

CRITICAL LINK



A Publication of the
Maryland Department of
Health and Mental Hygiene

The Laboratories Administration—Maryland's State Public Health Laboratory

Investigating Diarrheal Disease Outbreaks

Role of the Laboratories Administration's Public Health Microbiology Division is Indispensable

Introduction and Background

Responding to an outbreak usually requires involvement of the local health department, the State epidemiology and disease control program, the State public health laboratory and occasionally the Centers for Disease Control and Prevention.

The role of the Laboratories Administration's Public Health Microbiology (PHM) Division in the investigation of diarrheal diseases

outbreaks is indispensable. In this summary, we will focus on investigating and diagnosing diarrheal disease caused by enteric pathogens.

Stool specimens submitted from patients with diarrhea are routinely screened for the presence of *Salmonella* species, *Shigella* species, *Campylobacter* species and the Shiga-toxin producing *E. coli*. If *Yersinia* species or *Vibrio* species are suspected, the request form must indicate that, because these organisms have special growth requirements and will not be detected using the routine screening media.

Antimicrobial susceptibility testing is performed routinely on *Salmonella* and *Shigella* if isolated from primary cultures. Susceptibility testing is performed using ampicillin, ciprofloxacin, ceftriaxone, trimethoprim sulfa methoxazole (TMP-SMX), and chloramphenicol.

Salmonella can be shed for several days to several weeks beyond the active phase of disease. They are transmitted by direct contact with animals, water and food. Person-to-person transmission is



Figure 1. Different types of reactions produced by bacteria growing on Triple Sugar Iron (TSI) agar, and depending on the microorganism's ability to ferment glucose and/or produce hydrogen sulfide, presumptive identification of enteric pathogens can be achieved.

Photo source: Georgia Corso, Laboratories Administration

uncommon but can occur. The typhoid fever agent, *Salmonella* serotype Typhi, however, is commonly transmitted

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

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Table 1. see reference 4 and 5.

Organism	Infectious Dose	Survivability
<i>Shigella</i>	10-100 organisms	Reports showed organisms were detected up to 11 days in feces, 2-3 days in water, 8 days on patient shirt, and up to 30 days in milk, whole eggs, oysters, shrimp, and flour.
<i>Campylobacter</i>	10 ² -10 ⁶ organisms	In feces – up to 9 days; milk – 3 days Survive in moist environment (especially at lower temperature). Cannot tolerate drying
<i>Salmonella</i>	10 ⁵ organisms	Can survive up to 450 days in pig meat, 38 days in sludge, and several months in feces. Post-process contaminated peanut butter showed that <i>Salmonella</i> can survive for the duration of the product's expected shelf life.
Shiga-toxin producing <i>E. coli</i>	10-100 organisms	Are acid resistant and can survive acidic condition of the stomach. The toxin itself is an exotoxin and is heat-labile (destroyed rapidly at 60°C).

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Investigating Diarrheal Disease's Outbreaks

person-to-person or through fecally contaminated food and water.¹

Shigella organisms can be detected early in the course of infection but the number of viable organisms decreases significantly during late stages of the disease.² *Shigella* has a low infectious dose (i.e. as few as 10-100 organisms initiate disease), and person-to-person transmission does occur, especially among those who fail to cleanse hands and fingernails thoroughly. Houseflies can be colonized in their guts with *Shigella* without illness and can pass organisms in their feces. Feces adhere to the fly's legs which can lead to food contamination.²

The Shiga-toxin producing *E. coli* (STEC) are usually detectable during the acute phase (one to two days of onset) of illness and may be detected for five to seven days after onset.³ STEC also have a low infectious dose (10-200 organisms) and, as such, spread easily from person-to-person, especially among children and elderly adults in nursing homes. In addition to the O157:H7 serotype, the PHM Division tests for O26, O45, O103, and O111 Shiga-toxin producing strains (see Table 1).

Specimen Collection

Always remember, when it comes to proper infectious disease diagnosis the rule is: Quality In, Quality Out! Specimens for microbiological examinations are likely to contain living organisms whose recognition depends on good specimen management.⁶

At the very least, the specimen itself should be labeled with the patient's name, identifying number or birth date, and body site of collection. Sufficient information must be provided on the specimen so it can be matched with the request form. The federal Clinical Laboratory Improvement Amendments of 1988 (CLIA) prohibits a laboratory from processing a specimen if it is not labeled.

Just as a health care provider needs specific and critical information from a patient's history to formulate a diagnosis, the laboratory needs specific and critical information regarding the patient and the specimen.

Frequently, specimen request forms are received with illegible information, submitter information is missing, date and time of specimen collection is not indicated, or no specimen code is provided (see Figures 1 and 2). This will

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STATE LAB Use Only

INFECTIOUS AGENTS: CULTURE/DETECTION

TYPE OR PRINT REQUIRED INFORMATION OR PLACE LABELS ON ALL FOUR SIDES

DEH DFP DM1YFN ONOD DSTD DTB DCD DCR Patient SS# (last 4 digits):

Submitter: *[Illegible]* Last Name: *[Illegible]* DSR DJR DOther

Address: *[Illegible]* First Name: *[Illegible]* M.I. Maiden:

City: *[Illegible]* County: *[Illegible]* Date of Birth (mm/dd/yyyy): *[Illegible]*

State: *[Illegible]* Zip Code: *[Illegible]* Address: *[Illegible]*

Contact Name: *[Illegible]* City: *[Illegible]* County: *[Illegible]*

Phone # *[Illegible]* Fax # *[Illegible]* State: *[Illegible]* Zip Code: *[Illegible]*

Ethnicity: Hispanic/Latino Not Hispanic/Latino Unknown Sex: Male Female Transgender

Race: White African American Asian/Pacific American Indian/Alaska Native Multiracial Not Specified Other

Case # *[Illegible]* DOC# *[Illegible]* Outbreak # *[Illegible]* Submitter Lab # *[Illegible]*

Collect Date: *[Illegible]* Collect Time: *[Illegible]* Claim Dpm Onset Date: *[Illegible]*

Reason for Test: Screening Diagnosis Contact Test of Cure 2-3 Months Post Rx Suspected Carrier Isolate for ID Release

Therapy/Drug Treatment: No Yes Therapy/Drug Type: *[Illegible]* Therapy/Drug Date: *[Illegible]*

SPECIMEN CODE	SPECIMEN CODE	SPECIMEN CODE
BACTERIOLOGY/MYCOLOGY	SPECIAL BACTERIOLOGY	RESTRICTED TESTS
Bacterial Culture - Routine	Legionella Culture	Pre-approved submitters only
Additional specimen codes:	Leptospira	<i>Chlamydia trachomatis</i> /GC NAAT
<i>Bordetella pertussis</i>	Mycoplasma	<i>Chlamydia trachomatis</i> only/NAAT
Group A Strep	MYCOBACTERIOLOGY/AFB/TB	Norovirus ** (see comment on back)
Group B Strep Screen	AFB/TB Culture and Smear	OTHER TESTS FOR INFECTIOUS AGENTS
<i>C. difficile</i> Toxin	AFB/TB Referred Culture for ID	Test name:
Diphtheria	AFB/TB Referred Culture-Sensitivities	Prior arrangements have been made with the following DHMH Laboratories Administration employee.
Foodborne Pathogens (<i>B. cereus</i> , <i>C. perfringens</i> , <i>S. aureus</i>)	<i>M. tuberculosis</i> Referred Culture for Genotyping	
Fungus Culture:	Nucleic Acid Amplification Test for <i>M. tuberculosis</i> Complex (MTD)	
Fungus Smear:	PARASITOLOGY	
Gonorrhea Culture: Incubated? <input type="checkbox"/> Yes <input type="checkbox"/> No	Blood Parasites:	
Hrs. incubated: Add'l specimen codes:	Country visited outside US:	
MRSA (rule out)	Ova & Parasites: Immigrant? <input type="checkbox"/> Yes <input type="checkbox"/> No	
VRE (rule out)	Cryptosporidium	
ENTERIC INFECTIONS	Cyclospora/Isospora	
<i>Campylobacter</i>	Microsporidium	
<i>E. coli</i> O157 typing	Pinworm	
Enteric Culture - Routine (<i>Salmonella</i> , <i>Shigella</i> , <i>E. coli</i> O157, <i>Campylobacter</i>)	VIRUS/CHLAMYDIA	
<i>Salmonella</i> typing	Adenovirus*	
<i>Shigella</i> typing	Arbovirus Panel (WNV, EEEV, SLEV)	
<i>V. parahaemolyticus</i>	<i>Chlamydia trachomatis</i>	

In Figure 1, above, the information is illegible. Please print clearly. Figure 2, below, is a good submission. The information is legible and provides information for the submitter, the patient (patient name is fictitious), the collection date, and the specimen code.

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STATE LAB Use Only

INFECTIOUS AGENTS: CULTURE/DETECTION

TYPE OR PRINT REQUIRED INFORMATION OR PLACE LABELS ON ALL FOUR SIDES

DEH DFP DM1YFN ONOD DSTD DTB DCD DCR Patient SS# (last 4 digits):

Submitter: *Peninsula Regional Med Ctr* Last Name: *Jones* DSR DJR DOther

Address: *100 E. Carroll St* First Name: *Michael* M.I. Maiden:

City: *Salisbury* County: *[Illegible]* Date of Birth (mm/dd/yyyy): *4/19/1985*

State: *MD* Zip Code: *21801* Address: *217 Fort Johnson Rd*

Contact Name: *[Illegible]* City: *Silver Spring* County: *Montgomery*

Phone # *(410) 763-1811* Fax # *[Illegible]* State: *MD* Zip Code: *21071*

Ethnicity: Hispanic/Latino Not Hispanic/Latino Unknown Sex: Male Female Transgender

Race: White African American Asian/Pacific American Indian/Alaska Native Multiracial Not Specified Other

Case # *[Illegible]* DOC# *[Illegible]* Outbreak # *[Illegible]* Submitter Lab # *51271-0*

Collect Date: *3-16-09* Collect Time: *[Illegible]* Claim Dpm Onset Date: *[Illegible]*

Reason for Test: Screening Diagnosis Contact Test of Cure 2-3 Months Post Rx Suspected Carrier Isolate for ID Release

Therapy/Drug Treatment: No Yes Therapy/Drug Type: *[Illegible]* Therapy/Drug Date: *[Illegible]*

SPECIMEN CODE	SPECIMEN CODE	SPECIMEN CODE
BACTERIOLOGY/MYCOLOGY	SPECIAL BACTERIOLOGY	RESTRICTED TESTS
Bacterial Culture - Routine	Legionella Culture	Pre-approved submitters only
Additional specimen codes:	Leptospira	<i>Chlamydia trachomatis</i> /GC NAAT
<i>Bordetella pertussis</i>	Mycoplasma	<i>Chlamydia trachomatis</i> only/NAAT
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Fungus Culture:	Nucleic Acid Amplification Test for <i>M. tuberculosis</i> Complex (MTD)	
Fungus Smear:	PARASITOLOGY	
Gonorrhea Culture: Incubated? <input type="checkbox"/> Yes <input type="checkbox"/> No	Blood Parasites:	
Hrs. incubated: Add'l specimen codes:	Country visited outside US:	
MRSA (rule out)	Ova & Parasites: Immigrant? <input type="checkbox"/> Yes <input type="checkbox"/> No	
VRE (rule out)	Cryptosporidium	
ENTERIC INFECTIONS	Cyclospora/Isospora	
<i>Campylobacter</i>	Microsporidium	
<i>E. coli</i> O157 typing	Pinworm	
Enteric Culture - Routine (<i>Salmonella</i> , <i>Shigella</i> , <i>E. coli</i> O157, <i>Campylobacter</i>)	VIRUS/CHLAMYDIA	
<i>Salmonella</i> typing	Adenovirus*	
<i>Shigella</i> typing	Arbovirus Panel (WNV, EEEV, SLEV)	

not only delay specimen processing but may also have a negative impact on overall patient management.

Patients who are either part of an outbreak or have diarrhea are requested to provide stool specimens. Fresh stool is the best to collect, followed by stool swabs, followed by rectal swabs. Rectal swabs may recover *Shigella* and *Campylobacter* because they are invasive organisms and tend to adhere to epithelial cells.⁷ One to two grams of fresh stool containing pus, blood, or mucous, or 5-10 mL of liquid stool should be collected and placed in Cary-Blair transport media (Para-Pak C&S orange cap). If swabs are used, they must be placed in Cary-Blair transport media. This transport media contains a buffer to maintain a high pH that minimizes the destruction of bacteria when acid is produced. This transport media is suitable for the preservation of bacterial enteric pathogens.

Packaging

To maintain specimen integrity, specimens must be packaged in a triple packaging system (Figure 3.) This will ensure that under normal conditions of transport the specimen containers do not break, become punctured or leak their contents. The primary receptacle for liquid specimens must be a leak-proof test tube, a Petri dish sealed with Para-Film™, or a sealed vial or bottle. For solid specimens, the primary receptacle must be well sealed and unbreakable.

The secondary receptacle consists of a plastic specimen biohazard bag or a ziplock bag containing absorbent material. The absorbent material should be of sufficient quantity to absorb the entire contents of the bag if the primary container leaks. This secondary receptacle then must be placed in a tertiary receptacle.

The tertiary receptacle consists of a corrugated cardboard box with cushioning material inside to surround the secondary receptacle to prevent damage.

(Continued on page 4)

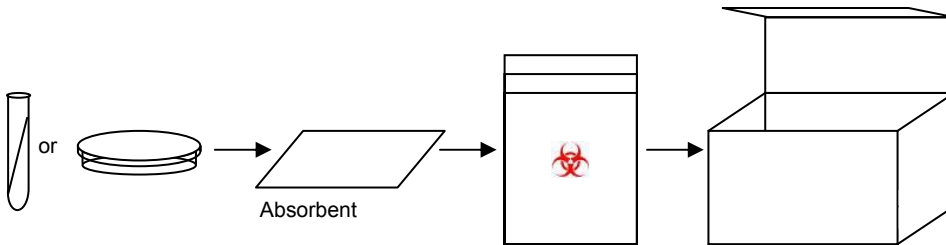


Figure 3. Triple packaging system will ensure the specimen containers do not break, become punctured or leak their contents. The primary receptacle for liquid specimens must be a leak-proof test tube, a Petri dish sealed with Para-Film,[™] or a sealed vial or bottle. The secondary receptacle consists of a plastic specimen biohazard bag or a ziplock bag containing absorbent material. The tertiary receptacle consists of a corrugated cardboard box with cushioning material inside to surround the secondary receptacle to prevent damage.

(Continued from page 3)
Investigating Diarrheal Disease's Outbreaks

Storage and Transport Conditions

Specimens must be stored and transported at refrigerator temperatures (e.g. using a cooler with cold packs.) Room temperature storage and transport will compromise the recovery of *C. jejuni*, *Shigella* and *Salmonella*.⁸ Also, Shiga-toxin stability and Shiga-toxin production are adversely affected by room temperature.

Recovery and Serotyping of Enteric Pathogens

Day One

Upon receipt in the laboratory, specimens are checked to make sure they arrive on the correct transport media and that the media is not expired. The test requisition and specimen container are also checked to make sure the patient information is the same on both. The stool is inoculated onto plated media (Hektoen Enteric agar plate [HE], MacKonkey Sorbitol Agar-SMAC-CT [cefixime-tellurite], Deoxycholate-Citrate-Lactose-Sucrose Agar [DCLS], one *Campylobacter* plate) and inoculated to a Gram Negative (GN) broth and Selenite F broth. These plates and broths are incubated 24 hours (with the exception of the *Campylobacter* plate) and examined the following day. The *Campylobacter* plate with Naladixic Acid and Cephalothin discs is incubated for 48 hours under microaerobic conditions.

Day Two

The GN broth is tested for the presence of shiga toxins with the Meridian EHEC ELISA kit. This takes approximately 2.5 hours. The Selenite F broth that was inoculated on Day 1 is now plated to a HE plate, a brilliant green plate and a Wilson-Blair plate. The HE and brilliant green plates are incubated for 24 hours and the Wilson-Blair plate is incubated for 48 hours.

The HE and DCLS plates are examined for *Salmonella* and *Shigella*. The SMAC-CT plate is examined for *E. coli* O157. When examining the HE plate, if green colonies with dark centers are seen, this is indicative of *Salmonella*. Two colonies are picked to two separate Triple-Sugar-Iron Agar (TSI) slants and incubated for 24 hours. When examining the HE plate, if clear green colonies are seen, this is indicative of *Shigella*. Two colonies are picked to two separate TSI slants and incubated for 24 hours. When examining the DCLS plate if clear pink colonies are seen, this could be indicative of salmonella or *Shigella* so two colonies are picked to two separate TSI slants and incubated for 24 hours. When examining the SMAC-CT plate, colorless pink colonies are indicative of *E. coli* O157. If they are seen, five separate colonies are tested for *E. coli* O157 with a latex kit. If any of these colonies are latex positive for *E. coli* O157, two of the colonies that tested positive are put on separate TSI slants and incubated for 24 hours. In addition, the SMAC-CT plate will be tested for shiga-toxins with the Meridian EHEC ELISA Kit. The submitter is notified via telephone and faxed a preliminary report if the EHEC test is positive.

Day Three

The *Campylobacter* plate is examined for growth of *Campylobacter* species. An oxidase test is done and a Gram's stain is prepared if the oxidase test is positive. If the Gram stain result is suggestive of *Campylobacter*, isolation plates are set up in an effort to isolate the organism. Naladixic Acid and Cephalothin discs are added to the plates and they are incubated for 48 hours.

The HE and brilliant green plates are examined for growth of *Salmonella* and *Shigella*. Hot pink colonies on the brilliant green are indicative of *Salmonella* or *Shigella*. If growth of either organism is suspected, two colonies are picked to two separate TSI slants and incubated for 24 hours. The HE is treated the same as it is on Day 2.

The TSI slants inoculated on Day 2 are examined to determine if the reaction is indicative of any enteric pathogen. If the slant is indicative of *Salmonella*, serotyping is done and if the serotyping is positive, a biochemical panel is set up. This procedure is the same for slants that are indicative of *Shigella* species. In addition, for positive stool specimens, blood agar plates are set up so antimicrobial susceptibility can be performed after 24 hours incubation. Once serotyping has been done, the submitter is contacted via telephone and is faxed a preliminary report.

If the slant is from a colony that tested positive for *E. coli* O157 and is found to be Shiga toxin positive, a biochemical panel is set up of 14 sugars and an H broth for typing the H7 antigen is set up.

Day Four

The Wilson-Blair plate is read. This plate is used for culturing *S. typhi*. Colony morphology is typically a black raised colony resembling a checker piece. If any colonies resembling *S. typhi* are suspected, two colonies are picked to two separate TSI slants and incubated for 24 hours.

The biochemical panels set up on Day 3 are read and results recorded. Part of the panel for salmonella includes an H broth

for typing the flagellar antigen. Formalized saline is now added to the H broth for the *E. coli* O157 typing and it incubates for 24 hours. The motility from the *E. coli* O157 is now “passed” to another motility and a new H broth. These are incubated for 24 hours. Antibiotic susceptibility tests are set up on a Mueller-Hinton plate with five antibiotics and the plate is incubated for 24 hours.

Day Five

Susceptibility plates are read and results recorded. For *Shigella* all necessary components have been completed, the isolation, serotyping, biochemical panel and susceptibilities. The *Shigella* isolate is ready to be finalized and results released to the submitter.

The *Campylobacter* plates incubated on Day 3 are now examined. If the culture is pure, the following tests are set up: sodium hippurate, nitrate, and catalase. The nitrate and catalase tubes are incubated under microaerobic conditions for 48 hours. The sodium hippurate test is incubated at 35°C for two hours.

The H broth is ready to be used for the flagellar typing of *Salmonella*. Most salmonella have two flagellar phases. Typically only one phase is expressed at a time. Once the first phase has been expressed, it must be immobilized to allow the unexpressed phase to express itself. This is called a “phase reversal.” The phase reversal is set up and must incubate for 24 hours.

The original H broth from the *E. coli* O157 is tested for the H7 antigen. The H7 antigen typically doesn’t express itself in the original broth. The broth must be “passed” at least three or four times before the H7 antigen is expressed. When that occurs, the final results are reported.

Day Six

The phase reversal is put into H broth and is incubated for 24 hours.

Day Seven

Formalized saline is added to the H broth and is incubated for 24 hours. The *Campylobacter* biochemicals incubated

on Day 5 are read. The results are recorded and *Campylobacter* is frozen in buffered glycerol and results are ready to be released to the submitter.

Day Eight

The phase reversal can be used to test for the missing flagellar antigen. If the antigen expresses itself, the results can be recorded and a final report can be sent out. If the antigen does not express itself, the culture must be restarted.

Conclusion

The diagnosis and investigation of a diarrheal disease outbreak is a process in which all partners cannot afford but to work together to provide the best patient care. Health care workers are equally responsible for the proper management of patient specimens. The pre-analytical, analytical and post-analytical phases are very much connected and any mishandling in one phase will certainly affect all other phases.

This article was written by Dr. Jafar Razeq and Celere Leonard of the Division of Public Health Microbiology

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Laboratory Statistics

Reported from the
Laboratories Administration
during the month of

March 2009

ENTERIC BACTERIOLOGY

GENUS SEROVAR	SEX	AGE	#	JURISDICTION
CAMPYLOBACTER JEJUNI				
U	48	1		BALTIMORE
U	16	1		BALTIMORE
M	55	1		BALTIMORE
M	3	1		BALTIMORE
M	68	1		MONTGOMERY
M	40	1		MONTGOMERY
F	82	1		TALBOT
ESCHERICHIA COLI, SEROTYPE O119:H6				
U	1	1		MONTGOMERY
ESCHERICHIA COLI, SEROTYPE O128				
U	51	1		OUT OF STATE
ESCHERICHIA COLI, SEROTYPE O157:H7				
F	17	2		ANNE ARUNDEL
ESCHERICHIA COLI, SEROTYPE O26:H11				
M	23	1		WICOMICO
SALMONELLA				
U	15	1		BALTIMORE
M	1	1		BALTIMORE
F	12	1		BALTIMORE CITY
SALMONELLA 6,7:-:1,5				
F	1	1		OUT OF STATE
F	0	1		OUT OF STATE
SALMONELLA AGONA				
F	0	1		MONTGOMERY
SALMONELLA ANATUM				
F	57	1		HARFORD
SALMONELLA DURHAM				
F	1	1		OUT OF STATE
SALMONELLA ENTERITIDIS				
F	33	1		ANNE ARUNDEL
F	0	1		BALTIMORE
F	71	1		BALTIMORE
F	36	1		BALTIMORE
M	0	1		BALTIMORE
M	82	1		BALTIMORE
M	6	1		BALTIMORE
U	0	2		BALTIMORE CITY
F	0	1		BALTIMORE CITY
F	65	1		BALTIMORE CITY
F	55	1		BALTIMORE CITY
F	46	1		BALTIMORE CITY
F	29	1		BALTIMORE CITY
F	25	2		BALTIMORE CITY
F	4	1		BALTIMORE CITY

F	4	1	BALTIMORE CITY
M	0	1	BALTIMORE CITY
M	61	1	BALTIMORE CITY
M	55	1	BALTIMORE CITY
M	45	1	BALTIMORE CITY
M	4	1	BALTIMORE CITY
F	20	1	CARROLL
M	4	1	MONTGOMERY
U	12	1	OUT OF STATE
U	1	1	OUT OF STATE
M	83	1	OUT OF STATE
M	64	2	TALBOT
M	55	1	WICOMICO
M	45	1	WICOMICO
SALMONELLA HEIDELBERG			
U	0	1	BALTIMORE CITY
F	3	1	KENT
F	9	1	WASHINGTON
SALMONELLA INFANTIS			
F	23	1	OUT OF STATE
SALMONELLA NEWPORT			
F	0	2	BALTIMORE CITY
SALMONELLA PANAMA			
U	87	1	BALTIMORE
SALMONELLA RUBISLAW			
M	51	1	ALLEGANY
SALMONELLA SAINTPAUL			
M	72	1	BALTIMORE
M	85	1	FREDERICK
U	39	1	OUT OF STATE
SALMONELLA SER 4,12:I:-			
M	1	1	FREDERICK
M	1	1	MONTGOMERY
M	55	1	MONTGOMERY
SALMONELLA SER TYPHIMURIUM			
F	6	1	BALTIMORE CITY
F	5	1	BALTIMORE CITY
M	68	1	FREDERICK
F	16	1	MONTGOMERY
M	16	1	OUT OF STATE
F	8	2	TALBOT
SALMONELLA TYPHIMURIUM			
VAR COPENHAGEN			
F	0	2	BALTIMORE CITY
M	69	1	BALTIMORE CITY
M	11	1	OUT OF STATE
F	26	1	PRINCE GEORGE'S
SENT TO CDC FOR SEROTYPING.			
M	1	1	OUT OF STATE
SHIGELLA FLEXNERI			
M	40	1	BALTIMORE
SHIGELLA FLEXNERI II:3,4			
M	39	1	BALTIMORE CITY
M	7	1	BALTIMORE CITY
M	0	1	PRINCE GEORGE'S
SHIGELLA SONNEI			
F	28	1	ANNE ARUNDEL
F	21	3	BALTIMORE CITY
F	20	1	BALTIMORE CITY
F	13	1	BALTIMORE CITY
F	5	2	BALTIMORE CITY
M	6	1	BALTIMORE CITY
F	6	1	OUT OF STATE
M	31	1	OUT OF STATE
M	6	1	OUT OF STATE
M	34	1	WASHINGTON
YERSINIA ENTEROCOLITICA			
F	8	1	ALLEGANY
TOTAL	97		

ISOLATES - REFERENCE

GENUS SPECIES			
SOURCE	#	JURISDICTION	
ACINETOBACTER BAUMANNII			
OTHER	1	WICOMICO	
ACINETOBACTER CALCOACETICUS-			
ACINETOBACTER BAUMANNI COMPLEX			
UNKNOWN	1	PRINCE GEORGE'S	
ACINETOBACTER JUNII			
WOUND	1	WICOMICO	
BACILLUS CEREUS			
STOOL	1	BALTIMORE CITY	
ENTEROCOCCUS FAECIUM			
BLOOD	1	WICOMICO	
KLEBSIELLA PNEUMONIAE			
UNKNOWN	1	PRINCE GEORGE'S	
URINE	1	PRINCE GEORGE'S	
UNKNOWN	1	WICOMICO	
KLEBSIELLA PNEUMONIAE			
UNKNOWN	1	PRINCE GEORGE'S	
KLEBSIELLA TERRIGENA			
UNKNOWN	1	WICOMICO	
PROTEUS MIRABILIS			
WOUND	1	HARFORD	
PROVIDENCIA STUARTII			
UNKNOWN	1	ALLEGANY	
PSEUDOMONAS SPECIES			
UNKNOWN	1	ALLEGANY	
STREPTOCOCCUS PNEUMONIAE			
BLOOD	1	SAINT MARY'S	
CSF	1	SAINT MARY'S	
TOTAL	15		

ISOLATES - MISCELLANEOUS

GENUS SPECIES			
SOURCE	#	JURISDICTION	
ACINETOBACTER CALCOACETICUS-			
ACINETOBACTER BAUMANNI COMPLEX			
WOUND	2	FREDERICK	
ACINETOBACTER LWOFFI			
WOUND	1	PRINCE GEORGE'S	
CITROBACTER KOSERI			
VAGINAL	1	SOMERSET	
CLOSTRIDIUM SOREDELLII			
BLOOD	2	BALTIMORE CITY	
ENTEROBACTER CLOACAE			
VAGINAL	1	MONTGOMERY	
ENTEROCOCCUS FAECALIS			
WOUND	1	FREDERICK	
ESCHERICHIA COLI			
BLOOD	1	BALTIMORE CITY	
CSF	1	BALTIMORE CITY	
WOUND	1	BALTIMORE CITY	
WOUND	1	FREDERICK	
VAGINAL	1	PRINCE GEORGE'S	
VAGINAL	1	SOMERSET	
GARDNERELLA VAGINALIS			
VAGINAL	1	MONTGOMERY	
VAGINAL	1	PRINCE GEORGE'S	
VAGINAL	5	SOMERSET	
HAFNIA ALVEI			
UNKNOWN	1	CARROLL	

PSEUDOMONAS AERUGINOSA			
WOUND	3	FREDERICK	
SPUTUM	1	MONTGOMERY	
STAPHYLOCOCCUS AUREUS			
WOUND	1	BALTIMORE	
BLOOD	1	BALTIMORE CITY	
SKIN	1	BALTIMORE CITY	
WOUND	1	BALTIMORE CITY	
WOUND	2	CARROLL	
WOUND	7	FREDERICK	
WOUND	1	FREDERICK	
SKIN	1	MONTGOMERY	
STAPHYLOCOCCUS,			
COAGULASE NEGATIVE			
WOUND	1	BALTIMORE	
WOUND	1	CARROLL	
WOUND	3	FREDERICK	
STREPTOCOCCUS SPECIES			
BLOOD	1	BALTIMORE CITY	
STREPTOCOCCUS ALPHA HEMOLYTIC			
ABSCCESS	1	MONTGOMERY	
STREPTOCOCCUS			
BETA HEMOLYTIC GROUP A			
THROAT	3	ALLEGANY	
THROAT	7	BALTIMORE CITY	
THROAT	3	CARROLL	
THROAT	3	MONTGOMERY	
THROAT	1	WICOMICO	
STREPTOCOCCUS			
BETA HEMOLYTIC NON-GROUP A			
THROAT	6	ALLEGANY	
THROAT	1	SOMERSET	
THROAT	2	WICOMICO	
STREPTOCOCCUS			
BETA HEMOLYTIC GROUP B			
VAGINAL	1	ANNE ARUNDEL	
VAGINAL	3	ANNE ARUNDEL	
BLOOD	1	BALTIMORE CITY	
WOUND	1	FREDERICK	
VAGINAL	5	HOWARD	
VAGINAL	2	MONTGOMERY	
VAGINAL	10	PRINCE GEORGE'S	
VAGINAL	8	PRINCE GEORGE'S	
VAGINAL	5	SOMERSET	
VAGINAL	1	SOMERSET	
TOTAL	111		

SEXUALLY TRANSMITTED DISEASES

GENUS SPECIES			
SEX	#	JURISDICTION	
SYPHILIS SEROLOGY			
F	3	ALLEGANY	
M	1	ALLEGANY	
F	2	ANNE ARUNDEL	
M	5	ANNE ARUNDEL	
F	4	BALTIMORE	
M	2	BALTIMORE	
F	18	BALTIMORE CITY	
M	39	BALTIMORE CITY	
M	1	CARROLL	
M	1	CHARLES	
M	1	DORCHESTER	
M	1	FREDERICK	

F	2	HARFORD
F	3	MONTGOMERY
M	3	MONTGOMERY
F	4	PRINCE GEORGE'S
M	30	PRINCE GEORGE'S
U	1	PRINCE GEORGE'S
F	1	TALBOT
F	3	WICOMICO
M	5	WICOMICO

TOTAL 130

CHLAMYDIA TRACHOMATIS

F	3	ALLEGANY
M	7	ALLEGANY
F	8	ANNE ARUNDEL
M	5	ANNE ARUNDEL
F	17	BALTIMORE
M	7	BALTIMORE
F	12	BALTIMORE CITY
M	38	BALTIMORE CITY
U	3	BALTIMORE CITY
F	2	CALVERT
F	2	CARROLL
F	3	CECIL
F	5	CHARLES
F	1	DORCHESTER
F	9	FREDERICK
M	4	FREDERICK
F	7	HARFORD
F	6	HOWARD
M	1	HOWARD
M	1	KENT
F	18	MONTGOMERY
M	9	MONTGOMERY
U	3	MONTGOMERY
F	72	PRINCE GEORGE'S
M	38	PRINCE GEORGE'S
F	3	QUEEN ANNE'S
F	2	SAINT MARY'S
F	7	SOMERSET
M	4	SOMERSET
F	6	TALBOT
F	2	WASHINGTON
F	22	WICOMICO
M	8	WICOMICO
F	2	WORCESTER
M	2	WORCESTER

TOTAL 339

NEISSERIA GONORRHOEAE

F	3	ALLEGANY
M	3	BALTIMORE
M	1	BALTIMORE CITY
M	1	CAROLINE
F	1	CHARLES
M	2	CHARLES
F	1	FREDERICK
M	2	HOWARD
F	2	KENT
M	2	KENT
F	1	MONTGOMERY
F	9	PRINCE GEORGE'S
M	18	PRINCE GEORGE'S
F	1	SAINT MARY'S
M	2	SAINT MARY'S
F	2	SOMERSET
F	7	WICOMICO
M	10	WICOMICO

TOTAL 68

**PENICILLIN RESISTANT
GONORRHEA**

REPORTED QUARTERLY
FOR JAN 2009 THROUGH MAR 2009

SEX	AGE	#	JURISDICTION
M	23	1	CHARLES
M	30	1	PRINCE GEORGE'S
M	20	1	PRINCE GEORGE'S
M	36	1	PRINCE GEORGE'S

TOTAL 4

MYCOBACTERIOLOGY

ISOLATE
SEX AGE # JURISDICTION

AEROBIC ACTINOMYCETE			
M	68	1	WICOMICO
MYCOBACTERIUM ABSCESSUS			
F	66	1	BALTIMORE
F	77	1	BALTIMORE
F	74	2	MONTGOMERY
M	24	1	PRINCE GEORGE'S
MYCOBACTERIUM AVIUM COMPLEX			
F	54	2	ALLEGANY
F	66	1	ALLEGANY
F	80	2	ALLEGANY
U	88	1	ANNE ARUNDEL
F	2	1	ANNE ARUNDEL
F	68	1	ANNE ARUNDEL
F	71	1	ANNE ARUNDEL
F	53	1	BALTIMORE
F	66	1	BALTIMORE
F	88	1	BALTIMORE
M	65	1	BALTIMORE
M	74	3	BALTIMORE
M	80	1	BALTIMORE
F	36	1	BALTIMORE CITY
F	45	1	BALTIMORE CITY
F	50	2	BALTIMORE CITY
F	78	1	BALTIMORE CITY
M	26	1	BALTIMORE CITY
M	27	1	BALTIMORE CITY
M	39	2	BALTIMORE CITY
M	44	1	BALTIMORE CITY
M	46	2	BALTIMORE CITY
M	50	1	BALTIMORE CITY
M	51	1	BALTIMORE CITY
M	65	1	BALTIMORE CITY
F	39	1	FREDERICK
F	80	2	FREDERICK
F	61	1	MONTGOMERY
F	67	1	MONTGOMERY
F	87	1	PRINCE GEORGE'S
F	73	1	WICOMICO
M	36	1	WICOMICO
MYCOBACTERIUM FORTUITUM			
F	71	1	BALTIMORE
F	59	1	MONTGOMERY
M	43	1	MONTGOMERY
M	49	1	MONTGOMERY
M	58	1	MONTGOMERY
M	83	1	MONTGOMERY
MYCOBACTERIUM FORTUITUM COMPLEX			
F	72	1	BALTIMORE
M	74	1	MONTGOMERY
F	73	2	PRINCE GEORGE'S

MYCOBACTERIUM GORDONAE			
F	26	1	BALTIMORE
M	56	1	BALTIMORE
M	62	1	BALTIMORE
M	74	1	BALTIMORE
M	58	1	BALTIMORE CITY
U	53	1	HARFORD
M	67	1	MONTGOMERY
M	54	2	OUT OF STATE
M	42	1	WICOMICO
M	76	1	WICOMICO
M	86	1	WICOMICO
MYCOBACTERIUM LENTIFLAVUM			
M	76	1	BALTIMORE CITY
MYCOBACTERIUM MARINUM			
U	70	2	ANNE ARUNDEL
MYCOBACTERIUM MUCOGENICUM			
M	89	1	BALTIMORE
M	48	1	PRINCE GEORGE'S
MYCOBACTERIUM TERRAE			
M	71	1	MONTGOMERY
MYCOBACTERIUM TUBERCULOSIS			
U	24	1	BALTIMORE CITY
F	28	1	MONTGOMERY
M	28	1	MONTGOMERY
M	33	1	MONTGOMERY
M	49	1	MONTGOMERY
F	35	1	OUT OF STATE
F	49	1	OUT OF STATE
F	27	1	PRINCE GEORGE'S
M	50	1	WICOMICO
MYCOBACTERIUM TUBERCULOSIS COMPLEX			
M	23	1	ANNE ARUNDEL
M	54	1	BALTIMORE
M	62	6	BALTIMORE
F	18	1	BALTIMORE CITY
F	22	2	BALTIMORE CITY
M	68	1	BALTIMORE CITY
F	38	1	FREDERICK
U	38	2	MONTGOMERY
F	27	3	MONTGOMERY
F	28	2	MONTGOMERY
F	32	1	MONTGOMERY
M	28	7	MONTGOMERY
M	33	2	MONTGOMERY
M	36	3	MONTGOMERY
M	44	2	MONTGOMERY
M	51	1	MONTGOMERY
M	54	1	MONTGOMERY
F	54	1	OUT OF STATE
M	23	1	OUT OF STATE
F	22	5	PRINCE GEORGE'S
F	27	1	PRINCE GEORGE'S
F	35	2	PRINCE GEORGE'S
M	23	2	PRINCE GEORGE'S
M	34	3	PRINCE GEORGE'S
M	69	2	PRINCE GEORGE'S
U	66	1	UNKNOWN
M	50	1	WICOMICO
MYCOBACTERIUM XENOPI			
M	48	1	WICOMICO
NON-PHOTOCHROMOGENIC MYCOBACTERIA			
F	65	1	ALLEGANY
F	43	1	BALTIMORE CITY
RAPIDLY GROWING MYCOBACTERIA			
F	80	1	OUT OF STATE
F	58	1	PRINCE GEORGE'S
SCOTOCHROMOGENIC MYCOBACTERIA			
M	35	1	PRINCE GEORGE'S
M	80	1	WICOMICO

TOTAL 146

MYCOBACTERIUM SUSCEPTIBILITY RESULTS

20 ISOLATES IDENTIFIED

7 DRUG RESISTANT STRAINS FOUND

#	JURISDICTION	DRUG(S)
1 ^B	BALTIMORE	PYRAZINAMIDE
1	MONTGOMERY	ISONIAZID
2 ^A	MONTGOMERY	ISONIAZID, PYRAZINAMIDE, ETHAMBUTOL
1 ^B	PRINCE GEORGE'S	PYRAZINAMIDE
2 ^A	QUEEN ANNE'S	ISONIAZID

^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

MYCOLOGY

ISOLATE

SEX	AGE	#	JURISDICTION
ASPERGILLUS FUMIGATUS			
F	84	1	ALLEGANY
F	0	2	ANNE ARUNDEL
F	76	1	ANNE ARUNDEL
M	65	1	ANNE ARUNDEL
M	56	1	BALTIMORE CITY
F	76	1	MONTGOMERY
F	82	1	PRINCE GEORGE'S
M	55	1	PRINCE GEORGE'S
F	60	1	TALBOT
M	0	1	TALBOT
M	77	1	TALBOT
ASPERGILLUS NIGER			
F	35	1	ALLEGANY
M	56	1	BALTIMORE CITY
M	80	1	BALTIMORE CITY
F	62	1	TALBOT
ASPERGILLUS TERREUS			
F	39	1	TALBOT
ASPERGILLUS VERSICOLOR			
M	75	1	BALTIMORE CITY
CANDIDA ALBICANS			
M	75	1	ANNE ARUNDEL
F	32	1	BALTIMORE
M	0	1	BALTIMORE CITY
M	45	1	BALTIMORE CITY
M	46	1	BALTIMORE CITY
M	62	1	BALTIMORE CITY
M	75	1	BALTIMORE CITY
M	77	1	BALTIMORE CITY
M	80	1	BALTIMORE CITY
F	55	1	CALVERT
M	28	1	CALVERT

M	56	1	CALVERT
F	29	1	CECIL
F	26	1	MONTGOMERY
F	57	1	MONTGOMERY
F	60	1	MONTGOMERY
F	66	1	MONTGOMERY
F	72	1	MONTGOMERY
F	80	1	MONTGOMERY
M	37	1	MONTGOMERY
M	45	1	MONTGOMERY
M	48	2	MONTGOMERY
M	83	1	MONTGOMERY
U	35	1	MONTGOMERY
U	0	1	PRINCE GEORGE'S
U	62	1	PRINCE GEORGE'S
F	19	2	PRINCE GEORGE'S
F	24	1	PRINCE GEORGE'S
F	32	1	PRINCE GEORGE'S
F	80	2	PRINCE GEORGE'S
F	82	1	PRINCE GEORGE'S
M	30	1	PRINCE GEORGE'S
M	49	1	PRINCE GEORGE'S
U	18	1	SOMERSET
F	18	4	SOMERSET
F	19	3	SOMERSET
F	22	1	SOMERSET
F	23	2	SOMERSET
F	26	1	SOMERSET
CANDIDA GLABRATA			
F	36	1	MONTGOMERY
F	78	1	MONTGOMERY
M	45	1	MONTGOMERY
CANDIDA KRUSEI			
M	79	1	BALTIMORE CITY
CANDIDA PARAPSILOSIS			
M	72	1	BALTIMORE
F	85	1	PRINCE GEORGE'S
M	31	2	PRINCE GEORGE'S
M	56	1	PRINCE GEORGE'S
CANDIDA SPECIES			
M	80	1	BALTIMORE CITY
CANDIDA TROPICALIS			
M	67	1	BALTIMORE CITY
M	81	1	BALTIMORE CITY
M	66	1	MONTGOMERY
U	39	1	PRINCE GEORGE'S
CHAETOMIUM SPECIES			
F	69	1	WICOMICO
CHRYSONILIA SITOPHILIA			
M	58	1	CHARLES
CLADOSPORIUM SPECIES			
U	7	1	TALBOT
CRYPTOCOCCUS NEOFORMANS			
M	47	1	MONTGOMERY
M	72	1	PRINCE GEORGE'S
EXOPHIALA SPECIES			
F	62	1	BALTIMORE CITY
FUSARIUM SPECIES			
F	55	1	BALTIMORE CITY
F	72	1	TALBOT
MALBRANCHEA SPECIES			
F	16	1	TALBOT
NOCARDIA ASTEROIDES			
M	83	1	CARROLL
NOCARDIA FARCINICA			
F	43	2	BALTIMORE CITY
PAECILOMYCES SPECIES			
F	55	1	CALVERT
PENICILLIUM SPECIES			
M	68	1	BALTIMORE CITY

U	76	1	MONTGOMERY
F	37	1	MONTGOMERY
F	57	1	MONTGOMERY
F	73	1	MONTGOMERY
F	57	1	PRINCE GEORGE'S
PITHOMYCES SPECIES			
M	0	1	WICOMICO
RHODOTORULA			
U	82	1	CARROLL
SCEDOSPORIUM PROLIFICANS			
F	98	1	TALBOT
SCYTALIDIUM SPECIES			
M	83	1	TALBOT
STREPTOMYCES SPECIES			
M	67	1	BALTIMORE CITY
TRICHOPHYTON MENTAGROPHYTES			
F	9	1	TALBOT
TRICHOPHYTON RUBRUM			
52	1	CARROLL	
M	89	1	TALBOT
TRICHOPHYTON TONSURANS			
F	3	1	BALTIMORE
0	1	TALBOT	
F	10	1	TALBOT
M	3	1	TALBOT
M	7	1	TALBOT
TRICHOSPORON ASAHII			
F	51	1	PRINCE GEORGE'S
TRICHOSPORON INKIN			
F	93	1	BALTIMORE
F	19	1	SOMERSET
TRICHOSPORON MUCOIDES			
F	82	1	PRINCE GEORGE'S

TOTAL 116

PARASITOLOGY

GENUS/SPECIES	#	JURISDICTION
ASCARIS LUMBRICOIDES		
7		PRINCE GEORGE'S
BLASTOCYSTIS HOMINIS		
1		MONTGOMERY
4		BALTIMORE CITY
1		HOWARD
1		PRINCE GEORGE'S
2		BALTIMORE CITY
3		HOWARD
DIENTAMOEBIA FRAGILIS		
1		PRINCE GEORGE'S
1		MONTGOMERY
ENDOLIMAX NANA		
2		PRINCE GEORGE'S
2		HOWARD
3		MONTGOMERY
1		BALTIMORE CITY
1		MONTGOMERY
3		PRINCE GEORGE'S
1		MONTGOMERY
1		HOWARD
4		PRINCE GEORGE'S
1		BALTIMORE CITY
2		MONTGOMERY
ENTAMEBA COLI		
1		MONTGOMERY
ENTAMEBA HISTOLYTICA		
1		MONTGOMERY
ENTAMOEBIA COLI		
1		BALTIMORE CITY

1	HOWARD
3	BALTIMORE CITY
1	MONTGOMERY
1	PRINCE GEORGE'S
1	MONTGOMERY
2	BALTIMORE CITY
2	MONTGOMERY
ENTAMOEBAS HARTMANNI	
1	BALTIMORE CITY
1	ANNE ARUNDEL
ENTEROBIUS VERMICULARIS	
1	CARROLL
1	PRINCE GEORGE'S
GIARDIA LAMBLIA	
2	HOWARD
2	HOWARD
HOOKWORM	
3	BALTIMORE CITY
2	BALTIMORE CITY
HYMENOLEPIS NANA	
3	BALTIMORE CITY
PLASMODIUM FALCIPARUM	
1	ANNE ARUNDEL
1	BALTIMORE CITY
TRICHURIS TRICHIURA	
8	BALTIMORE CITY
TOTAL	82

FOOD SAFETY & SECURITY

	TOTALS
FOOD SAMPLES	40
NOTABLE PATHOGENS:	
SALMONELLA SP.	6
CAMPYLOBACTER SP.	7
LISTERIA SP.	0
CRABMEAT SAMPLES	0
EXCEEDING STANDARDS ¹	0
NOTABLE PATHOGENS:	
SHELLFISH SAMPLES	2
EXCEEDING STANDARDS ²	0
NOTABLE PATHOGENS:	
SHELLFISH GROWING WATERS SAMPLES	225
TOTAL SAMPLES	267
TOTAL STANDARDS EXCEEDED	13

STANDARDS

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

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

WATER MICROBIOLOGY

	# TESTED	# NON-COMPLIANT
COMMUNITY	4	0
NON-COMMUNITY	241	22
TOTAL	245	22

VIRUS ISOLATION

ISOLATE	SEX	AGE	#	JURISDICTION
ADENOVIRUS				
M		1	1	MONTGOMERY
F		3	1	MONTGOMERY
M		0	1	MONTGOMERY

SUBTOTAL 3

ECHOVIRUS 18				
F		11	1	TALBOT

SUBTOTAL 1

HERPES SIMPLEX VIRUS TYPE 1				
F		22	1	BALTIMORE CITY

SUBTOTAL 1

INFLUENZA A VIRUS				
F		13	1	ALLEGANY
F		27	1	BALTIMORE
F		2	1	MONTGOMERY
M		24	1	MONTGOMERY
M		40	1	MONTGOMERY
M		12	1	BALTIMORE CITY
M		1	1	BALTIMORE CITY
M		51	1	BALTIMORE CITY
M		4	1	BALTIMORE CITY
F		15	1	BALTIMORE CITY

SUBTOTAL 10

INFLUENZA B VIRUS				
M		4	1	MONTGOMERY
M		14	1	WORCESTER
F		15	1	BALTIMORE CITY
M		3	1	BALTIMORE CITY
F		36	1	BALTIMORE CITY
F		5	1	BALTIMORE CITY
M		18	1	BALTIMORE CITY
M		0	1	BALTIMORE CITY

SUBTOTAL 8

PARAINFLUENZA VIRUS 1				
F		0	1	MONTGOMERY

SUBTOTAL 1

PARAINFLUENZA VIRUS 3				
M		0	1	MONTGOMERY

SUBTOTAL 1

RESPIRATORY SYNCYTIAL VIRUS				
M		0	1	MONTGOMERY
F		2	1	MONTGOMERY
F		0	1	MONTGOMERY
U		2	1	MONTGOMERY
F		0	1	MONTGOMERY

SUBTOTAL 5

TOTAL 30

VIRAL POLYMERASE CHAIN REACTION (PCR)

ISOLATE	SEX	AGE	#	JURISDICTION
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HERPES SIMPLEX VIRUS TYPE 1				
U		22	1	ANNE ARUNDEL
F		22	1	BALTIMORE
F		18	1	BALTIMORE CITY
F		21	2	BALTIMORE CITY
F		22	1	BALTIMORE CITY
M		20	1	BALTIMORE CITY
M		21	1	BALTIMORE CITY
M		22	1	BALTIMORE CITY
F		17	1	CALVERT
M		14	1	DORCHESTER
M		20	1	FREDERICK
M		25	1	MONTGOMERY
F		19	1	PRINCE GEORGE'S
F		20	2	PRINCE GEORGE'S
F		21	2	PRINCE GEORGE'S
F		29	1	PRINCE GEORGE'S
F		16	1	UNKNOWN
F		20	2	WICOMICO

HERPES SIMPLEX VIRUS TYPE 2				
F		21	1	ALLEGANY
M		22	1	ALLEGANY
F		17	1	ANNE ARUNDEL
M		21	1	ANNE ARUNDEL
M		27	1	ANNE ARUNDEL
F		16	1	BALTIMORE
F		21	1	BALTIMORE
F		25	2	BALTIMORE
F		33	1	BALTIMORE
F		37	1	BALTIMORE
U		0	1	BALTIMORE CITY
U		13	1	BALTIMORE CITY
U		16	1	BALTIMORE CITY
U		18	1	BALTIMORE CITY
U		19	1	BALTIMORE CITY
U		20	1	BALTIMORE CITY
U		22	1	BALTIMORE CITY
U		23	1	BALTIMORE CITY
U		24	2	BALTIMORE CITY
U		27	1	BALTIMORE CITY
U		28	1	BALTIMORE CITY
U		38	1	BALTIMORE CITY
F		0	2	BALTIMORE CITY

F	18	1	BALTIMORE CITY
F	20	1	BALTIMORE CITY
F	24	2	BALTIMORE CITY
F	25	1	BALTIMORE CITY
F	42	1	BALTIMORE CITY
F	53	1	BALTIMORE CITY
F	56	1	BALTIMORE CITY
F	57	1	BALTIMORE CITY
M	0	2	BALTIMORE CITY
M	18	1	BALTIMORE CITY
M	20	1	BALTIMORE CITY
M	21	3	BALTIMORE CITY
M	22	2	BALTIMORE CITY
M	26	2	BALTIMORE CITY
M	29	1	BALTIMORE CITY
M	31	1	BALTIMORE CITY
M	33	1	BALTIMORE CITY
M	39	1	BALTIMORE CITY
M	51	1	BALTIMORE CITY
M	58	1	BALTIMORE CITY
F	19	1	CAROLINE
M	24	1	CAROLINE
F	21	1	CARROLL
F	23	1	CARROLL
F	0	1	CECIL
F	22	1	CHARLES
F	24	1	CHARLES
M	55	1	CHARLES
M	28	1	DORCHESTER
F	19	1	FREDERICK
F	24	2	FREDERICK
F	25	1	FREDERICK
M	21	1	GARRETT
M	27	1	HOWARD
F	40	1	MONTGOMERY
M	22	2	MONTGOMERY
M	26	1	MONTGOMERY
F	19	1	PRINCE GEORGE'S
F	20	1	PRINCE GEORGE'S
F	21	1	PRINCE GEORGE'S
F	37	1	PRINCE GEORGE'S
M	26	1	PRINCE GEORGE'S
M	45	1	PRINCE GEORGE'S
F	25	1	QUEEN ANNE'S
M	27	1	QUEEN ANNE'S
M	32	1	SAINT MARY'S
F	28	1	WORCESTER
INFLUENZA A (H1)			
U	15	1	BALTIMORE
U	24	1	BALTIMORE
U	25	1	BALTIMORE
U	27	1	BALTIMORE
U	37	1	BALTIMORE
U	46	1	BALTIMORE
U	79	1	BALTIMORE
F	26	1	BALTIMORE
M	28	1	BALTIMORE
M	45	1	BALTIMORE
U	19	1	BALTIMORE CITY
M	0	1	BALTIMORE CITY
M	1	1	BALTIMORE CITY
M	17	1	BALTIMORE CITY
U	0	1	MONTGOMERY
F	0	1	MONTGOMERY
F	3	1	MONTGOMERY
M	0	1	MONTGOMERY
M	10	1	MONTGOMERY
M	15	1	MONTGOMERY

M	2	1	MONTGOMERY
M	6	1	MONTGOMERY
M	9	1	MONTGOMERY
F	3	1	WORCESTER
F	39	1	WORCESTER
F	48	1	WORCESTER
F	51	1	WORCESTER
F	6	1	WORCESTER
M	16	1	WORCESTER
M	19	1	WORCESTER
M	3	1	WORCESTER
INFLUENZA A (H3)			
M	0	1	BALTIMORE CITY
M	16	1	WORCESTER
INFLUENZA B VIRUS			
U	0	1	BALTIMORE
U	12	1	BALTIMORE
U	16	2	BALTIMORE
U	19	1	BALTIMORE
U	2	2	BALTIMORE
U	22	1	BALTIMORE
U	23	1	BALTIMORE
U	29	1	BALTIMORE
U	49	1	BALTIMORE
U	5	3	BALTIMORE
U	56	1	BALTIMORE
U	70	1	BALTIMORE
F	17	1	BALTIMORE
F	18	1	BALTIMORE
F	2	1	BALTIMORE
F	28	1	BALTIMORE
F	32	1	BALTIMORE
F	42	1	BALTIMORE
M	15	1	BALTIMORE
M	16	1	BALTIMORE
M	17	1	BALTIMORE
M	19	1	BALTIMORE
M	5	2	BALTIMORE
U	16	1	BALTIMORE CITY
F	0	2	BALTIMORE CITY
F	15	1	BALTIMORE CITY
F	19	2	BALTIMORE CITY
F	20	1	BALTIMORE CITY
F	22	2	BALTIMORE CITY
F	3	1	BALTIMORE CITY
M	0	1	BALTIMORE CITY
M	21	1	BALTIMORE CITY
M	5	1	BALTIMORE CITY
F	19	1	DORCHESTER
M	5	1	DORCHESTER
F	0	1	MONTGOMERY
F	1	1	MONTGOMERY
F	15	2	MONTGOMERY
F	7	2	MONTGOMERY
F	8	3	MONTGOMERY
M	1	1	MONTGOMERY
M	4	1	MONTGOMERY
M	8	1	MONTGOMERY
F	6	1	TALBOT
M	11	1	TALBOT
F	10	1	WORCESTER
F	13	1	WORCESTER
M	12	1	WORCESTER
M	24	1	WORCESTER
M	6	1	WORCESTER
TOTAL 198			

VIRAL HEPATITIS

ORGANISM	# SPECIMENS	# POSITIVES	JURISDICTION
HEPATITIS A			
	1	0	ANNE ARUNDEL
	1	0	CARROLL
	1	0	PRINCE GEORGE'S
SUBTOTAL	3	0	
HEPATITIS B			
	64	2	ALLEGANY
	182	3	ANNE ARUNDEL
	67	1	BALTIMORE
	639	8	BALTIMORE CITY
	6	0	CALVERT
	15	0	CARROLL
	148	2	CECIL
	3	0	CHARLES
	76	1	FREDERICK
	17	0	GARRETT
	60	0	HARFORD
	22	0	HOWARD
	1	0	KENT
	317	8	MONTGOMERY
	336	12	PRINCE GEORGE'S
	1	0	QUEEN ANNE'S
	1	0	SAINT MARY'S
	1	0	SOMERSET
	11	0	TALBOT
	25	0	WASHINGTON
	104	1	WICOMICO
SUBTOTAL	2,096	38	
HEPATITIS C			
	57	12	ALLEGANY
	218	50	ANNE ARUNDEL
	65	3	BALTIMORE
	333	72	BALTIMORE CITY
	6	1	CALVERT
	22	3	CARROLL
	98	15	CECIL
	8	0	CHARLES
	84	3	FREDERICK
	23	0	GARRETT
	22	1	HARFORD
	1	0	HOWARD
	1	0	KENT
	44	1	MONTGOMERY
	194	6	PRINCE GEORGE'S
	2	0	QUEEN ANNE'S
	3	0	SAINT MARY'S
	1	0	SOMERSET
	11	0	TALBOT
	5	0	WASHINGTON
	19	2	WICOMICO
	2	1	WORCESTER
SUBTOTAL	1,219	170	
TOTALS	3,318	208	

RABIES

SOURCE	#	JURISDICTION
CAT	1	FREDERICK
FOX	1	HOWARD
HORSE	1	FREDERICK
RACCOON	2	BALTIMORE
	1	CARROLL
	1	FREDERICK
	1	HARFORD
	5	MONTGOMERY
	2	PRINCE
GEORGE'S	3	ST MARYS
	2	WASHINGTON
	1	WORCESTER
SKUNK	1	CAROLINE
	1	DORCHESTER
	1	CARROLL
	2	ST MARYS
TOTAL POSITIVES	25	
TOTAL SPECIMENS	292	

CHLAMYDIOPHILIA PSITTACI (CHLAMYDIA)

REPORTED QUARTERLY
NONE REPORTED THIS QUARTER

CD4 FLOW CYTOMETRY WORKLOAD

REPORTED QUARTERLY
COMPARING CURRENT QUARTER TO
SAME QUARTER LAST YEAR

DATES	Level 1	Level 2	Level 3	TOTAL
	<14%	14%-28%	≥29%	
1/01/09 THROUGH 3/31/09	161	460	302	923
1/01/08 THROUGH 3/31/08	260	481	283	1024

BLOOD LEAD

MARYLAND			
I	<10		80
IIA	10-14		5
IIB	15-19		4
III	20-44		3
IV	45-69		0
V	>69		0
TOTAL			92
WASHINGTON DC			
I	<10		0
IIA	10-14		0
IIB	15-19		0
III	20-44		0
IV	45-69		0
V	>69		0
TOTAL			0

NEWBORN & CHILDHOOD SCREENING

STATISTICS FOR FEBRUARY 2009

PRESUMPTIVE POSITIVES

DISORDERS	#
PHENYLKETONURIA	4
MAPLE SYRUP URINE DISEASE	2
HOMOCYSTEINURIA	11
TYROSINEMIA	2
ARGININEMIA	1
CITRULLINEMIA	0
GALACTOSEMIA	3
BIOTINIDASE DEFICIENCY	2
HYPOTHYROIDISM	72
HEMOGLOBIN -DISEASE	13
HEMOGLOBIN -BENIGN	492
CONGENITAL ADRENAL HYPERPLASIA (CAH)	67
CYSTIC FIBROSIS	4
FATTY ACID OXIDATIONS	3
ORGANIC ACIDEMIAS	14
ACYLCARNITINE - BORDERLINE	10
ACYLCARNITINE - OTHERS	0

MONTHLY TOTALS

# OF SPECIMENS SCREENED	9,898
NUMBER OF TESTS	700,920
% UNSATISFACTORY SPECIMENS	3.7

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
CITRULLINEMIA 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
SECONDARY HYPOTHYROIDISM	0
SICKLE CELL DISEASE -SS	0
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	323
PM ₁₀	0	0
RADIATION		
AIR/CHARCOAL FILTERS	0	70
MILK	0	0
WIPES	0	142
RAW WATER	0	6
VEGETATION	0	0
OTHER	0	0
DRINKING WATER		
METALS		
COMMUNITY	3	3
NON-COMMUNITY	1	9
PRIVATE WELLS	47	146
PESTICIDES & PCBs		
COMMUNITY	0	36
NON-COMMUNITY	0	8
PRIVATE WELLS	0	0
VOLATILE ORGANIC COMPOUNDS		
COMMUNITY	3	147
NON-COMMUNITY	0	94
PRIVATE WELLS	5	173
RADIATION		
COMMUNITY	4	37
NON-COMMUNITY	0	0
PRIVATE WELLS	0	5
INORGANICS		
COMMUNITY	0	10
NON-COMMUNITY	6	121
PRIVATE WELLS	15	162
FOOD CHEMISTRY		
SUSPECTED TAMPERING	0	0
MICROSCOPIC FILTH	0	0
LABELING	0	0
SURVEILLANCE	0	15
CHEMICAL CONTAMINATION	0	0
TOTAL	86	1,512

VIRAL LOAD SPECIMENS					
HIV-1 RNA COPIES/ ML	<10 ³	10 ³ —10 ⁴	10 ⁴ —10 ⁵	>10 ⁵	TOTALS
ALLEGANY	9	0	1	0	10
FREDERICK	2	0	0	1	3
MONTGOMERY	89	17	15	5	126
PRINCE GEORGE'S	88	11	13	1	113
SOMERSET	2	0	0	0	2
WASHINGTON	5	2	3	0	10
WICOMICO	1	1	1	1	4
SUBTOTALS	196	31	33	8	268
DEPT. OF CORRECTIONS	31	8	7	2	48
TOTALS	227	39	40	10	316

HIV ANTIBODY SCREENING					
SUBMITTER	TOTAL SPECIMENS	# EIA POSITIVE	% EIA POSITIVE	# WB POSITIVE	% WB POSITIVE
CORRECTIONAL INSTITUTIONS	154	5	3.25%	3	60.00%
FAMILY PLANNING (NON-GOVERNMENT)	146	0	0.00%	0	0.00%
HEALTH CENTERS (NON-GOVERNMENT)	673	44	6.54%	43	97.73%
HEALTH DEPT, NON-STD, FAMILY PLAN	487	6	1.23%	4	66.67%
HEALTH DEPT, NON-STD, OB/GYN	12	0	0.00%	0	0.00%
HEALTH DEPT, NON-STD, OTHER	775	55	7.10%	53	96.36%
HEALTH DEPT, STD CLINICS	1,019	15	1.47%	13	86.67%
HOSPITAL, OTHER	129	14	10.85%	13	92.86%
HOSPITAL, PUBLIC	16	1	6.25%	1	100.00%
LABORATORIES (NON-HOSPITAL)	357	18	5.04%	10	55.56%
PEDIATRIC - CHILD HEALTH	15	1	6.67%	1	100.00%
PEDIATRIC - OUT PATIENT	1	0	0.00%	0	0.00%
PRIVATE PHYSICIANS	15	1	6.67%	1	100.00%
PRIVATE STUDENT HEALTH CENTERS	36	0	0.00%	0	0.00%
PUBLIC STUDENT HEALTH CENTERS	303	1	0.33%	0	0.00%
TOTALS	4,138	161	3.89%	142	88.20%



MAILING LABEL

Critical Link
 o/o Georgia Corso, Room L-15
 J. Mehnen Joseph Public Health Laboratory
 Department of Health & Mental Hygiene
 201 West Preston Street
 Baltimore, Maryland 21201

