This was a unique situation because it was a criminal act, and every piece of evidence had to be fully documented and accounted for," Rodriguez said. He led a team of seven forensic anthropologists from the Army's Central Identification Laboratory, Hawaii; the FBI; and the Smithsonian Institution that worked 12-hour days for over 2 weeks helping to identify victims and return them to their loved ones.

"We have a well-established system for processing mass casualties at Dover," Rodriguez said, "and one of the first areas staffed by the forensic anthropology team was triage." There, he and his colleagues provided initial anatomic assessments and ensured a smooth transition to experts in fingerprint and dental identification.

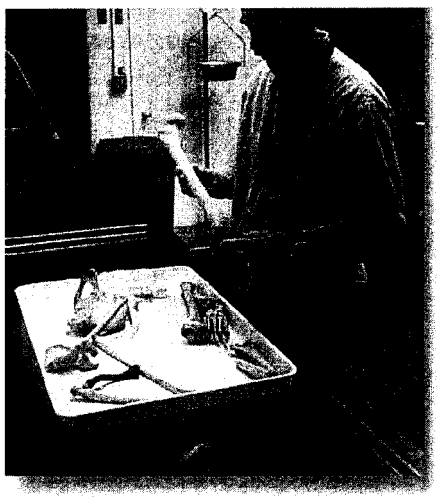
Forensic anthropologists also worked closely with the forensic pathologists at autopsy to determine anatomy or provide a biological profile of a specimen. "We're able to provide specific characteristics, especially when having to re-associate remains of multiple individuals," he said. This included questions of sex, race, age, and unique identifying factors. "We're able to provide an accurate reconstruction of skeletal material when needed, and this is really critical in the identification process."

The forensic anthropology team wasn't immune to the enormity of what happened on September 11. "Everybody was shocked realizing that this operation was the result of a terrorist attack," Rodriguez said. "It added to the magnitude of our work. We were concerned that another attack might be imminent, and it really felt as though we were fighting a war and doing science at the same time. It was very challenging both mentally and physically."

The scale of the operation was also enormous. "This was the largest mass fatality incident we've seen in years, and it required hundreds of decisions to be made quickly and accurately, not only in victim identification but also in logistics and personnel issues," he said. "But, our biggest concern was always for the families. We worked hard to get the job done and return the victims to their loved ones."

– *Christopher C. Kelly*





Dr. William C. Rodriguez, III, reviews case information with investigators at Dover (top) and examines training specimens at his Rockville, Md office.

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Operation Noble Eagle:
Forensic dentistry plays essential role following Pentagon terrorist crash



Air Force Colonel Charles Pemble led the dental identification team at Dover.

AFIP's Department of Oral and Maxillofacial Pathology, under the direction of Department Chair Colonel Charles Pemble, USAF, DC, played a critical role in helping to identify victims of the September 11th American Airlines Flight 77 terrorist crash into the Pentagon. A total of eight AFIP military officers—five staff oral pathologists and three oral pathology residents—formed the core investigative group at Dover. They were joined by two oral pathologists, one each from the National Naval Dental Center, Bethesda, Md, and the Naval Hospital, Portsmouth, Va. Supporting them were an additional 43 personnel, including 9 dentists and 19 dental technicians from the 436th Dental Flight at Dover AFB, Del, and 6 dentists and 9 dental technicians from the 81st Dental Squadron, Keesler AFB, Miss. "This combined support really proved to be the ideal situation for us," Pemble noted. "Their presence allowed for rotation of personnel in making identifications while also continuing to operate the Dover dental clinic. Sick call and other essential dental care continued uninterrupted."

Preparations moved quickly on two fronts immediately following the September 11 tragedy. As USAF dental personnel at Dover prepared the mortuary facilities to handle the expected casualties, Col Pemble alerted the Central Panorex Storage Facility in Monterey, Calif, that antemortem panographic dental x-rays of the military victims would be needed. (Many servicemembers have a panograph, or full-mouth x-ray on file. Panographs are a valuable comparison tool for making positive victim identification.) With commercial air traffic grounded, however, another source had to be found to transport the records overnight, and DoD officials expedited the delivery through a dedicated military aircraft.

For the next 5 days, the dental contingent worked 12-hour shifts, completing an average of 22 exams a day. Col Pemble also planned on using relief teams of dentists, technicians, a computer specialist, and an administrative officer every 7 to 10 days, in anticipation of even greater casualty numbers. As recovery operations slowed at the Pentagon, however, those teams weren't needed. "We were able to complete our assignment with the designated personnel," said Pemble.

Three weeks into the mission, dental identifications were performed in over 63% of the cases, and in 30% of the cases served as the sole method of identification. The AFIP staff utilized a number of techniques, including the charting of preexisting dental conditions using antemortem and postmortem forms. A recent innovation utilized at Dover was the digital postmortem x-ray, which relies on sensors instead of film. The technique also eliminates chemical processing, which saves time and money and has minimal environmental impact. "We also chose to utilize an automated comparison tool, called *WinID*," Pemble said, "primarily because we had over 170 potential deaths, and many were civilians with varying dental records. *WinID* is a Microsoft Access-based system that runs under windows and can link the antemortem and postmortem dental charting to graphics."

In the future, Col Pemble foresees the development of a dental image repository to further assist in the identification process. "These are images that can be captured digitally, or, if film, scanned and sent to the storage facility," he said.

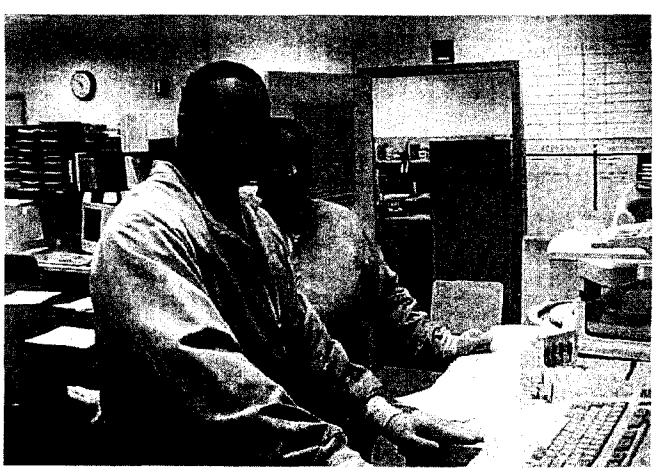
– Christopher C. Kelly

Operation Noble Eagle:
Forensic Toxicology staffers provide analysis

A staff of 18 forensic scientists and administrative personnel in AFIP's Division of Forensic Toxicology worked overtime following the September 11 Pentagon attack to aid investigators in determining the cause and manner of death.

Experts conducted a number of tests on specimens that were included in the final medical examiner reports. The division provides expertise following military incidents or accidents to aid in medical and criminal investigations.

"Many of the personnel worked 12-hour days, including weekends, to complete this mission in a timely manner. They did an outstanding job," said Aaron Jacobs, COL, MS, USA, chief deputy medical examiner and head of the division.



HM2 James E. Miller and SSgt Emilda Greenidge-Blake joined other division members in performing essential forensic toxicology testing.

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Operation Noble Eagle:

Electronic Mass Disaster Dental Identification Triage utilized following Pentagon attack

"A step in the right direction!"

Last spring, members of the 436th Dover Air Force Base (DAFB) medical group (dental and radiology) civil engineers, DAFB Port Mortuary staff, and CAPT Douglas Arendt, USN, DC, held a 2-day brainstorming session to develop a plan for possible retrofit of part of the triservice port mortuary (fig 1). Arendt, who serves as chief of Forensic Dentistry for AFIP's Department of Oral and Maxillofacial Pathology, said that the goal was to upgrade conventional radiologic resources to digital radiographic capture and to facilitate more efficient mass disaster identification triage algorithms—"specifically, to set the framework for a more futuristic patient electronic data management and retrieval system."



CAPT Douglas Arendt, USN, DC

AFIP initiated this new system following the tragic crash of American Airlines Flight 77 into the Pentagon. Coincidentally, much of the equipment had recently arrived at Dover, and was waiting to be set up. This short-fused evolution was aided by Mr. Manny Penna, a Schick CDR (computerized digital radiography) representative who witnessed the collapse of the World Trade Center towers from his office across the river in New Jersey. Manny volunteered to drive to DAFB with missing x-ray sensors and expedited digital radiography training for members of the 436th. As a result, we successfully integrated the electronic sensors with laptops in the x-ray bays.



Fig 1—Lt Col Beecher and staff brainstorming in X-ray bays.

The other elements of the proposed electronic triage ID system went into place on new software protocols. Getting on line was a direct result of the incredible efforts of our computer strike team, composed of TSgt Hines, HMC Butler, Mr Doug Oswell, and SSgt John Spreadbury. The bottom line is we set up an integrated system that accepted and manipulated digital x-ray images and networked a mass disaster graphical interface and information-sorting program (WINID II) (fig 2).



Fig 2—HMC Butler and TSGT Hines preparing network cables.

As antemortem clinical records arrived, staff manually reviewed them and developed a historical composite of all clinical procedures, then converted this information to computer codes and entered it into WINID II. At the same time, antemortem images were scanned using a TPU (transparency adapter) and linked with the antemortem clinical charting file in WINID II. Other staff simultaneously entered postmortem data, creating a hard copy snapshot of the CDR digital x-rays, and linked them to postmortem data files. As the data banks increased in size, computer searches and prioritized matches were developed.

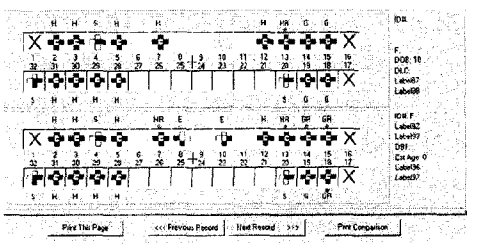


Fig 3—Example of Odontogram

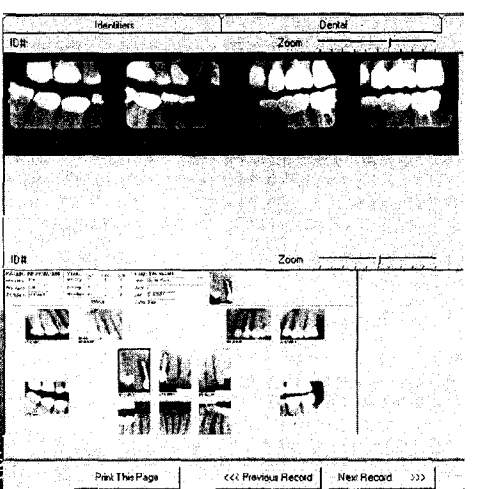


Fig 4—Antemortem and postmortem linked x-ray images on monitor.

Once a possible match was generated, odontologists then examined an odontogram (fig 3) (a pictorial chart comparing antemortem and postmortem dental charting), followed by viewing the antemortem and postmortem x-ray images on the monitor (fig 4). If a reason-

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able match resulted, the files were pulled for the final visual comparison, and a final report was generated documenting the similar dental findings (fig 5).

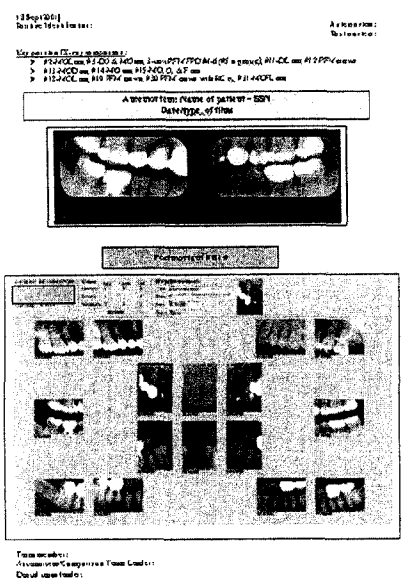


Fig 5—Example of final comparison report

CAPT Arendt feels that the decision to go "all digital" on x-ray capture, as well as to implement a networked graphical image and data-sorting program (WINID II), was well worth the effort. "Without hesitation, I strongly believe that the high number of positive identifications produced in a timely manner resulted because of dedicated staff and computer enhancement," he said (fig 6). Arendt added that "no matter what approach is used, if antemortem reference material (clinical information) is not available or isn't that of the victims being processed at that time, no system can resolve that issue."

A few thoughts for the future:

- Implement a dedicated URL or email address and disseminate that information broadly to law enforcement, so that health care professionals (military and civilian) can send digital information to us directly.
- Software issues: Whatever software is utilized in the future (WINID or CHCS), assure it has good "viewability" on the monitor and multiple graphical links. The digital x-ray capture should "drop" directly into the program, rather than requiring a variety of steps to get to that point.
- Network issues: Network the digital x-ray capture to the dissection bays and to the comparison section.



Fig 6—Some Team members 13 Sept – 27 Sept 2001 from AFIP, 436th DAFB and Keesler AFB):

Operation Noble Eagle: Mortality Surveillance Division provides critical data collection and case-tracking support

Lisa Pearse, MAJ, MC, USA, chief of OAFME's Mortality Surveillance Division, created and utilized an electronic database that provided critical victim identification information to investigators during *Operation Noble Eagle*. "Because of the large-scale nature of the September 11 events, data collection and case tracking were essential elements of the Dover mission," she said. Her contributions marked the first time that OAFME utilized an electronic tracking database to supplement paper records, and allowed for real-time reporting throughout the mission.



Lisa Pearse, MAJ, MC, USA

Dr. Pearse is a preventive medicine physician, recently assigned to OAFME to conduct mortality surveillance. This includes monitoring all active-duty deaths for trends, especially those that could represent emerging infections or a subtle biological warfare attack. In Dover, Pearse quickly designed a database to describe and follow all victims through the identification process. "The database tracked demographic information on the missing, and helped us focus on the presence or absence of medical and dental records or DNA profiles on each of the 188 individuals," she said. "Finally, as identifications were made, we utilized the database to keep track of who had been identified and by what method (dental, fingerprint, or DNA)."

Pearse continues to track identification data and produces daily status reports as the investigation winds down. She's also analyzing data to evaluate the casualty identification modalities, injury patterns, and structural issues in the Pentagon that might have influenced survival patterns.

– *Christopher C. Kelly*



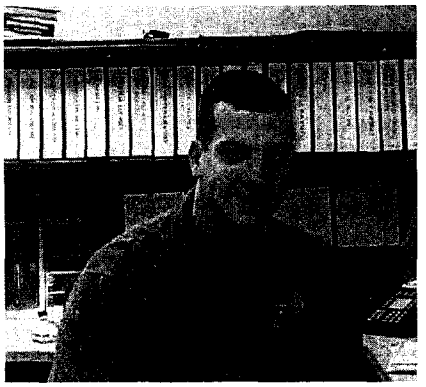
Penny Rodriguez, executive assistant to the Director, worked at Dover for over two weeks to help coordinate and communicate forensic findings to DoD officials and family members.

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Operation Noble Eagle:
Air Force Special Agent reflects on his role at Dover Port Mortuary



Three weeks after the Pentagon disaster, most Department of Defense personnel returned to their jobs, including Special Agent Russell Strasser, chief of the Office of the Armed Forces Medical Examiner's Criminal Investigation Division, who returned with a new sense of patriotism. "AFIP isn't just a job. Its role in identifying victims following tragedies like September 11 is a real service we provide for families and the United States as a whole, and just to have been involved in something of that magnitude was astounding," he said. "It made me realize how important the AFIP mission is and how great it is to be an American."

Strasser worked at the Dover Air Force Base (Delaware) Port Mortuary for almost 3 weeks following the September 11 terrorist attacks. As victims of the attack arrived at the morgue, SA Strasser was there to ensure a smooth movement through eight designated stations in the identification process. Those stations were: arrival, scanning for explosive ordnance, photography, anthropology, fingerprinting, x-ray, dental, and autopsy. Strasser ensured that enlisted personnel assigned to move the deceased through each station did so in a timely and appropriate manner.

For 2 weeks following the terrorist attack, AFIP's team of forensic pathologists, anthropologists, odontologists, scientists, and investigators coordinated all aspects of *Operation Noble Eagle.* Since arriving at AFIP 18 months ago, SA Strasser has worked on a dozen cases involving fatalities. The terrorist attack on the Pentagon stands out most in his mind because of the number killed and the national and international attention it attracted. Last October, he worked on the USS *Cole* terrorist attack in Yemen in which 17 American servicemembers died. AFIP's forensic team identified the 17 *Cole* victims in only 3 days.

"We thought we had put in some pretty full days working on the *Cole* victims," Strasser said. " However, there were a few times in Dover when we processed 30 casualties per day, but we had many more staff available to do so." Strasser was impressed by the teamwork he saw at Dover. "It was good to see all the entities work together, " he said. "Once we had a positive identification, we knew we could bring closure to the victim's family, and that was important."

– Michele Hammonds

Operation Noble Eagle:
Radiologic Pathology provides Dover support

Radiologists from AFIP's Department of Radiologic Pathology played an important role in identifying casualties in *Operation Noble Eagle.* "COL Ted Harcke, a reservist who recently served as a visiting scientist from the American Roentgen Ray Society, staffed the mortuary for the first 2 weeks," said CAPT (Sel) Kelly Koeller, MC, USN, department chair. Dr. Koeller and MAJ Joseph Bifano, Chief of Radiology at Dover AFB Clinic, also staffed the radiology section at Dover during the operation.

The radiologists were responsible for reviewing whole-body radiographs in order to document injuries on the victims. "By looking at what types of injuries are present, we gain some insight into whether they were the result of blast effects, blunt trauma, or heat, and this helped us place victims in specific locations when the event occurred," Koeller said. The whole-body radiograph also enabled the radiology contingent to identify personal effects, jewelry, age of the victim, and any other materials present as part of the identification process. "Because this was a crime scene investigation, we also searched for any objects, such as weapons or aircraft parts, that might be helpful in the investigation."

The radiologists also worked closely with forensic odontologists to identify the presence of teeth, an excellent source of DNA. "Sometimes teeth aren't readily observable during the physical inspection, and our findings were a great help to the forensic dental team," Koeller said.

The final whole-body x-ray report assisted others in the identification process, and encouraged professionals at other stations to compare their observations with the report and to seek out the radiologist for consultation and discussion. It proved beneficial to increasing the accuracy of the information found and provided great confidence in the conclusions.

"What we brought to this mission is a unique and truly valuable asset, one that really couldn't be found anywhere else," Koeller said.

– Christopher C. Kelly



Col Ted Harcke briefs LtGen Paul Carlton, USAF Surgeon General, on radiology operations at Dover.

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NYC 9/11 Public Portal Document

Noble Eagle from page 1

AFIP utilized a well-defined and tested system for conducting the identifications of the Pentagon victims. When remains arrived at the morgue, a scanning device searched for the presence of unexploded ordinance or metallic foreign bodies. A computerized tracking system then assigned numbers to each victim for efficient tracking. FBI experts collected trace evidence to search for chemicals from explosive devices and conducted fingerprint identifications. Forensic dentistry experts from the Department of Oral and Maxillofacial Pathology then performed dental charting and comparison with antemortem dental records. Full-body radiographs followed to document skeletal fractures and assist in the identification process, followed by autopsy inspection.

At autopsy, forensic pathologists determined the cause and manner of death, aided by forensic anthropologist Dr. William C. Rodriguez in determining the race, sex, and stature of victims when necessary. A board-certified epidemiologist managed the tracking system for data collected during the autopsy process, and tissue samples were collected for DNA identification and further toxicologic studies. Forensic photographers, essential to any forensic investigation, documented injuries and personal effects. Finally, mortuary specialists then embalmed, dressed, and casketed remains prior to release to next-of-kin.

For 8 days a full complement of AFIP forensic specialists worked 12-hour shifts to complete the operation. "This is the largest mass fatality we've dealt with in recent years," Ensign said. "We have modalities today that we didn't have before. Our investigation was much more technology-intensive."

Ensign noted that the entire team worked well together. "Because of the combined effort of all three services and the FBI, we were very pleased with the speed of the identification process. Essential records and references were submitted to us in a timely way." Logistical help from AFIP also played an important role. "We had tremendous logistical issues obtaining equipment, especially with additional demands in New York City and Somerset County, Pennsylvania," he said. "Fortunately our logistical support was terrific in helping us get material in."

Others also played essential roles. Histotechnicians from the Department of Scientific Laboratories served as autopsy technicians, assisting pathologists with the remains, while special agents assigned by the various services helped in the investigation. "It was a terrific team effort," he said.

Operation Noble Eagle:
On the front line: OAFME's Bob Veasey ensures investigators are ready to go

Bob Veasey, OAFME's chief of Operational Investigations, is often on the front lines following military aircraft mishaps. Veasey oversees and manages logistics issues for OAFME investigators during search-and-recovery operations by obtaining equipment, ensuring lodging and serving as the OAFME point-of-contact in the field to help expedite mission requirements. The team is mandated to launch worldwide in a number of hours, and Veasey makes sure equipment and supplies are packed and ready to go. "We're like firemen; we respond when we get the call," he said.

And when the call came on September 11, Veasey packed, loaded and shipped supplies and equipment to Dover. "We prestaged (packed) everything we had in my office within 6 hours once we received notification that we were going to Dover Air Force Base," he said. "The truck left AFIP the next morning, headed to Dover."



Bob Veasey with supplies and equipment used by OAFME staff.

Veasey ordered equipment for the forensic team of pathologists, anthropologists, odontologists, and other mortuary workers who had been temporarily assigned to work at Dover's Port Mortuary in support of *Operation Noble Eagle*.

"The operation at Dover was so big, and the forensic teams and support personnel kept using up so many supplies that I had to constantly order more," he said.

As the number of casualties increased, and with it the requirement for expanded morgue capabilities, Veasey had to estimate and order additional supplies within 24 hours. "We were also put on alert for possible World Trade Center casualties and responded to the Flight 93 crash in Pennsylvania," he said. As a result, Veasey expanded the OAFME mass casualty response capability from 300 to 1,000, where it remains today if needed.

While Veasey is accustomed to working on crash cases in which there are causalities, the terrorists attack at the Pentagon and in Pennsylvania is a tragedy all by itself. "This was very personal to me because a lot of the people killed were military, and I'm retired military," he said. "We also had civilians and children on the aircraft. My desire is to recover, identify, and return the victims to their families so they can start the closure process."

– *Michele Hammonds*

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Operation Noble Eagle: Helping Pentagon families who lost loved ones, AFIP Personnel Staff Special Assistance Center

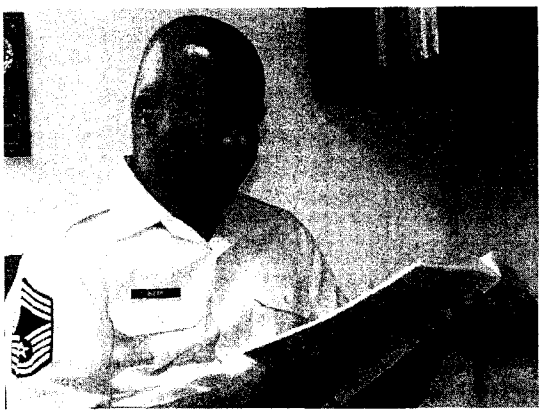
In the aftermath of the September 11 terrorist attack at the Pentagon, AFIP experts relied on DNA analysis to provide a positive identification for many of the victims. To make a DNA identification, however, a reference specimen is required—typically small amounts of blood, tissue, hair, teeth, or other biological material from the deceased. Since 1992, the AFIP has maintained a special repository of bloodstain cards for over 3.5 million servicemembers for just such a purpose. In fact, 53 cards from the repository were used to help identify active-duty servicemembers and reservists killed in the Pentagon attack. But, what about the civilians who died?

That's where staff from the Armed Forces DNA Identification Laboratory (AFDIL) provided special assistance. Under the direction of James J. Canik, AFDIL's deputy director, staff members from AFIP and Walter Reed organized a blood collection center at the temporary family assistance center in Crystal City, Virginia. Canik talked with families about the importance of DNA in helping to identify casualties.

"DNA is new technology with the capability of providing those answers back to the families," he said. Working with him were Air Force CMSgt Ontee Biggs and TSgt. Charles A. Lattany, III, to meet and interview family members. For almost 3 weeks Canik's group worked 12-hour shifts, 7 days a week at the center.

"Working with the families was our primary focus," Biggs said. "We helped to calm them down, and we made sure we were there to fulfill their needs." The assignment of explaining the DNA process and the purpose of the tests to distraught family members wasn't always easy to watch, he said.

Taking the focus off himself and putting the family members first proved helpful for Lattany. "In a situation like that you forget about yourself and you really look forward to helping out other people. For them, having to lose loved ones is a hard thing to have to deal with," Lattany said.



CMSgt Ontee W. Biggs staffed the family assistance center.

Canik also met and interviewed family members of other civilian and military causalities who didn't have DNA reference samples (bloodstain cards) on file. "Dealing with the families one-on-one is difficult because of the circumstances and the recent loss of a loved one under extremely traumatic conditions," Canik said. "We saw the full range of emotions— everything from happiness and thankfulness that we were there working on their behalf, to the anger and frustration that normally surfaced as part of the grieving process."

Due to the aircraft crashing into the Pentagon and the subsequent fire, family members were told identification of victims would not be an easy task, and families were asked to give blood to help DNA experts in the process.

"Family members were being asked to do and provide different things, but by giving their blood sample they realized they were doing something tangible and vitally important to assist in the identification of their family member. It was one of the most positive things we had in our involvement with the families – as we made them part of the process in bringing them the answers they sought," Canik said.

– Michele Hammonds



AFIP civilian photographers who provided support at Dover were (from left) Steve Kruger, Veronica Ferris, and Andy Morataya.

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Operation Noble Eagle:
Histotechnicians provide valuable support at Dover; all enlisted play vital role at AFIP

For three recent graduates of AFIP's Tri-Service School of Histotechnology who served as autopsy assistants at Dover following the Pentagon terrorist attack—the assignment was once-in-a-lifetime. One that A1C Earl Gibson, Amn Tashanda Ashford, and HM3 Marco Mendoza, all histotechnicians, will never forget.

It was the first time in the school's history that its students and some staff participated in a mass casualty identification operation. In all, about 30 histotechnicians volunteered and deployed to Dover to help forensic pathologists in the identification process. The histotechnicians rotated throughout the operation, working 3 or more days before being replaced by other histotechnician reinforcements before returning to the AFIP.

"I volunteered to help because I wanted to learn something, and I knew AFIP has some of the best pathologists in the world," said A1C Gibson. "Before I went to Dover, I didn't understand the whole process of how casualties are handled there."

Traditionally, as part of their training, histotechnicians are taught to assist pathologists in autopsies in a sterile setting at a medical facility. Up until the September 11 terrorist attacks, the recent graduates received most of their training inside the classroom. When they were tasked to work at the Dover Air Force Base Port Mortuary, however, their training took on new meaning.

In mass fatality operations at Dover, forensic investigators utilize a series of stations to conduct victim identifications. And the histotechnicians were there to help, moving victims from station to station, assisting with the recovery of personal effects, and even taking notes for the pathologists. Their valuable assistance was needed at every station. "They were terrific," said team leader Bruce Ensign, Maj, USAF, MC. "Thanks to their help, our pathologists were able to conduct their investigations more rapidly and efficiently."

HM3 Mendoza said working in the morgue proved to be a very moving experience for him, with the knowledge that just a few hours before, the victims had been alive and serving their country at the Pentagon. "It was real emotional," he said. "I wanted to participate. In fact, a lot of us wanted to help out, and being at Dover gave us a chance to help the forensic pathologists." Amn Ashford said she adjusted to her new role quickly. "This was nothing like I could ever imagine. It was a really different experience. I think the training has given me an edge over my counterparts."

Behind the scenes at AFIP, Army MSG Daneen Harris and Air Force MSgt Joy Williams are two senior enlisted advisors for their respective services. They coordinated and provided work schedules for 35 to 40 enlisted AFIP servicemembers to help out in the aftermath of the Pentagon terrorist attack. Servicemembers' assignments ranged from driving, courier duties, and guarding AFIP's perimeter to assisting pathologists at Dover. Military personnel cut orders for personnel tasked to deploy to Dover. "Nearly all military personnel here were involved in this mission," MSgt Williams said.

Enlisted personnel and officers at AFIP helped man a specially created Emergency Operations Center, headed by Lt Col Larry Shaw, AFIP's chief of staff for Administrative Services, said Air Force MSgt Chris Sepulveda, NCOIC of the deployed histotechnicans. "Once it was recognized that the Pentagon terrorist attack was an emergency, we needed a place to track and record information between the AFIP, the FBI, the Surgeon General, and everyone who needed to coordinate with us. The Emergency Operations Center was the nerve center, and Lt Col Shaw ran it," he said.

– *Michele Hammonds*





Air Force MSgts Joy Williams and Chris Sepulveda provided support at AFIP.



OAFME forensic photography staff who led the Dover operation from left: TSgt Michael Godwin, USAF; TSgt Louis Briscese, USAF, NCOIC; PHC(SW/AW) Sean Doyle, USN, LCPO, and PH3 Christopher Williams.

Photo by TSgt Briscese.

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Museum *from page 3*

pathology consultation for the Pennsylvania crash, and five staff members of the Armed Forces DNA Identification Laboratory collected DNA samples in the Somerset morgue.

Sledzik and Barbian, physical anthropologists on staff of the NMHM/AFIP, oversee a collection of human medical and pathological specimens. They provide forensic anthropology consultation to several local and federal agencies and teach an annual AFIP course in forensic anthropology.

"The methods of interpreting the biological aspects of the human skeleton are similar, whether you are looking at a Civil War soldier or a recent disaster victim," said Barbian.

"The Museum is proud to support this work as a service to the nation," said Dr. Adrianne Noe, Museum Director. "Yet, it is no surprise that we should be able to do so. Our efforts are an excellent example of public service, combining support for families with our unique experiences and expertise at this critical time."

Operation Noble Eagle:

Supplies, equipment and facilities: a "round-the clock" operation for AFIP Logistics staff

Staff from AFIP's Directorate of Logistics provided essential supplies and services for hundreds of personnel who deployed to Dover for *Operation Noble Eagle*, according to William McCarthy, MAJ, MS, USA, Director of Logistics at AFIP. "We were on the scene, in place, and ready to support the mission before the first casualties began arriving at Dover," he said. On the afternoon of September 11, McCarthy anticipated needing supplies on short notice and coordinated with the MEDCOM Contracting Office, Northeast Region, and established a pipeline for a 24- hour support. He and Candy Moroz, finance and logistics support officer for AFIP's Center for Advanced Pathology, headed to Dover 2 days later to establish a forward-deployed logistics cell in support of the Office of the Armed Forces Medical Examiner. "We worked closely with OAFME's Bob Veasey and the permanent logistics staff at Dover to ensure the availability of the appropriate supplies, equipment, and facilities. Local hospitals also donated items we could not obtain in time," he added.



Candy Moroz, finance and logistics support officer for AFIP's Center for Advanced Pathology works with a Dover staff member.

AFIP spent over $700,000 for equipment, including protective suits, goggles, shoes, masks, and portable equipment for forensic and mortuary workers. "I ordered whatever supplies Mr. Veasey and his staff needed," said Moroz, who spent almost 2 weeks providing critical logistics support to the forensic investigators. With commercial air travel completely shut down, supplies were unavailable through usual shipping methods. Moroz often drove hundreds of miles each day to purchase and deliver items to the mortuary facility. "Many retail companies, including Lowes, Dymo Label and Fitzco donated a large amount of supplies when they learned of the work going on at Dover. Other companies such as Fisher Scientific also donated supplies and waived shipping charges to help us carry out the mission," she said.

Angela D. Washington, Lt Col, USAF, MSC, group administrator for AFIP's annex in Rockville, Md, was responsible for arranging lodging, and billeting for many personnel. She accomplished this in a few short days, despite the limited supply of available hotel rooms in the Dover area. Washington also organized an in-house courier system, transporting forensic evidence from Dover to the Armed Forces DNA Identification Laboratory in Rockville. "That was significant because we would leave Dover by 1 p.m. and arrive with the DNA samples at AFDIL by 4 p.m.," she said. "Lab personnel could process the specimens the same day, speeding up the identification effort."

– *Michele Hammonds*

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Department of Advanced Medical Education
2002 Continuing Medical Education Courses

NEW COURSE!

MUSCLE DISORDERS COURSE AND WORKSHOP

- May 10–11, 2002
- Holiday Inn Select, Bethesda, Md.
- The AFIP designates this educational activity for a maximum of 16 hours for Category 1 credit.

The AFIP muscle disorders course and workshop for clinicians, pathologists, and researchers will combine essential didactics with hands-on interpretation of histologic slides at prepared microscopic stations to allow participants to strengthen their understanding of muscle disorders and diagnostic muscle pathology. General introductory lectures alternating with microscopic slide sessions will be followed by in-depth presentations on Duchenne's muscular dystrophy, autoimmunity, inclusion body myositis, mitochondrial disorders, and application of molecular/genetic methods to clinical and pathologic diagnosis. A series of clinicopathologic correlations to allow participants to practice their diagnostic skills will close the workshop. This course should enrich the participants' understanding of:

- Skeletal muscle histomorphology and utilization of various staining modalities to identify pathologic features of disease.
- Basic patterns of muscle disease (inflammatory, dystrophic, neurogenic, toxic, metabolic/mitochondrial) and derivation of differential diagnoses.
- The pathophysiology and pathogenesis of muscle disorders.
- Pathology reports and correlation with clinical diagnosis and management of patients with muscle diseases.

For more information, contact course coordinator Mr. Ricky Giles. Telephone numbers, E-Mail, and Web site located in the green box below.

40th Annual Dr. Kenneth M. Earle Memorial NEUROPATHOLOGY REVIEW

- February 25–March 1, 2002/Hyatt Regency Bethesda, Bethesda, Md.
- The AFIP designates this educational activity for a maximum of 31 credits.

This is the 40th iteration, which is dedicated to the memory of Kenneth M. Earle, MD, former Chairman, Department of Neuropathology. This highly structured 5-day course will provide a comprehensive review of neuropathology for individuals interested in both NEUROSCIENCE and PATHOLOGY. Lectures will be illustrated by gross and microscopic photographs and will be supplemented by a course syllabus containing numerous COLOR PHOTOMICROGRAPHS, and the AFIP fascicle on *Tumors of the Central Nervous System.* Participants can expect to gain:

- Enhanced knowledge of the pathology and recent developments in the pathophysiology of common and unique disorders of the central and peripheral nervous systems and skeletal muscle.
- Familiarization with recently recognized pathologic processes related to the central and peripheral nervous systems and skeletal muscle.
- Improved understanding of basic histopathologic, histochemical, immunohistochemical, and ultrastructural features of disorders of the central and peripheral nervous systems and skeletal muscle.
- Insight into clinical, radiologic, and pathologic correlations, and prognostic factors of central nervous system lesions.

For more information, contact course coordinator Mr. Ricky Giles. Telephone numbers, E-Mail, and Web site located in the green box below.

NEUROPATHOLOGY SEMINARS

- **Location:** Armed Forces Institute of Pathology, Washington, DC
- Session 1: GENERAL NEUROPATHOLOGY
  Date: January 7 – 18, 2002/24 Credit Hours
- Session 2: DEVELOPMENTAL AND GENETIC DISORDERS
  Date: January 22 – February 1, 2002/22 Credit Hours
- Session 3: TUMORS OF THE CENTRAL NERVOUS SYSTEM
  Date: February 4 – 15, 2002/24 Credit Hours
- Session 4: NEURODEGENERATIVE DISEASES
  Date: February 19 – 22, 2002/12 Credit Hours
- Session 5: 40th Annual KENNETH M. EARLE NEUROPATHOLOGY REVIEW
  Date: February 25 – March 1, 2002/31 Credit Hours
- Session 6: NEUROMUSCULAR DISEASES
  Date: March 4 – 15, 2002/22 Credit Hours
- Session 7: INFECTIOUS DESEASES OF THE CNS
  Date: March 18 – 22, 2002/12 Credit Hours
- Session 8: NEURORADIOLOGY
  Date: March 25 – 29, 2002/37 Credit Hours

The AFIP Seminars in the Neuropathology series is a systematic review of the major topics in diagnostic neuropathology. The seminar series is designed to prepare pathology, neurology, neurosurgery, and neuroradiology residents for specialty board certification. The participants receive a 1- to 1-½ hour lecture, followed by a microscopic tutorial session, during which microscopic slides illustrating the lecture concepts are presented and discussed. Approximately 1 day a week (depending on material availability) the students participate in a 2-hour case-based presentation session, which incorporates interpretation of diagnostic radiographic images, intraoperative and gross speciman transparencies, and histopathologic sections. This session is conducted jointly by AFIP neuroradiology and neuropathology staff. The afternoons are reserved for individual study, during which time the students are encouraged to take advantage of the wealth of educational materials available at the AFIP. Participants of each seminar will benefit by gaining:

- Enhanced knowledge of the pathology and recent developments in the pathophysiology of common and unique disorders of the central and peripheral nervous systems and skeletal muscle.

DME

Department of Medical Education
Armed Forces Institute of Pathology
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Telephone: 202.782.2634
Toll Free: 1.800.577.3749 (U.S. only)
FAX: 202.782.5020
Toll Free FAX: 1/800.441.0094 (U.S. only)
International FAX: 1/877.891.3482
Email: came@afip.osd.mil
URL: http://www.afip.org/edu/

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- Familiarization with recently recognized pathologic processes related to the central and peripheral nervous systems and skeletal muscle.
- Improved understanding of basic histopathologic, histochemical, immunohistochemical, and ultrastructural features of disorders of the central and peripheral nervous systems and skeletal muscle.
- Insight into clinical, radiologic, and pathologic correlations, and prognostic factors of central nervous system lesions.

For more information, contact course coordinator Mr. Ricky Giles. Telephone numbers, E-Mail, and Web site located in the green box on page 15.

40th Annual Basic Science Course OTOLARYNGOLOGY HEAD AND NECK SURGERY

- March 5 - 29, 2002
- Uniformed Services University of the Health Sciences, Bethesda, Md.

The otolaryngology course is 4 weeks long and includes intensive reviews in pathology, anatomy, physiology, and clinical sciences related to the head and neck. The course is ideally suited for residents in training and practitioners wishing to review the basic sciences and obtain clinical knowledge. Participants will be exposed to the material through lectures, microscopic examinations of personal glass slide collections, and cadaver dissections. Participants will attend the MG Paul H. Streit Memorial Seminar that will focus on laryngology. A self-diagnostic slide examination in histopathology will be given at the end of the course. It is recommended each student purchase Wenig, Bruce, *Atlas of Head and Neck Pathology*, W.B. Saunders Company, Philadelphia, Pa 19093, or from a participating book vendor before attending the course.

For more information, contact course coordinator SSgt. Stephen Huntington. Telephone numbers, E-Mail, and Web site located in the green box on page 15.

38th Annual FORENSIC IDENTIFICATION (DENTISTRY) AND EMERGING TECHNOLOGIES

The course is open to civilian & military and includes both lectures and hands-on lab sessions.

- March 18–22, 2002
- Hyatt Regency, Bethesda, Maryland
- The course fills quickly, so you are encouraged to register early.

The course continues to evolve with the primary focus to bring the forensic scientist up to date with current industry standards. This year we have added lectures by experts from Central Identification Lab, Hawaii, Criminal Justice Information Services Division, Investigative Graphics, and Armed Forces Center for Child Protection; a retrospective look at the Murrah Federal Building Disaster; and integrated computer mass disaster lab. The lab incorporates digital x-ray and gross specimen photographic capture and manipulation, and WINID software navigation into the wet specimen lab. In addition, we have added a craniofacial age assessment lab.

The primary focus of this evolving course is to bring the forensic scientists up-to-date with current "e" technologies and cutting edge identification modalities, as well as to immerse them in the more traditional forensic disciplines. While the primary emphasis is on forensic odontology, it also embraces and dovetails with other related disciplines that all forensic scientists need to know. Numerous medical specialists, including odontologists, medical examiners, anthropologists, and criminologists, who attended this course in the past report that it significantly impacted their practices and that the involvement of such a wide range of specialists is an added value. Key topics include:

- Digital Imaging (bitemark and medical imaging cases)
- Computerized Digital Radiography & Superimposition Techniques
- DNA (overview & cases)
- Software Applications (WINID)
- Forensic Pathology (Medical Examiner & Aerospace)
- Anthropology
- Mass Disaster Organization, including DMORT & NTSB
- Bitemark Analysis
- Spouse, Child & Elder Abuse
- Overview of Forensic Odontology
- Criminal Profiling
- Radiographic Aging techniques

For further information, contact course coordinator SSgt. Stephen Huntington. Telephone numbers, E-Mail, and Web site located in the green box on page 15.

MICROSCOPE WORKSHOP: UPDATE ON RENAL BIOPSIES IN MEDICAL RENAL DISEASES

- April 5–7, 2002
- Holiday Inn Select, Silver Spring, Md.

This is a 3-day course designed to review the pathology of renal diseases. The course should interest pathologists and nephrologists who evaluate kidney biopsies in their practice, as well as physicians, residents, and fellows interested in renal pathology, and for preparation in their specialty board examination. The course format includes didactic lectures covering clinical and pathologic aspects of nephrology and nephropathology followed by laboratory sessions in the afternoons.

For more information contact course coordinator Mr. Ricky Giles. Telephone numbers, E-Mail, and Web site located in the green box on page 15.

12th Annual ANATOMIC PATHOLOGY

- April 14–20, 2002/Holiday Inn Select, Bethesda, Md.
- The AFIP designates this educational activity for a maximum of 70 credits.

This 1-week intensive review of anatomic pathology focuses on current concepts and diagnostic problems. Representative staff from each of the AFIP departments listed in the program will provide didactic lectures that are complemented by an extensive syllabus and "hands-on" microscopic study sessions. In addition to 48 hours of lectures, there will be 22 hours of microscope time intermixed with the lectures. A CD-ROM (PC) set containing selected digitized images of the study set slides will be provided to participants.

The course objectives for the course are to:

- Prepare pathology residents in their final 2 years of training for their boards.
- Train practicing pathologists seeking a short, intense update-and-review course.
- Enable pathologists to maximize their overall anatomic pathology skills by slide reviews of study sets.
- Thoroughly brief pathologists on updated and current anatomic pathology procedures and methods.

For further information, contact course coordinator SSgt. Stephen Huntington. Telephone numbers, E-Mail, and Web site located in the green box on page 15.

15th Annual FORENSIC ANTHROPOLOGY

- May 6–10, 2002
- Uniformed Services University of the Health Sciences, Bethesda, Md.

Forensic anthropologists apply their skills to body search-and-recovery techniques, taphonomic analysis, trauma interpretation, bone DNA , and mass disaster victim identification. This course uses hands-on laboratory sessions to teach basic techniques of skeletal analysis. Lectures provide the methodological basis of the osteological techniques and introduce additional applications of the field. Forensic pathologists, medicolegal investigators, forensic dentists, attorneys, and others involved in death investigations will find this course an excellent introduction to the field.

For more information, contact course coordinator Mr. Ricky Giles. Telephone numbers, E-Mail, and Web site located in the green box on page 15.

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Abstracts of Recent Publications by AFIP Staff

Influenza RNA not detected in archival brain tissues from acute encephalitis lethargica cases or in postencephalitic Parkinson cases

Sherman McCall, MD, James M. Henry,MD, Ann H. Reid, MA, and Jeffery K. Taubenberger, MD, PhD

Abstract. Encephalitis lethargica (EL) was a mysterious epidemic, temporally associated with the 1918 Spanish influenza pandemic. Numerous symptoms characterized this disease, including headache, diplopia, fever, fatal coma, delirium, oculogyric crisis, lethargy, catatonia, and psychiatric symptoms. Many patients who initially recovered subsequently developed profound, chronic parkinsonism. The etiologic association of influenza with EL is controversial. Five acute EL autopsies and more than 70 postencephalitic parkinsonian autopsies were available in the Armed Forces Institute of Pathology (AFIP) tissue repository. Two of these 5 acute EL cases had histopathologic changes consistent with that diagnosis. The remaining 3 cases were classified as possible acute EL cases as the autopsy material was insufficient for detailed histopathologic examination. RNA lysates were prepared from 29 CNS autopsy tissue blocks from the 5 acute cases and 9 lysates from blocks containing substantia nigra from 2 postencephalitic cases. RNA recovery was assessed by amplification of beta-2-microglobulin mRNA and 65% of the tissue blocks contained amplifiable RNA. Reverse transcription-polymerase chain reaction (RT-PCR) for influenza matrix and nucleoprotein genes was negative in all cases. Thus, it is unlikely that the 1918 influenza virus was neurotropic and directly responsible for the outbreak of EL.

J Neuropathol Exp Neurol. 2001;60:696-704.

Experimenting on the past: the enigma of von Economo's encephalitis lethargica

Ann H. Reid, MA, Sherman McCall, MD, James M. Henry, MD, and Jeffery K. Taubenberger, MD, PhD

Abstract. Encephalitis lethargica (EL) was a complex and mysterious disease that appeared around the same time as the great influenza pandemic of 1918. The contemporaneous relationship of the 2 diseases led to speculation that they were causally related. Contemporary and subsequent observers conjectured that the influenza virus, directly responsible for the deaths of more than 20 million people, might also have been the cause of EL. A review of the extensive literature by observers of the EL epidemic suggests that most contemporary clinicians, epidemiologists, and pathologists rejected the theory that the 1918 influenza virus was directly responsible for EL. Disappearance of the acute form of EL during the 1920s has precluded direct study of this entity. However, modern molecular biology techniques have made it possible to examine archival tissue samples from victims of the 1918 pandemic in order to detect and study the genetic structure of the killer virus. Similarly, tissue samples from EL victims can now be examined for evidence of infection by the 1918 influenza virus.

J Neuropathol Exp Neurol. 2001;60:663-670.

Coronary calcification: insights from sudden coronary death victims

A. P. Burke, A. Taylor, A. Farb, G. T. Malcom, and R. Virmani

Summary. We studied 108 cases of sudden coronary death at autopsy. Any calcification was present in 55% of men and women under 40 years; all hearts showed some calcification by age 50 in men, and by age 60 in women. The only risk factor independently associated with increased calcification was diabetes mellitus, in women only. The degree of calcification was greatest for acute and healed plaque ruptures, and the least for plaque erosion. Calcification in coronary atherosclerosis appears to be delayed in women, is greatest in women diabetics, and is associated with one type of plaque instability, namely plaque rupture.

Z Kardiol. 2000;89(suppl 2):II49--II53.

Experimental evaluation of a short transitional edge protection balloon for intracoronary stent deployment

Andrew J. Carter, David P. Lee, MD, Takeshi Suzuki, MD, Lynn Bailey, Alexandra Lansky, MD, Russ Jones, and Renu Virmani, MD

The purpose of this study was to determine if balloon injury to the adjacent arterial wall during intracoronary stent deployment influences late in-stent neointimal formation. Stent design and deployment techniques are considered important factors in determining acute and long-term success with intracoronary stenting. Experimental and clinical studies support that the extent of neointimal formation and the probability for restenosis are influenced by the magnitude of arterial trauma induced with stenting. Nineteen 18-mm-long balloon-expandable stainless steel stents (MULTI-LINK Duet) were implanted at a 1:1 stent-to-artery ratio in the coronary arteries of swine with a conventional noncompliant balloon (n = 10) or a novel noncompliant balloon with short tapered shoulders to prevent edge dissection (n = 9). Quantitative coronary angiography and histology were used to evaluate balloon and artery interactions and the chronic vascular responses to the stents. Nineteen stents were implanted in the coronary arteries of seven swines at an inflation pressure of 14 atm using a standard noncompliant (n = 10) or a unique short transitional edge protection (n = 9) balloon. Histologic analysis at 28 days demonstrated balloon-associated barotrauma in 13 of 20 (65%) of adjacent nonstented arterial segments with the conventional balloon and only 3 of 18 (17%) of the adjacent nonstented arterial segments with the short transition edge protection balloon (P = 0.022). In-stent neointimal area and % stenosis correlated with the severity of peristent arterial injury (r = 0.43, P = 0.01). In-stent vessel injury scores were similar for stents with peristent injury (1.0 ± 0.3) versus stents without peristent injury (1.0 ± 0.03, P = 0.73). In-stent neointimal area and % stenosis were greater for stents with peristent injury (2.36 ± 0.74 mm^2, 32% ± 9%) as compared to stents without peristent injury (1.39 ± 0.70 mm^2, 20% ± 10%, P = 0.01). Arterial wall injury adjacent to a stent after high-pressure deployment contributes to late in-stent neointimal hyperplasia in this model. These experimental data suggest that further study is warranted to refine stent implantation techniques and that modifications of balloon shape or material may be useful to optimize stent deployment and reduce arterial trauma.

Cathet Cardiovasc Intervent. 2000;51:112-119.

Influenza A virus neuraminidase: regions of the protein potentially involved in virus-host interactions

Thomas G. Fanning, Ann H. Reid, and Jeffery K. Taubenberger

Phylogenetically informative amino acid positions (PIPs) were identified in influenza A neuraminidases of subtypes N1 and N2. Neuraminidase evolves in a lineage-specific way as the virus adapts to a new host or changes to evade the host's immune system. Thus, many PIPs undoubtedly identify positions involved in virus-host interactions. Phylogenetically important regions (PIRs) are defined as several PIPs near one another. There are 15 PIRs on N1 and 12 on N2, seven of which are shared between the two subtypes. Many PIRs are coincident with antigenic or glycosylation sites. Other PIRs may represent additional antigenic sites or may be involved in other aspects of virus-host biology.

Virology. 2000;276:417-423.

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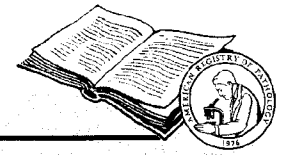
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