CRITICAL LINK

John M. Colmers
Secretary

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The Laboratories Administration—Maryland's State Public Health Laboratory

Tandem Mass Spectrometry in Newborn Screening

A Guiding Light for Pediatric Clinicians

The mass spectrometry (MS) instrument, an analyzer that determines the number of ions and their masses in various compounds, was invented more than two decades ago. The instrument generates ions from a liquid sample and separates them according to their mass-to-charge ratios (m/z) for identification of particular analytes. The resulting ions represent the molecular make-up of the analytes.[1]

Over the past decade, mass spectrometry has been modified to a higher functional level with improvements in sensitivity and specificity for complex clinical applications. This new configuration, with different scan functions, was introduced as tandem mass spectrometry (MS/MS.)

MS/MS History

In 1990, researchers[2] first proposed using ionization techniques of fast atom bombardment or liquid secondary ionization with MS/MS to analyze dried blood spots (DBS) from newborn infants to screen for inherited metabolic disorders. Historically, each disorder to be screened required a separate test that used a portion of the DBS. This limitation held the number of tests mandated for newborn screening (NBS) in the U.S. to around a half dozen.

In 1997, North Carolina became the first state to initiate universal MS/MS newborn screening, initially using a commercial laboratory, with all follow-up and confirmatory testing performed through the NC Newborn Screening Program (NSP). In April 1999, the NC NSP Laboratory began conducting the MS/MS analyses in-house.[3] The NC model for MS/MS became a model adopted or adapted for use by many other state public health laboratories including Maryland, which began MS/MS in August, 2002. The success of this MS/MS NBS model in identifying infants with metabolic disorders depends on a comprehensive follow-up NBS component integrating the public health laboratory and academic metabolic centers (e.g., University of Maryland and Johns Hopkins University).

The Newborn Screening Laboratory of the Maryland Department of Health and Mental Hygiene began evaluating MS/MS in June 2001. In November 2003, tandem mass spectrometry was established

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Laboratories Administration Hosts Two EID Fellows

The Centers for Disease Control and Prevention (CDC) and the Association of Public Health Laboratories (APHL) support a number of Emerging Infectious Disease (EID) Laboratory Fellowship Programs to train and prepare scientists for careers in public health laboratories and to support public health initiatives related to infectious diseases.

These fellowships are highly competitive. This year, 85 state, local and CDC laboratories applied to become host laboratories and offered over 120 opportunities (billets) for the 2009 class of fellows. Competition among potential fellows is also very high with only 35 being selected for the coming year out of a total of 71 interviewed finalists.

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Georgia Corso

TECHNICAL QUESTIONS

Questions concerning technical content of this newsletter may be referred to Dr. Jack DeBoy at 410-767-6100

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as a routine analytical technology in the State NBS laboratory. Today the Laboratories Administration NBS Division maintains a MS/MS test menu for 53 genetic disorders and variants.

MS/MS Application

MS/MS can furnish the fingerprint-like identity of compounds, such as amino acids and acylcarnitines.[4] The analysis includes quantification of ions (intensity) for a specific m/z resulting from a precursor ion or a neutral loss of a functional/basic group.[5]

In tandem mass spectrometry, the product ions are sorted within a magnetic field.[3] From there the ions enter a collision chamber, where these so-called precursor ions collide with the molecules of a neutral gas and fragment. After determination of the m/z of the resulting fragments, the selected ions are transmitted as electric pulses. This rhythmic current is picked up by a detector that translates the electric pulses into signals representing the concentration of ions for a particular m/z. This information is viewed as a collection of standard curves, known as a mass spectrum.[4]

Development of MS/MS has improved the early detection of more than 50 metabolic disorders in newborn populations by performing a single assay. This mass screening technology analyzes the amino acids and acylcarnitines from a newborn blood spot dried on filter paper. Specific enzymes are needed for metabolism of particular energy-generating compounds. Inadequacy or absence of an enzyme may result in a disorder of amino acid metabolism, fatty acid oxidation, or organic acidemia.

MS/MS has played an important role not only in identification of metabolic errors but also in understanding the functionality of various organic compounds in maintaining an individual's neurological and physiological performances. In the 1980s, the association of carnitine deficiency with fatty acid and organic acid metabolic defects was taken into consideration. It was also known that acylcarnitines represent the state of β-oxidation in mitochondria. The value of these findings was so significant that it encouraged researchers to develop the assays for quantification of carnitines and acylcarnitines in newborn infants. In the 1990s, following fundamental improvements in MS systems, tandem mass spectrometry seemed promising in screening for metabolic defects.[5]

One of the metabolic disorders analyzed by MS/MS, medium chain acyl-CoA dehydrogenase (MCAD) deficiency, is the most common disorder of fatty acid oxidation in the newborn screening panel. This autosomal recessive disorder affects between 1/6,000 and 1/10,000 newborn infants. The infant with this genetic condition has abnormal levels of acylcarnitine hexanoyl (C6), octanoyl (C8), decanoyl (C10), and decenoyl (C10:1) that can be detected by MS/MS within the first two weeks after birth. Untreated MCAD has been associated with mental retardation and death.[5,6]

Another life-threatening condition in the Laboratories Administration's NBS profile is isovaleric acidemia (IVA). This autosomal recessive disorder is the result of a defective isoleucine catabolic pathway. IVA has been characterized by elevation of the acylcarnitine isovaleryl (C5), which may be picked up by MS/MS analysis. The survival and life quality of a newborn with this metabolic abnormality depends on early diagnosis and appropriate treatment.[5,6]

Maple syrup urine disease (MSUD) is a mentally and physically disabling condition, if untreated. It results from the absence of an enzyme vital in processing the three amino acids: leucine, isoleucine, and valine. For diagnosis of this defect, the most reliable marker in MS/MS data analysis is the simultaneous increase of leucine and valine.[5,6]

The enzyme phenylalanine hydroxylase converts the amino acid phenylalanine to the amino acid tyrosine. The absence or

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extremely reduced level of this enzyme results in an autosomal recessive disorder known as phenylketonuria (PKU). Individuals with this condition have an elevated phenylalanine concentration in their blood and body fluids, which can have neurological consequences. PKU, the most common amino acid disorder, occurs in 1/10,000 to 1/25,000 newborns. With early diagnosis and dietary restriction of phenylalanine, individuals with PKU can have a healthy and active life. [5,6]

Application of a multi-analyte technology, such as MS/MS, with greatly improved data processing software and high result accuracy rates has its own challenges for reducing false negative results without increasing false positives. To overcome analytical inaccuracy, the analyte cutoff concentrations must be examined statistically and adjusted in a timely manner.

Unsatisfactory specimen collection may diminish the quality of the screening results. In addition, due to the higher sensitivity of newborn specimen analysis, some disorders may not be identified by MS/MS in infants older than seven days. One example is the increased concentration of the acylcarnitine glutaryl (C5DC) in infants with Glutaric acidemia type I (GA-I), particularly within the first week of the postnatal period. Other elements may also appear perplexing in MS/MS analysis due to certain food supplements, vitamins, and certain classes of drugs, which produce acylcarnitines as they are processed. [5]

With this automated and highly sensitive method, short laboratory turnaround time, and follow-up confirmatory tests, many metabolic disorders can be detected and treated early in life to decrease morbidity and mortality.

Summary

The use of MS/MS allowed the simultaneous determination of a large number of acylcarnitines as an acylcarnitine profile. MS/MS was further applied to amino acids such as phenylalanine to detect PKU, tyrosinemia, MSUD, and homocystinuria. By the mid-1990's the development and application of electrospray ionization (ESI) MS/MS, with its ability to be automated, made high-volume screening for amino acid, organic acid, and fatty acid metabolic disorders practical for screening large populations of newborns. [7,8]

As the State's Advisory Council on Hereditary and Congenital Disorders identifies additional disorders to be screened, the extra cost using MS/MS will be relatively small compared to the earlier era when a new test had to be developed for each additional disorder. This will help maintain a cost-effective public health program, even as we screen for new disorders that occur with lower population frequencies.

This article was written by Roya Alborz.

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Laboratories Administration Hosts Two EID Fellows

Selected fellows, after being matched with host laboratories, participate in an orientation session at CDC in Atlanta to gain a general understanding of the public health laboratory system and how it relates to infectious disease surveillance, prevention, research and control. Fellows then report to their host public health laboratories to receive year-long advanced infectious disease laboratory related training. [1]

Earlier this year the Laboratories Administration's Dr. Chengru Zhu submitted an application to serve as a mentor and host a fellow in the Division of Environmental Microbiology. Dr. Maria Paz Carlos also submitted an application as a co-mentor with Dr. Robert Myers to host a fellow in the Division of Virology and Immunology. In June, Dr. Zhu learned that his Division had been matched with an International EID fellow. In July, Dr. Carlos also learned that her Division had been matched with an EID Advanced Laboratory Training Fellow. For two fellows out of only 35 to be matched in the same year at the same public health laboratory is a true testament of the high regard that the public health community has for the Maryland Laboratories Administration and its scientific expertise.

International EID Fellowship

Since its inception in 1999, the International EID Fellowship Program has provided over 60 non-U.S. citizen laboratory scientists from Asia, Africa, the Middle East and Europe with training and research opportunities at local, state and federal public health laboratories. This is a one-year program, designed for doctoral level scientists that emphasizes professional development in laboratory related aspects of infectious diseases. These fellows are placed in U.S. public health laboratories which best match the training and research needs of the fellow and demonstrate a commitment and capacity to host an international scientist. A specific, objective-based laboratory curriculum is developed for each fellow, depending on his or her areas of need and interest. The curriculum may focus on laboratory management issues such as public health laboratory operations, outbreak investigations, laboratory quality assurance and safety, and data management systems. The training and research conducted under the fellowship

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is intended to enhance laboratory practices in the fellow's home country. Establishing an on-going relationship among the U.S. host laboratory, the fellow, and the fellow's home country public health laboratory is also an important part of the Program.

Xinzhi Wang, Ph.D., M.Sc.

The International EID Fellow is Dr. Xinzhi Wang. Dr. Wang earned a Ph.D. in Preventive Veterinary Medicine from China's Shanghai Veterinary Research Institute (SVRI) and an M.Sc. degree from the University of Yangzhou. Her doctoral research involved immunological studies of a protective monoclonal antibody, construction of a hybridization library, and microarray analysis, all involving *Shistosoma japonicum*. She then joined the SVRI research group where she studied defensin-like antimicrobial peptides in the tick, *Haemaphysalis longicornis*, and picked up new knowledge and skills in medical microbiology, molecular biology, protein chemistry, cell biology and immunology. Along the way she also had 10 papers published in peer-reviewed journals.

In our Division of Environmental Microbiology, Dr. Wang will work to develop an ethidium monoazide polymerase chain reaction (EMA-PCR) to detect bacterial pathogens in food matrices and determine EMA treatment conditions needed to differentiate viable and nonviable bacteria. This project will focus on *Escherichia coli* O157:H7, *Vibrio* species and *Listeria monocytogenes*, all microorganisms of significant public health importance.

EID Advanced Laboratory Training Fellowship

For the past 14 years, the EID Advanced Laboratory Training Fellowship has provided to bachelor's, master's, and doctoral level scientists an opportunity to spend a year with emphasis on the practical application of technologies, methods, and practices related to emerging infectious diseases. Half of the 31 fellows selected for 2009 were matched with state or local public health laboratories, and half were matched with CDC laboratories.

The training is customized for each fellow based on areas of infectious disease interest, high priority laboratory personnel needs and host laboratory specialties. Training fellows also receive objective-based laboratory curricula developed for each fellow that focuses on such areas as vaccine-preventable diseases, molecular methods, drug resistant pathogens, diagnostic testing methods and instrumentation, sexually transmitted diseases, and emerging infections.

Jing-Wen Tan, B.S.

Maryland's Advanced Laboratory Training Fellow is Jing-Wen Tan. Ms. Tan just graduated from the University of California at Los Angeles (UCLA) with a B.S. Degree in Molecular, Cellular, and Developmental Microbiology. As an undergraduate, she held laboratory research positions, prepared and presented research reports, served as a Co-Managing Editor of UCLA's *Undergraduate Science Journal*, and received nine academic and community service awards. She is a native of Guangdong Province in China, and as an "avid consumer of peanut butter and jelly sandwiches" Ms. Tan became increasingly aware of the important role public health laboratory scientists play in safeguarding the health of people. On completing her training she will pursue graduate degrees, and aspires to a leadership role involving international laboratory partnerships in a national or international research institute or public health organization. Ms. Tan comes to Baltimore with a passion for both laboratory science and public health.

In the Laboratories Administration, Ms. Tan will rotate through the laboratories in both the Division of the Molecular Biology and of Virology and Immunology, with a focus on one long term project (i.e., surveillance for influenza A and B viruses circulating in Maryland and development of strain typing and antiviral resistance testing). Laboratory rotations will include: HIV Laboratory Services and Drug Resistance Program; Virus Identification; Influenza and other Respiratory Viral Pathogens; and the Arbovirus and Norovirus Testing Programs.

We hope everyone will help make Ms. Tan and Dr. Wang feel at home and support them in their important work over the next year, as they further both their careers and the mission of the Laboratories Administration and the Department.

Article prepared by Dr. Jack DeBoy.

Reference

[1] Focus on Fellows 2008: Emerging Infectious Disease Laboratory Fellowship. 2008. Association of Public Health Laboratories, pp. 1-20, fellowships@aphl.org

Kenyans Come to Maryland

On July 16 and 17, 2009, a delegation of five representatives from Kenya visited the Laboratories Administration through a program funded by the Centers for Disease Control and Prevention (CDC) and the Association of Public Health Laboratories (APHL). The Kenyans' mission was to visit several public health laboratories in the United States, and Maryland was one of their stops.

The delegates from Kenya were Dr. Jane Wasike, Director of the Nairobi National Public Health Laboratories and Head of the Ministry of Public Health and Sanitation, Mr. Dan Owiti, Chief Technician of the Medical Laboratory, Mr. Mamo Abudo, in charge of the HIV Reference Laboratory, and Dr. Peter Tukei, the APHL Country Program Coordinator in Kenya. Michael Wanga attended in place of Dr. Moses Njue Gachoki, Head of the Division of Diagnostics and Forensic Science. Ava Onalaja, representative from APHL, traveled with the group as guide.

During the first day, Dr. DeBoy, Director of the Laboratories Administration, presented an overview of clinical and public health laboratories

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From left to right: Mr. Dan Owiti, Mr. Michael Wanga, Ms. Ava Onalaja, Dr. Jane Wasike, Mr. Mamo Umuro, and Dr. Peter Tukei.
Photo source: Georgia Corso, Laboratories Administration

in the United States, focusing on the history and organization of Maryland's public health laboratory system. Then a tour of the "Laboratory Tower" began with the Division of Public Health Microbiology and the Division of Environmental Microbiology. The Kenyans then received an overview of the Laboratories Administration's "Total Quality Management Program," emphasizing internal and external quality assurance systems, followed by an in-depth discussion. The afternoon ended with a tour of HIV Retrovirology Laboratories in the Division of Molecular Biology.

On Friday, the day began with a presentation by Dr. DeBoy on Maryland's plan for a new central laboratory, followed by a presentation and tour by Steve Montgomery, Chief of the Office of Information Management Systems. He presented an overview and demonstration of the Office of Laboratory Information Management System's (LIMS) functions and operations. The laboratory tours for the day were the Division of Virology and Immunology and the other programs of the Division of Molecular Biology.

At the conclusion, a wealth of information had been shared, and both the Kenyan delegation and the Laboratories Administration participants were enlightened by many new ideas. The Laboratories Administration's *Critical Link* went global, as all the Kenyan representatives asked to be added to the electronic mailing list.

This article was written by Georgia Corso.

Laboratory Statistics

Reported from the
Laboratories Administration
during the month of
May 2009

ENTERIC BACTERIOLOGY

SEX	AGE	#	JURISDICTION
GENUS SEROVAR			
CAMPYLOBACTER JEJUNI			
F	69	1	BALTIMORE
F	57	1	BALTIMORE
F	44	1	BALTIMORE
U	2	2	MONTGOMERY
U	48	1	OUT OF STATE
CAMPYLOBACTER JEJUNI SS DOYLEI			
M	3	1	BALTIMORE
F	57	1	TALBOT
ESCHERICHIA COLI O111:NON-MOTILE.			
F	2	1	OUT OF STATE
U	15	1	OUT OF STATE
ESCHERICHIA COLI, SEROTYPE O157:H7			
F	19	1	CALVERT
SALMONELLA			
M	82	1	ANNE ARUNDEL
SALMONELLA 6,7:-:1,5			
F	25	1	BALTIMORE
SALMONELLA ENTERITIDIS			
M	46	1	ALLEGANY
F	75	1	BALTIMORE
F	58	1	BALTIMORE
F	49	1	BALTIMORE
U	0	1	BALTIMORE CITY
F	67	1	BALTIMORE CITY
F	58	2	BALTIMORE CITY
F	27	1	BALTIMORE CITY
F	24	1	BALTIMORE CITY
F	1	2	BALTIMORE CITY
M	52	1	BALTIMORE CITY
F	34	1	FREDERICK
F	66	1	HARFORD
M	43	1	HARFORD
F	0	2	OUT OF STATE
F	47	1	OUT OF STATE
F	45	1	OUT OF STATE
F	44	1	OUT OF STATE
SALMONELLA HARTFORD			
F	24	1	BALTIMORE
M	42	1	PRINCE GEORGE'S
SALMONELLA MUENCHEN			
F	32	1	BALTIMORE CITY
SALMONELLA ORANIENBURG			
F	23	1	OUT OF STATE
SALMONELLA PARATYPHI A			
F	32	2	BALTIMORE
SALMONELLA SAINTPAUL			
M	35	1	TALBOT
SALMONELLA SANDIEGO			
F	74	1	BALTIMORE
SALMONELLA SER 4,5,12:I:-			
M	13	1	OUT OF STATE
M	9	1	OUT OF STATE
SALMONELLA SER TYPHIMURIUM			
F	72	1	ALLEGANY
M	54	2	BALTIMORE CITY
M	6	1	OUT OF STATE
M	3	1	OUT OF STATE

M	1	1	OUT OF STATE
F	33	1	OUT OF STATE
SHIGELLA FLEXNERI			
F	33	1	PRINCE GEORGE'S
SHIGELLA FLEXNERI II:3,4			
F	5	1	OUT OF STATE
SHIGELLA SONNEI			
M	7	1	BALTIMORE
F	0	1	BALTIMORE CITY
F	2	1	BALTIMORE CITY
M	63	1	MONTGOMERY
M	0	1	OUT OF STATE
M	14	1	OUT OF STATE
M	1	1	OUT OF STATE

TOTAL 60

ISOLATES - REFERENCE

GENUS SPECIES			
SOURCE	#	JURISDICTION	
ACINETOBACTER LWOFFII			
CSF	1	BALTIMORE CITY	
CITROBACTER FARMERI			
BLOOD	1	BALTIMORE CITY	
CORYNEBACTERIUM SPECIES			
WOUND	1	CARROLL	
ENTEROBACTER CLOACAE			
BLOOD	1	BALTIMORE CITY	
ENTEROCOCCUS AVIUM			
ULCER	1	FREDERICK	
ENTEROCOCCUS FAECALIS			
WOUND	2	CARROLL	
ULCER	1	FREDERICK	
STOOL-VRE	1	WASHINGTON	
ENTEROCOCCUS FECALIS			
WOUND	1	WASHINGTON	
ESCHERICHIA COLI			
BLOOD	2	BALTIMORE CITY	
CSF	1	BALTIMORE CITY	
ULCER	1	FREDERICK	
WOUND	2	FREDERICK	
GARDNERELLA VAGINALIS			
VAGINAL	5	PRINCE GEORGE'S	
VAGINAL	3	SOMERSET	
KLEBSIELLA PNEUMONIAE			
BLOOD	1	BALTIMORE CITY	
PROTEUS MIRABILIS			
WOUND	1	FREDERICK	
PENIS	1	WASHINGTON	
PSEUDOMONAS AERUGINOSA			
BLOOD	1	BALTIMORE CITY	
SPUTUM	1	CARROLL	
FOOT	1	FREDERICK	
ULCER	1	FREDERICK	
SPUTUM	1	WASHINGTON	
PSEUDOMONAS PUTIDA			
SCALP	1	MONTGOMERY	
STAPHYLOCOCCUS AUREUS			
WOUND	1	ANNE ARUNDEL	
BLOOD	1	BALTIMORE CITY	
WOUND	1	BALTIMORE CITY	
WOUND	1	CARROLL	
ULCER	2	FREDERICK	
TOE	1	FREDERICK	
WOUND	5	FREDERICK	
PENIS	1	MONTGOMERY	
VAGINAL	1	SOMERSET	
STAPHYLOCOCCUS			
COAGULASE NEGATIVE			
BLOOD	2	BALTIMORE CITY	
CSF	1	BALTIMORE CITY	
NASAL SWAB	1	CARROLL	
WOUND	2	FREDERICK	
TOE	1	FREDERICK	
STREPTOCOCCUS ACIDOMINIMUS			
CSF	1	BALTIMORE CITY	
STREPTOCOCCUS			
BETA HEMOLYTIC GROUP A			
BLOOD	1	BALTIMORE CITY	
STREPTOCOCCUS			
BETA HEMOLYTIC GROUP B			
VAGINAL	1	ANNE ARUNDEL	
WOUND	1	FREDERICK	
VAGINAL	2	HOWARD	
VAGINAL	1	MONTGOMERY	
VAGINAL	1	PRINCE GEORGE'S	
VAGINAL	1	PRINCE GEORGE'S	
VAGINAL	5	PRINCE GEORGE'S	
VAGINAL	1	SOMERSET	
VAGINAL	3	SOMERSET	
STREPTOCOCCUS MILLERI GROUP C			
WOUND	1	FREDERICK	
STREPTOCOCCUS ORALIS			
BLOOD	1	BALTIMORE CITY	
STREPTOCOCCUS SPECIES			
BLOOD	1	BALTIMORE CITY	

TOTAL 75

ISOLATES - MISCELLANEOUS

GENUS SPECIES			
SOURCE	#	JURISDICTION	
ACINETOBACTER LWOFFI			
CSF	1	BALTIMORE CITY	
CITROBACTER FARMERI			
BLOOD	1	BALTIMORE CITY	
CORYNEBACTERIUM SPECIES			
WOUND	1	CARROLL	
ENTEROBACTER CLOACAE			
BLOOD	1	BALTIMORE CITY	
ENTEROCOCCUS AVIUM			
ULCER	1	FREDERICK	
ENTEROCOCCUS FAECALIS			
WOUND	2	CARROLL	
ULCER	1	FREDERICK	
STOOL-VRE	1	WASHINGTON	
ENTEROCOCCUS FECALIS			
WOUND	1	WASHINGTON	
ESCHERICHIA COLI			
BLOOD	2	BALTIMORE CITY	
CSF	1	BALTIMORE CITY	
ULCER	1	FREDERICK	
WOUND	2	FREDERICK	
GARDNERELLA VAGINALIS			
VAGINAL	5	PRINCE GEORGE'S	
VAGINAL	3	SOMERSET	
KLEBSIELLA PNEUMONIAE			
BLOOD	1	BALTIMORE CITY	
PROTEUS MIRABILIS			
WOUND	1	FREDERICK	
PENIS	1	WASHINGTON	
PSEUDOMONAS AERUGINOSA			
BLOOD	1	BALTIMORE CITY	
SPUTUM	1	CARROLL	
FOOT	1	FREDERICK	
ULCER	1	FREDERICK	
SPUTUM	1	WASHINGTON	
PSEUDOMONAS PUTIDA			
SCALP	1	MONTGOMERY	
STAPHYLOCOCCUS AUREUS			
WOUND	1	ANNE ARUNDEL	
BLOOD	1	BALTIMORE CITY	
WOUND	1	BALTIMORE CITY	
WOUND	1	CARROLL	
ULCER	2	FREDERICK	
TOE	1	FREDERICK	
WOUND	5	FREDERICK	
PENIS	1	MONTGOMERY	
VAGINAL	1	SOMERSET	
STAPHYLOCOCCUS,			
COAGULASE NEGATIVE			
BLOOD	2	BALTIMORE CITY	
CSF	1	BALTIMORE CITY	
NASAL SWAB	1	CARROLL	
WOUND	2	FREDERICK	
WOUND 5TH LEFT TOE	1	FREDERICK	
STREPTOCOCCUS ACIDOMINIMUS			
CSF	1	BALTIMORE CITY	
STREPTOCOCCUS			
BETA HEMOLYTIC GROUP A			
BLOOD	1	BALTIMORE CITY	
THROAT	2	BALTIMORE	
THROAT	4	MONTGOMERY	
THROAT	1	WICOMICO	
STREPTOCOCCUS			
BETA HEMOLYTIC NON-GROUP A			
THROAT	10	ALLEGANY	
THROAT	4	WICOMICO	
STREPTOCOCCUS			
BETA HEMOLYTIC GROUP B			
VAGINAL	1	ANNE ARUNDEL	
WOUND	1	FREDERICK	
VAGINAL	2	HOWARD	
VAGINAL	1	MONTGOMERY	
VAGINAL	1	PRINCE GEORGE'S	
VAGINAL	1	PRINCE GEORGE'S	
VAGINAL	5	PRINCE GEORGE'S	
VAGINAL	1	SOMERSET	
VAGINAL	3	SOMERSET	
STREPTOCOCCUS MILLERI GROUP C			
WOUND	1	FREDERICK	
STREPTOCOCCUS ORALIS			
BLOOD	1	BALTIMORE CITY	
STREPTOCOCCUS SPECIES			
BLOOD	1	BALTIMORE CITY	

TOTAL 96

SEXUALLY TRANSMITTED DISEASES

GENUS SPECIES

SEX	#	JURISDICTION
SYPHILIS SEROLOGY		
F	2	ANNE ARUNDEL
M	3	ANNE ARUNDEL
F	6	BALTIMORE
M	6	BALTIMORE
F	12	BALTIMORE CITY
M	18	BALTIMORE CITY
U	1	BALTIMORE CITY
M	1	CARROLL
M	1	CECIL
M	2	CHARLES
M	1	DORCHESTER
F	1	FREDERICK
M	1	HARFORD
F	1	HOWARD
F	6	MONTGOMERY
M	2	MONTGOMERY
F	8	PRINCE GEORGE'S
M	17	PRINCE GEORGE'S
F	1	WICOMICO
M	1	WICOMICO
TOTAL	**91**	
CHLAMYDIA TRACHOMATIS		
F	5	ALLEGANY
M	6	ALLEGANY
U	2	ALLEGANY
F	14	ANNE ARUNDEL
M	8	ANNE ARUNDEL
U	2	ANNE ARUNDEL
F	16	BALTIMORE
M	7	BALTIMORE
F	16	BALTIMORE CITY
M	38	BALTIMORE CITY
U	4	BALTIMORE CITY
F	4	CALVERT
M	2	CALVERT
F	1	CAROLINE
F	2	CARROLL
F	1	CECIL
F	7	CHARLES
M	1	CHARLES
F	1	DORCHESTER
F	16	FREDERICK
M	2	FREDERICK
U	2	FREDERICK
F	1	GARRETT
F	8	HARFORD
M	1	HARFORD
F	5	HOWARD
M	4	HOWARD
F	1	KENT
F	14	MONTGOMERY
M	2	MONTGOMERY
F	55	PRINCE GEORGE'S
M	37	PRINCE GEORGE'S
F	1	QUEEN ANNE'S
F	3	SAINT MARY'S
F	1	SOMERSET
M	4	SOMERSET
U	1	SOMERSET
F	4	TALBOT
F	4	WASHINGTON
M	4	WASHINGTON
F	20	WICOMICO
M	17	WICOMICO
F	2	WORCESTER
M	3	WORCESTER
TOTAL	**349**	
NEISSERIA GONORRHOEAE		
M	1	BALTIMORE
M	2	CALVERT
M	1	CECIL
F	3	CHARLES
M	2	CHARLES
F	1	DORCHESTER
M	2	FREDERICK
F	8	PRINCE GEORGE'S
M	15	PRINCE GEORGE'S
F	1	QUEEN ANNE'S
F	3	SAINT MARY'S
M	2	SAINT MARY'S
F	2	SOMERSET
F	1	WICOMICO
M	4	WICOMICO
F	1	WORCESTER
TOTAL	**49**	

MYCOBACTERIOLOGY

ISOLATE

SEX	AGE	#	JURISDICTION
MYCOBACTERIUM ABSCESSUS			
F	48	5	BALTIMORE
F	66	1	BALTIMORE
MYCOBACTERIUM AVIUM COMPLEX			
F	62	1	ALLEGANY
M	41	1	ALLEGANY
M	5	1	ALLEGANY
M	57	1	ALLEGANY
M	70	2	ALLEGANY
F	59	1	ANNE ARUNDEL
F	47	1	BALTIMORE
F	70	2	BALTIMORE
F	80	1	BALTIMORE
M	34	1	BALTIMORE
M	50	1	BALTIMORE
M	56	1	BALTIMORE
M	80	1	BALTIMORE
F	0	1	BALTIMORE CITY
F	30	1	BALTIMORE CITY
F	38	1	BALTIMORE CITY
F	66	1	BALTIMORE CITY
F	68	1	BALTIMORE CITY
M	0	1	BALTIMORE CITY
M	36	1	BALTIMORE CITY
M	44	1	BALTIMORE CITY
M	49	2	BALTIMORE CITY
M	77	1	BALTIMORE CITY
F	45	3	CARROLL
M	50	1	CARROLL
M	52	1	CARROLL
M	82	1	CARROLL
F	70	1	FREDERICK
M	46	1	FREDERICK
M	71	1	FREDERICK
M	87	1	FREDERICK
F	103	2	MONTGOMERY
F	26	1	MONTGOMERY
F	48	1	MONTGOMERY
M	36	1	MONTGOMERY
F	66	1	PRINCE GEORGE'S
M	81	1	WASHINGTON
F	65	1	WICOMICO
M	32	1	WICOMICO
M	49	1	WICOMICO
M	57	1	WICOMICO
M	59	1	WICOMICO
MYCOBACTERIUM BOVIS			
F	48	1	BALTIMORE
MYCOBACTERIUM CHELONAE			
F	80	1	BALTIMORE CITY
F	84	1	MONTGOMERY
M	45	1	MONTGOMERY
M	87	1	OUT OF STATE
MYCOBACTERIUM FORTUITUM			
F	59	1	MONTGOMERY
F	80	1	OUT OF STATE
MYCOBACTERIUM FORTUITUM COMPLEX			
M	27	1	BALTIMORE CITY
M	39	1	OUT OF STATE
MYCOBACTERIUM GORDONAE			
F	67	1	BALTIMORE
M	74	1	BALTIMORE
F	55	1	BALTIMORE CITY
M	23	1	BALTIMORE CITY
M	27	1	HOWARD
F	26	1	OUT OF STATE
F	49	1	PRINCE GEORGE'S
M	50	1	WICOMICO
MYCOBACTERIUM KANSASII			
M	31	1	BALTIMORE
M	64	1	BALTIMORE CITY
M	59	1	MONTGOMERY
M	48	1	OUT OF STATE
F	45	1	PRINCE GEORGE'S
MYCOBACTERIUM MARINUM			
M	49	1	BALTIMORE CITY
M	49	1	FREDERICK
MYCOBACTERIUM SCROFULACEUM			
F	82	2	BALTIMORE
MYCOBACTERIUM TUBERCULOSIS			
M	87	1	BALTIMORE
F	32	1	BALTIMORE CITY
M	42	1	BALTIMORE CITY
M	54	1	BALTIMORE CITY
M	15	1	HOWARD
F	26	1	MONTGOMERY
M	28	1	MONTGOMERY
F	26	1	OUT OF STATE
F	33	1	OUT OF STATE
F	37	1	OUT OF STATE
F	29	1	PRINCE GEORGE'S
M	66	1	SAINT MARY'S
M	0	1	UNKNOWN
M	71	1	WASHINGTON
MYCOBACTERIUM TUBERCULOSIS COMPLEX			
F	36	1	BALTIMORE
M	54	1	BALTIMORE
M	63	4	BALTIMORE
M	87	1	BALTIMORE
F	32	4	BALTIMORE CITY
F	41	1	BALTIMORE CITY
F	62	2	BALTIMORE CITY
M	32	3	BALTIMORE CITY
M	80	2	BALTIMORE CITY
M	79	1	HARFORD
M	15	1	HOWARD
F	65	1	MONTGOMERY
M	27	1	MONTGOMERY
M	28	3	MONTGOMERY
M	33	5	MONTGOMERY
M	35	1	MONTGOMERY
M	48	1	MONTGOMERY
M	49	1	MONTGOMERY
M	51	3	MONTGOMERY

F	26	5	OUT OF STATE
F	29	1	OUT OF STATE
F	32	2	OUT OF STATE
M	21	1	OUT OF STATE
M	23	1	OUT OF STATE
M	33	1	OUT OF STATE
M	77	1	OUT OF STATE
M	86	1	OUT OF STATE
M	87	3	OUT OF STATE
F	22	1	PRINCE GEORGE'S
F	32	5	PRINCE GEORGE'S
M	30	3	PRINCE GEORGE'S
M	31	1	PRINCE GEORGE'S
M	35	2	PRINCE GEORGE'S
M	58	4	PRINCE GEORGE'S
M	58	2	QUEEN ANNE'S
M	90	1	WASHINGTON
F	38	1	WICOMICO
M	38	1	WICOMICO
M	53	4	WICOMICO
MYCOBACTERIUM XENOPI			
M	85	1	FREDERICK
M	54	3	PRINCE GEORGE'S
F	0	1	UNKNOWN
M	0	1	UNKNOWN
NON-PHOTOCHROMOGENIC MYCOBACTERIA			
M	38	1	CHARLES
M	27	1	MONTGOMERY
M	36	1	PRINCE GEORGE'S
RAPIDLY GROWING MYCOBACTERIA			
M	58	1	BALTIMORE CITY
M	69	1	HARFORD
SCOTOCHROMOGENIC MYCOBACTERIA			
M	38	1	CHARLES
F	39	1	HARFORD
F	53	1	WICOMICO

TOTAL 186

MYCOBACTERIUM SUSCEPTIBILITY RESULTS

21 ISOLATES IDENTIFIED

6 DRUG RESISTANT STRAINS FOUND

#	JURISDICTION	DRUG(S)
1	MONTGOMERY	ISONIAZID
1	PRINCE GEORGE'S	ISONIAZID, STREPTOMYCIN
2[A]	PRINCE GEORGE'S	ISONIAZID
1	WASHINGTON DC	STREPTOMYCIN
1	WASHINGTON DC	ISONIAZID, STREPTOMYCIN

[A] TWO ISOLATES FROM THE SAME PATIENT
[B] PROBABLE FOR M. BOVIS
[C] MEETS CASE DEFINITION OF MULTI-DRUG TUBERCULOSIS (MDRTB)

Mycobacterium tuberculosis complex consists of:
- *M. tuberculosis*
- *M. bovis*
- *M. bovis, BCG*
- *M. africanum*
- *M. microti*
- *M. canettii*

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The Department, in compliance with the Americans with Disabilities Act, ensures that qualified individuals with disabilities are given an opportunity to participate in and benefit from DHMH services, programs, benefits, and employment opportunities.

MYCOLOGY

ISOLATE SEX	AGE	#	JURISDICTION
ALTERNARIA SPECIES			
M	102	1	ALLEGANY
U	0	1	CECIL
ASPERGILLUS FLAVUS			
F	48	1	TALBOT
ASPERGILLUS FUMIGATUS			
F	60	1	ALLEGANY
F	66	1	ANNE ARUNDEL
F	76	1	BALTIMORE CITY
F	82	2	BALTIMORE CITY
M	68	1	CARROLL
F	83	1	PRINCE GEORGE'S
F	85	1	PRINCE GEORGE'S
M	68	1	PRINCE GEORGE'S
F	81	1	TALBOT
M	66	1	TALBOT
ASPERGILLUS NIGER			
F	84	1	ALLEGANY
M	45	1	ALLEGANY
U	67	1	ANNE ARUNDEL
M	45	1	BALTIMORE CITY
F	57	1	CARROLL
ASPERGILLUS USTUS			
U	67	1	ANNE ARUNDEL
M	28	1	TALBOT
BEAUVERIA			
F	68	1	BALTIMORE CITY
CANDIDA ALBICANS			
M	43	1	BALTIMORE CITY
M	60	1	BALTIMORE CITY
M	63	1	BALTIMORE CITY
M	67	1	BALTIMORE CITY
F	52	1	CALVERT
F	60	1	CALVERT
F	78	1	CALVERT
M	60	1	CARROLL
F	26	1	CECIL
M	0	1	FREDERICK
F	15	1	MONTGOMERY
F	28	1	MONTGOMERY
F	29	1	MONTGOMERY
F	41	1	MONTGOMERY
F	52	1	MONTGOMERY
F	62	2	MONTGOMERY
M	32	1	MONTGOMERY
M	56	1	MONTGOMERY
M	71	1	MONTGOMERY
U	0	3	PRINCE GEORGE'S
U	74	1	PRINCE GEORGE'S
F	0	1	PRINCE GEORGE'S
F	18	1	PRINCE GEORGE'S
F	22	2	PRINCE GEORGE'S
F	23	1	PRINCE GEORGE'S
F	49	2	PRINCE GEORGE'S
F	53	1	PRINCE GEORGE'S
F	82	1	PRINCE GEORGE'S
F	84	1	PRINCE GEORGE'S
F	87	1	PRINCE GEORGE'S
M	0	1	PRINCE GEORGE'S
M	31	1	PRINCE GEORGE'S
M	38	1	PRINCE GEORGE'S
M	78	1	PRINCE GEORGE'S
M	80	1	PRINCE GEORGE'S
F	18	3	SOMERSET
F	19	1	SOMERSET
F	20	5	SOMERSET
F	22	1	SOMERSET
F	23	1	SOMERSET
U	19	1	SOMERSET
F	26	1	WICOMICO
CANDIDA GLABRATA			
M	43	1	BALTIMORE CITY
M	60	1	BALTIMORE CITY
F	79	1	PRINCE GEORGE'S
F	84	1	PRINCE GEORGE'S
M	0	4	PRINCE GEORGE'S
CANDIDA KRUSEI			
M	60	1	BALTIMORE CITY
F	87	1	PRINCE GEORGE'S
CANDIDA LUSITANIAE			
F	74	1	BALTIMORE CITY
M	60	1	CARROLL
CANDIDA PARAPSILOSIS			
M	73	1	PRINCE GEORGE'S
CANDIDA SPECIES			
M	60	1	FREDERICK
M	66	1	MONTGOMERY
F	0	1	PRINCE GEORGE'S
CANDIDA TROPICALIS			
M	43	1	BALTIMORE CITY
M	60	1	BALTIMORE CITY
F	43	1	PRINCE GEORGE'S
CRYPTOCOCCUS NEOFORMANS			
M	51	1	PRINCE GEORGE'S
DEMATIACEOUS FUNGI IMPERFECTI			
F	51	1	TALBOT
FUSARIUM SPECIES			
M	63	1	CARROLL
F	21	1	TALBOT
F	65	1	TALBOT
GEOTRICHUM PENICILLATUM			
F	38	1	ANNE ARUNDEL
F	77	1	TALBOT
MYCELIA STERILIA			
M	51	1	TALBOT
NOCARDIA ASTEROIDES COMPLEX			
F	56	1	BALTIMORE CITY
M	84	1	BALTIMORE CITY
NOCARDIA NOVA			
M	81	1	BALTIMORE
PENICILLIUM SPECIES			
F	0	1	ALLEGANY
M	47	1	BALTIMORE CITY

F	72	1	MONTGOMERY
F	0	1	PRINCE GEORGE'S
F	66	1	TALBOT
F	88	1	TALBOT
M	77	1	TALBOT

SACCHAROMYCES CEREVISIAE

M	69	1	ANNE ARUNDEL

STREPTOMYCES SPECIES

M	80	1	BALTIMORE

TRICHOPHYTON RUBRUM

M	24	1	ALLEGANY
M	39	1	BALTIMORE CITY
M	44	1	CHARLES

TRICHOPHYTON TONSURANS

F	6	1	BALTIMORE CITY

TOTAL 118

PARASITOLOGY

GENUS/SPECIES	#	JURISDICTION
BLASTOCYSTIS HOMINIS	3	BALTIMORE CITY
	1	MONTGOMERY
	1	BALTIMORE CITY
BLASTOCYSTIS HOMINIS	1	FREDERICK
	1	MONTGOMERY
	1	FREDERICK
	1	HOWARD
	3	PRINCE GEORGE'S
	1	MONTGOMERY
	1	FREDERICK
DIENTAMOEBA FRAGILIS	1	BALTIMORE CITY
	1	MONTGOMERY
ENDOLIMAX NANA	3	HOWARD
	2	MONTGOMERY
	2	ANNE ARUNDEL
	2	MONTGOMERY
ENTAMOEBA COLI	2	PRINCE GEORGE'S
ENTAMOEBA HARTMANNI	1	MONTGOMERY
	1	CARROLL
ENTEROBIUS VERMICULARIS	2	BALTIMORE
	1	WASHINGTON
	1	HOWARD
GIARDIA LAMBLIA	1	MONTGOMERY
	1	HOWARD
HOOKWORM	1	MONTGOMERY
IODAMOEBA BÜTSCHLII	1	MONTGOMERY

TOTAL 37

WATER MICROBIOLOGY

	# TESTED	# NON-COMPLIANT
COMMUNITY	2	0
NON-COMMUNITY	305	93
TOTAL	**307**	**93**

FOOD PROTECTION

	TOTALS
FOOD	
SAMPLES	40
NOTABLE PATHOGENS:	
CAMPYLOBACTER SP.	2
LISTERIA SP.	0
SALMONELLA SP.	2
CRABMEAT	
SAMPLES	0
EXCEEDING STANDARDS[1]	0
SHELLFISH	
SAMPLES	0
EXCEEDING STANDARDS[2]	0
SHELLFISH GROWING WATERS	
SAMPLES	422
TOTAL SAMPLES	**462**
TOTAL STANDARDS EXCEEDED	**4**

STANDARDS

[1]CRABMEAT FRESH
ESCHERICHIA COLI AT < 36 MPN/100 GRAMS
STANDARD PLATE COUNT AT < 100

[2]SHELLFISH
FECAL COLIFORMS AT < 230 MPN/100 GRAMS
STANDARD PLATE COUNT AT < 500,000 PER GRAM

VIRUS ISOLATION

ISOLATE SEX	AGE	#	JURISDICTION
ADENOVIRUS			
U	7	1	CALVERT
SUBTOTAL		**1**	
HERPES SIMPLEX VIRUS TYPE 1			
F	20	1	SOMERSET
M	48	1	BALTIMORE CITY
M	19	1	BALTIMORE CITY
SUBTOTAL		**3**	
INFLUENZA A VIRUS			
F	71	1	BALTIMORE
M	45	1	BALTIMORE
M	82	1	MONTGOMERY
U	46	1	MONTGOMERY
M	5	1	PRINCE GEORGE'S
SUBTOTAL		**5**	
INFLUENZA B VIRUS			
F	42	1	BALTIMORE
M	17	1	BALTIMORE
F	3	1	MONTGOMERY
F	2	1	BALTIMORE CITY
SUBTOTAL		**4**	
PARAINFLUENZA VIRUS 1			
M	42	1	BALTIMORE CITY
F	6	1	BALTIMORE CITY
SUBTOTAL		**2**	
PARAINFLUENZA VIRUS 3			
F	89	1	CARROLL
M	83	1	KENT
F	60	1	TALBOT
SUBTOTAL		**3**	
RHINOVIRUS			
M	0	1	BALTIMORE CITY
SUBTOTAL		**1**	
TOTAL		**19**	

VIRAL POLYMERASE CHAIN REACTION (PCR)

ISOLATE SEX	AGE	#	JURISDICTION
HERPES SIMPLEX VIRUS TYPE 1			
F	19	1	ALLEGANY
F	22	1	BALTIMORE
F	27	1	BALTIMORE
F	0	1	BALTIMORE CITY
F	19	1	BALTIMORE CITY
F	20	1	BALTIMORE CITY
F	21	1	BALTIMORE CITY
F	28	1	BALTIMORE CITY
M	20	1	BALTIMORE CITY
M	22	1	BALTIMORE CITY
M	28	1	BALTIMORE CITY
F	25	1	CALVERT
F	26	1	CALVERT
F	22	1	CHARLES
M	23	1	DORCHESTER
M	20	1	FREDERICK
F	27	1	HARFORD
F	18	1	PRINCE GEORGE'S
F	25	1	PRINCE GEORGE'S
F	20	1	SOMERSET
F	31	1	WICOMICO
HERPES SIMPLEX VIRUS TYPE 2			
F	23	1	ALLEGANY
F	27	1	ALLEGANY
M	23	1	ANNE ARUNDEL
F	42	1	BALTIMORE
U	22	1	BALTIMORE CITY
U	24	1	BALTIMORE CITY
U	39	1	BALTIMORE CITY
F	0	1	BALTIMORE CITY
F	16	2	BALTIMORE CITY
F	18	1	BALTIMORE CITY
F	19	1	BALTIMORE CITY
F	21	2	BALTIMORE CITY
F	25	1	BALTIMORE CITY
F	27	1	BALTIMORE CITY
F	31	1	BALTIMORE CITY

M	0	2	BALTIMORE CITY
M	20	1	BALTIMORE CITY
M	22	1	BALTIMORE CITY
M	23	1	BALTIMORE CITY
M	25	1	BALTIMORE CITY
M	28	1	BALTIMORE CITY
M	32	1	BALTIMORE CITY
M	43	2	BALTIMORE CITY
M	46	1	BALTIMORE CITY
M	54	2	BALTIMORE CITY
M	21	1	CARROLL
M	22	1	CHARLES
M	35	1	CHARLES
F	37	1	FREDERICK
F	24	1	HARFORD
F	27	1	HARFORD
M	31	1	HOWARD
F	38	2	MONTGOMERY
M	52	1	MONTGOMERY
U	51	1	MONTGOMERY
F	22	1	PRINCE GEORGE'S
F	38	1	PRINCE GEORGE'S
M	28	1	PRINCE GEORGE'S
M	37	1	PRINCE GEORGE'S
M	47	1	PRINCE GEORGE'S
M	25	1	SAINT MARY'S
F	23	1	WICOMICO
M	27	1	WICOMICO
INFLUENZA A(H1)			
F	18	1	ANNE ARUNDEL
M	19	1	ANNE ARUNDEL
M	3	1	ANNE ARUNDEL
F	8	1	BALTIMORE CITY
F	3	1	HOWARD
F	38	1	HOWARD
F	39	1	HOWARD
M	7	1	HOWARD
U	46	1	MONTGOMERY
F	22	1	MONTGOMERY
F	60	1	MONTGOMERY
M	5	1	MONTGOMERY
M	5	1	PRINCE GEORGE'S
M	44	1	QUEEN ANNE'S
INFLUENZA A(H3)			
U	0	1	BALTIMORE
F	45	1	BALTIMORE
F	46	1	BALTIMORE
F	71	1	BALTIMORE
F	27	1	BALTIMORE CITY
F	40	1	BALTIMORE CITY
M	28	1	BALTIMORE CITY
M	49	1	BALTIMORE CITY
U	2	1	HOWARD
U	59	1	HOWARD
U	37	1	MONTGOMERY
F	12	1	MONTGOMERY
F	17	1	MONTGOMERY
F	4	1	MONTGOMERY
F	52	1	MONTGOMERY
M	49	1	MONTGOMERY
M	82	1	MONTGOMERY
U	49	1	OUT OF STATE
U	51	1	OUT OF STATE
F	0	1	OUT OF STATE
M	1	1	OUT OF STATE
M	5	1	PRINCE GEORGE'S
F	48	1	WASHINGTON
INFLUENZA B VIRUS			
F	11	1	ANNE ARUNDEL
F	2	1	ANNE ARUNDEL
M	7	2	ANNE ARUNDEL
M	9	1	ANNE ARUNDEL
U	4	1	BALTIMORE
F	3	1	BALTIMORE
M	5	1	FREDERICK
M	4	1	HARFORD
U	36	1	MONTGOMERY
F	3	1	MONTGOMERY
F	75	1	WORCESTER
POSITIVE ENTEROVIRUS			
F	0	1	ANNE ARUNDEL
F	28	1	ANNE ARUNDEL
F	6	1	ANNE ARUNDEL
F	66	1	ANNE ARUNDEL
M	2	1	ANNE ARUNDEL
M	46	1	ANNE ARUNDEL
M	8	1	ANNE ARUNDEL
M	9	1	ANNE ARUNDEL
U	15	1	BALTIMORE
M	14	1	BALTIMORE
U	41	1	BALTIMORE CITY
U	53	1	BALTIMORE CITY
F	11	1	BALTIMORE CITY
F	22	1	BALTIMORE CITY
F	24	1	BALTIMORE CITY
F	34	1	BALTIMORE CITY
M	29	1	BALTIMORE CITY
M	44	1	BALTIMORE CITY
M	8	1	BALTIMORE CITY
F	18	1	CALVERT
F	20	1	CALVERT
M	18	1	CALVERT
M	19	1	CALVERT
M	54	1	CALVERT
M	8	1	CALVERT
F	0	1	CECIL
M	31	1	CHARLES
M	51	1	HARFORD
M	37	1	HOWARD
F	10	1	MONTGOMERY
F	12	1	MONTGOMERY
F	17	1	MONTGOMERY
F	37	1	MONTGOMERY
M	15	1	MONTGOMERY
M	21	1	MONTGOMERY
M	27	1	MONTGOMERY
M	53	1	MONTGOMERY
U	11	1	OUT OF STATE
U	22	1	OUT OF STATE
U	6	1	OUT OF STATE
F	0	1	OUT OF STATE
F	12	1	OUT OF STATE
F	19	1	OUT OF STATE
F	31	1	OUT OF STATE
F	65	1	OUT OF STATE
F	8	1	OUT OF STATE
M	13	2	OUT OF STATE
M	14	1	OUT OF STATE
M	20	1	OUT OF STATE
M	9	2	OUT OF STATE
U	9	1	PRINCE GEORGE'S
F	11	2	PRINCE GEORGE'S
F	31	1	PRINCE GEORGE'S
F	38	1	PRINCE GEORGE'S
F	42	2	PRINCE GEORGE'S
M	0	1	PRINCE GEORGE'S
M	10	1	PRINCE GEORGE'S
M	11	1	PRINCE GEORGE'S
M	15	1	PRINCE GEORGE'S
M	5	1	PRINCE GEORGE'S
M	55	1	PRINCE GEORGE'S
M	8	2	PRINCE GEORGE'S
M	9	2	PRINCE GEORGE'S

TOTAL 188

VIRAL HEPATITIS

ORGANISM	# SPECIMENS	# POSITIVES	JURISDICTION
HEPATITIS A			
	1	0	ANNE ARUNDEL
	1	0	BALTIMORE
	2	0	CARROLL
SUBTOTAL	**4**	**0**	
HEPATITIS B			
	46	1	ALLEGANY
	165	3	ANNE ARUNDEL
	47	1	BALTIMORE
	413	8	BALTIMORE CITY
	8	0	CALVERT
	12	0	CARROLL
	130	1	CECIL
	5	0	CHARLES
	72	1	FREDERICK
	6	0	GARRETT
	57	1	HARFORD
	32	1	HOWARD
	263	0	MONTGOMERY
	303	9	PRINCE GEORGE'S
	3	0	QUEEN ANNE'S
	1	0	SAINT MARY'S
	2	0	SOMERSET
	12	0	TALBOT
	28	0	WASHINGTON
	105	0	WICOMICO
SUBTOTAL	**1,710**	**26**	
HEPATITIS C			
	37	7	ALLEGANY
	184	70	ANNE ARUNDEL
	48	3	BALTIMORE
	172	32	BALTIMORE CITY
	7	0	CALVERT
	11	0	CARROLL
	66	13	CECIL
	6	0	CHARLES
	77	6	FREDERICK
	7	0	GARRETT
	30	5	HARFORD
	4	0	HOWARD
	38	1	MONTGOMERY
	166	7	PRINCE GEORGE'S
	9	1	QUEEN ANNE'S
	2	0	SAINT MARY'S
	3	1	SOMERSET
	12	0	TALBOT
	5	2	WASHINGTON
	19	2	WICOMICO
SUBTOTAL	**903**	**150**	
TOTALS	**2,617**	**176**	

RABIES

SOURCE	#	JURISDICTION
BAT	4	ANNE ARUNDEL
	2	MONTGOMERY
	1	PRINCE GEORGES
CAT	1	FREDERICK
	1	PRINCE GEORGES
FOX	1	BALTIMORE
	1	CECIL
	1	ST MARYS
RACCOON	3	BALTIMORE CITY
	1	BALTIMORE
	2	CARROLL
	1	CHARLES
	4	FREDERICK
	1	GARRETT
	2	HARFORD
	1	HOWARD
	4	MONTGOMERY
	1	PRINCE GEORGES
	1	SOMERSET
	2	TALBOT
	2	WASHINGTON
	9	WORCESTER
SKUNK	1	BALTIMORE

TOTAL POSITIVES **47**

TOTAL SPECIMENS **406**

CHLAMYDIOPHILIA PSITTACI
(CHLAMYDIA)

REPORTED QUARTERLY
NO REPORT THIS MONTH

CD4 FLOW CYTOMETRY WORKLOAD

REPORTED QUARTERLY
NO REPORT THIS MONTH

BLOOD LEAD

MARYLAND			
	I	<10	131
	IIA	10-14	5
	IIB	15-19	4
	III	20-44	9
	IV	45-69	0
	V	>69	0
TOTAL			**149**
WASHINGTON DC			
	I	<10	1
	IIA	10-14	0
	IIB	15-19	0
	III	20-44	0
	IV	45-69	0
	V	>69	0
TOTAL			**1**

NEWBORN & CHILDHOOD SCREENING

STATISTICS FOR FEBRUARY 2009

PRESUMPTIVE POSITIVES

DISORDERS	#
PHENYLKETONURIA	2
MAPLE SYRUP URINE DISEASE	2
HOMOCYSTINURIA	4
TYROSINEMIA	5
ARGININEMIA	0
CITRULLINEMIA	0
GALACTOSEMIA	6
BIOTINIDASE DEFICIENCY	1
HYPOTHYROIDISM	72
HEMOGLOBIN -DISEASE	18
HEMOGLOBIN -BENIGN	440
CONGENITAL ADRENAL HYPERPLASIA (CAH)	54
CYSTIC FIBROSIS	2
FATTY ACID OXIDATIONS	0
ORGANIC ACIDEMIAS	9
ACYLCARNITINE - BORDERLINE	8
ACYLCARNITINE - OTHERS	0

MONTHLY TOTALS

# OF SPECIMENS SCREENED	12,318
NUMBER OF TESTS	1,051,715
% UNSATISFACTORY SPECIMENS	2.5

YEAR-TO-DATE CONFIRMED CASES

CONDITIONS	# CONFIRMED
MCAD	0
3MCC	1
SCAD	0
VLCAD	0
GA-I	0
IVA	0
PA	0
MAPLE SYRUP URINE DISEASE	0
PKU-CLINICALLY SIGNIFICANT VARIANT	0
CLINICALLY SIGNIFICANT VARIANT HYPERPHENYLALANINEMIA (NOT CLASSICAL PKU)	0
VARIANT HYPERPHENYLALANINEMIA (NOT CLINICALLY SIGNIFICANT)	0
CITRULINEMIA I (CIT-I)	0
GALACTOSEMIA-CLASSICAL GALT DEFICIENCY	0
GALACTOSEMIA - VARIANT	0
BIOTINIDASE DEFICIENCY	0
GALACTOSE EPIMERASE DEFICIENCY	0
PARTIAL BIOTINIDASE DEFICIENCY	0
CAH- CLASSICAL SALT WASTING	0
CAH-NON-CLASSICAL	0
HYPOTHYROIDISM - PRIMARY	5
OTHER HYPOTHYROIDISM	1
SECONFARY HYPOTHYROIDISM	0
SICKLE CELL DISEASE -SS	1
SICKLE CELL DISEASE -SC	0
SICKLE CELL DISEASE -SE	0
SICKLE CELL DISEASE - S BETA THALASSEMIA	0
CYSTIC FIBROSIS	2

ENVIRONMENTAL CHEMISTRY

SAMPLES	# NON-COMPLIANT	# TESTED
ASBESTOS		
AIR	0	0
BULK	2	5
AIR QUALITY		
$PM_{2.5}$	0	431
PM_{10}	0	0
RADIATION		
AIR/CHARCOAL FILTERS	0	62
MILK	0	0
WIPES	0	40
RAW WATER	0	7
VEGETATION	0	0
OTHER	0	0
DRINKING WATER		
METALS		
COMMUNITY	13	36
NON-COMMUNITY	7	11
PRIVATE WELLS	56	196
PESTICIDES & PCBs		
COMMUNITY	0	110
NON-COMMUNITY	0	12
PRIVATE WELLS	0	1
VOLATILE ORGANIC COMPOUNDS		
COMMUNITY	5	294
NON-COMMUNITY	0	103
PRIVATE WELLS	2	61
RADIATION		
COMMUNITY	2	32
NON-COMMUNITY	0	0
PRIVATE WELLS	0	7
INORGANICS		
COMMUNITY	0	35
NON-COMMUNITY	0	55
PRIVATE WELLS	4	149
FOOD CHEMISTRY		
SUSPECTED TAMPERING	0	0
MICROSCOPIC FILTH	0	0
LABELING	0	0
SURVEILLANCE	0	1
CHEMICAL CONTAMINATION	0	3
TOTAL	**91**	**1,651**

VIRAL LOAD SPECIMENS

HIV-1 RNA COPIES/ML	$<10^3$	10^3—10^4	10^4—10^5	$>10^5$	TOTALS
ALLEGANY	17	0	1	0	**18**
CARROLL	0	1	0	0	**1**
FREDERICK	0	1	0	0	**1**
MONTGOMERY	72	7	3	3	**85**
PRINCE GEORGE'S	92	15	14	3	**124**
WASHINGTON	3	0	0	0	**3**
WICOMICO	0	1	3	0	**4**
SUBTOTALS	184	25	21	6	**236**
DEPT. OF CORRECTIONS	35	8	8	3	**54**
TOTALS	**219**	**33**	**29**	**9**	**290**

HIV ANTIBODY SCREENING

SUBMITTER	TOTAL SPECIMENS	# EIA POSITIVE	% EIA POSITIVE	# WB POSITIVE	% WB POSITIVE
CORRECTIONAL INSTITUTIONS	131	3	2.29%	3	100.00%
FAMILY PLANNING (NON-GOVT)	120	0	0.00%	0	0.00%
HEALTH CENTERS (NON-GOVT)	503	36	7.16%	33	91.67%
HEALTH DEPT, NON-STD, FAMILY PLANNING	522	4	0.77%	2	50.00%
HEALTH DEPT, NON-STD, OB/GYN	12	0	0.00%	0	0.00%
HEALTH DEPT, NON-STD, OTHER	579	52	8.98%	48	92.31%
HEALTH DEPT, STD CLINICS	849	12	1.41%	11	91.67%
HOSPITAL, OTHER	138	13	9.42%	11	84.62%
HOSPITAL, PUBLIC	18	2	11.11%	2	100.00%
LABORATORIES (NON-HOSPITAL)	309	13	4.21%	8	61.54%
PEDIATRIC - CHILD HEALTH	5	0	0.00%	0	0.00%
PRIVATE PHYSICIANS	11	0	0.00%	0	0.00%
PRIVATE STUDENT HEALTH CTRS	25	0	0.00%	0	0.00%
PUBLIC STUDENT HEALTH CTRS	256	1	0.39%	1	100.00%
TOTALS	**3,478**	**136**	**3.91%**	**119**	**87.50%**

MAILING LABEL

Critical Link
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