

CRITICAL LINK



A Publication of the
Maryland Department of
Health and Mental Hygiene

The Laboratories Administration—Maryland's State Public Health Laboratory

Congenital Adrenal Hyperplasia (CAH)

An Acute Neonatal Disorder

Introduction

Advances in the fields of genetics and cell biology have enhanced our understanding of neonatal disorders.¹ Congenital adrenal hyperplasia (CAH) refers to any of several autosomal recessive diseases resulting from defects in steps of the synthesis of cortisol from cholesterol by the adrenal glands (see Figure 1). In the newborn CAH is the most common cause of ambiguous genitalia and sudden death due to salt wasting. Infants with CAH who are not diagnosed and treated early are particularly susceptible to sudden death in the first few weeks of life. These clinical manifestations make prompt diagnosis through newborn screening highly desirable. Clinical Manifestations may include ambiguous genitalia that make it difficult to determine the baby's sex, vomiting leading to dehydration and

death in early infancy, early pubic hair and rapid growth in childhood, precocious puberty or failure of puberty to occur, excessive facial hair, virilization and/or menstrual irregularity in adolescence, and infertility due to anovulation.²

Pathophysiology

Cortisol is an adrenal steroid hormone necessary for life. Production begins in the second month of fetal life. Insufficient cortisol production results in rising levels of adrenocorticotropic hormone (ACTH), which in turn induces the overgrowth (hyperplasia) and over activity of the steroid-producing cells of the adrenal cortex. The defects causing adrenal hyperplasia are present at birth.

CAH is a deficiency in one of five enzymes required to synthesize cortisol from cholesterol in the adrenal cortex. Mutations in the 21-hydroxylase (21-OHD) gene are the most frequent cause of CAH. In the first two steps of the normal biochemical pathway, cholesterol is converted to progesterone and then to two end products: aldosterone and cortisol. In 21-OHD deficiency, both pathways are blocked, preventing the synthesis of aldosterone and cortisol (see Figure 2). The obstructed steroid pathway produces an accumulation of 17-hydroxy-

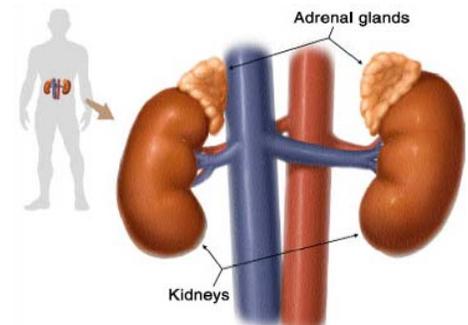


Figure 1: Diagram of adrenal glands.
Source: www.nichd.nih.gov

progesterone (17-OHP). The increased 17-OHP levels in the affected newborns permits screening for the disorders using dried bloodspots on filter paper.¹ Other types of CAH are lipid congenital adrenal hyperplasia, CAH due to 17 α -hydroxylase deficiency, 3 β -hydroxysteroid dehydrogenase deficiency, and 11 β -hydroxylase deficiency.²

Newborn Screening for CAH

The Laboratories Administration's Newborn and Childhood Screening Laboratories (NBS) added CAH testing to its newborn screening panel of tests in 2001. As of 2008, all 50 states mandate screening for CAH. In approximately

(Continued on page 2)

July 2010
Volume 14, Number 7

CRITICAL LINK

PRODUCTION MANAGER

Georgia Corso

EDITORIAL BOARD

Jack DeBoy, Dr. P. H.
 Prince Kassim, Ph.D.
 Fizza Majid, Ph.D.
 Robert Myers, Ph.D.
 Jafar Razeq, Ph.D.
 Jim Svrjcek, B.A.
 Michael Wajda, M.S., J.D.
 Chengru Zhu, Ph.D.

LABORATORIES ADMINISTRATION

Director
Jack DeBoy, Dr.P.H.

Deputy Director
 for Scientific Programs
Robert Myers, Ph.D.

Deputy Director
 for Administrative and
 Regulatory Programs
Michael Wajda, M.S., J.D.

TECHNICAL QUESTIONS

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

The Critical Link is published monthly by the staff of the Laboratories Administration Department of Health & Mental Hygiene 201 W. Preston Street Baltimore, Maryland 21201 (Phone 410-767-6909)

(Continued from page 1)

Congenital Adrenal Hyperplasia (CAH)

one in 15,000 live births, 21-OHD deficiency occurs. Since 2001, in Maryland, 29 babies have been confirmed to have some form of CAH by the NBS.

Maryland's NBS laboratories use the 1235 AutoDELFIA (Automatic Immunoassay System) to determine the 17-OHP in blood specimens dried on filter paper. Carefully established cutoffs are necessary to separate babies with normal 17-OHP concentration from those affected with elevated 17-OHP.³

Principles of the Assay

The AutoDELFIA Neonatal 17 α -OH-progesterone (17-OHP) assay is a solid phase, time-resolved fluoroimmunoassay based on the competitive reaction between europium-labeled 17-OHP and specimen 17-OHP (from a dried blood spot). This assay also uses 17-OHP specific polyclonal antibodies. Danazol facilitates the release of 17-OHP from the binding proteins.⁴ A second antibody, directed against the rabbit IgG, is coated to the solid phase, giving convenient separation of the antibody-bound and free antigen.

Enhancement Solution dissociates europium ions from the labeled antigen into solution where they form highly fluorescent chelates with components of the Enhancement Solution. The fluorescence in each well is then measured. The fluorescence of each sample is inversely proportional to the concentration of 17-OHP in the sample (see Figure 3).

Interpretation of the results

The concentration of 17-OHP is evaluated in relation to the patient's weight and age at the time of specimen collection. Specimens collected from patients less than 24 hours old are considered invalid and a repeat collection is strongly recommended.

If elevated 17-OHP is detected by the screening procedure, the results are reported to the NBS Program's Follow-Up Unit for appropriate follow-up. Additional testing is required to differentiate between 21- and 11 β -hydroxylase deficiencies.

Limitations

Some substances that could interfere with the detection of 17-OHP are EDTA, citrate, progesterone, deoxycorticosterone, tetrahydrocortisone, prednisolone, corticosterone, testosterone, and estriol. Other limitations include Dried blood spots that are of poor quality (layered, damaged filter paper, serum rings, etc.) and poor antibody specificity in combination with abundant cross reacting hormones in the newborn's blood. Stress to the newborn due to premature birth or critical illness can cause increased adrenal cortisol and 17-OHP secretion causing incorrect quantitation of 17-OHP. Despite these limitations, CAH is included in many newborn screening panels worldwide and all state sponsored programs in the United States.

(Continued on page 3)

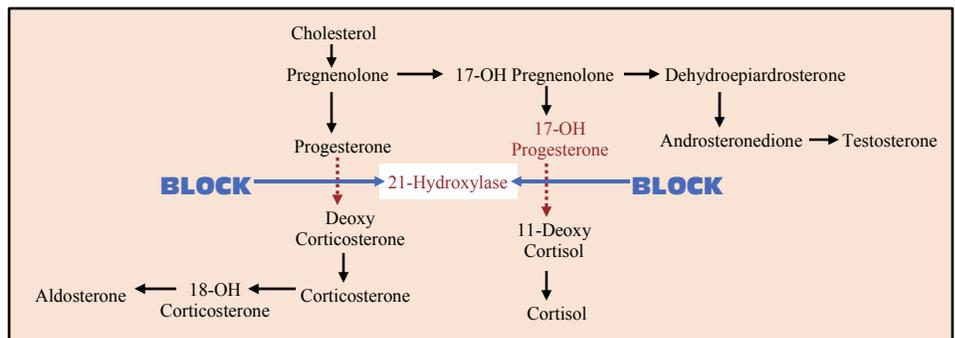


Figure 2: Pathway showing 21-Hydroxylase deficiency. Source: Laboratories Administration.

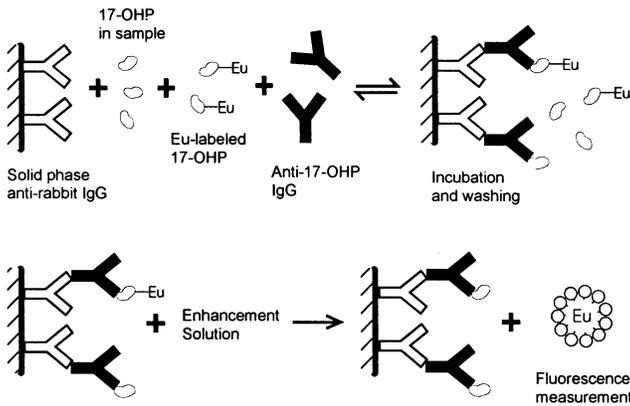


Figure 3. Source: PerkinElmer AutoDELFIATM Neonatal 17 α -OH-progesterone kit insert.

(Continued from page 2)

Congenital Adrenal Hyperplasia(CAH)

Diagnosis

Confirmation tests include serum electrolytes and serum steroid profiling. The advantage of profiling is that ratios of compounds can be calculated and the same criteria for diagnosis can be used regardless of a newborn's age at the time of sampling for 17-OHP levels. Molecular genetics methods, examining fetal DNA are useful in prenatal diagnosis and genetic counseling.⁵

Treatment

CAH is treatable with medications. The classical CAH patient requires lifelong medical management. Treatment includes: providing glucocorticoid to reduce hyperplasia and overproduction of androgens or mineralocorticoids; providing replacement mineralocorticoids and extra salt to correct salt deficiency; and providing replace-

ment testosterone or estrogen at puberty if the person is deficient. Additionally, patients receive treatments to optimize growth by delaying puberty or delaying bone maturation.²

Summary

CAH is an inherited autosomal recessive disorder that affects the adrenal gland. The disorder is caused by defects in the synthesis of cortisol and aldosterone, usually due to 21-OHD deficiency. In the severe form of classical CAH, uncontrolled loss of salt and the fluids of

the body cause severe salt wasting leading to adrenal crisis and death. Classical CAH can be detected through newborn screening. Newborn screening for CAH saves lives. The benefits of newborn screening include early diagnosis, consequently reducing newborn morbidity and mortality.⁶

Article compiled by Geetha Jagannathan and Fizza Gulamali-Majid, Ph.D.

References

- Stokowski, L. (2009): Congenital Adrenal Hyperplasia: An Endocrine Disorder with Neonatal Onset. <http://www.sciencedirect.com/science/journal/08995885> *Critical Care Nursing Clinics of North America* 21, 2, 195-212.
- <http://www.chemistrydaily.com/chemistry/>
- Kit insert AutoDELFIATM Neonatal 17 α -OH-progesterone, PerkinElmer Life and Analytical Sciences. June 2006.
- Pugeat, M.M., Dunn, J.F., Nisula, B.C. (1981): Transport of steroid hormones Interaction of 70 drugs with testosterone-binding globulin and corticosteroid-binding globulin in human plasma. *J. Clin. Endocrin.* 53,69-75.
- Adrenal Diseases – Congenital Adrenal Hyperplasia (CAH) The Facts You Need to Know; www.nadf.us
- Speiser, P.W., (2004): Improving Neonatal Screening of Congenital Adrenal Hyperplasia. *J. Clin. Endocrin.* 89,8, 3685-3686.

Laboratory Statistics

Reported by the
Laboratories Administration
covering results from the month of
May 2010

ENTERIC BACTERIOLOGY

GENUS	SEROVAR	SEX	AGE	#	JURISDICTION
CAMPYLOBACTER JEJUNI					
U	0			1	ANNE ARUNDEL
M	0			1	ANNE ARUNDEL
M	40			1	ANNE ARUNDEL
F	35			1	BALTIMORE

F	2	1	BALTIMORE
M	68	1	BALTIMORE
M	22	2	BALTIMORE CITY
M	32	1	MONTGOMERY
F	57	1	OUT OF STATE
F	29	1	OUT OF STATE
F	7	1	OUT OF STATE
M	79	1	OUT OF STATE
F	1	1	TALBOT
ESCHERICHIA COLI, SEROTYPE O157:H7			
F	44	1	WASHINGTON
ESCHERICHIA COLI, SEROTYPE O157:NON-MOTILE			
F	73	2	MONTGOMERY
M	2	1	MONTGOMERY
SALMONELLA SER. ENTERITIDIS			
F	39	1	BALTIMORE
F	1	1	BALTIMORE
M	0	1	BALTIMORE
M	55	1	BALTIMORE
M	1	2	BALTIMORE
U	4	1	BALTIMORE CITY
F	0	2	BALTIMORE CITY
F	67	1	BALTIMORE CITY
F	46	1	BALTIMORE CITY
M	69	2	BALTIMORE CITY
M	56	1	BALTIMORE CITY
M	12	1	BALTIMORE CITY
M	0	1	BALTIMORE CITY
M	75	1	CARROLL
M	70	1	CARROLL

M	64	1	FREDERICK
M	90	1	MONTGOMERY
F	25	1	OUT OF STATE
F	3	1	OUT OF STATE
F	3	1	OUT OF STATE
M	36	1	OUT OF STATE
M	29	1	OUT OF STATE
M	2	1	OUT OF STATE
F	1	1	TALBOT
F	5	1	WASHINGTON
M	3	1	WICOMICO
SALMONELLA SER. HEIDELBERG			
M	75	1	CALVERT
SALMONELLA SER. JAVIANA			
M	47	1	OUT OF STATE
SALMONELLA SER. NEWPORT			
M	3	1	WASHINGTON
SALMONELLA SER. PARATYPHI A			
U	56	1	PRINCE GEORGE'S
SALMONELLA SER. PARATYPHI B VAR L(+) TARTRATE +			
F	14	1	OUT OF STATE
SALMONELLA SER. POONA			
M	42	1	CECIL
M	23	1	OUT OF STATE
SALMONELLA SER. SAINTPAUL			
F	12	1	BALTIMORE
SALMONELLA SER. TYPHI			
M	6	1	OUT OF STATE
SALMONELLA SER. TYPHIMURIUM			
U	0	1	ANNE ARUNDEL
M	20	1	BALTIMORE CITY

F	20	1	FREDERICK
F	1	1	TALBOT
SALMONELLA			
SER. TYPHIMURIUM VAR COPENHAGEN			
F	2	1	OUT OF STATE
M	56	1	WASHINGTON
M	0	1	WICOMICO
SALMONELLA SER. VIRCHOW			
F	32	1	FREDERICK
SHIGELLA FLEXNERI VI:(4)			
F	0	1	BALTIMORE CITY
M	0	1	BALTIMORE CITY
SHIGELLA SONNEI			
F	5	1	OUT OF STATE
F	4	1	OUT OF STATE
M	0	1	OUT OF STATE
M	48	1	OUT OF STATE
UNABLE TO IDENTIFY ORGANISM.			
SENT TO CDC FOR IDENTIFICATION.			
F	93	1	ANNE ARUNDEL
VIBRIO ALGINOLYTICUS			
M	48	1	OUT OF STATE
VIBRIO PARAHAEMOLYTICUS			
F	64	1	BALTIMORE CITY
M	37	1	OUT OF STATE
VIBRIO SPECIES			
M	52	2	ANNE ARUNDEL
YERSINIA ENTEROCOLITICA			
F	0	1	BALTIMORE CITY
TOTAL	77		

ISOLATES - REFERENCE

GENUS SPECIES			
SOURCE	#	JURISDICTION	
BACILLUS CEREUS			
BLOOD	1	ANNE ARUNDEL	
BACILLUS FIRMUS			
STOOL	1	MONTGOMERY	
BACILLUS PUMILUS			
STOOL	1	MONTGOMERY	
KLEBSIELLA PNEUMONIAE			
WOUND	1	CHARLES	
STREPTOCOCCUS EQUINUS			
BLOOD	1	ALLEGANY	
TOTAL	5		

ISOLATES - MISCELLANEOUS

GENUS SPECIES			
SOURCE	#	JURISDICTION	
CLOSTRIDIUM SEPTICUM			
BLOOD	1	BALTIMORE CITY	
ENTEROCOCCUS FAECALIS			
BLOOD	2	BALTIMORE CITY	
ESCHERICHIA COLI			
BLOOD	2	BALTIMORE CITY	
ABDO	1	CARROLL	
GARDNERELLA VAGINALIS			
VAGINAL	6	PRINCE GEORGE'S	
VAGINAL	1	PRINCE GEORGE'S	
VAGINAL	1	SOMERSET	
VAGINAL	1	TALBOT	
KLEBSIELLA PNEUMONIAE			
BLOOD	1	BALTIMORE CITY	

STAPHYLOCOCCUS AUREUS			
WOUND	1	BALTIMORE	
LUNG	1	BALTIMORE CITY	
WOUND	1	BALTIMORE CITY	
BREAST	1	CARROLL	
NASO	1	CARROLL	
WOUND	1	CARROLL	
WOUND	1	CARROLL	
VAGINAL	1	MONTGOMERY	
NASAL	1	PRINCE GEORGE'S	
WOUND	2	PRINCE GEORGE'S	
STAPHYLOCOCCUS, COAGULASE NEGATIVE			
WOUND	2	BALTIMORE	
BLOOD	2	BALTIMORE CITY	
WOUND	2	CARROLL	
FACIAL	1	PRINCE GEORGE'S	
STREPTOCOCCUS, BETA HEMOLYTIC GROUP B			
VAGINAL	2	ANNE ARUNDEL	
SKIN	1	BALTIMORE CITY	
VAGINAL	2	MONTGOMERY	
THROAT	1	PRINCE GEORGE'S	
VAGINAL	3	PRINCE GEORGE'S	
VAGINAL	10	PRINCE GEORGE'S	
STREPTOCOCCUS, BETA HEMOLYTIC NON-GROUP A			
THROAT	4	ALLEGANY	
STREPTOCOCCUS PNEUMONIAE			
U	1	BALTIMORE CITY	
OTHER	1	BALTIMORE CITY	
PLEURAL	1	BALTIMORE CITY	
TOTAL	56		

SEXUALLY TRANSMITTED DISEASES

GENUS SPECIES			
SEX	#	JURISDICTION	
SYPHILIS SEROLOGY			
M	1	ALLEGANY	
F	1	ANNE ARUNDEL	
M	1	ANNE ARUNDEL	
F	2	BALTIMORE	
M	6	BALTIMORE	
F	8	BALTIMORE CITY	
M	30	BALTIMORE CITY	
M	1	CHARLES	
F	1	DORCHESTER	
F	3	MONTGOMERY	
M	5	MONTGOMERY	
F	4	PRINCE GEORGE'S	
M	28	PRINCE GEORGE'S	
U	1	PRINCE GEORGE'S	
F	1	TALBOT	
M	1	WASHINGTON	
F	1	WICOMICO	
M	2	WICOMICO	
F	1	WORCESTER	
TOTAL	98		

CHLAMYDIA TRACHOMATIS			
F	6	ALLEGANY	
M	4	ALLEGANY	
F	25	ANNE ARUNDEL	
M	13	ANNE ARUNDEL	

F	20	BALTIMORE	
M	4	BALTIMORE	
F	7	BALTIMORE CITY	
M	20	BALTIMORE CITY	
F	2	CALVERT	
M	1	CALVERT	
F	1	CAROLINE	
M	1	CAROLINE	
F	5	CARROLL	
M	2	CARROLL	
F	3	CECIL	
M	1	CECIL	
F	4	CHARLES	
M	5	CHARLES	
F	2	DORCHESTER	
M	2	DORCHESTER	
F	7	FREDERICK	
M	4	FREDERICK	
F	3	GARRETT	
F	3	HARFORD	
M	5	HARFORD	
F	2	HOWARD	
M	3	HOWARD	
U	1	HOWARD	
F	2	KENT	
F	13	MONTGOMERY	
M	2	MONTGOMERY	
F	53	PRINCE GEORGE'S	
M	63	PRINCE GEORGE'S	
U	1	PRINCE GEORGE'S	
F	1	QUEEN ANNE'S	
M	1	QUEEN ANNE'S	
F	6	SAINT MARY'S	
F	2	SOMERSET	
M	4	SOMERSET	
M	3	TALBOT	
F	9	WASHINGTON	
M	5	WASHINGTON	
F	17	WICOMICO	
M	8	WICOMICO	
F	7	WORCESTER	
M	1	WORCESTER	
TOTAL	354		

NEISSERIA GONORRHOEAE			
M	2	ALLEGANY	
F	3	ANNE ARUNDEL	
M	2	BALTIMORE	
F	1	BALTIMORE CITY	
M	1	CAROLINE	
F	1	CECIL	
F	2	CHARLES	
M	1	CHARLES	
F	1	DORCHESTER	
M	2	DORCHESTER	
M	1	HARFORD	
F	1	KENT	
F	2	MONTGOMERY	
M	3	MONTGOMERY	
F	17	PRINCE GEORGE'S	
M	18	PRINCE GEORGE'S	
U	1	PRINCE GEORGE'S	
M	1	SAINT MARY'S	
F	9	WICOMICO	
M	10	WICOMICO	
F	1	WORCESTER	
M	1	WORCESTER	
TOTAL	81		

MYCOBACTERIOLOGY

ISOLATE	SEX	AGE	#	JURISDICTION
MYCOBACTERIUM ABSCESSUS				
F	72	1		BALTIMORE
M	63	2		WICOMICO
MYCOBACTERIUM AVIUM				
M	39	1		BALTIMORE
MYCOBACTERIUM AVIUM COMPLEX				
F	34	1		BALTIMORE
F	51	1		BALTIMORE
F	64	1		BALTIMORE
M	39	1		BALTIMORE
M	52	1		BALTIMORE
M	55	1		BALTIMORE
M	60	4		BALTIMORE
M	85	1		BALTIMORE
M	0	1		BALTIMORE CITY
M	47	1		BALTIMORE CITY
M	49	1		BALTIMORE CITY
M	66	1		BALTIMORE CITY
M	40	1		CALVERT
F	64	2		CARROLL
M	75	1		CECIL
F	77	1		FREDERICK
M	73	1		FREDERICK
M	56	1		MONTGOMERY
F	77	1		OUT OF STATE
F	71	1		WICOMICO
F	83	1		WICOMICO
M	38	1		WICOMICO
MYCOBACTERIUM FORTUITUM COMPLEX				
F	78	1		FREDERICK
F	41	1		PRINCE GEORGE'S
F	73	1		PRINCE GEORGE'S
F	60	1		WICOMICO
MYCOBACTERIUM GORDONAE				
M	66	1		BALTIMORE CITY
F	86	1		CARROLL
F	70	1		HOWARD
M	73	1		HOWARD
M	56	1		MONTGOMERY
M	60	1		PRINCE GEORGE'S
U	70	1		WICOMICO
F	66	1		WICOMICO
M	19	2		WICOMICO
M	58	1		WICOMICO
MYCOBACTERIUM KANSASII				
M	58	1		BALTIMORE
M	54	1		BALTIMORE CITY
F	77	1		OUT OF STATE
MYCOBACTERIUM TUBERCULOSIS				
F	28	1		BALTIMORE
M	59	1		BALTIMORE CITY
M	42	1		HOWARD
M	27	1		MONTGOMERY
M	40	1		MONTGOMERY
F	50	1		OUT OF STATE
M	35	1		OUT OF STATE
F	22	1		PRINCE GEORGE'S
M	48	1		PRINCE GEORGE'S
MYCOBACTERIUM TUBERCULOSIS COMPLEX				
M	79	1		ANNE ARUNDEL
F	28	2		BALTIMORE
M	24	3		BALTIMORE
F	25	1		BALTIMORE CITY
M	49	1		BALTIMORE CITY
M	69	1		BALTIMORE CITY
M	73	2		BALTIMORE CITY
M	42	3		HOWARD

F	38	1	MONTGOMERY
F	85	7	MONTGOMERY
M	15	6	MONTGOMERY
M	27	1	MONTGOMERY
M	40	5	MONTGOMERY
M	45	3	MONTGOMERY
M	46	1	MONTGOMERY
M	68	8	MONTGOMERY
F	35	1	OUT OF STATE
M	48	1	OUT OF STATE
M	50	1	OUT OF STATE
F	22	2	PRINCE GEORGE'S
F	38	1	PRINCE GEORGE'S
M	48	4	PRINCE GEORGE'S
RAPIDLY GROWING MYCOBACTERIA			
F	70	1	PRINCE GEORGE'S
SCOTOCHROMOGENIC MYCOBACTERIA			
M	31	1	BALTIMORE
TOTAL		115	

MYCOBACTERIUM SUSCEPTIBILITY RESULTS

17 ISOLATES IDENTIFIED

3 DRUG RESISTANT STRAINS FOUND

#	JURISDICTION	DRUG(S)
1	ANNE ARUNDEL	ISONIAZID, STREPTOMYCIN
1	MONTGOMERY	STREPTOMYCIN
1	WASHINGTON DC	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:

<i>M. tuberculosis</i>	<i>M. africanum</i>
<i>M. bovis</i>	<i>M. microti</i>
<i>M. bovis, BCG</i>	<i>M. canettii</i>

PARASITOLOGY

GENUS/SPECIES	#	JURISDICTION
BLASTOCYSTIS HOMINIS		
	1	PRINCE GEORGE'S
	1	PRINCE GEORGE'S
DIENTAMOEBIA FRAGILIS		
	1	FREDERICK
	2	HOWARD
ENDOLIMAX NANA		
	3	MONTGOMERY
	4	PRINCE GEORGE'S
ENTAMOEBIA COLI		
	1	HOWARD
	3	PRINCE GEORGE'S
	1	PRINCE GEORGE'S
ENTAMOEBIA HARTMANNI		
	1	MONTGOMERY
	1	HOWARD
	2	ANNE ARUNDEL
ENTEROBIUS VERMICULARIS		
	1	BALTIMORE CITY
GIARDIA LAMBLIA		
	1	MONTGOMERY
	1	FREDERICK
	1	HOWARD
HYMENOLEPIS NANA		
	1	HOWARD
TOTAL	26	

FOOD PROTECTION

FOOD	TOTALS
NUMBER OF SAMPLES	40
NOTABLE PATHOGENS:	
<i>CAMPYLOBACTER SP.</i>	5
<i>CLOSTRIDIUM DIFFICILE</i>	0
<i>ENTEROCOCCUS</i>	37
<i>E. COLI</i>	29
<i>E. FAECALIS</i>	0
<i>LISTERIA SP.</i>	0
<i>MRSA</i>	21
<i>SALMONELLA SP.</i>	7
<i>VRE</i>	5

CRABMEAT

NUMBER OF SAMPLES	0
EXCEEDING STANDARDS ¹	0
NOTABLE PATHOGENS:	
<i>LISTERIA INNOCUA</i>	0

SHELLFISH

NUMBER OF SAMPLES	0
EXCEEDING STANDARDS ²	0

TOTAL STANDARDS EXCEEDED

0

SHELLFISH GROWING WATERS

NUMBER OF SAMPLES	206
-------------------	-----

TOTAL NUMBER OF SAMPLES

246

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

VIRUS ISOLATION

ISOLATE	SEX	AGE	#	JURISDICTION
ADENOVIRUS				
M	2	1		ALLEGANY
M	21	1		BALTIMORE
M	1	1		BALTIMORE
M	19	1		WICOMICO
M	19	1		WICOMICO
F	21	1		WICOMICO
F	19	1		WICOMICO
HERPES SIMPLEX VIRUS TYPE 1				
M	20	1		PRINCE GEORGE'S
M	24	1		PRINCE GEORGE'S
F	28	1		BALTIMORE CITY
HUMAN METAPNEUMOVIRUS				
F	0	1		BALTIMORE CITY
PARAINFLUENZA VIRUS 1				
F	19	1		ALLEGANY
PARAINFLUENZA VIRUS 3				
F	54	1		BALTIMORE
M	2	1		BALTIMORE
M	0	1		PRINCE GEORGE'S
TOTAL		15		

WATER MICROBIOLOGY

	# TESTED	# NON-COMPLIANT
COMMUNITY	0	0
NON-COMMUNITY	284	52
TOTAL	284	52

VIRAL POLYMERASE CHAIN REACTION (PCR)

ISOLATE

SEX AGE # JURISDICTION

HERPES SIMPLEX VIRUS TYPE 1

F	18	1	ALLEGANY
F	19	1	ALLEGANY
M	19	1	BALTIMORE
F	18	1	BALTIMORE CITY
F	24	1	BALTIMORE CITY
F	29	2	BALTIMORE CITY
F	19	1	CALVERT
F	31	1	CALVERT
F	18	1	CECIL
M	29	1	CECIL
M	25	1	FREDERICK
M	21	1	GARRETT
F	21	1	PRINCE GEORGE'S
F	22	1	PRINCE GEORGE'S
F	18	1	WICOMICO
F	20	1	WICOMICO
F	21	2	WICOMICO

HERPES SIMPLEX VIRUS TYPE 2

F	22	1	ANNE ARUNDEL
F	28	1	ANNE ARUNDEL
F	19	1	BALTIMORE
F	23	1	BALTIMORE
F	33	1	BALTIMORE
F	79	1	BALTIMORE
U	0	1	BALTIMORE CITY
F	18	2	BALTIMORE CITY
F	20	1	BALTIMORE CITY
F	24	1	BALTIMORE CITY
F	27	1	BALTIMORE CITY
F	34	1	BALTIMORE CITY
F	47	1	BALTIMORE CITY
F	48	1	BALTIMORE CITY
M	0	1	BALTIMORE CITY
M	18	1	BALTIMORE CITY
M	23	1	BALTIMORE CITY
M	31	1	BALTIMORE CITY
M	33	1	BALTIMORE CITY
M	37	1	BALTIMORE CITY
M	43	1	BALTIMORE CITY
M	48	1	BALTIMORE CITY
M	50	1	BALTIMORE CITY
F	22	1	CARROLL
F	16	1	CHARLES
F	27	1	CHARLES
M	44	1	CHARLES
F	27	1	FREDERICK
M	24	1	HARFORD
M	38	1	HARFORD
F	20	1	PRINCE GEORGE'S
F	22	1	PRINCE GEORGE'S
F	30	1	PRINCE GEORGE'S

F	36	1	PRINCE GEORGE'S
M	17	1	PRINCE GEORGE'S
M	20	1	PRINCE GEORGE'S
M	26	1	PRINCE GEORGE'S
M	48	1	PRINCE GEORGE'S
F	21	1	SOMERSET
F	20	1	UNKNOWN
F	28	1	UNKNOWN
F	25	1	WICOMICO
M	27	1	WICOMICO
F	22	1	WORCESTER
INFLUENZA A(H1/N1) NOVEL A			
F	52	1	ALLEGANY
M	62	1	BALTIMORE CITY

TOTAL 66

VIRAL HEPATITIS

ORGANISM

SPECIMENS
POSITIVES
JURISDICTION

HEPATITIS B

62	0	ALLEGANY
173	1	ANNE ARUNDEL
53	1	BALTIMORE
380	3	BALTIMORE CITY
6	0	CALVERT
6	1	CARROLL
119	0	CECIL
6	0	CHARLES
1	0	DORCHESTER
35	0	FREDERICK
13	0	GARRETT
33	0	HARFORD
10	0	HOWARD
2	0	KENT
300	2	MONTGOMERY
332	11	PRINCE GEORGE'S
1	0	QUEEN ANNE'S
3	0	SAINT MARY'S
3	0	SOMERSET
4	0	TALBOT
1	0	UNKNOWN
41	0	WASHINGTON
62	0	WICOMICO

SUBTOTAL 1,646 19

HEPATITIS C

53	10	ALLEGANY
209	35	ANNE ARUNDEL
66	6	BALTIMORE
214	43	BALTIMORE CITY
6	0	CALVERT
7	0	CARROLL
78	12	CECIL
13	0	CHARLES
43	1	FREDERICK
14	0	GARRETT
57	5	HARFORD
6	1	HOWARD

3	1	KENT
54	1	MONTGOMERY
178	10	PRINCE GEORGE'S
3	0	QUEEN ANNE'S
3	0	SAINT MARY'S
3	0	SOMERSET
4	0	TALBOT
19	1	WASHINGTON
14	0	WICOMICO

SUBTOTAL 1,047 126

TOTALS 2,693 145

RABIES

SOURCE	#	JURISDICTION
BAT	1	ANNE ARUNDEL
	1	CALVERT
	1	PRINCE GEORGE'S
CAT	1	CHARLES
	1	PRINCE GEORGE'S
FOX	1	MONTGOMERY
	1	QUEEN ANNE'S
GROUND HOG	1	MONTGOMERY
RACCOON	2	BALTIMORE
	2	BALTIMORE CITY
	1	CALVERT
	2	HARFORD
	1	HOWARD
	4	MONTGOMERY
	2	TALBOT
	3	WORCESTER
SKUNK	1	SAINT MARY'S
	1	WICOMICO

TOTAL POSITIVES 27

TOTAL SPECIMENS 331

CHLAMYDIOPHILIA PSITTACI (CHLAMYDIA)

REPORTED QUARTERLY
NO REPORT THIS MONTH

CD4 FLOW CYTOMETRY WORKLOAD

REPORTED QUARTERLY
NO REPORT THIS MONTH

BLOOD LEAD

MARYLAND			
I	<10		139
IIA	10-14		4
IIB	15-19		2
III	20-44		5
IV	45-69		0
V	>69		0
TOTAL			150

NEWBORN & CHILDHOOD SCREENING

PRESUMPTIVE POSITIVES

DISORDERS	#
PHENYLKETONURIA (PKU)	2
MAPLE SYRUP URINE DISEASE (MSUD)	0
HOMOCYSTINURIA	15
TYROSINEMIA	3
ARGININEMIA	0
CITRULLINEMIA	0
GALACTOSEMIA	0
BIOTINIDASE DEFICIENCY	4
HYPOTHYROIDISM	87
HEMOGLOBIN -DISEASE	20
HEMOGLOBIN -BENIGN	491
CONGENITAL ADRENAL HYPERPLASIA (CAH)	39
CYSTIC FIBROSIS	4
FATTY ACID OXIDATIONS	10
ORGANIC ACIDEMIAS	14
ACYLCARNITINE - BORDERLINE	6
ACYLCARNITINE - OTHERS	0
MONTHLY TOTALS	
# OF SPECIMENS SCREENED	11,843
NUMBER OF TESTS	645,748
% UNSATISFACTORY SPECIMENS	1.9

2010 YEAR-TO-DATE CONFIRMED CASES

CONDITIONS	# CONFIRMED
MEDIUM CHAIN ACYL-CoA DEHYDROGENASE DEFICIENCY (MCAD)	1
SHORT CHAIN ACYL-CoA DEHYDROGENASE DEFICIENCY (SCAD)	3
ELEVATED FORMIMINOGLUTAMIC ACID (FIGLU)	1
3-METHYLCROTONYL-COA CARBOXYLASE DEFICIENCY (3-MCC)	3
GALACTOSE EPIMERASE DEFICIENCY	1
GALACTOSEMIA - VARIANT -DG	2
GALACTOSEMIA - UNKNOWN VARIANT	1
CONGENITAL ADRENAL HYPERPLASIA-SALT WASTING	2
CONGENITAL ADRENAL HYPERPLASIA-UNCLASSIFIED	1
HYPOTHYROIDISM - PRIMARY	13
OTHER HYPOTHYROIDISM	7
TBG DEFICIENCY	1
SICKLE CELL DISEASE -SS	24
SICKLE CELL DISEASE -SC	16
SICKLE CELL DISEASE -S BETA THALASSEMIA	1
SICKLE CELL DISEASE-SV	1
HEMOGLOBIN VARIANT	1
CYSTIC FIBROSIS	3
CFTR-RELATED METABOLIC SYNDROME (CRMS)	1
TRANSIENT TYROSINEMIA	5

ENVIRONMENTAL CHEMISTRY

SAMPLE TYPES	# NON-COMPLIANT	# TESTED
ASBESTOS		
AIR	0	0
BULK	1	10
AIR QUALITY		
PM _{2.5}	0	383
RADIATION		
AIR/CHARCOAL FILTERS	0	64
MILK	0	0
WIPES	0	43
RAW WATER	0	10
VEGETATION	0	0
OTHER	0	3
DRINKING WATER		
METALS		
COMMUNITY	17	18
NON-COMMUNITY	22	26
PRIVATE WELLS	57	162
PESTICIDES & PCBs		
COMMUNITY	0	72
NON-COMMUNITY	0	45
PRIVATE WELLS	0	2
VOLATILE ORGANIC COMPOUNDS		
COMMUNITY	0	219
NON-COMMUNITY	0	198
PRIVATE WELLS	0	39
RADIATION		
COMMUNITY	2	16
NON-COMMUNITY	0	0
PRIVATE WELLS	0	16
INORGANICS		
COMMUNITY	0	27
NON-COMMUNITY	2	41
PRIVATE WELLS	1	104
FOOD CHEMISTRY		
SUSPECTED TAMPERING	0	0
MICROSCOPIC FILTH	0	0
LABELING	0	0
SURVEILLANCE	0	4
CHEMICAL CONTAMINATION	0	0
TOTAL	102	1,502

VIRAL LOAD SPECIMENS

HIV-1 RNA COPIES/ML	<10 ³	10 ³ —10 ⁴	10 ⁴ —10 ⁵	>10 ⁵	TOTALS
ALLEGANY	12	0	1	0	13
FREDERICK	4	0	1	0	5
MONTGOMERY	66	12	4	3	85
PRINCE GEORGE'S	84	14	14	2	114
WASHINGTON	2	1	1	0	4
WICOMICO	2	0	1	1	4
SUBTOTALS	170	27	22	6	225
DEPT. OF CORRECTIONS	9	1	1	0	11
TOTALS	179	28	23	6	236

HIV ANTIBODY SCREENING

SUBMITTER	TOTAL SPECIMENS	# EIA POSITIVE	% EIA POSITIVE	# WB POSITIVE	% WB POSITIVE
CORRECTIONAL INSTITUTIONS	181	2	1.10%	1	50.00%
FAMILY PLANNING (NON-GOVERNMENT)	158	1	0.63%	0	0.00%
HEALTH CENTERS (NON-GOVERNMENT)	345	31	8.99%	31	100.00%
HLTH DEPT, NON-STD, FAMILY PLAN	408	0	0.00%	0	0.00%
HLTH DEPT, NON-STD, OB/GYN	82	0	0.00%	0	0.00%
HLTH DEPT, NON-STD, OTHER	567	40	7.05%	38	95.00%
HLTH DEPT, STD CLINICS	947	7	0.74%	7	100.00%
HOSPITAL, OTHER	98	10	10.20%	10	100.00%
HOSPITAL, PUBLIC	21	0	0.00%	0	0.00%
JUVENILE SERVICES	70	1	1.43%	1	100.00%
LABORATORIES (NON-HOSPITAL)	347	16	4.61%	6	37.50%
PEDIATRIC - CHILD HEALTH	10	0	0.00%	0	0.00%
PRIVATE PHYSICIANS	7	2	28.57%	1	50.00%
PRIVATE STUDENT HEALTH CNTRS	23	0	0.00%	0	0.00%
PUBLIC STUDENT HEALTH CENTERS	223	3	1.35%	1	33.33%
TOTALS	3,487	113	3.24%	96	84.96%



MAILING LABEL

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

