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Bacteriophages as Antimicrobial Agents

Over the past 20 years, as antibiotic resistance has become more prevalent, a number of Western research scientists and clinicians have begun looking at bacteriophages as therapeutic alternatives to antibiotics in the treatment of bacterial infections. This is especially important when dealing with bacterial strains that are resistant to multiple antibiotics.

In 1915, Frederick Twort discovered a virus that destroyed bacteria. Two years later, Felix d'Herelle independently made similar observations and called these viruses bacteriophages (bacteria eaters). Bacteriophages, or phages, are viruses with a specific affinity for bacteria and have been found associated with essentially all groups of bacteria. Like other viruses they contain DNA or RNA and vary in structure from simple filamentous bacterial viruses to relatively complex forms with contractile tails (see Figure 2). Their relationships to the host bacteria are rather specific and, with some phages, their genetic material may become incorporated into the host's as a prophage and not immediately induce lysis of a bacterium. However, many phages

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Supporting a Neighbor

In January, the Washington DC Blood Lead Laboratory asked the Laboratories Administration to perform DC's blood lead testing. We conducted this testing for January, February, and March with a total of 218 specimens. In April, DC resumed testing.

However, in June, DC again asked us to take on their blood lead testing due to a problem with their graphite furnace atomic absorption spectrometer. Our analyses in June, July and August involved 239 specimens. It is anticipated that DC will resume testing when a new ICP/MS (Inductively Coupled Plasma/Mass Spectrometer) is in place and validated for use sometime in November.

Scientist Usha Dixit, of DHMH's Laboratories Administration, operates a graphite furnace atomic absorption spectrometer. This instrument tests whole blood specimens for lead. Its typical daily capacity is about 55 to 60 tests per day.

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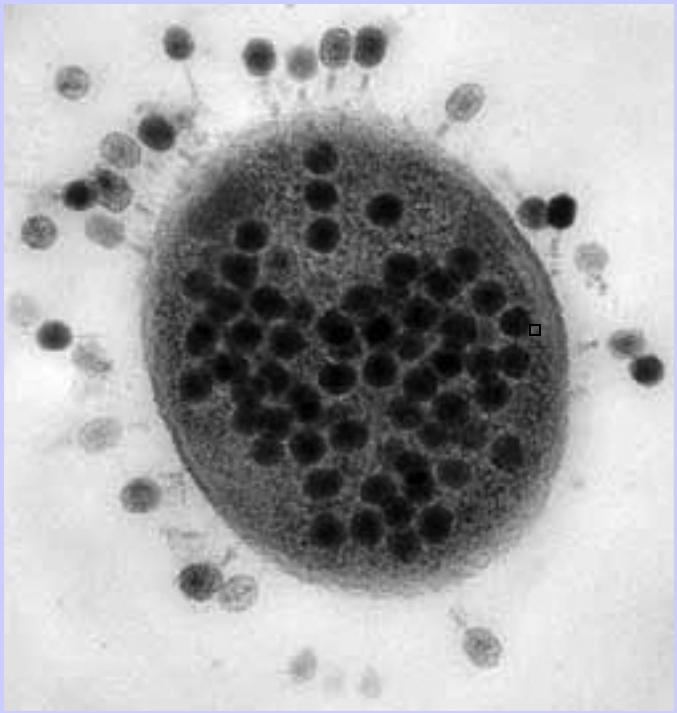
Bacteriophages as Antimicrobial Agents

are considered virulent in that they regularly and immediately use the bacteria they infect to reproduce new phage and lyse their host bacteria (see Figure 1).



A transmission electron micrograph of a thin section of *Escherichia coli* K-12 infected with Bacteriophage T4. Wikipedia

Phages active against certain pathogenic bacteria were first used to treat bacterial infections in the 1920's, a decade before penicillin was discovered. However, the medical interest associated with initial successes using phages did not last. The lack of knowledge about basic phage biology at that time resulted in many clinical failures and phage therapy was soon abandoned by Western medicine in favor of newly emerging antibiotics.[1]

However, in parts of the former Soviet Union, such as the Republic of Georgia, phage therapy has continued for 80 years. Clinicians in Georgia have been using genus-specific phages (e.g., phages against *Staphylococcus*, *Streptococcus*, *Pseudomonas*, *Shigella*, and *Escherichia*), both as monophage and cocktails of different phages, to treat antibiotic-refractive infections ranging from decubitis and diabetic ulcers and other wounds to otitis media, urinary tract infections, and intestinal infections.

Although these therapies have not been subjected to the scrutiny associated with efficacy and pharmacokinetic determinations required in countries that enforce certification for marketed pharmaceuticals, present efforts to develop phage into antibacterial agents have been greatly enhanced by current knowledge of phage biology. This knowledge of phage genetics and physiology has been gained over the last 50 years when phages were used in research that developed the fields of both virology and molecular biology.[2]

Growing evidence is showing that phages can save animals from a variety of lethal infections. *E. coli* can produce extended spectrum beta-lactamase (ESBL) enzymes which give bacteria resistance to a broad range of beta-lactamase antibiotics (e.g., penicillins). In a recent study[3] with mice Wang, et al. used phage Φ9882, derived from an ESBL-producing *E. coli* strain isolated from hospital sewage. Bacteremia was induced in the mice by intraperitoneal (i.p.) injection of $3x19^7$ CFU/ml of the *E. coli*. This was the minumum lethal dose (MLD) of the strain in this animal model. Mice infected with the MLD of the strain all died within 14 hours. However, a single i.p. injection of Φ9882 given 40 minutes after the bacterial challenge resulted in 100% survival at 24-168 hours, compared to 0% survival of saline-injected controls. Those authors proposed using the phage-mouse model to evaluate the therapeutic efficacy of lytic phages against ESBL-producing *E. coli* infections in humans.

Other reports indicate that appropriate administration of living phages can be used to treat lethal infections caused by gram-negative bacteria that include *E. coli*, *P. aeruginosa*, *Acinetobacter baumannii*, *Klebsiella pneumoniae*, *Vibrio vulnificus*, *Salmonella* species, and such gram-positive bacteria as *Enterococcus facium* and *S. aureus*.[4] Scientists are also researching the use of phage against the spread of methicillin resistant *S. aureus* (MRSA).

Although whole phage continue to generate interest as an alternative to antibiotics, focus is shifting to the use of purified phage components as antibacterial agents.[5] Most notable are purified phage-encoded endolysins reported to be effective in treating bacterial infections caused by such gram-positive bacteria as *S. pyogenes*, *S. pneumoniae*, *Bacillus anthracis*, and group B streptococci.[6]

These phage-encoded endolysins are peptidoglycan hydrolases produced in phage-infected bacterial cells toward the end of the phage growth (lytic) cycle. They induce lysis of the bacterial cell, enabling the release of progeny virions. Endolysins also are capable of rapidly degrading peptidoglycan when applied externally, as purified recombinant proteins, to the bacterial cell wall.[6] The unique ability of phage-encoded endolysins to rapidly cleave peptidoglycan in a species-specific manner makes them promising antibacterial agents. Although they were originally developed with the intent of killing bacteria colonizing mucous membranes, endolysins also may prove useful in treating systemic infections.

(Continued on page 3)

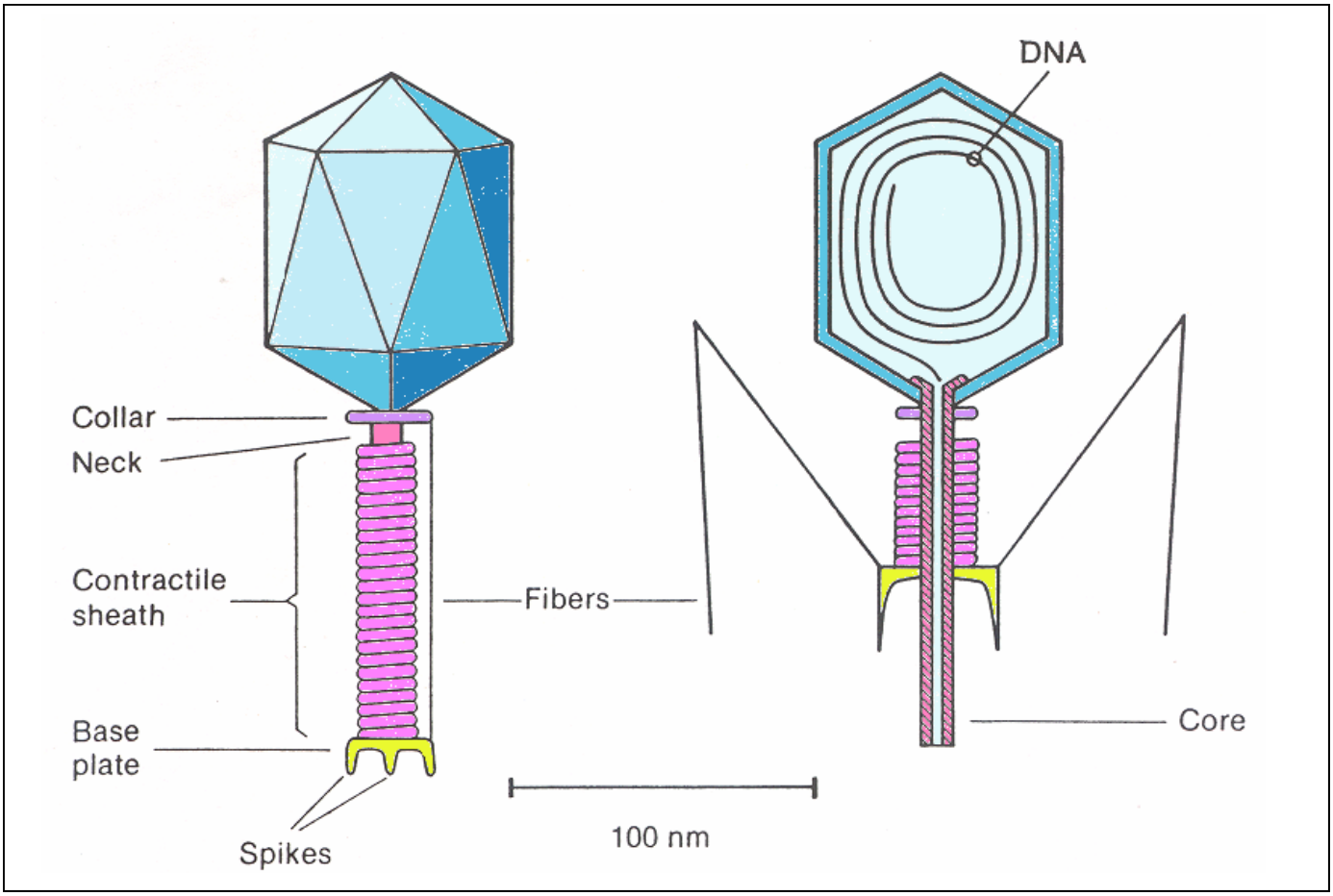


Figure 2. Phage T4 with extended and contracted tail. (Source: Ackermann, H.-W. and M.S. DuBow. Viruses of Prokaryotes. 1987. CRC Press, Boca Raton FL pg. 2).

(Continued from page 2)

Bacteriophages as Antimicrobial Agents

As potential antibacterials, endolysins possess important features that include a novel mode of action, a narrow antibacterial spectrum, activity against bacteria regardless of their antibacterial sensitivity, and a low probability of developing resistance. However, studies are required that compare the effectiveness of endolysins to traditional antibiotics.

As interest in phage has increased, a number of companies have begun investing in phage technology leading to novel therapeutic approaches. For example, researchers in the Republic of Georgia have developed and marketed a novel wound healing preparation that uses a sustained-release matrix consisting of a biodegradeable polymer impregnated with an antibiotic and lytic phages. Reportedly, wounds and ulcers healed completely in 67(80%) of 96 patients for whom follow-up data were available.[7] In 2005 a similar biodegradable preparation using phage and ciprofloxacin was used to treat MRSA-infected wounds involving local radiation injuries caused by exposure to Strontium 90.[8]

Phages also have potential to be used against bioterrorism agents (e.g., *B. anthracis*), and in second-generation phage therapies based on phage-derived single-protein-lysis systems. In addition to phage-coded inhibitors of peptidoglycon synthesis (a protein antibiotic), other efforts are addressing search methods for novel antibiotic agents using phage genomic informatics and for vaccines using phages or their products.[4] These potential therapies are expected to offset complications of chemotherapy such as multidrug resistance and substituted microbial flora.

Material for this article compiled by Dr. Jack DeBoy

References

[1] Hanlon, G.W. 2007. *Internat. J. Antimicrob. Agents*, 30(2):118-128.
[2] Merril, C.R., D. Scholl, and S.L. Adhya. 2003. *Nat. Rev. Drug Discov.*, 2(6):489-497.
[3] Wang, J., et al. 2006. *Internat. J. Mol. Med.*, 17(2):347-355.
[4] Matsuzaki, S., et al. 2005. *J. Infect. Chemother.*, 11(5):211-219.
[5] Fisckette, V.A., D. Nelson, and R. Schuch. 2006. *Nat. Biotechnol.*, 24 (12):1508-1511.
[6] Borysowski, J., B. Weber-Dobrowska, and A. Gorski. 2006. *Exp. Biol. Med.* (Maywood), 231(4):366-377.
[7] Markoishvuli, K. et al. 2005. *Internat. J. Dermatopath.*, 41(7):453-458.
[8] Jikia, D., et al. 2005. *Clin. Exper. Dermatopath.*, 30(1):23-26.

StarLIMS update

Since the last StarLIMS update we have made significant progress. We have moved the Syphilis Serology, Hepatitis Serology, Measles-mumps-rubella-varicella (MMRV), Arbovirus, and Virus Isolation laboratories to the live system. In the Division of Microbiology the Enterics, GC, and TB laboratories are in parallel testing. The TB laboratory should be moved to the live system by October, with the other laboratories in the Division to follow shortly. The environmental laboratories within the Administration are still in the developmental and site acceptance testing phases; however, the Inorganic laboratories are close to moving into parallel testing.

We have added new faxing ability to fax results in a line list format to submitters. Using this function, laboratories can have their released results faxed at the end of each day, greatly shortening the turn around time for the laboratories to receive results. The laboratories have also added the ability to fax certain results to submitters, county health officers and EDCP based upon conditions we setup within the system.

We are also installing a browser-based My-LIMS application that will allow our external clients the ability to search and view results directly from our laboratory information management system (LIMS). The environmental labs are also involved in developing an interface with the Maryland Department of Environment's Maryland Water Quality Exchange, a Web-based application that will allow testing results to be immediately available to our clients.

The Laboratories Administration has accomplished a lot in implementing our new LIMS, but we still have a great deal to accomplish. We need to test the bioterrorism application, move our molecular laboratories to the new system and finish up in the Environment Chemistry Division. Hopefully we will have all this accomplished around the end of the calendar year.

This article written by Steve Montgomery.

Farewell to Dr. Jeffrey Roche

At the most recent *Critical Link* Editorial Board Meeting, Dr. Jeffrey Roche regretfully announced he would no longer be able to serve on the Board, as he is leaving State service in mid-October to take a position with the federal government.

Dr. Roche was Center Chief for Clinical Epidemiology in the Office of Epidemiology and Disease Control Programs of DHMH's Community Health Administration. His former work in laboratory science (as a board-certified pathologist) and his role in monitoring communicable disease activity in Maryland provided a unique insight about the relevance of the *Critical Link*'s scientific articles to ongoing public health issues. He was the only member on the *Critical Link* Editorial Board who was not a Laboratories Administration employee. He has been a bond between the two administrations, offering a different view at board meetings of the subjects covered in our publication, giving unique insight and providing the relevance of the *Critical Link*'s scientific articles to ongoing public health issues.

Dr. Roche, who served on the Editorial Board for nine years, has been a most valuable asset to the *Critical Link*. His knowledge and expertise will be sorely missed. The other Board members would like to thank him for all his hard work and wish him all the best.

The services and facilities of the Maryland Department of Health and Mental Hygiene (DHMH) are operated on a non-discriminatory basis. This policy prohibits discrimination on the basis of age; ancestry; color; creed; marital status; mental or physical disability; national origin; race; religious affiliation, belief, or opinion; sex; or sexual orientation and applies to the provisions of employment and granting of advantages, privileges and accommodations. 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.

MARYLAND

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LABORATORY STATISTICS

NS – Not Speciated
NT – Non-Typeable
VRE – Vancomycin Resistant
SP – Species
NG – No Growth

* This genus has recently been given a new genus name. The genus name in parenthesis is the old name.
** Formerly a part of the *Trichosporon beigelii* complex.
***Alpha streptococci other than *S. pneumoniae* and *Enterococcus*.

REPORTED 7/01/07 - 7/31/07

ENTERIC BACTERIOLOGY

GENUS SEROVAR	SEX	AGE	#	JURISDICTION
CAMPYLOBACTER COLI				
	F	47	1	PRINCE GEORGE'S
	M	3	1	BALTIMORE CITY
CAMPYLOBACTER JEJUNI				
	M	41	1	ALLEGANY
	M	50	1	ALLEGANY
	M	69	1	ALLEGANY
	U		1	ALLEGANY
	F	19	1	CAROLINE
	F	5	1	MONTGOMERY
	F	55	1	BALTIMORE CITY
	F	57	1	BALTIMORE CITY
	M	22	1	BALTIMORE CITY
	M	26	1	BALTIMORE CITY
ESCHERICHIA COLI O157:H7				
	F	14	1	BALTIMORE
SALMONELLA AGONA				
	F	51	1	PRINCE GEORGE'S
SALMONELLA BARDO				
	U	40	1	OUT OF STATE
SALMONELLA BOURNEMOUTH				
	M	8	1	BALTIMORE CITY
SALMONELLA BRAENDERUP				
	U		1	ANNE ARUNDEL
	U	51	1	ANNE ARUNDEL
SALMONELLA DERBY				
	M		1	BALTIMORE CITY
SALMONELLA ENTERITIDIS				
	F	37	1	ANNE ARUNDEL
	F	9	1	BALTIMORE
	M	3	1	BALTIMORE
	M	17	1	BALTIMORE
	M	37	1	CHARLES
	F	43	1	MONTGOMERY
	F	16	1	PRINCE GEORGE'S
	M	76	1	PRINCE GEORGE'S
	M	58	1	TALBOT
	U		1	WICOMICO
	F		1	BALTIMORE CITY
	F	32	1	BALTIMORE CITY
	M		1	BALTIMORE CITY
	M	1	1	BALTIMORE CITY
	M	14	1	BALTIMORE CITY
	M	76	1	BALTIMORE CITY
	U		1	BALTIMORE CITY
	U	2	1	BALTIMORE CITY
	F		1	OUT OF STATE
	F	41	1	OUT OF STATE
	U		1	OUT OF STATE
	U	2	1	OUT OF STATE
	U	3	1	OUT OF STATE
	U	9	1	OUT OF STATE

U	11	1	OUT OF STATE
U	40	1	OUT OF STATE
U	41	1	OUT OF STATE
U	54	1	OUT OF STATE
U	74	1	OUT OF STATE
SALMONELLA HADAR			
M	10	1	PRINCE GEORGE'S
SALMONELLA HARTFORD			
M	43	1	OUT OF STATE
U		1	OUT OF STATE
SALMONELLA HEIDELBERG			
F	76	1	WICOMICO
U		1	BALTIMORE CITY
SALMONELLA I 6,7:NON-MOTILE			
U	93	1	OUT OF STATE
SALMONELLA IV 44:Z4,Z23:-			
F	1	1	BALTIMORE
SALMONELLA JAVIANA			
M	80	1	BALTIMORE
F	82	1	MONTGOMERY
M	82	1	MONTGOMERY
SALMONELLA KENTUCKY			
U	61	1	FREDERICK
SALMONELLA LITCHFIELD			
F	76	1	BALTIMORE
SALMONELLA MONTEVIDEO			
F	14	1	HOWARD
F		1	WASHINGTON
SALMONELLA MUENSTER			
F	26	1	BALTIMORE CITY
F	47	1	BALTIMORE CITY
SALMONELLA NESSZIONA			
F	51	1	FREDERICK
SALMONELLA NEWPORT			
M	34	1	BALTIMORE
M	51	1	MONTGOMERY
F	6	1	TALBOT
M	47	1	TALBOT
F	24	1	WASHINGTON
M	48	1	WICOMICO
U		1	WICOMICO
M		1	OUT OF STATE
U		1	OUT OF STATE
U	3	1	OUT OF STATE
U	5	1	OUT OF STATE
SALMONELLA ORANIENBURG			
F	40	2	BALTIMORE CITY
F	77	1	OUT OF STATE
SALMONELLA PAKISTAN			
F	9	1	OUT OF STATE
SALMONELLA PANAMA			
U	49	1	OUT OF STATE
SALMONELLA PARATYPHI A			
M	36	1	ANNE ARUNDEL
SALMONELLA POONA			
M	2	2	BALTIMORE CITY
U		2	OUT OF STATE
SALMONELLA RICHMOND			
F	21	1	MONTGOMERY
SALMONELLA SAINTPAUL			
F	18	1	HOWARD
M	8	1	BALTIMORE CITY
U		1	BALTIMORE CITY
U	31	1	OUT OF STATE
SALMONELLA STANLEY			
M	18	1	CECIL
M	1	1	FREDERICK
U	1	1	OUT OF STATE
SALMONELLA TENNESSEE			
F		1	BALTIMORE
SALMONELLA TYPHI			
M	17	1	WICOMICO
SALMONELLA TYPHIMURIUM			
F	27	1	ANNE ARUNDEL
F	59	1	ANNE ARUNDEL
M	35	1	CARROLL
F		1	DORCHESTER
M	11	1	FREDERICK
F	25	1	HOWARD
U	1	2	MONTGOMERY
M	76	1	OUT OF STATE
U	11	1	OUT OF STATE
SALMONELLA TYPHIMURIUM VAR COPENHAGEN			
F		1	ANNE ARUNDEL
U	3	1	ANNE ARUNDEL
M	42	1	BALTIMORE
M		1	BALTIMORE CITY
F		1	OUT OF STATE
U	3	1	OUT OF STATE
U	27	1	OUT OF STATE
SALMONELLA UNTYPABLE			
U	69	1	CECIL
F	60	1	FREDERICK
F	64	1	BALTIMORE CITY
SALMONELLA WANDSWORTH			
U	2	2	OUT OF STATE
SALMONELLA 4,12:i:-			
F	49	1	CALVERT
F		1	MONTGOMERY
SALMONELLA 4,5,12:i:-			
M	22	1	ALLEGANY
M	22	1	FREDERICK
F	6	1	BALTIMORE CITY
M	3	1	BALTIMORE CITY
U	7	1	BALTIMORE CITY
M	9	1	OUT OF STATE
U	1	1	OUT OF STATE
U	5	1	OUT OF STATE
U	7	1	OUT OF STATE
SHIGELLA FLEXNERI II:3,4			
M	6	1	PRINCE GEORGE'S
SHIGELLA FLEXNERI II:7,8			
M	50	1	MONTGOMERY
SHIGELLA SONNEI			
M	7	1	ANNE ARUNDEL
F	2	1	MONTGOMERY
F	19	1	MONTGOMERY
M	11	1	MONTGOMERY
M	33	1	MONTGOMERY
F		1	ST. MARY'S
U	29	1	OUT OF STATE
VIBRIO ALGINOLYTICUS			
F	18	1	CECIL
VIBRIO FLUVIALIS			
U	27	1	OUT OF STATE
VIBRIO MIMICUS			
M	27	1	ANNE ARUNDEL
VIBRIO VULNIFICUS			
M		1	BALTIMORE CITY
TOTAL		**142**	

ISOLATES – THROAT CULTURES

COUNTY	GROUP A[1]	NON-GROUP A
ALLEGANY	0	1
WORCESTER	3	1
TOTAL	**3**	**2**

[1] *Streptococcus pyogenes*

BACTERIOLOGY IDENTIFICATIONS
Referrals

GENUS SPECIES SOURCE	#	JURISDICTION
HAEMOPHILUS INFLUENZAE NON-TYPEABLE		
BLOOD	1	ALLEGANY
HAEMOPHILUS INFLUENZAE SEROTYPE C		
BLOOD	1	ST. MARY'S
HAEMOPHILUS INFLUENZAE SEROTYPE E		
BLOOD	1	BALTIMORE CITY
HAEMOPHILUS INFLUENZAE SEROTYPE F		
BLOOD	1	ANNE ARUNDEL
NEISSERIA MENINGITIDIS SEROGROUP B		
BLOOD	1	WASHINGTON DC
OLIGELLA URETHRALIS		
BLOOD	1	PRINCE GEORGE'S
TOTAL	**6**	

ISOLATES – MISCELLANEOUS

GENUS SPECIES SOURCE	#	JURISDICTION
ACINETOBACTER CALCOACETICUS-BAUMANNII COMPLEX		
FOOT	1	FREDERICK
ACINETOBACTER LWOFFII		
BLOOD	1	BALTIMORE CITY
BACILLUS SPECIES		
FOOT	1	FREDERICK
CITROBACTER FREUNDII		
FOOT	1	FREDERICK
CLOSTRIDIUM SPECIES		
CSF	1	BALTIMORE CITY
CORYNEBACTERIUM SPECIES		
BLOOD	2	BALTIMORE CITY
TOE	1	FREDERICK
WOUND	1	PRINCE GEORGE'S
ENTEROBACTER CLOACAE		
TOE	1	FREDERICK
ENTEROCOCCUS FAECALIS		
BLOOD	1	BALTIMORE CITY
FOOT	1	FREDERICK
TOE	1	FREDERICK
ESCHERICHIA COLI		
BLOOD	1	BALTIMORE CITY
KLEBSIELLA OXYTOCA		
TOE	1	FREDERICK
KLEBSIELLA PNEUMONIAE		
BLOOD	1	BALTIMORE CITY
FOOT	1	FREDERICK
PSEUDOMONAS AERUGINOSA		
BLOOD	1	BALTIMORE CITY
FOOT	1	FREDERICK
TOE	2	FREDERICK
PSEUDOMONAS ORYZIHABITANS		
TOE	1	FREDERICK
STAPHYLOCOCCUS AUREUS		
LESION	1	ANNE ARUNDEL
BLOOD	1	BALTIMORE CITY
FINGER	1	CARROLL
WOUND	2	CARROLL
TOE	3	FREDERICK
FOOT	2	FREDERICK
SKIN	1	MONTGOMERY
VAGINAL	1	MONTGOMERY
SPUTUM	1	WICOMICO
STAPHYLOCOCCUS SPECIES		
INCISION	1	CARROLL
INCISION	1	FREDERICK
TOE	1	FREDERICK
SKIN	1	PRINCE GEORGE'S
STENOTROPHOMONAS MALTOPHILIA		
WOUND	1	PRINCE GEORGE'S
STREPTOBACILLUS MONILIFORMIS		
CSF	1	BALTIMORE CITY
STREPTOCOCCUS BETA-HEMOLYTIC GROUP A		
BLOOD	1	BALTIMORE CITY
STREPTOCOCCUS BETA-HEMOLYTIC GROUP B		
VAGINAL	3	ANNE ARUNDEL
BLOOD	1	BALTIMORE CITY
VAGINAL	4	HOWARD
VAGINAL	3	MONTGOMERY
STREPTOCOCCUS NON-HEMOLYTIC		
BLOOD	2	BALTIMORE CITY
TOTAL	**55**	

SEXUALLY TRANSMITTED DISEASES

GENUS SPECIES SEX	#	JURISDICTION
NEISSERIA GONORRHEAE		
F	3	ANNE ARUNDEL
M	5	ANNE ARUNDEL
F	2	BALTIMORE
M	1	BALTIMORE
F	1	CALVERT
F	1	CAROLINE
M	4	CHARLES
M	2	DORCHESTER
F	2	FREDERICK
M	1	HARFORD
F	1	HOWARD
M	1	HOWARD
F	6	MONTGOMERY
M	7	MONTGOMERY
F	15	PRINCE GEORGE'S
M	40	PRINCE GEORGE'S
F	1	QUEEN ANNE'S
M	1	QUEEN ANNE'S
F	1	ST. MARY'S
F	1	SOMERSET
M	1	SOMERSET
F	2	TALBOT
F	1	WASHINGTON
M	1	WASHINGTON CO
F	2	WICOMICO
M	7	WICOMICO
F	1	BALTIMORE CITY
M	8	BALTIMORE CITY
F	1	OUT OF STATE
TOTAL	**120**	
SYPHILIS SEROLOGY		
F	1	ANNE ARUNDEL
M	1	ANNE ARUNDEL
F	2	BALTIMORE
M	2	BALTIMORE
M	1	CALVERT
F	1	CHARLES
M	1	HARFORD
M	1	HOWARD

F		2	MONTGOMERY
F		4	PRINCE GEORGE'S
M		5	PRINCE GEORGE'S
F		2	BALTIMORE CITY
M		5	BALTIMORE CITY
TOTAL		**28**	

CHLAMYDIA TRACHOMATIS

F		3	ALLEGANY
F		22	ANNE ARUNDEL
M		21	ANNE ARUNDEL
F		21	BALTIMORE
M		14	BALTIMORE
M		2	CALVERT
F		7	CAROLINE
M		1	CAROLINE
F		1	CARROLL
F		1	CECIL
M		1	CECIL
F		16	CHARLES
M		10	CHARLES
F		1	DORCHESTER
M		2	DORCHESTER
F		5	FREDERICK
M		1	FREDERICK
F		1	GARRETT
F		7	HARFORD
M		7	HARFORD
F		7	HOWARD
M		5	HOWARD
U		1	HOWARD
M		3	KENT
F		17	MONTGOMERY
M		16	MONTGOMERY
U		1	MONTGOMERY
F		52	PRINCE GEORGE'S
M		23	PRINCE GEORGE'S
U		1	PRINCE GEORGE'S
F		4	QUEEN ANNE'S
M		2	QUEEN ANNE'S
F		4	ST. MARY'S
M		2	ST. MARY'S
F		3	SOMERSET
M		2	SOMERSET
F		2	TALBOT
F		7	WASHINGTON
M		4	WASHINGTON
F		15	WICOMICO
M		16	WICOMICO
F		7	WORCESTER
M		3	WORCESTER
F		8	BALTIMORE CITY
M		23	BALTIMORE CITY
F		3	OUT OF STATE
M		5	OUT OF STATE
TOTAL		**380**	

MYCOBACTERIOLOGY

GENUS SPECIES

SEX	AGE	#	JURISDICTION
MYCOBACTERIUM TUBERCULOSIS			
M	21	1	BALTIMORE
F	23	1	HARFORD
M	42	1	HARFORD
M	26	1	MONTGOMERY
M	47	1	MONTGOMERY
M	54	1	MONTGOMERY
M	73	1	MONTGOMERY
F	23	1	PRINCE GEORGE'S
M	48	1	PRINCE GEORGE'S
F	49	1	WICOMICO
M	24	1	WORCESTER
F	24	1	BALTIMORE CITY
F	39	1	BALTIMORE CITY
M	48	1	BALTIMORE CITY
M	57	1	BALTIMORE CITY
M	60	1	BALTIMORE CITY
MYCOBACTERIUM TUBERCULOSIS COMPLEX			
M	21	1	BALTIMORE
F	23	1	HARFORD
F	54	1	HARFORD
F	74	1	HARFORD
M	42	1	HARFORD
M	59	1	HOWARD
F	22	2	MONTGOMERY
F	26	1	MONTGOMERY
F	32	1	MONTGOMERY
M	26	2	MONTGOMERY
M	47	1	MONTGOMERY
M	53	1	MONTGOMERY
M	63	1	MONTGOMERY
M	73	1	MONTGOMERY
F	18	1	PRINCE GEORGE'S
F	23	1	PRINCE GEORGE'S
F	40	1	PRINCE GEORGE'S
M	21	1	PRINCE GEORGE'S
M	47	1	PRINCE GEORGE'S
M	48	1	PRINCE GEORGE'S
M	51	1	PRINCE GEORGE'S
M	24	1	WORCESTER
F	24	1	BALTIMORE CITY
M	47	1	BALTIMORE CITY
M	50	1	BALTIMORE CITY
M	30	1	OUT OF STATE
MYCOBACTERIUM ABSCESSUS			
F	60	1	ANNE ARUNDEL
MYCOBACTERIUM AVIUM COMPLEX			
M	32	1	ANNE ARUNDEL
M	58	1	BALTIMORE
M	67	1	BALTIMORE
M	87	1	BALTIMORE
M	82	1	CARROLL
F	62	1	FREDERICK
F	73	1	FREDERICK
M	48	1	FREDERICK
M	77	1	FREDERICK
M	81	1	FREDERICK
F	37	1	MONTGOMERY
M	42	1	MONTGOMERY
M	82	1	MONTGOMERY
F	55	1	PRINCE GEORGE'S
U	51	1	PRINCE GEORGE'S
F	49	1	WICOMICO
F	92	1	WICOMICO
F	14	1	BALTIMORE CITY
F	28	1	BALTIMORE CITY
F	29	1	BALTIMORE CITY
F	32	1	BALTIMORE CITY
F	39	1	BALTIMORE CITY
M	47	1	BALTIMORE CITY
M	49	1	BALTIMORE CITY
M	37	1	OUT OF STATE
M	65	1	OUT OF STATE
MYCOBACTERIUM BOVIS			
M	70	1	ALLEGANY
MYCOBACTERIUM CHELONAE			
M	48	1	OUT OF STATE
MYCOBACTERIUM FORTUITUM			
F	74	1	HARFORD
F	25	1	MONTGOMERY
M	64	1	PRINCE GEORGE'S

M	45	1	WICOMICO
F	23	1	BALTIMORE CITY
M	42	1	BALTIMORE CITY
M	56	1	OUT OF STATE
MYCOBACTERIUM FORTUITUM COMPLEX			
M	50	1	PRINCE GEORGE'S
M	64	1	PRINCE GEORGE'S
MYCOBACTERIUM GORDONAE			
F	61	1	ALLEGANY
F	40	1	BALTIMORE
F	77	1	BALTIMORE
M	47	1	BALTIMORE
F	64	1	CAROLINE
M	46	1	MONTGOMERY
F	29	1	PRINCE GEORGE'S
M	15	1	PRINCE GEORGE'S
M	21	1	PRINCE GEORGE'S
M	28	1	PRINCE GEORGE'S
M	41	1	PRINCE GEORGE'S
M	21	1	SOMERSET
F		1	WICOMICO
M	72	1	WICOMICO
F	78	1	BALTIMORE CITY
MYCOBACTERIUM KANSASII			
M	57	1	BALTIMORE CITY
MYCOBACTERIUM MARINUM			
F	57	1	BALTIMORE
F	56	1	CARROLL
M	36	1	HARFORD
TOTAL		**101**	

MYCOBACTERIUM SUSCEPTIBILITY RESULTS

DURING THE MONTH OF JUNE, 2007, WE REPORTED SUSCEPTIBILITY RESULTS ON 36 ISOLATES OF *M. TUBERCULOSIS* COMPLEX.*

9 DRUG RESISTANT STRAINS WERE IDENTIFIED:

#	JURISDICTION	DRUG RESISTANCE
2[AB]	ALLEGANY	® to PYRAZINAMIDE
1	CAROLINE	® to STREPTOMYCIN and ISONIAZID
2	MONTGOMERY	® to STREPTOMYCIN
1	MONTGOMERY	® to STREPTOMYCIN and ISONIAZID
1[C]	MONTGOMERY	® to STREPTOMYCIN, ISONIAZID, RIFAMPIN, RIFABUTIN, ETHIONAMIDE, PYRAZINAMIDE, and PARA AMINOSALICYLIC ACID
1[C]	MONTGOMERY	® to ISONIAZID, STREPTOMYCIN, RIFAMPIN, RIFABUTIN, and ETHAMBUTOL
1	BALTIMORE CITY	® to STREPTOMYCIN

[A] Two isolates from the same patient
[B] Probable *M. bovis*
[C] Meets the case definition of Multi-Drug Resistant Tuberculosis (MDRTB)
® RESISTANT

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

MYCOLOGY

GENUS SPECIES	SEX	AGE	#	JURISDICTION
ARTHRINIUM SPECIES				
	M	65	1	OUT OF STATE
ASPERGILLUS RESTRICTUS				
	F	64	1	WICOMICO
ALTERNARIA SP				
	F	41	1	ALLEGANY
	F	25	1	MONTGOMERY
	M	23	1	MONTGOMERY
	M	12	1	PRINCE GEORGE'S
	M	80	1	PRINCE GEORGE'S
	F		1	BALTIMORE CITY
ASPERGILLUS FLAVUS				
	F	25	1	ANNE ARUNDEL
	F	42	1	ANNE ARUNDEL
	M	48	1	ANNE ARUNDEL
ASPERGILLUS FUMIGATUS				
	F	61	1	ALLEGANY
	U		1	ANNE ARUNDEL
	M	90	1	MONTGOMERY
	F	87	1	TALBOT
	M	69	1	BALTIMORE CITY
ASPERGILLUS NIGER				
	F	52	1	ANNE ARUNDEL
	F	45	1	MONTGOMERY
ASPERGILLUS OCHRACEUS				
	F	63	1	ANNE ARUNDEL
	U		1	ANNE ARUNDEL
	F	53	1	HARFORD
	F	81	1	PRINCE GEORGE'S
ASPERGILLUS USTUS				
	M	83	1	OUT OF STATE
ASPERGILLUS VERSICOLOR GROUP				
	M	48	1	ANNE ARUNDEL
	F	53	1	FREDERICK
	M	75	1	BALTIMORE CITY
BIPOLARIS SP				
	F	38	1	BALTIMORE CITY
	M		1	BALTIMORE CITY
CANDIDA ALBICANS				
	M	56	1	ANNE ARUNDEL
	M	77	1	ANNE ARUNDEL
	F	40	1	CALVERT
	F	20	1	CECIL
	F	25	1	CECIL
	M	77	1	CECIL
	F	17	1	MONTGOMERY
	F	24	1	MONTGOMERY
	F	27	1	MONTGOMERY
	F	41	1	MONTGOMERY
	F	62	1	MONTGOMERY
	F	64	1	MONTGOMERY
	F	69	1	MONTGOMERY
	F	82	1	MONTGOMERY
	M	39	1	MONTGOMERY
	M	48	1	MONTGOMERY
	M	62	1	MONTGOMERY
	M	85	1	MONTGOMERY
	F	42	1	PRINCE GEORGE'S
	F	49	1	PRINCE GEORGE'S
	F	55	1	PRINCE GEORGE'S
	F	59	1	PRINCE GEORGE'S
	F	68	1	PRINCE GEORGE'S
	M	55	1	PRINCE GEORGE'S
	M	65	1	PRINCE GEORGE'S
	F	58	1	BALTIMORE CITY
	F	70	1	BALTIMORE CITY
	M	59	1	BALTIMORE CITY

M	68	1	BALTIMORE CITY
F	83	1	OUT OF STATE
CANDIDA GLABRATA			
F	77	1	PRINCE GEORGE'S
F	83	1	OUT OF STATE
CANDIDA KRUSEI			
F	37	1	MONTGOMERY
F	32	1	PRINCE GEORGE'S
CANDIDA PARAPSILOSIS			
M	27	1	FREDERICK
CANDIDA RUGOSA			
M	27	1	FREDERICK
CANDIDA TROPICALIS			
M	39	1	MONTGOMERY
F	42	1	PRINCE GEORGE'S
M	29	1	PRINCE GEORGE'S
F	83	1	OUT OF STATE
CHRYSOSPORIUM SP			
M	47	1	ANNE ARUNDEL
F	42	1	MONTGOMERY
M	33	1	TALBOT
CLADOSPORIUM SP			
M	63	1	ALLEGANY
M	59	1	BALTIMORE
F	64	1	TALBOT
CRYPTOCOCCUS NEOFORMANS			
M	36	1	CHARLES
M	21	1	PRINCE GEORGE'S
M	61	1	BALTIMORE CITY
EPICOCCUM SP			
M	63	1	ALLEGANY
F	21	1	CARROLL
F	61	1	WICOMICO
M	40	1	WICOMICO
M	43	1	WICOMICO
EXOPHIALA SP			
M	35	1	FREDERICK
M	60	1	BALTIMORE CITY
FONSECAEA PEDROSOI			
F		1	BALTIMORE CITY
FUSARIUM SP			
M	35	1	FREDERICK
U	71	1	PRINCE GEORGE'S
GEOTRICHUM SP			
M	81	1	BALTIMORE
MUCOR SP			
U		1	WICOMICO
NOCARDIA ASTEROIDES COMPLEX			
M	83	1	FREDERICK
NOCARDIA NOVA			
M	59	1	BALTIMORE
M	36	1	WASHINGTON
PAECILOMYCES VARIOTTII			
U		1	ANNE ARUNDEL
PENICILLIUM SP			
F	65	1	ALLEGANY
M	59	1	ALLEGANY
U		1	ALLEGANY
M	36	1	CALVERT
U	40	1	MONTGOMERY
F	77	1	PRINCE GEORGE'S
M	60	1	PRINCE GEORGE'S
F	89	1	TALBOT
M	67	1	TALBOT
F	61	1	WICOMICO
F		1	BALTIMORE CITY
M	57	1	BALTIMORE CITY
U	77	1	BALTIMORE CITY
PESTALOTIA SP			
M	44	1	TALBOT
RHIZOPUS ORYZAE			
F	55	1	TALBOT
RHODOTORULA SP			
F	33	1	SOMERSET
F	17	1	BALTIMORE CITY
SCOPULARIOPSIS SP			
M	75	1	BALTIMORE CITY
TRICHODERMA SP			
M	49	1	ANNE ARUNDEL
TRICHOPHYTON MENTAGROPHYTES			
M	51	1	TALBOT
TRICHOPHYTON RUBRUM			
F	24	1	ALLEGANY
M	68	1	WICOMICO
U		1	WICOMICO
TRICHOPHYTON TONSURANS			
F	3	1	TALBOT
U	38	1	TALBOT
YEAST-LIKE ORGANISM			
M	36	1	ANNE ARUNDEL
TOTAL		**119**	

PARASITOLOGY

GENUS SPECIES	#	JURISDICTION
PROTOZOA		
BLASTOCYSTIS HOMINIS	2	MONTGOMERY
DIENTAMOEBA FRAGILIS	2	MONTGOMERY
ENDOLIMAX NANA	9	MONTGOMERY
	1	PRINCE GEORGE'S
ENTAMOEBA COLI	5	MONTGOMERY
	1	PRINCE GEORGE'S
ENTAMOEBA HARTMANNI	1	BALTIMORE CITY
	3	MONTGOMERY
	2	PRINCE GEORGES
GIARDIA LAMBLIA	8	MONTGOMERY
	1	PRINCE GEORGE'S
TOTAL	**35**	
NEMATODES		
ENTEROBIUS VERMICULARIS	1	FREDERICK
HOOKWORM	2	FREDERICK
TOTAL	**3**	

ARTHROPOD IDENTIFICATION

NO SPECIMENS RECEIVED

TICK IDENTIFICATION

NO SPECIMENS RECEIVED

WATER MICROBIOLOGY

	# TESTED	**# NON-COMPLIANT**
COMMUNITY	2	0
NON-COMMUNITY	422	94
TOTAL	**424**	**94**

FOOD SAFETY

FOOD AND SHELLFISH MICROBIOLOGY

	# OF SAMPLES	NOTABLE PATHOGENS
FOOD	2	0
		# STANDARDS EXCEEDED *
CRABMEAT	0	0
		# STANDARDS EXCEEDED **
SHELLFISH	3	0
SHELLFISH GROWING WATERS	249	
TOTAL	**254**	**0**

STANDARDS

*CRABMEAT-FRESH
ESCHERICHIA COLI = LESS THAN 36 MPN/100 GRAM
STANDARD PLATE COUNT = LESS THAN 100,000 PER GRAM

** SHELLFISH
FECAL COLIFORMS = LESS THAN 230 MPN/100 GRAM
STANDARD PLATE COUNT = LESS THAN 500,000 PER GRAM

VIRUS ISOLATION

ISOLATE	SEX	AGE	#	JURISDICTION
HERPES SIMPLEX UNTYPABLE				
	F	26	1	ANNE ARUNDEL
	M	77	1	ANNE ARUNDEL
	F	22	1	CALVERT
	M	1	1	BALTIMORE CITY
SUBTOTAL			**4**	
VARICELLA				
	M	24	1	BALTIMORE CITY
SUBTOTAL			**1**	
HERPES SIMPLEX I				
	F	18	1	ANNE ARUNDEL
	F	21	1	ANNE ARUNDEL
	M	18	1	ANNE ARUNDEL
	M	27	1	ANNE ARUNDEL
	F	31	1	BALTIMORE
	F	32	1	BALTIMORE
	F	19	1	CHARLES
	M	27	1	CHARLES
	F	22	1	FREDERICK
	F	17	1	HARFORD
	F	20	1	PRINCE GEORGE'S
	F	22	1	PRINCE GEORGE'S
	M	20	1	PRINCE GEORGE'S
	F	19	1	WORCESTER
	M	39	1	BALTIMORE CITY
	U	17	1	BALTIMORE CITY
SUBTOTAL			**16**	
HERPES SIMPLEX II				
	F	17	1	ANNE ARUNDEL
	F	20	1	ANNE ARUNDEL
	F	35	1	ANNE ARUNDEL
	F	17	1	BALTIMORE
	F	22	1	BALTIMORE
	F	25	1	CALVERT
	F	33	1	CECIL
	M	30	1	CHARLES
	M	29	1	FREDERICK
	F	24	1	HARFORD
	F	31	1	MONTGOMERY
	F	45	1	MONTGOMERY
	F	19	1	PRINCE GEORGE'S
	F	20	1	PRINCE GEORGE'S
	F	21	1	PRINCE GEORGE'S
	F	28	1	PRINCE GEORGE'S
	F	36	1	PRINCE GEORGE'S
	M	24	1	PRINCE GEORGE'S
	M	28	1	PRINCE GEORGE'S
	F	19	1	SOMERSET
	F	18	1	WASHINGTON
	F	20	1	WICOMICO
	F		2	BALTIMORE CITY
	F	17	1	BALTIMORE CITY
	F	18	2	BALTIMORE CITY
	F	20	1	BALTIMORE CITY
	F	21	1	BALTIMORE CITY
	F	24	1	BALTIMORE CITY
	F	25	1	BALTIMORE CITY
	F	26	2	BALTIMORE CITY
	F	62	1	BALTIMORE CITY
	M	19	1	BALTIMORE CITY
	M	20	1	BALTIMORE CITY
	M	27	1	BALTIMORE CITY
	M	32	1	BALTIMORE CITY
	M	41	1	BALTIMORE CITY
	M	44	1	BALTIMORE CITY
	M	50	1	BALTIMORE CITY
	M	62	1	BALTIMORE CITY
	U		2	BALTIMORE CITY
	U	19	1	BALTIMORE CITY
	U	22	1	BALTIMORE CITY
	U	29	2	BALTIMORE CITY
	U	36	1	BALTIMORE CITY
	U	38	1	BALTIMORE CITY
SUBTOTAL			**50**	
TOTAL			**71**	

VIRAL HEPATITIS

ORGANISM	#	POSITIVES	JURISDICTION
HEPATITIS A			
	1	0	BALTIMORE CITY
SUBTOTAL	**1**	**0**	
HEPATITIS B			
	9	0	ALLEGANY
	16	0	ANNE ARUNDEL
	7	0	BALTIMORE
	9	0	CARROLL
	38	3	CECIL
	7	0	FREDERICK
	2	0	GARRETT
	16	1	HARFORD
	5	0	HOWARD
	38	2	MONTGOMERY
	43	6	PRINCE GEORGE'S
	2	0	TALBOT
	4	0	WASHINGTON
	7	0	WICOMICO
	55	2	BALTIMORE CITY
SUBTOTAL	**258**	**14**	
HEPATITIS C			
	7	2	ALLEGANY
	15	7	ANNE ARUNDEL
	10	1	BALTIMORE
	11	2	CARROLL

	19	1	CECIL
	5	0	FREDERICK
	3	0	GARRETT
	5	0	HARFORD
	5	0	HOWARD
	5	0	MONTGOMERY
	22	2	PRINCE GEORGE'S
	2	0	TALBOT
	5	1	WASHINGTON
	3	0	WICOMICO
	59	22	BALTIMORE CITY
SUBTOTAL	**176**	**38**	
TOTAL	**435**	**52**	

RABIES

SOURCE	#	JURISDICTION
BAT	3	ANNE ARUNDEL
	2	BALTIMORE
	1	CHARLES
	1	HARFORD
	1	PRINCE GEORGE'S
	3	BALTIMORE CITY
CAT	1	BALTIMORE
	1	FREDERICK
FOX	1	FREDERICK
	1	WICOMICO
GROUNDHOG	1	ALLEGANY
RACCOON	1	BALTIMORE
	1	CAROLINE
	1	CECIL
	2	CHARLES
	2	FREDERICK
	1	HARFORD
	1	KENT
	1	ST. MARY'S
	2	TALBOT
	1	WASHINGTON
SKUNK	2	FREDERICK
TOTAL POSITIVES	**31**	
TOTAL SPECIMENS	**638**	

CHLAMYDOPHILIA (CHLAMYDIA) PSITTACI

REPORTED QUARTERLY
NO REPORT THIS MONTH

PENICILLIN RESISTANT GONORRHEA STATISTICS

REPORTED QUARTERLY
NO REPORT THIS MONTH

CD4 FLOW CYTOMETRY WORKLOAD

REPORTED QUARTERLY
NO REPORT THIS MONTH

NEWBORN & CHILDHOOD SCREENING

STATISTICS FOR JULY 2007

PRESUMPTIVE POSITIVES

DISORDERS	#
PHENYLKETONURIA	1
MAPLE SYRUP URINE DISEASE	12
HOMOCYSTINURIA	11
TYROSINEMIA	6
ARGININEMIA	2
CITRULLINEMIA	0
GALACTOSEMIA	3
BIOTINIDASE DEFICIENCY	1
HYPOTHYROIDISM	64
HEMOGLOBIN -DISEASE	11
HEMOGLOBIN -BENIGN	308
CONGENITAL ADRENAL HYPERPLASIA (CAH)	17
CYSTIC FIBROSIS	3
FATTY ACID OXIDATIONS	12
ORGANIC ACIDEMIAS	13
ACYLCARNITINE - BORDERLINE	2
ACYLCARNITINE - OTHERS	1

MONTHLY TOTALS

# OF SPECIMENS SCREENED	11,512
NUMBER OF TESTS	768,804
% OF UNSATISFACTORY SPECIMENS	5.4

YEAR-TO-DATE CONFIRMED CASES

CONDITIONS	# CONFIRMED
MCAD	2
3MCC	1
SCAD	1
VLCAD	1
GA-I	0
3-HYDROXY 3 METHYLGLUTTARYL COA LYASE DEFICIENCY (HMG)	1
MAPLE SYRUP URINE DISEASE	1
PKU- CLINICALLY SIGNIFICANT	2
VARIATANT HYPERPHENYLALANINEMIA - NOT CLINICALLY SIGNIFICANT	2
GALACTOSEMIA- CLASSICAL GALT DEFICIENCY	1
GALACTOSEMIA - VARIANT	1
BIOTINIDASE DEFICIENCY	0
GALACTOSE EPIMERASE DEFICIENCY	0
GALACTOSE TRANSFERASE DEFICIENCY (GALT CLASSICAL)	1
PARTIAL BIOTINIDASE DEFICIENCY	2
CAH- CLASSICAL SALT WASTING	2
CAH-NON-CLASSICAL	0
HYPOTHYROIDISM - PRIMARY	7
HYPOTHYROIDISM - SECONDARY	1
OTHER HYPOTHYROIDISM	3
SICKLE CELL DISEASE -SS	10
SICKLE CELL DISEASE -SC	5
SICKLE CELL DISEASE -S BETA THALASSEMIA	2
CYSTIC FIBROSIS	2

LEAD SCREENING - BLOOD LEAD

CLASS		RANGE ug/dl	TESTS # of
MARYLAND			
	I	<10	130
	IIA	10-14	4
	IIB	15-19	5
	III	20-44	12
	IV	45-69	0
	V	>69	0
TOTAL			**151**
WASHINGTON DC			
	I	<10	67
	IIA	10-14	0
	IIB	15-19	0
	III	20-44	0
	IV	45-69	0
	V	>69	0
TOTAL			**67**

ENVIRONMENTAL CHEMISTRY

SAMPLES	# NON-COMPLIANT	# TESTED
ASBESTOS		
AIR	0	0
BULK	3	5
AIR QUALITY		
$PM_{2.5}$	0	520
PM_{10}	0	0
RADIATION		
AIR/CHARCOAL FILTERS	0	66
MILK	0	4
WIPES	0	92
RAW WATER	0	10
VEGETATION	0	0
OTHER	0	2
DRINKING WATER		
METALS		
COMMUNITY	12	21
NON-COMMUNITY	2	4
PRIVATE WELLS	83	254
PESTICIDES & PCBs		
COMMUNITY	0	49
NON-COMMUNITY	0	15
PRIVATE WELLS	0	1
VOLATILE ORGANIC COMPOUNDS		
COMMUNITY	2	261
NON-COMMUNITY	0	53
PRIVATE WELLS	0	213
RADIATION		
COMMUNITY	26	84
NON-COMMUNITY	0	0
PRIVATE WELLS	6	10
INORGANICS		
COMMUNITY	1	8
NON-COMMUNITY	5	54
PRIVATE WELLS	3	218
FOOD CHEMISTRY		
SUSPECTED TAMPERING	0	0
MICROSCOPIC FILTH	0	0
LABELING	0	0
SURVEILLANCE	0	5
CHEMICAL CONTAMINATION	0	0
TOTAL	**143**	**1,949**

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LEAD ENVIRONMENTAL

TEST	#	ELEV	BRL	UNSAT
TOTAL PAINT	**3**	**2**	**0**	**1**
TOTAL SOIL	**9**	**0**	**1**	**1**
DUST				
FLOOR	316	43	255	0
SILL	399	20	331	0
WELL	194	14	115	1
OTHER	11	0	11	0
TOTAL DUST	**920**	**77**	**712**	**1**
GRAND TOTAL	**932**	**79**	**713**	**3**

INTERPRETATION OF RESULTS:

# = Number of Samples Received
ELEV= Elevated
BRL= Below Reporting Limit
UNSAT = Unsatisfactory
PAINT Positive in excess of 0.5%
SOIL Action level 400 - 5,000 ppm
DUST Clearance limits: Floor/Other 40 ug/sq ft
Window Sill 250 ug/sq ft
Window Well 400 ug/sq ft

VIRAL LOAD SPECIMENS (JULY 2007)

HIV–1 RNA COPIES/ML					
JURISDICTION	**$<10^3$**	**10^3-10^4**	**10^4-10^5**	**$>10^5$**	**TOTALS**
ALLEGANY	31	3	1	1	36
BALTIMORE	1	0	0	1	2
CARROLL	2	1	0	0	3
DORCHESTER	0	0	0	1	1
FREDERICK	2	0	1	1	4
HOWARD	0	1	1	0	2
MONTGOMERY	247	40	48	24	359
PRINCE GEORGE'S	180	27	37	23	267
SOMERSET	1	0	0	0	1
WASHINGTON	3	1	0	1	5
WICOMICO	6	2	5	2	15
SUBTOTAL	473	75	93	54	695
DEPT OF CORRECTIONS	261	69	109	43	482
GRAND TOTAL	**734**	**144**	**202**	**97**	**1,177**

HIV ANTIBODY SCREENING – BLOOD (JULY 2007)

SPECIMEN SOURCES	TOTAL	POSITIVE EIA	%	POSITIVE WB	%
HEALTH DEPARTMENTS AND CLINICS	2,750	105	3.82%	96	91.43%
HOSPITALS	128	6	4.69%	6	100.00%
DETENTION CENTERS	612	11	1.80%	7	63.64%
PRIVATE PHYSICIANS	15	0	0.00%	0	0.00%
STUDENT HEALTH CLINICS	57	0	0.00%	0	0.00%
EMPLOYEE HEALTH CLINICS	6	0	0.00%	0	0.00%
AUTOPSIES	348	24	6.90%	19	79.17%
ORGAN/TISSUE DONORS	78	1	1.28%	1	100.00%
TOTAL	**3,994**	**147**	**3.68%**	**129**	**87.76%**

MAILING LABEL

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