

# MICROBIOLOGICAL LABORATORY SERVICES



The Division of Microbiological Laboratory Services plays a very important role in the diagnosis and control of communicable and infectious diseases in Westchester County. Clinical laboratory diagnostic services are provided to diverse agencies including the Westchester County Department of Health (WCDH) and its affiliated clinics, Westchester County Medical Examiner, Westchester County Department of Corrections, Westchester Medical Center and other acute care hospitals in Westchester County, area nursing homes and other healthcare facilities. The division also provides regional reference laboratory diagnostic services to area hospital laboratories and healthcare centers, particularly in the diagnosis of tuberculosis, sexually transmitted diseases and viral infections. The Virology Laboratory serves as a regional World Health Organization (WHO) collaborating laboratory for the isolation and identification of different strains of influenza viruses.

The Biodefense Laboratory has been designated by the Centers for Disease Control and Prevention (CDC) and the New York State Department of Health (NYSDOH) as the regional Laboratory Response Network (LRN) Reference Laboratory serving Westchester, Rockland, Putnam, Dutchess, Orange, Sullivan and Ulster counties.

## **I. Laboratory services provided:**

### **A. General Microbiology Laboratories:**

1. **Bacteriology:** This laboratory section performs tests for pathogenic bacteria causing infections of the throat, lower respiratory tract, gastrointestinal tract, urogenital tract, skin, wounds, blood, cerebrospinal fluid, brain and other organs/tissues. The laboratory utilizes culture techniques and other methods for the detection of *Legionella*, *Salmonella*, *Neisseria gonorrhoeae* and many other bacteria of public health significance. Patient samples from suspected food-borne or water-borne disease outbreaks are cultured to identify the presence of pathogenic bacteria. The lab employs special techniques to enhance the detection of *E.coli 0157:H7* and *Campylobacter*. An automated microbial identification system is used in combination with conventional biochemical methods to provide specific organism identification and an antibiotic susceptibility profile of culture isolates.
2. **Parasitology:** This laboratory section conducts routine Ova and Parasite testing of patient stool samples. Immunofluorescence testing is performed for the detection of *Giardia* and *Cryptosporidium*. Special stains are used to enhance microscopic identification of select parasites.



- 3. Molecular Diagnostics:** Nucleic acid amplification (NAA) testing is performed for the direct detection of *Neisseria gonorrhoeae* and *Chlamydia trachomatis* in urine and genital specimens. Nucleic acid probe assays are performed on mycobacterial culture isolates for rapid identification of *Mycobacterium tuberculosis* and selected nontuberculous mycobacteria. The molecular diagnostics testing menu has been expanded and enhanced during the past 2 years. (see Accomplishments for 2016 below)
- 4. Mycobacteriology:** Clinical specimens from the lower respiratory tract and other body sites are tested for tuberculosis (TB) and other mycobacterial infections. Acid-fast bacillus (AFB) smear results are provided within 30 hours of specimen receipt for prompt initial management of patients with suspected active TB. Automated instruments are employed for enhanced and accelerated detection of mycobacterial growth in culture, as well as for drug susceptibility testing of culture isolates of *M. tuberculosis*. A state-of-the-art automated molecular test able to detect *M. tuberculosis* DNA within 2-3 hours of initial sample processing was introduced in 2015.

## B. Virology Laboratories:

- 1. Tissue Culture Virology:** Direct testing is performed on upper respiratory specimens for the rapid detection of type A and type B influenza virus infections. Tissue culture procedures are performed for the isolation and identification of a wide variety of viruses, including influenza, mumps, measles, varicella zoster virus, herpes simplex virus, cytomegalovirus, adenovirus, respiratory syncytial virus, enterovirus and others.
- 2. Diagnostic Immunology:** Serological tests for syphilis such as RPR and VDRL are used to screen serum and CSF samples, respectively; TP-PA and FTA-ABS assays are specific treponemal tests used to confirm the diagnosis of syphilis. This laboratory section also performs tests on serum to detect evidence of HIV infection; testing includes both screening assays and supplemental assays when indicated, in accordance with current recommendations for the laboratory diagnosis of HIV infection issued by CDC. Enzyme immunoassays are performed to detect agent-specific IgG and/or IgM antibodies to viruses such as measles, mumps and varicella zoster virus. Miscellaneous tests are performed to detect *Legionella* urinary antigen and enterohemorrhagic *E. coli* toxin.



### **C. Biodefense Laboratory:**

The Biodefense Laboratory is a certified Biosafety Level 3 regional Laboratory Response Network (LRN-B) Reference Laboratory equipped to provide testing of environmental and clinical samples for the presence of Anthrax, Brucellosis, Burkholderia, Tularemia, Plague, Ricin and Orthopox viruses. The Biodefense Laboratory provides these highly specialized laboratory services to seven counties in the lower Hudson Valley region and also provides surge testing capacity for the state of New York. Rapid molecular testing and conventional culture methods that have been specifically approved by the Laboratory Response Network and Centers for Disease Control (CDC) are used for the detection of the above potential agents of bioterrorism.

### **Laboratory Licenses, Accreditations and Certifications:**

The Division of Microbiological Services maintains a current clinical laboratory permit, issued annually by the New York State Department of Health Clinical Laboratory Evaluation Program (CLEP), in the following laboratory categories:

- \* Bacteriology (Comprehensive)
- \* Diagnostic Immunology
- \* Mycobacteriology (Comprehensive)
- \* Parasitology (Comprehensive)
- \* Virology (Comprehensive)



Federal CLIA licensing is also maintained through CLEP accreditation by the NYS DOH.

The Biodefense Laboratory is accredited by the NYS DOH Environmental Laboratory Accreditation Program (ELAP) to perform testing of environmental samples for the presence of agents of potential bioterrorism. After ELAP announced and implemented a brand new required certification program in June 2016 for laboratories wishing to offer *Legionella* culture analysis of non-potable water and drinking water samples collected in NYS, the Bacteriology section of the General Microbiology Laboratories was able to obtain certificates of approval in these 2 categories without difficulty. Bacteriology was also re-certified to perform *Legionella* culture analysis of environmental water samples by the CDC ELITE program certification. These cultures are designed to detect, identify and quantitate *Legionella* species within water samples, including *Legionella pneumophila* which causes Legionnaire's Disease. The Division of Microbiological Services is also certified by the NYS Department of Health in electronic communicable disease reporting via the Electronic Clinical Laboratory Reporting System (ECLRS) application on the Health Commerce System.

### **Laboratory Revenues:**

Diagnostic tests for tuberculosis and sexually transmitted diseases are provided at no cost to residents of Westchester County and non-residents who are patients at Westchester County hospitals, as mandated by the New York State Department of Health. The division's operating expenses for these public health initiatives are partially subsidized by state aid. The division also receives grant funds from the state of New York for Chlamydia surveillance testing performed for the NYS Infertility Prevention Project and for biodefense laboratory testing performed as part of the CDC Public Health Emergency Preparedness program. A small amount of revenue is generated from testing performed for a few private companies and out-of-county clients.

### **Agencies Utilizing Microbiological Laboratory Services:**

The Microbiological Laboratories serve a few dozen clients, many of which are area hospitals and nursing homes. Agencies and clients include:

- Westchester County Health Department
- Westchester County Medical Examiner
- Westchester Medical Center
- All other acute care hospitals in Westchester County
- Nursing homes and other healthcare facilities in Westchester County
- Rockland County Department of Health
- Westchester County Department of Corrections
- Westchester County Department of Emergency Services
- Westchester County Department of Public Safety
- Municipal police departments
- Federal Bureau of Investigation
- United States Postal Service
- Private companies and other agencies

### **Types of Specimens/Samples Analyzed:**

The various laboratory sections within the Division of Microbiological Services analyze patients' blood, urine, stool, sputum, body fluids, swabs and tissue samples to detect microbial pathogens and also test patients' sera to determine the presence/absence of antibodies to selected infectious agents of importance to public health. Certain lab sections also perform testing of environmental samples including potable and non-potable water, food and unknown substances that may potentially contain agents of bioterrorism. All of the above specimens are collected and processed according to guidelines established by the New York State Department of Health and the American Society for Microbiology. Types of samples include:

- \* **Clinical (Patient) Samples** - for the isolation and identification of bacteria, mycobacteria, viruses, and parasites, or for the presence/absence of IgG and IgM antibodies to various infectious agents.
- \* **Potable and Non-Potable Water Samples** – for the isolation, identification and quantification of *Legionella*.
- \* **Food Samples** – for the isolation and identification of bacterial pathogens and toxins that may be the etiologic agents of recent or ongoing outbreaks of gastrointestinal disease.
- \* **Biothreat Samples** – for detection and identification of potential agents of bioterrorism.

### **Epidemiological Disease Tracking Service:**

The laboratory uses a laboratory information management system (LIMS) for the entry, reporting, storage and retrieval of all laboratory data. The system has a web-based inquiry module which allows ordering physicians and other health care providers to view their patients' test results. Epidemiological data for several infectious diseases of major public health concern (Tuberculosis, Syphilis, Gonorrhea, Chlamydia, HIV and Influenza) are retrieved from the LIMS and statistical reports for tracking these diseases are generated for the Westchester County Health Department, the New York State Department of Health and other agencies. These tracking reports play an important role in maintaining public health surveillance and preventing the spread of these diseases. The laboratory has also been certified as a member of the Electronic Clinical Laboratory Reporting System (ECLRS) for the New York State Department of Health to actively contribute to the reporting infrastructure of public health.

### **Laboratory Training and Education:**



The laboratory provides an educational program experience for residents and fellows rotating from New York Medical College and Westchester Medical Center, particularly in the areas of mycobacteriology, virology and sexually transmitted diseases. Infectious Disease fellows and Clinical Pathology residents may spend up to two weeks training in the various laboratories for completion of specialty board eligibility requirements.

The laboratory also offers volunteer internship programs and seasonal employment opportunities for college students.

### **Notable Accomplishments for 2016:**

- Implemented the Xpert Norovirus test, an automated molecular diagnostic assay for rapid (same day) detection of Norovirus in stool, which is used to test samples collected during gastrointestinal illness outbreak investigations conducted by the Westchester County Department of Health. Previously, outbreak samples had to be shipped to the NYS DOH Lab in Albany, resulting in long turnaround times for test results.
- Initiated validation of the Geenius HIV 1/2 Supplemental Assay to replace the Multispot HIV test; the manufacturer of both of these tests announced in 2016 that it would cease production of new lots of the Multispot test. In comparison with the Multispot test, interpretation of Geenius assay results is easier and less subjective.
- Obtained certificates of approval from NYS DOH Environmental Laboratory Accreditation Program to perform Legionella culture analysis of non-potable water and drinking water samples.

### **Goals for 2017:**

- Successfully validate Xpert CT/GC assay to detect chlamydia and/or gonorrhea in cervical samples. This rapid, automated molecular diagnostic test has already been validated for testing urine samples. Validation of the Xpert CT/GC assay for both specimen types will allow us to retire the outdated, highly labor-intensive Aptima CT/GC nucleic amplification assay.
- Complete the validation of the Geenius HIV 1/2 Supplemental Assay and begin reporting patient results with it before our supply of Multispot HIV test kits is exhausted or reaches its expiration date. Satisfactory validation by method comparison is made more difficult by the relatively low numbers of samples we receive for HIV testing.
- Complete the capital budget purchase of a major software upgrade for our Laboratory Information Management System, develop a comprehensive plan for the upgrade and ideally schedule installation of the new software version by the end of the calendar year.

### **Positioning for the Future:**

The division's most important project through 2018 is completion of the major software version upgrade for the laboratory information management system. We will assess the overall diagnostic utility and cost effectiveness of implementing additional molecular tests that could potentially replace some of our current labor-intensive, culture-based methods. We will also continue to look for opportunities for further cross-training of lab technologists to perform a greater variety of test methods, allowing us to maximize staff scheduling flexibility and optimize test workload management.

TABLE I

<b>Summary of Microbiological Laboratory Services</b>						
	2014		2015		2016	
	Number of Specimens	Actual Tests	Number of Specimens	Actual Tests	Number of Specimens	Actual Tests
BACTERIOLOGY	2015	2189	1780	2005	1835	2056
BIODEFENSE	18	30	18	30	10	16
PARASITOLOGY	25	75	13	41	26	78
MOLECULAR DIAGNOSTIC	2392	4790	2186	4372	2321	4600
MYCOBACTERIOLOGY (TB)	4760	10841	4486	10080	4466	10287
MYCOLOGY	3	6	1	1	Discontinued	Discontinued
VIROLOGY	425	441	303	325	303	330
DIAGNOSTIC IMMUNOLOGY	245	266	124	155	191	200
SYPHILIS SEROLOGY	2337	2917	1724	2000	1661	1795
<b>TOTAL</b>	<b>12220</b>	<b>21555</b>	<b>10635</b>	<b>19009</b>	<b>10813</b>	<b>19284</b>

TABLE II

<b>WORKLOAD Summary of Microbiological Laboratory Services *</b>						
	2014		2015		2016	
	Non-reportable tests (estimated)	Reportable Tests *	Non-reportable test (estimated)	Reportable Tests *	Non-reportable tests	Reportable Tests *
BACTERIOLOGY	2363	10837	4819	14035	3060	7340
BIODEFENSE	3663	300	3352	300	2292	100
PARASITOLOGY	83	450	115	246	116	156
MOLECULAR DIAGNOSTIC	805	11975	741	21860	773	23200
MYCOBACTERIOLOGY (TB)	2168	47600	2171	44860	2479	44660
MYCOLOGY	89	18	1	8	discontinued	N/A
VIROLOGY	1277	3528	1198	2600	1188	2420
DIAGNOSTIC IMMUNOLOGY	936	980	650	620	620	764
SYPHILIS SEROLOGY	1272	5834	1384	4000	1386	3820
<b>TOTAL</b>	<b>12656</b>	<b>81522</b>	<b>14431</b>	<b>90929</b>	<b>11914</b>	<b>82460</b>

\* Tests are weighted on a scale of 1 to 10. For each test in this category, a weight is assigned depending on the complexity as defined by CLIA'88, the time for analysis and the individual biochemical components performed for identification.

TABLE III

MICROBIOLOGICAL SERVICES SPECIMENS RECEIVED BY LABORATORY – 2016							
CLIENT	BACTERIOLOGY & PARASITOLOGY & BIODEFENSE	MOLECULAR DIAGNOSTICS	MYCOBACTERIOLOGY	VIROLOGY	DIAGNOSTIC IMMUNOLOGY	SYPHILIS SEROLOGY	TOTAL
WESTCHESTER MEDICAL CENTER *	0	0	1247	3	2	0	1252
WESTCHESTER COUNTY DEPT. OF HEALTH	1647	1595	460	200	171	1525	5598
WESTCHESTER COUNTY DEPT. OF CORRECTIONS	0	705	38	0	3	10	756
HOSPITALS IN COUNTY	6	0	2633	5	2	126	2772
MISCELLANEOUS	218	21	88	95	13	0	435
TOTAL SPECIMENS	1871	2321	4466	303	191	1661	10813

\* Includes hospital inpatient, outpatient, and related facilities including Psychiatric Institute

TABLE III shows the diversity of major clients served by the laboratories in 2016. Two or more tests were performed on many specimens.

TABLE IV

INCIDENCE OF SEXUALLY TRANSMITTED DISEASES (2014-2016)						
SEXUALLY TRANSMITTED DISEASES	2014		2015		2016	
	TOTAL SPECIMENS	PERCENT POSITIVE	TOTAL SPECIMENS	PERCENT POSITIVE	TOTAL SPECIMENS	PERCENT POSITIVE
GONORRHEA	4166	2.4	3569	2.4	3784	1.8
SYPHILIS	2337	8.0	1724	11.3	1661	11.7
CHLAMYDIA	2652	8.4	2302	7.3	2440	8.0
HERPES	89	30.3	63	31.7	48	29.2
HIV	184	10.3	46	30.4	150	10.7

TABLE IV shows the incidence of positive specimens submitted to this laboratory in the past three years for sexually transmitted diseases (gonorrhea, syphilis, chlamydia, herpes, HIV). This table does not reflect the overall totals and percentages of sexually transmitted diseases in all of Westchester County.



## **DIVISION OF MICROBIOLOGICAL SERVICES**



Gram stain of *Neisseria meningitidis*

### **A. GENERAL MICROBIOLOGY LABORATORIES:**

#### **1. Bacteriology**

The Bacteriology Laboratory performs diagnostic tests for the detection, isolation and identification of bacteria from a wide variety of clinical specimens; it is also capable of performing bacteriological tests on a few specific types of environmental samples including food and water. The most commonly identified infections in this laboratory are sexually transmitted diseases such as gonorrhea and chlamydia. Other bacterial diseases occasionally identified include meningial, bloodstream, wound, respiratory, gastrointestinal and urinary tract infections. The Bacteriology Laboratory provides: (a) clinical diagnostic testing and consultative services to the Westchester County Department of Health, Westchester County Medical Examiner, Westchester Medical Center and other area hospitals; (b) special microbiology reference services to area hospitals for bacteria that are difficult to culture and/or specifically identify, including *E.coli* 0157:H7, *Legionella* and *Bordetella*; (c) testing services for the isolation of potential pathogens from samples collected during investigation and management of food-borne and water-borne disease outbreaks within the county. These investigations are initiated by the Westchester County Department of Health, which coordinates the submission of food and water samples to the Bacteriology Laboratory for isolation and confirmation of disease-causing organisms.



*Legionella* culture plate

Testing for *Legionella* in potable and non-potable waters is occasionally requested by institutions such as hospitals and nursing homes. Due to the increased susceptibility of their patient population to specific pathogens including *Legionella*, surveillance monitoring is often recommended.

**TABLE V**

#### **NUMBER OF INDIVIDUAL TESTS PERFORMED IN BACTERIOLOGY**

<b>Samples</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>
Food sample	0	3	1
General Bacteria	221	218	296
Gonorrhea	1771	1383	1488
Legionella	23	154	50
Susceptibility testing	122	121	142

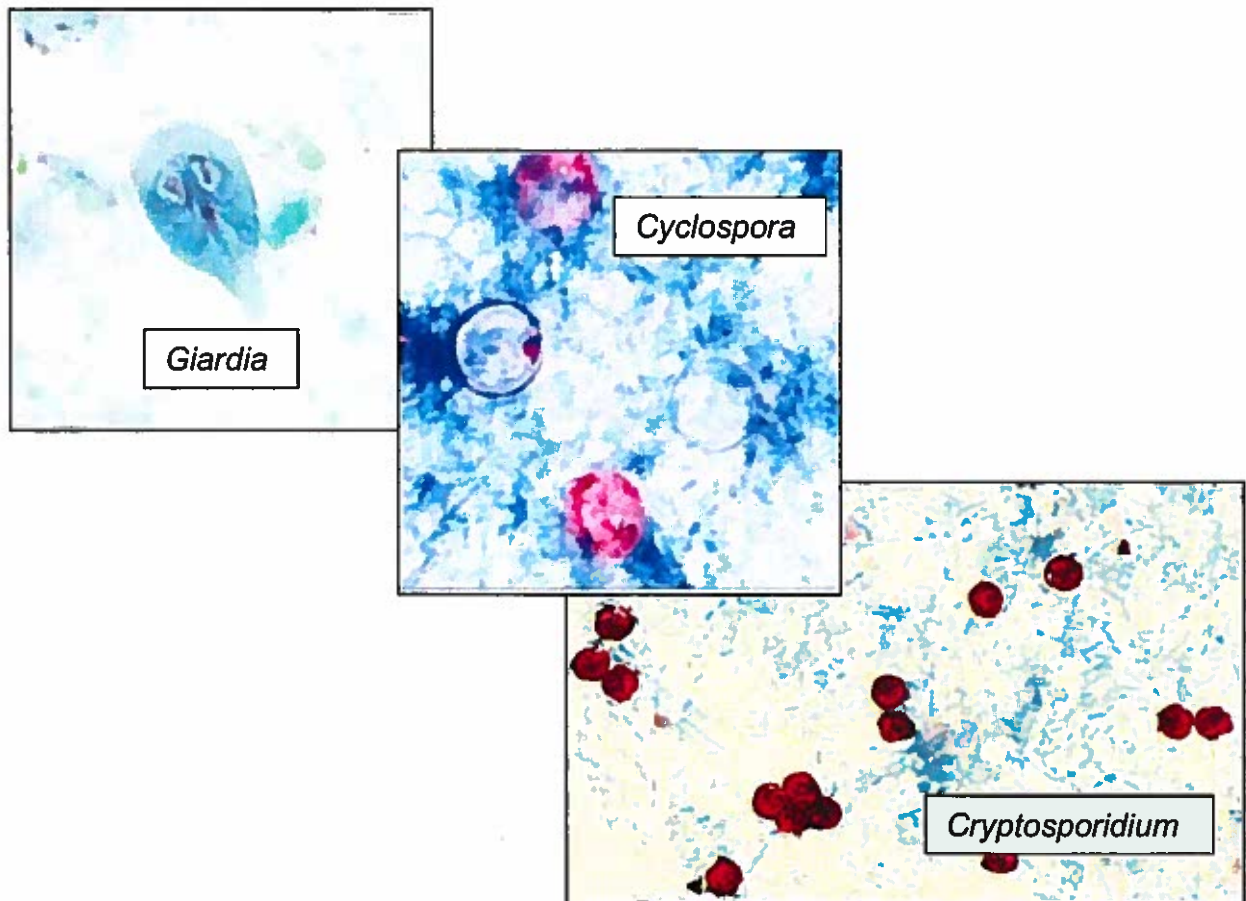
## DIVISION OF MICROBIOLOGICAL SERVICES

### 2. Parasitology

The Parasitology Laboratory provides diagnostic testing services for the detection and identification of various parasites from clinical specimens. Parasites are examined by macroscopic, microscopic and (where applicable) immunofluorescent methods. The vast majority of the specimens submitted for parasitology testing are stool samples, but the laboratory is also capable of detecting and identifying malarial parasites (*Plasmodium* species) and *Babesia* in blood smears. All stool specimens are routinely tested for *Giardia* and *Cryptosporidium* with an immunofluorescent method that uses monoclonal antibodies for definitive diagnosis.

Historically, *Giardia* has been the most frequent parasite detected. It is found more often in the southern and western regions of the United States, but detection of an increased number of symptomatic cases in the local area might indicate an epidemiologic shift to the northeastern region of the country. Recent water samples from reservoirs supplying parts of Westchester County have shown low numbers of *Giardia* and *Cryptosporidium* in the water supply. The clinical significance of this finding is unknown, but severely immunocompromised patients are considered to be at risk for infections with these parasitic organisms.

The laboratory also maintains the equipment, expertise and proficiency necessary to identify *Cyclospora*; therefore, it serves as the regional reference laboratory to area hospitals and healthcare providers for the detection and confirmation of this parasite. Upon request, laboratory staff can provide training to area hospital laboratories for the identification of *Cyclospora* in clinical specimens.



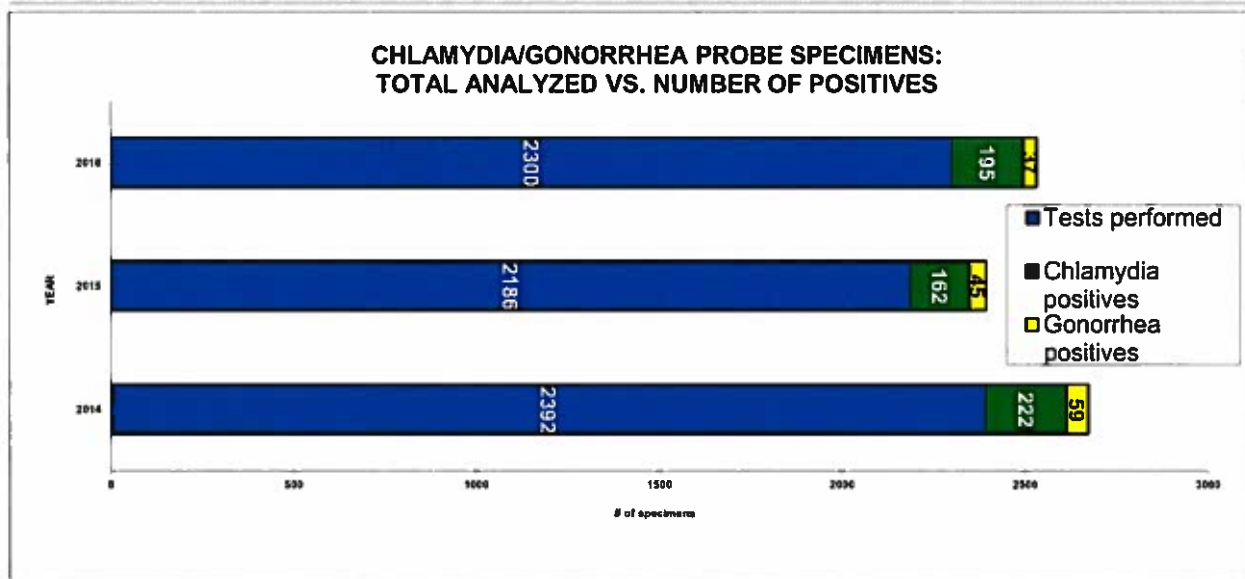
# DIVISION OF MICROBIOLOGICAL SERVICES

## 3. Molecular Diagnostics

In the Molecular Diagnostics Laboratory, nucleic acid amplification (NAA) procedures are used to detect *Chlamydia trachomatis* and *Neisseria gonorrhoeae* directly in clinical specimens. Direct molecular diagnostic procedures provide rapid testing for organisms that may otherwise take several days to identify in culture. Transcription mediated amplification (TMA) procedures for Chlamydia and Gonorrhea in urine and genital specimens are used to enhance test sensitivity. Use of urine specimens allows collection and submission of patient samples for diagnostic testing without discomfort associated with invasive procedures.



FIGURE 1



In the future, the Molecular Diagnostics Laboratory will offer additional nucleic acid based methods for rapid detection of communicable infectious disease.

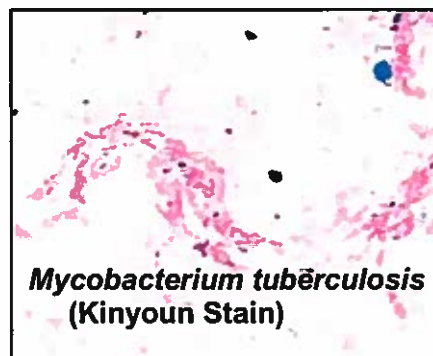
## **DIVISION OF MICROBIOLOGICAL SERVICES**

### **4. Mycobacteriology**

The Mycobacteriology Laboratory is one of the largest tuberculosis laboratories in New York State outside of New York City. It offers state-of-the-art procedures for detection and identification of mycobacteria that cause tuberculosis (TB) and other diseases. The first priority of this laboratory is to make a rapid diagnosis of TB to initiate control measures in preventing further spread of this disease. In December 2015 the laboratory began to perform direct molecular diagnostic testing of sputum samples for detection of *M. tuberculosis* complex DNA, providing results within 2-3 hours of initial specimen processing. The laboratory also performs (a) automated MGIT procedures for accelerated detection of mycobacterial growth, (b) nucleic acid probe procedures for rapid identification of *M. tuberculosis* complex and selected nontuberculous mycobacteria (NTM), (c) conventional biochemical methods for mycobacterial speciation, and (d) drug sensitivity testing of *M. tuberculosis* complex isolates. The laboratory is open daily except Sundays to process cultures and perform acid-fast stains on smears within 30 hours of specimen receipt, enabling healthcare providers and public health authorities to appropriately manage presumptive active tuberculosis patients. The Mycobacteriology Laboratory also serves as a central resource for tracking the majority of tuberculosis patients throughout Westchester County through its laboratory information management system, thus providing an important vehicle for regional TB control.

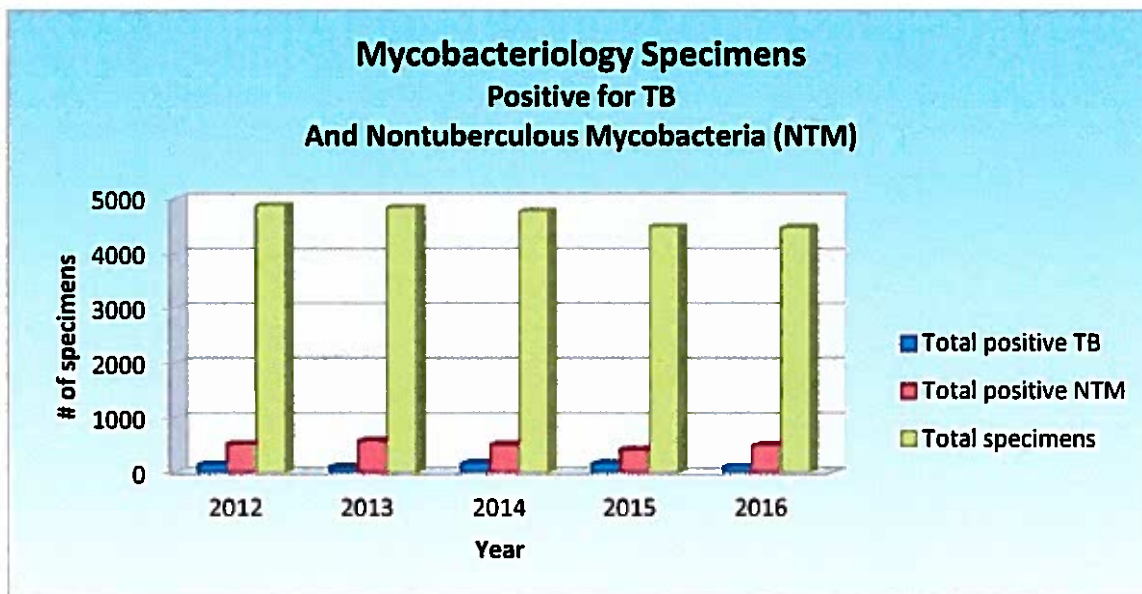
**TABLE VI**  
**SPECIMENS RECEIVED IN THE TB LABORATORY**

	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>
<b>Total specimens</b>	4838	4760	4486	4466
<b>Positive for TB</b>	102 (2.1%)	162 (3.4%)	157 (3.5%)	114 (2.6%)
<b>Positive for NTM</b>	578 (11.9%)	505 (10.6%)	417 (9.3%)	499 (11.2%)



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**FIGURE 2**



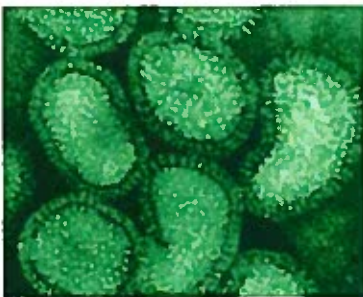
# **DIVISION OF MICROBIOLOGICAL SERVICES**

## **B. VIROLOGY LABORATORIES:**

### **1. Tissue Culture Virology**

The Tissue Culture Virology Laboratory provides state-of-the-art rapid direct methods and tissue culture methods for the detection and identification of a variety of viruses and chlamydiae in swabs, fluids and organ tissues collected from appropriate body sites. Rapid influenza antigen testing is available for direct detection of influenza types A and B in clinical specimens within 20-30 minutes of specimen receipt. Culture amplified (shell vial) techniques are employed to identify herpes simplex virus, enterovirus, cytomegalovirus, adenovirus, influenza and other respiratory viruses within 24-48 hours. Traditional tissue culture methods are utilized where applicable to grow and identify selected viruses and chlamydiae.

The laboratory works with the Departments of Health of Westchester County and New York State to identify and control influenza virus outbreaks in nursing homes in Westchester and other counties in the Lower Hudson Valley region. The laboratory collaborates with the World Health Organization Collaborating Center for Influenza at the Centers for Disease Control and Prevention to identify new strains of influenza viruses during the course of the flu season to help formulate flu vaccines for the next season. New Influenza isolates are sent to CDC for further characterization and possible inclusion in the influenza vaccine. Influenza vaccine that was distributed worldwide for the 2005-2006 season contained Influenza A H3N2 virus isolated in this laboratory.



Influenza virus



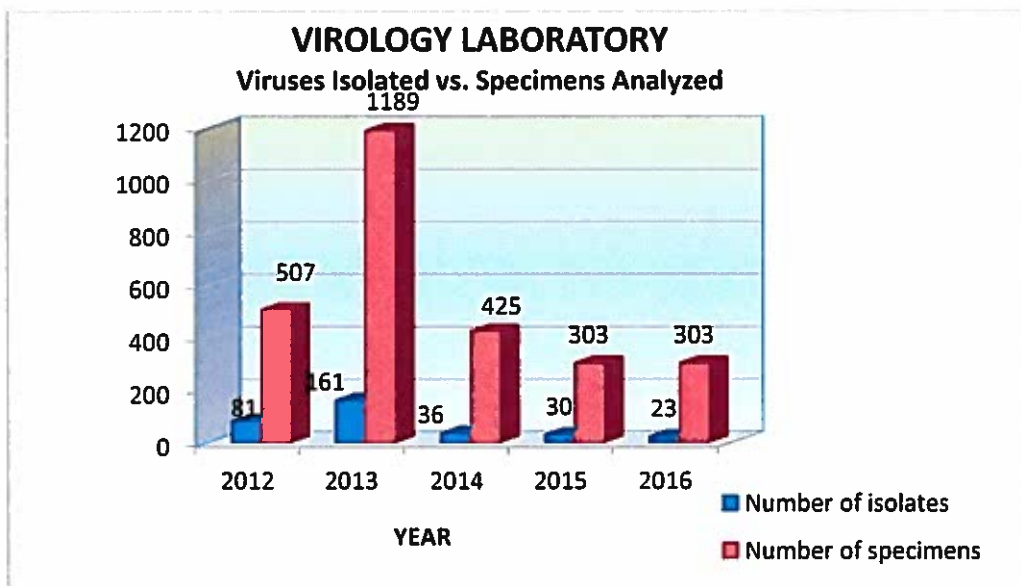
Enterovirus

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**TABLE VIII**

<b>VIRUSES ISOLATED / DETECTED IN 2016</b>	
<b>VIRUS</b>	<b>NUMBER ISOLATED/DETECTED</b>
Adenovirus	3
Herpes Simplex Virus	14
Influenza Virus B	2
Mumps Virus	3
Varicella zoster Virus (chickenpox)	1

**FIGURE 3**



**The high volume of specimens and greater positivity rate in 2013 was due to an active flu season.**

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### **2. Diagnostic Immunology**

The Diagnostic Immunology Laboratory provides syphilis screening and confirmatory testing to clinics and hospitals in Westchester County. The RPR and VDRL tests are the screening methods for blood and cerebrospinal fluid specimens, respectively. The TP-PA and FTA-ABS tests are the respective methods for confirming the diagnosis of syphilis. This section also serves as a regional reference laboratory for hospital laboratories in Westchester County for diagnostic confirmation of syphilis. Through the laboratory information management system (LIMS), the laboratory provides pertinent epidemiologic data on syphilis patients to the local health department for tracking these patients and their contacts to control the spread of syphilis within Westchester County. In 2015, a total of 1,724 specimens were submitted to this laboratory for syphilis testing (see TABLE I).

The Diagnostic Immunology Laboratory also receives blood/serum and cerebrospinal fluid specimens for serologic evaluation of various viral, bacterial and parasitic infections. This laboratory performs diagnostic testing for varicella (chicken pox), rubella, measles, mumps, herpes simplex, *Chlamydia*, enterohemorrhagic *E.coli* toxins and Human Immunodeficiency Virus. Both screening tests (ELISA) and supplemental differential tests (Geenius) are performed for the detection and differentiation of antibodies to HIV-1 and HIV-2. In addition to ELISA, the laboratory employs immunofluorescent methods for the detection of agent-specific IgG and IgM antibodies to the other infectious agents listed above. In general, the presence of specific IgG antibodies indicates convalescent phase of infection, past infection or prior vaccination; an elevated level of specific IgM antibodies typically indicates either recent onset of infection or viral re-activation. These methods have the highest sensitivity and specificity in diagnosing the presence of antibodies due to infections or vaccinations. Serum samples are occasionally tested for antibodies to two or more infectious agents.

**TABLE IX**

<b>REPORTABLE TESTS IN DIAGNOSTIC IMMUNOLOGY</b>			
<b>TEST</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>
Enterohemorrhagic <i>E.coli</i> toxin	34	16	22
Human Immunodeficiency virus (HIV)	184	84	150
Legionella Urinary Antigen	0	1	0
Measles IgG	10	7	2
Measles IgM	7	6	2
Mumps IgG	6	8	8
Norovirus PCR	N/A	N/A	21
Varicella IgG(Chicken Pox)	1	2	6
Other tests (Legionella IgG/IgM, Rubella IgG/IgM)	2	Discontinued Rubella	Discontinued Legionella IgG/IgM
<b>TOTAL</b>	<b>244</b>	<b>124</b>	<b>211</b>



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FIGURE 4

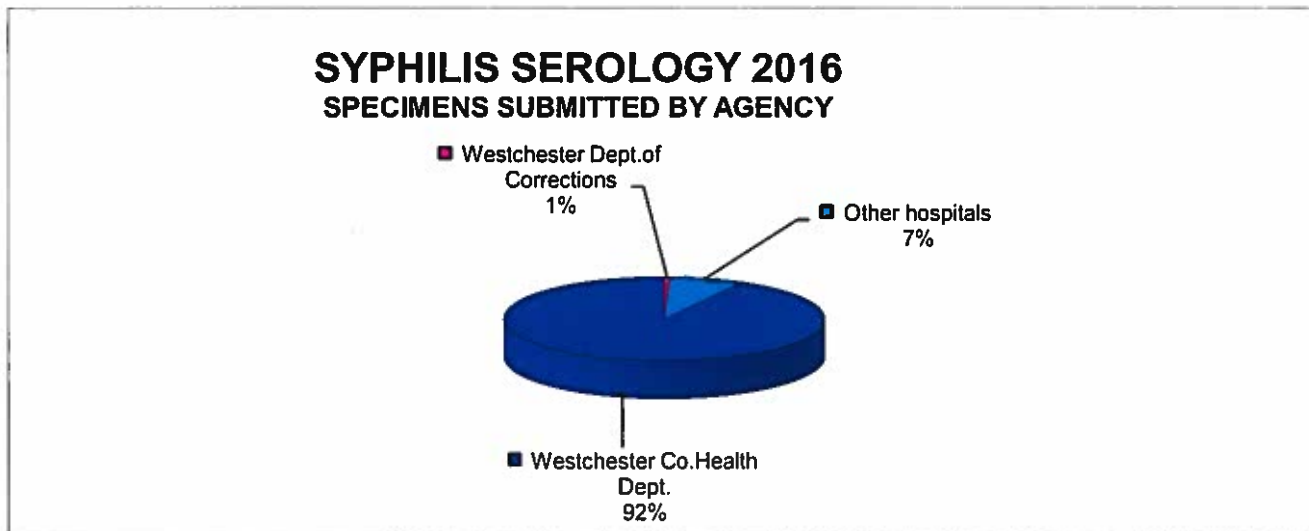
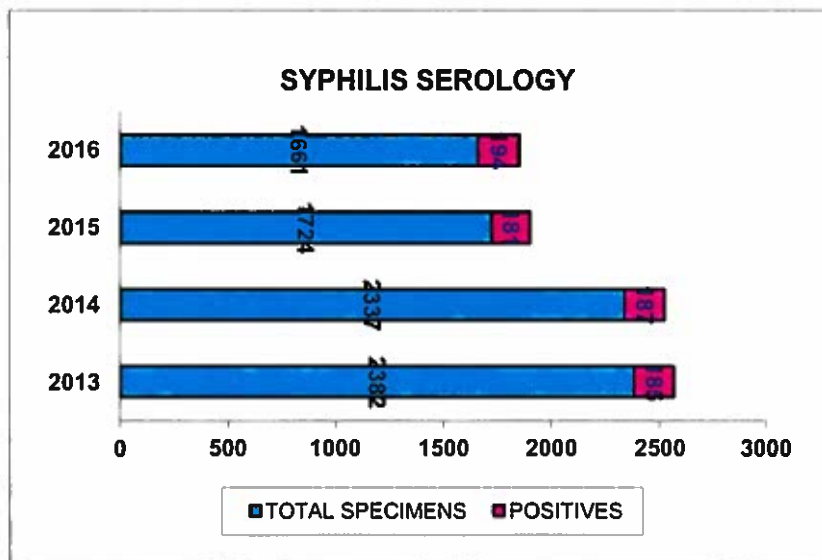


FIGURE 5



## **DIVISION OF MICROBIOLOGICAL SERVICES**

### **C. BIODEFENSE LABORATORY**

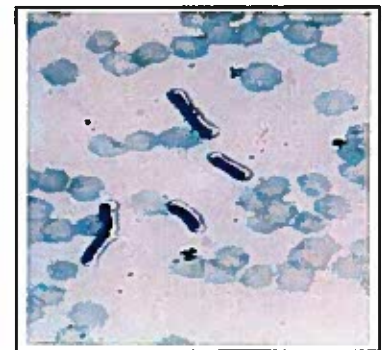
The Biodefense Laboratory is a certified Biosafety Level 3 (BSL-3) laboratory that has been designated by the Centers for Disease Control and Prevention (CDC) and New York State Department of Health (NYSDOH) as a regional Laboratory Response Network (LRN) Reference Laboratory. It provides reference testing for agents of bioterrorism for seven counties in the Lower Hudson Valley region. The laboratory participates in the proficiency testing programs conducted by NYSDOH and CDC. This laboratory is certified to accept environmental samples for detection of *Bacillus anthracis*, *Yersinia pestis*, *Francisella tularensis*, *Burkholderia*, *Brucella*, Orthopox virus and Ricin. In addition, the Biodefense Laboratory is certified to test for emerging pathogens such as avian influenza H5N1 and novel influenza A 2009 H1N1 (swine flu) viruses. All samples with potential biothreat significance and/or public health emergency implications undergo a rigorous threat assessment before they are accepted for testing. Threat assessment is coordinated with Westchester County Departments of Public Safety (DPS), Emergency Services (DES) and Health (WCHD). Environmental sample submission is coordinated with the FBI and various municipal law enforcement agencies throughout the county.

All LRN sentinel laboratories in the counties of Westchester, Rockland, Orange, Putnam, Dutchess, Sullivan and Ulster counties are expected to refer any clinical specimens or bacterial isolates with potential biothreat significance to the County Biodefense Laboratory for specialized testing. The Biodefense Laboratory performs confirmatory tests and forwards the isolated organisms to NYSDOH or CDC for further characterization.



***B.anthraxis* on blood agar**

***Yersinia pestis* bipolar staining**



***B. anthracis* with capsules**

## **DIVISION OF MICROBIOLOGICAL SERVICES**

### **III. MEDIA / GLASSWARE SECTION**

The Media/Glassware section cleans and sterilizes laboratory glassware for the entire Department of Laboratories and Research. This section is responsible for preparation of various types of culture media for the Environmental Bacteriology Laboratory. Special media for isolation of pathogens from food-borne outbreaks and other infections are also prepared for the Microbiology Laboratories. Plating efficiency tests are performed routinely on media and solutions to comply with strict quality control standards. Quality control checks are recorded on steam sterilizers, oven and glassware washers.

This section also decontaminates biohazardous waste for the entire department by following strict state and federal guidelines. Several sterilizer loads of biohazardous waste are decontaminated every day.



Media/Glassware prepares and distributes specimen collection kits and transport containers to the Westchester County Health Department, Westchester County Department of Corrections, hospitals and other clinics. These kits are used by various health care providers and agencies to send patient specimens to our laboratories for a variety of tests.

<b>WORKLOAD IN MEDIA / GLASSWARE (2012-2016)</b>					
	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>
<b>DIAGNOSTIC KITS / CONTAINERS</b>	6148	4281	3067	3740	2851
<b>MEDIA PREPARED (units)</b>	65637	63078	50818	56790	49666
<b>GLASSWARE MACHINE CYCLES</b>	1221	1419	1458	1303	1171
<b>STERILIZER CYCLES</b>	1314	1564	1377	1432	1370

## **DIVISION OF MICROBIOLOGICAL SERVICES**

### **IV. SUMMARY OF PERSONNEL QUALIFICATIONS**

<b>John H. Wolk</b>	Chief of Microbiological Services / Laboratory Director B.S., Biology, Saint Joseph's University, Philadelphia PA M.D., University of Pennsylvania, Philadelphia PA Anatomical and Clinical Pathology Residency, Temple University, Philadelphia PA Pediatric Pathology Fellowship, Saint Christopher's Hospital for Children, Philadelphia PA NYS Physician License Laboratory Director Certificate of Qualification, NYSDOH CLEP
Professional Experience:	Westchester County Department of Laboratories and Research - 4 years New York Medical College, Valhalla NY - 1 year Westchester Medical Center, Valhalla NY - 2 years Danbury Hospital, Danbury CT - 13 years
Professional Affiliations:	College of American Pathologists American Society for Clinical Pathology American Society for Microbiology (Division C) Society for Pediatric Pathology
Academic Affiliations:	Assistant Professor, Department of Pathology, New York Medical College
Committees:	Chairman, Biosafety/Biosecurity Committee for Select Agents Member, DL&R Health and Safety Committee Member, Westchester County Emergency Preparedness Work Group
Other Functions:	Lead Technical Director, LRN Biodefense Laboratory (NYSDOH ELAP) Biosafety Officer, Department of Laboratories and Research NYS HCS Health Provider Network Coordinator
<b>Diane Anton</b>	Director of Program Development II B.S. Biology (Cum Laude), Mercy College, Dobbs Ferry, NY M.S. Medical Microbiology, Long Island University, Brooklyn, NY M (ASCP) Certified NYS Licensed Clinical Lab Technologist
Professional Experience:	Westchester County Department of Laboratories and Research - 33 years Northern Westchester Hospital Center, Mount Kisco, NY - 1 year
Professional Affiliations:	American Society for Microbiology, New York City Branch American Society for Clinical Pathology New York State Public Health Association
Committees:	Information Technology Committee Biosafety/Biosecurity Committee for Select Agents Soft Computer Users Group
Other Functions:	Quality Assurance Manager and Technical Director, LRN Biodefense Laboratory (NYSDOH ELAP) NYS HCS Health Provider Network Coordinator Dangerous Goods Shipping Coordinator for Biologicals Departmental Information Technology Coordinator

## **DIVISION OF MICROBIOLOGICAL SERVICES**

**Mohammad Bashir**                      Virologist (Bench Supervisor)  
DVM University of Agriculture, Faisalabad, Pakistan, 1972  
ECFMG University of Illinois, 1988

Professional Experience:              Westchester County Department of Laboratories and Research - 4 years  
Virologist/Lab Manager, Montefiore Medical Center, Bronx, NY - 30 years  
Hackensack University Medical Center, Hackensack, NJ - 6 years  
Columbia University Medical Hospital, Bronx, NY - 6 months  
NYS Licensed Clinical Lab Technologist

Professional Affiliation:              Member American Veterinary Medical Association (AVMA)  
Member American Society of Clinical Pathology  
Member of New York State Veterinary Medical Society  
NYS Licensed Clinical Lab Technologist  
Who's Who in Veterinary Medicine Biodate Published 1983

Other Functions:                      Fire Marshall

**Linda Faga**                              Senior Laboratory Technician

Professional Experience:              Westchester County Department of Laboratories and Research - 26 years

**Nicholas Hoover**                      Senior Microbiologist (Biodefense Laboratory)  
B.S. Biology, the George Washington University, Washington, D.C.  
NYS Licensed Clinical Lab Technologist

Professional Experience:              Westchester County Department of Laboratories and Research - 11 years  
Pathco Medical, P.C. - 1.5 years  
MDS Hudson Valley Laboratories - 2 years

Other Functions:                      Laboratorian, LRN Biodefense Laboratory (CDC SAP)  
Critical Agents Analyst, LRN Biodefense Laboratory (NYSDOH ELAP)

**Ayo Majekodunmi**                      Microbiologist (Bench Supervisor)  
B.S. Medical and Research Technology, University of Maryland School of Medicine, Baltimore, MD  
M.S. Information Technology, Pace University, White Plains, NY  
MT (ASCP) Certified  
NYS Licensed Clinical Lab Technologist

Professional Experience:              Westchester County Department of Laboratories and Research - 14 years  
Lab Support / WC Department of Laboratories and Research - 1 year  
St. Joseph's Medical Center, Yonkers, NY - 2 years  
University of Maryland Medical System, Baltimore, MD - 2 years  
Providence Lab Associates, Rockville, MD - 2 years

**Aleyamma Mathews**                      Microbiologist (Bench Supervisor)  
MBBS (Bachelor of Medicine: Bachelor of Surgery), Gandhi Medical College, Bhopal, India  
NYS Licensed Clinical Lab Technologist

Professional Experience:              Westchester County Department of Laboratories and Research - 18 years.  
Long Island College Hospital, Brooklyn, NY - 11 years  
New York Methodist Hospital, Brooklyn, NY - 1 year

## **DIVISION OF MICROBIOLOGICAL SERVICES**

**Tonya McLaughlin**                      Assistant Microbiologist  
B.A. Biology (Summa Cum Laude), Cheyney University of Pennsylvania, Cheyney, PA  
M.S. Microbiology & Immunology, Graduate School of Basic Medical Sciences, New York Medical College, Valhalla, NY  
NYS Licensed Clinical Lab Technologist

Professional Experience:                      Westchester County Department of Laboratories and Research - 16 years  
Westchester County Department of Health – part time acting lab supervisor – 8 months  
Other Functions:                              Laboratorian, LRN Biodefense Laboratory (NYSDOH ELAP)

**Lynn Orefice**                              Office Assistant

Professional Experience:                      Westchester County Department of Laboratories and Research - 16 years

**Raymond Padovani**                      Assistant Microbiologist  
B.S. Medical Technology, Mercy College, Dobbs Ferry, NY  
MT (ASCP) Certified  
NYS Licensed Clinical Lab Technologist

Professional Experience:                      Westchester County Department of Laboratories and Research - 23 years  
Yorktown Medical Laboratory, Yorktown Heights, NY - 10 years  
Northern Westchester Hospital, Mt. Kisco, NY - 1 year  
Westchester County Department of Health – part time acting lab supervisor – 3 years

Professional Affiliations:                      American Society for Clinical Pathology  
Other Functions:                              Fire Marshall (Back-up)

**Kay Patel**                                      Assistant Microbiologist  
B.S. Major: Microbiology, Minor: Chemistry, Gujrat University, India  
M.S. Microbiology, School of Sciences, Gujrat University, India  
NYS Licensed Clinical Lab Technologist

Professional Experience:                      Westchester County Department of Laboratories and Research - 8 years  
St. John's Riverside Hospital, Yonkers, NY - 10 years  
Nyack Hospital, Nyack, NY - 5 years  
Mount. Vernon Hospital, Mount Vernon, NY - 7.5 years  
Montefiore Hospital, Bronx, NY - 1 year

Professional Other Functions:                      American Society of Microbiology, New York City Branch  
Fire Marshall

**Diana Ramirez-Michel**                      Assistant Microbiologist  
B.S. Medical Technology, Mercy College, Dobbs Ferry, NY  
MT (ASCP) Certified  
NYS Licensed Clinical Lab Technologist

Professional Experience:                      Westchester County Department of Laboratories and Research - 26 years  
Lawrence Hospital, Bronxville, NY - 8 years  
St. Joseph's Hospital, Yonkers, NY - 3 years

Professional Affiliations:                      American Society for Clinical Pathology  
American Society of Microbiology, New York City Branch

## **DIVISION OF MICROBIOLOGICAL SERVICES**

**Nycil Varghese**                    Assistant Microbiologist  
B.S. Microbiology, MGR College, Madras University, India  
M.S. Microbiology, Sri Ramakrishna College of Science, India  
NYS Licensed Clinical Lab Technologist

Professional Experience:        Westchester County Department of Laboratories and Research - 8 years  
New York Presbyterian Hospital, New York, NY - 2 years  
Par Pharmaceuticals - 4 years

Professional                        American Society for Microbiology, New York City Branch

**Sharon E. Weekes-Threash**    Senior Microbiologist (Quality Assurance Manager) (retired June 2016)  
B.S. Health Science, Hunter College, New York, NY  
Our Lady of Mercy (Misericordia) - 2 years  
Columbia University, Parkinson's Disease Foundation - 3 months (Fellowship)  
NYS Licensed Clinical Lab Technologist

Professional Experience:        Westchester County Department of Laboratories and Research – 21.5 years  
Westchester County Medical Center, Valhalla, NY - 8 years  
Kaiser Foundation Health Plan - 3 years

Professional Affiliations:       American Society for Microbiology  
American Society for Microbiology, New York City Branch  
National Association of Professional Women  
The International Women's Leadership Association

Committees:                        Safety Committee  
Environmental Management Safety Committee  
Chemical Hygiene Committee  
Westchester County Workplace Violence Committee  
Chairperson, Labor Management Committee  
Health & Safety Committee – CSEA

Other Functions:                  Fire Marshall  
First Responder