The National Molecular Subtyping Network for Foodborne Disease Surveillance

PulseNet™ News

State & Local Public Health Laboratories in the United States and PulseNet Canada

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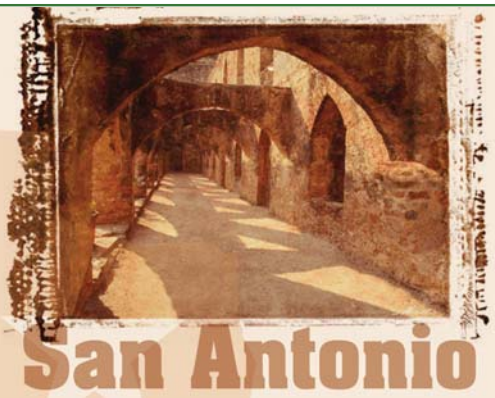
Welcome to Texas

Bienvenidos PulseNet participants,



On behalf of the Texas Department of Health and the State of Texas, we would like to welcome everyone to historic San Antonio for the 2003 PulseNet Update Meeting. We are excited to be hosting the 7th annual conference with its "Back-to-Basics" theme, and we hope that information exchange is successful and that everyone has a great time. For escaping sessions, the lively energy of the River Walk, the ghosts of the Alamo, and the romance of Spanish-colonial missions are sure to provide entrancing distractions for all. CDC

Hasta luego!

Suzanne Barth, Adam Toguchi, Matt Richardson

Expanding the Net to Vector Borne Diseases

Kristy A. Kubota, MPH, Research Microbiologist, PulseNet, Centers for Disease Control and Prevention, Fort Collins, CO

The Foodborne and Diarrheal Diseases Branch at CDC is leading the effort in collaboration with the Division of Vector Borne Infectious Diseases, Bacterial Zoonotic Diseases Branch (BZB), NCID/CDC to expand PulseNet to include a Bioterrorism (BT) module starting with two Category A bioterrorism bacterial zoonotic agents, *Yersinia pestis* and *Francisella tularensis*. This activity is led by Kristy Kubota, who is on temporary assignment to the Diagnostic and Reference Section in BZB in Fort Collins, Colorado to develop the PFGE protocols and BioNumerics client database platform. The goal for this project is to develop a robust molecular subtyping system for naturally-occurring enzootic isolates to serve as baseline for the BT module. The plan is to adopt the developed subtyping protocols for use in the Laboratory Response Network (LRN). Most, if not all the LRN laboratories, already have the capability of performing PFGE and are using BioNumerics PulseNet client databases to connect to the national PulseNet server to upload and compare patterns. We would like to use the current BioNumerics client scripts already established for the foodborne pathogens and modify them for these pathogens in the event of a bioterrorism attack and for routine surveillance.

The PulseNet standardized PFGE protocol for *E. coli* O157:H7 has been shown to work well for both *Y. pestis* and *F. tularensis*. We have selected *Asc*I as the primary enzyme for PFGE typing of *Y. pestis* and are in the process of selecting a second enzyme and its associated running conditions. For *F. tularensis*, we have started PFGE typing strains with *Bln*I; however, because of poor resolution of its lower molecular weight bands, we are evaluating other enzymes. We are currently working on a validation study with four state public health laboratories to evaluate the PFGE protocol for *Y. pestis*.

In October 2002, we had the opportunity to evaluate the protocol for *Y. pestis* when two cases of plague were diagnosed in New York City. The question was raised as to whether these two cases might have been caused by an act of bioterrorism, since plague had never been reported in New York City. The *Y. pestis* infections were seen in a New Mexican couple that was vacationing in New York City. After receiving the specimen at the

PulseNet In the News

Linda Chiu and the work of the Alberta PulseNet Laboratory were recently featured in a Canadian newspaper. The article, *Genetic Fingerprints Betray Food-borne Bugs*, can be found in the February 15, 2003 edition of The Edmonton Journal.

Dr. Bala Swaminathan and others from CDC were featured in a televised news story on 60 Minutes II on CBS January 23 of this year. The news spot featured the multi-state *Listeria* outbreak that originated in Pennsylvania last summer.

Continued from the cover

CDC Fort Collins laboratory, we recovered an isolate from one of the two case-patients and confirmed it as *Y. pestis*. Fortuitously, there were already two isolates collected in July from the patients' residential property in New Mexico archived in the *Y. pestis* collection. The PFGE typing was performed on these isolates and analysis showed that the patient isolate and the isolates obtained from their property had indistinguishable PFGE patterns. In addition, an environmental investigation was conducted on the patients' property shortly after confirmation of the two cases. Several additional isolates were obtained from sites in and around the property; these isolates shared the same indistinguishable PFGE patterns. All of these patterns were distinct from isolates collected from different areas of the United States and other countries. Currently, the *Y. pestis* database includes 91 PFGE patterns associated with 49 different PFGE types. Therefore, PFGE subtyping using *Asc*I appears to be a useful tool for subtyping *Y. pestis* strains. CDC

Call For Contributions.

The editor welcomes any contribution for the "PulseNet News" Newsletter in the form of short articles, news of recent publications, conference abstracts, news and anything else related to PulseNet. Please direct all submissions to the APHL PulseNet Program Manager, Sharon Rolando (SRolando@aphl.org).

Recommendations for PulseNet

Participating laboratories on prioritization of PFGE subtyping of foodborne pathogens

Efrain Ribot, PhD, Chief, PulseNet Methods Development and Validation Laboratory, Centers for Disease Control and Prevention

PulseNet was established to serve as an early warning system for outbreaks of foodborne illness. PulseNet's success lies in its ability to recognize widely dispersed clusters of foodborne illness that may indicate that an outbreak is occurring. Early detection of a cluster is achieved through active surveillance, which in the case of PulseNet means performing routine PFGE subtyping of routine isolates received in each of the participating laboratories and submitting the DNA fingerprints of these isolates to the national database. Since PulseNet was established in 1996, there have been many instances in which real-time PFGE subtyping led to the identification of outbreaks, nationally and internationally, even when there was no initial epidemiologic evidence suggesting that outbreaks were occurring. Real-time subtyping is critical for early cluster detection, especially in situations where cases are widely dispersed over a region or through multiple states or countries. Every laboratory participating in PulseNet must work towards achieving real-time subtyping of all pathogens tracked by the network. However, we recognize that it may not be possible, because of personnel and resource constraints, for every PulseNet laboratory to subtype all isolates in a timely manner. This limitation has led some laboratories to develop a system in which isolates are batched until there are enough to run a full gel. This practice, while more cost effective for the laboratory, is not conducive to early cluster detection, and could have a detrimental impact on public health. Here we present a series of recommendations to help participating laboratories establish subtyping priorities in a manner that is consistent with PulseNet policies and objectives.

Laboratories participating in PulseNet are required to subtype all isolates of *E. coli* O157:H7 and *Listeria monocytogenes* immediately upon receipt and then analyze the isolates and submit the patterns to the PulseNet National Database without delay. If laboratories are unable to maintain expertise in *L. monocytogenes* subtyping, they should forward the isolates to the CDC or their area lab. Routine PFGE subtyping of all *Salmonella* and *Shigella* isolates received in the public health laboratory is also desirable. At a minimum, all PulseNet laboratories must subtype *Salmonella* and *Shigella* isolates when requested by CDC or by state epidemiologists to do so, or when there is a significant increase in isolations (that is, the number of isolates received by the laboratory exceeds the expected number for that period) of specific serotypes or species. Situations may arise when a participating lab is unable to achieve the real-time subtyping requirements of the program. In these situations, laboratories should contact their PulseNet area lab for consultation and isolate referral. CDC

PulseNet Asia Pacific Network Begins to Take Shape

Sharon Rolando MHS, MT(ASCP) PulseNet Program Manager, Association of Public Health Laboratories, Washington, DC

On December 12-13, 2002, a meeting was held in Honolulu, HI to explore the possibility of setting up PulseNet Pacific Rim. The purpose of the Honolulu meeting was to discuss the standardization of methods, data generation, and terms for data sharing and collaboration. Through interactive brainstorming sessions, participants discussed the benefits and challenges of forming PulseNet

Recent Publication:

Excess Mortality Associated with Foodborne Disease

Peter Gerner-Smidt, MD, DSc, Visiting Scientist, PulseNet Europe, Centers for Disease Control and Prevention, Atlanta, GA

In PulseNet, we work with surveillance of foodborne infections with the ultimate goal to prevent illness. Most foodborne infections are diarrheal illnesses, which are usually self-limiting. However, some of these infections may ultimately lead to the death of the patient; a recently published study from Denmark1indicates that this mortality is likely to be underestimated. Although the focus of the study in Denmark is fundamentally different from the work of PulseNet, the findings of the study in Denmark stresses the importance of the work that we are doing in preventing foodborne illnesses.

In Denmark, all citizens are registered with the Civil Registry System (CRS) as a unique 10-digit code consisting of the date of birth in ddmmyy-format, plus four additional unique digits. This number uniquely identifies any person living in the country, and is used whenever anyone contacts the Danish authorities. The registration code is thus used in many different public registries. Although the different registries are not normally linked, it is possible to obtain permission to link different registries to each other for scientific purposes. The CRS generates the code and contains information about any Danish resident's age, sex, place of residence and vital status at a given time. A second registry is the Danish registry for enteric pathogens, which contains data on all patients who have been diagnosed with a bacterial enteric infection since 1991.

Two other registries are the patient registry, which contains data on patients admitted to hospitals, and the cancer registry, which contains data on patients with a diagnosed cancer in Denmark.

The authors of the Danish study obtained permission to link these four registries to study the mortality related to infections caused by common bacterial enteric pathogens. Almost 49,000 persons with a diagnosed enteric infection caused by *Salmonella*, *Campylobacter*, *Yersinia*, or *Shigella* were each matched for age, sex and residence to 10 persons in the CRS who served as controls and the death rates of case-patients were compared to those of controls for a period up to one year post-infection. To compensate for mortality caused by underlying illness, the data were also linked to the patient and the cancer registries. Overall, the risk of dying within a year of infection was 3.1 times higher among case-patients than among controls. As could be expected, the risk was highest in the month immediately following the infection. However, this increased mortality rate remained significantly higher for up to six months after the initial infection among patients infected with *Yersinia*, and up to one year after infection with either *Salmonella* or *Campylobacter*. The investigation does not explain the reasons for this long term increased mortality rate, but indicates that the number of deaths related to foodborne disease is likely to be underestimated. CDC

1. Helms M, Vastrup P, Gerner-Smidt P, Mølbak K. Short and long term mortality associated with foodborne bacterial gastrointestinal infections: registry based study. Br Med J 2003 Feb 15;326:357-361.

Pacific Rim, developed an action plan for the establishment of PulseNet Pacific Rim, and formed a Steering Committee for this network.

Representatives from CDC, APEC (Asia Pacific Economic Cooperation), WHO, EnterNet, and the Washington State Department of Public Health attended the meeting and addressed the participants. Invited participants in this planning meeting included 14 representatives from 12 Pacific Rim countries/areas. Each country/area presented its current status of foodborne surveillance, as well as an outline of its capabilities for future participation in laboratory-based laboratory surveillance. The participants agreed that a network for foodborne surveillance in the region should be formed, and that this network would benefit by functioning as a part of the global PulseNet network. Also, the participants decided that *PulseNet Asia Pacific* would be a more appropriate name for the network, particularly with the inclusion of the Centre for Health and Population Research (formerly International Centre for Diarrhoeal Disease Research, Bangladesh), Dacca, Bangladesh as one of the participating institutions in the network.

A Steering Committee was set up for PulseNet Asia Pacific with the following members: Kai Man KAM, Hong Kong (chairman/coordinator); Diane LIGHTFOOT, Australia (secretary); Haruo WATANABE, Japan; Yasin MD ROHANI, Malaysia; Celia CARLOS, Philippines; Jian-Guo XU, Peoples Republic of China; G. Balakrish NAIR, Bangladesh; and Chien-Shun CHIOU, Taiwan.

Additional invited participants from the Asia Pacific region were: Cindy LUEY, Hong Kong; Bok Kwan LEE, Korea; Kwai-Lin THONG, Malaysia; Brent J. GILPIN, New Zealand; Orn-Anong RATCHTRACHENCHAI, Thailand; and Binh Minh NGUYEN, Vietnam.

Action items developed at this meeting and currently under study include the compilation of a detailed list of costs necessary for setting up a PulseNet laboratory, the development of a systems configuration for the network, setting up a PulseNet Asia Pacific WebBoard conference, and the distribution of laboratory protocols for the subtyping of pathogenic organisms important to the region. Dr. Kai Man Kam of Hong Kong and Dr. Diane Lightfoot of Australia are graciously taking on the responsibility of moving PulseNet Asia Pacific beyond the planning stages and towards an active network.

Melissa Gosuico (rear) and Joan Rogers (front)

Laboratory Profile: City of Houston

Joan Rogers, Microbiologist, City of Houston Department of Health and Human Services, Houston, TX

In January 2001, the Laboratory Bureau of the Houston Department of Health and Human Services assembled the components necessary to begin PFGE analysis of all *Salmonella, Shigella, E. coli* 0157:H7, and *Neisseria meningitidis* isolates submitted to our laboratory. The lab receives isolates from both area hospitals and reference laboratories for identification and/or serotyping; PFGE was performed on approximately 1000 isolates in calendar year 2002.

Two CHEF-DR III units, a Gel Doc, and Quantity One and BioNumerics software were purchased under a CDC ELCIDS (Epidemiology and Laboratory Capacity for Infectious Disease Surveillance) grant jointly awarded to the Houston Laboratory and to the Epidemiology Bureaus. We have had one microbiologist processing all PFGE isolates, but have recently begun training an additional microbiologist, who was also hired under the ELCIDS grant program.

The Houston Laboratory currently performs PFGE analysis on all *Salmonella, Shigella, Neisseria meningitidis,* and Shiga-toxin producing *E. coli* isolates as soon as serotyping is complete. Pattern numbers are assigned locally, and pattern designations are forwarded to both our local and county Epidemiology Bureaus for inclusion in their databases. In addition to routinely forwarding these pattern numbers, the Laboratory highlights temporally-occurring pattern clusters and brings these to the attention of our epidemiologists. The Laboratory and the Epidemiology Bureaus are still exploring how best to use PFGE information in the context of active surveillance. Any feedback from other health departments on this subject would be most welcome!

We routinely submit all tiff images and demographic information to CDC. Additionally, PulseNet WebBoard postings are loaded into our local database, and, if recent matches are noted, that information is forwarded on to the Bureau of Epidemiology—and the match noted to the WebBoard. We try to stay in close contact with our PulseNet Area Laboratory, located at the Texas Department of Health in Austin. This lab receives all of our *E. coli* and *Neisseria meningitidis* images and demographics, and any significant clusters of *Salmonella* (rule of thumb, three or more of one pattern in a month). Currently, TDH is also processing any *Listeria* isolates that we receive. Our goal is to be running our own *Listeria* isolates by summer, 2003.

The Houston Lab has benefited from the WebBoard technical discussions. In addition, we've noted an improvement in our image quality with the purchase of a MilliQ water system, the replacement of a scratched and clouded UV filter, and the addition of an enzyme freezer that maintains a constant –20ºC. We have also begun covering our gels after pouring, as the lab continues to have a dust problem! Tropical Storm Allison hit our Laboratory hard in the summer of 2001, and we learned first hand what gels look like when run at ambient lab temperatures of 90ºF, when run with buffer made with non-distilled water, and when poured with heavy concentrations of air particulates present—all the results of working in a construction site! These factors definitely impact quality! Things have improved; however, we won't be satisfied until our gels are as sharp and clear as some of the postings that we've seen on the WebBoard! CDC

News from the PulseNet National Database

Susan B. Hunter, MS, Chief, PulseNet Database Administration Team, Centers for Disease Control and Prevention, Atlanta, GA

Three sets of PulseNet BioNumerics client scripts were distributed to participating laboratories in February 2003. The first set was an update of the PulseNet BioNumerics *E. coli* client scripts. These scripts contained all "bug fixes" that had previously been sent for the *E. coli* scripts, the new universal standard, and the new PulseNet USA logo. The new *Salmonella* and *Listeria* scripts and instructions for converting a Molecular Analyst (GelCompar) PulseNet-compatible database into a PulseNet BioNumerics database were distributed as well. These scripts contain reference systems for both the old database standards and the new universal standards; the new standard is loaded as the default. The *Salmonella, Listeria,* and *E. coli* scripts are fully compatible with version 3 BioNumerics and have a series of PulseNet lightning bolt icons to allow for quick access to PulseNet scripts and queries.

Upon release of the PulseNet *Salmonella* and *Listeria* client scripts, the national online *Salmonella* and *Listeria* databases became available to certified laboratories. Laboratories are encouraged to upload data to the national databases and perform comparisons of their patterns to those in the national database. Current efforts are underway to complete the *Shigella* client scripts and convert the National *Shigella* database to an online database. Members of the database team are available to assist with any questions related to converting data or uploading to the national databases by calling (404) 639-4558 or emailing PFGE@CDC.GOV

Discounts to PulseNet USA Participating Laboratories:

Please visit the topic ***Discounts*** under the ***General PulseNet Information*** conference on the WebBoard for information on current and on-going discounts for participating PulseNet laboratories.

PulseNet CDC Offers Training for Area Laboratorians

Mary Ann Lambert-Fair, Microbiologist, PulseNet Methods Development and Validation Lab, Centers for Disease Control and Prevention, Atlanta, GA

1st Row (left to right): Susan Hunter, Kim Hutcheson, Jennifer Kincaid, Susan Van Duyne, Jennifer Mark, Kelley Hise, John Kools, Kristy Kubota, Judy Gaither; 2nd Row: Dr. Efrain Ribot, Brenda Bowersox, Dr. Jean Whichard, Jana Lockett, Mary Ann (Lambert) Fair, Sonya Flores, Brenda Brown, Klaus Steuermann, Loretta McCroskey, Kali Erickson; 3rd Row: Lynn Mauro, Adam Beall, Jenni Wagner, Mary Kate Cichon, Dr. Peter Gerner-Smidt

The PulseNet "Standardized Molecular Subtyping of Foodborne Bacterial Pathogens by Pulsed-Field Gel Electrophoresis (PFGE)" and "Beginning PulseNet BioNumerics" workshops were held at CDC in Atlanta during the week of February 3–7, 2003. Four participants, representing one county and three state health departments, came for the entire week of training and two additional participants from other state health laboratories came for the BioNumerics portion of the workshop.

In addition, nine CDC personnel participated in the PulseNet BioNumerics workshop. Topics covered ranged from analyzing TIF files to uploading to the online database and running comparisons. This course was an updated and revised version of previous courses, created by Kristy Kubota and others on the PulseNet Database Administration team. Thank you to all the people who helped to make both workshops successful—and for the great students! CDC

PulseNet Workshops

Full Workshop *(Both PFGE Lab Methods and BioNumerics)* Participants:

- Kali Erickson, **North Dakota** Department of Health
- Sonya Flores, **New Mexico** Scientific Laboratory Division
- Jenni Wagner, **Utah** Department of Health
- Klaus Steuermann, **San Diego County** Public Health Laboratory

Additional PulseNet BioNumerics Workshop Participants:

- Mary Kate Cichon, **Massachusetts** Department of Public Health
- Jennifer Mark, **California** Department of Public Health

How would you like to receive the PulseNet newsletter?

Currently, everyone who is subscribed to receive the *PulseNet* quarterly newsletter receives a hard copy in the mail. The newsletter is also available electronically on the WebBoard and on the PulseNet website **(www.cdc.gov/pulsenet/news.htm).** If you would like to stop receiving the hard copy version and either receive the electronic version via e-mail or access it via the website or the WebBoard, please send your request to the PFGE inbox at pfge@cdc.gov with the subject line: *PulseNet* Newsletter.

Update from PulseNet Canada

In November, 2002, PulseNet Canada welcomed Dr. Lai-King Ng as the new Chief of the National Laboratory for Enteric Pathogens, the National Microbiology Laboratory, Population and Public Health Branch.

Dr. Lai-King Ng writes: "One of the important tasks of my position is to enhance the laboratory surveillance systems. PulseNet Canada is one of the projects that I champion as the first typing scheme to be implemented as part of the real-time electronic surveillance system. To achieve this, we are going to install a secure scientific network for Internet exchange of data between our laboratory and the provincial public health and reference laboratories. At the same time, we are standardizing the database to include the *E. coli* O157:H7 PFGE types that appeared in Canada in the last few years. Training will be provided to Canadian laboratories, which will be performing PFGE typing in the near future. Our next phase is to also include MRSA and VRE PFGE typing to our electronic surveillance system." CDC

State, County and City Health Departments

From around the nation,we also welcome:

- **David Elliott,** Virginia Department of Health
- **Stephanie Kreis,** Arizona Department of Health Services
- **Elise Smith,** Virginia Department of Health
- **Francis Tannor,** Virginia Department of Health
- **Janie Tierheimer,** Oregon State Public Health Laboratory

Farewells:

- **Kim Laurie,** Indiana Department of Health
- **Simone Warrack**, Arizona Department of Health Services

PulseNet News

A Publication of: The Centers for Disease Control and Prevention, National Center for Infectious Diseases, Division of Bacterial and Mycotic Diseases, Foodborne and Diarrheal Diseases Branch.

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Publications and Abstracts

- Crump JA, Bopp CA, Greene KD, Kubota KA, Middendorf RL, Wells JG, Mintz ED. ***Toxigenic Vibrio*** cholerae Serogroup O141-associated Cholera-like diarrhea and bloodstream infection in the United States. J Infect Dis 2003 Feb 18;187:866-868.
- Crump JA, Sulka AC, Langer AJ, Schaben C, Crielly AS, Gage R, Chernak E, Baysinger M, Moll M, Withers G, Toney DM, Hunter SB, Hoestra RM, Wong SK, Griffin PM, Van Guilder TJ. An outbreak of ***Escherichia coli*** O157:H7 infections among visitors to a dairy farm. N Engl J Med 2002;8:555-560.
- Kubota K. Molecular Epidemiology and Food Safety: The PulseNet Experience.
- ASM Workshop, Microorganisms in Foods—Now What? 103rd Annual meeting of the American Society for Microbiology (ASM), to be presented in Washington D.C., May 18, 2003.
- Kubota K, Hunter S, Kincaid J, Hise K, Gerner-Smidt P, Beebe J, Woo-Ming A. Molecular Surveillance of STEC O157:H7 by PulseNet USA: Cluster Detection and Outbreak Investigations in 2002. 5th International Symposium on 'Shiga Toxin (Verocytotoxin)-Producing Escherichia coli Infections, to be presented in Edinburgh, Scotland, June 8-11, 2003.
- Lambert-Fair M. PulseNet PFGE Protocols and Methods. ASM Workshop WS-07, Pulsed-Field Gel Electrophoresis and DNA Fingerprinting. 103rd Annual meeting of the American Society for Microbiology (ASM), to be presented in Washington D.C., May 17, 2003.
- Sealy T, Kubota KA, Chu, MC. One-day Rapid Pulsed-Field Gel Electrophoresis (PFGE) protocol for Typing of ***Yersinia pestis.***103rd Annual meeting of the American Society for Microbiology (ASM), to be presented in Washington D.C., May 22, 2003.
- Stanley M, Kubota KA, Sealy T, Chu MC. Comparison of Multi-Locus Variable Number Tandom Repeat Analysis (MLVA) and Pulsed-Field Gel Electrophoresis (PFGE) typing of ***Yersinia pestis*** Isolates. 103rd Annual meeting of the American Society for Microbiology (ASM), to be presented in Washington D.C., May 22, 2003.
- Varma JK, Reller M, DeLong S, Trottier J, Nowicki S, Diorio M, Koch E, Greene K, Bannerman T, York S, Lambert-Fair M, Wells J, Mead P. A Large Outbreak of ***E. coli*** O157:NM Infections Following Exposure to a Contaminated Building, Ohio 2001 (slide presentation). 40th Annual Infectious Disease Society of America Conference, presented in Chicago, October 2002.

CDC PulseNet Task Force Farewells

- **Peggy S. Hayes,** Chief of the Epidemic Investigation and Support Laboratory, retired after 37 years with the Centers for Disease Control and Prevention. Before joining the Foodborne and Diarrheal Diseases Branch in 1993, Peggy worked in several different branches, including the Respiratory and Special Pathogens Lab Branch, and the Meningitis and Special Pathogens Branch. She was a pioneer in the isolation, identification, and detection of *Listeria monocytogenes*. She was one of the key participants in a large laboratory-based study that demonstrated that most sporadic listeriosis infections are foodborne. Peggy authored or co-authored more than 68 peer-reviewed publications.
- **Lindsay Sails** joined the PulseNet Database Administration team in 2000. Lindsay was responsible for editing and creating the PulseNet newsletter, editing and creating documents for the PulseNet website, helping with the organization of the Annual PulseNet Update Meetings, and many other administrative duties involved with making PulseNet successful. Lindsay returned home to the UK in February 2003, where she and her husband Andy will be residing in Newcastle.
- **Iris "*Joi*" Hudson**, a member of the PulseNet Database Administration team since September 2002, was responsible for the *Shigella* database. She was accepted into a Post-Baccalaureate program in nutrition at Emory University in January 2003.
- **Brenda Bowersox,** a member of the PulseNet Methods and Validation Laboratory since September 2002, accepted a position with the Ohio State Health Lab. She will be working with the CDC's emergency bioterrorism response team.

CDC PulseNet Task Force New Members

Jana Lockett joined the PulseNet database administration team in March 2003 and will be working primarily with *Salmonella* TIF files analysis, database management, and cluster identification of *Salmonella* serotypes. Jana comes to us from the University of Georgia where she received her B.S. in Biology in December 2002.