DIVISION OF MICROBIOLOGICAL SERVICES

MICROBIOLOGICAL LABORATORY SERVICES

The Microbiological Laboratories play an important role in the diagnosis and control of communicable and infectious diseases in Westchester County. Laboratory Services are provided to diverse agencies including Westchester Medical Center, Westchester County Medical Examiner, Westchester County Department of Health and its affiliated clinics, Westchester County Department of Corrections, New York Medical College, private hospitals, private physicians, nursing homes and other agencies.

The laboratories also serve as a reference center for the area hospitals and health centers particularly in the diagnosis of tuberculosis, sexually transmitted diseases and viral infections.

The Virology Laboratory serves as the regional WHO collaborating laboratory for the isolation and identification of different strains of Influenza viruses.

The Biodefense Laboratory has been designated by CDC and New York State Department of Health as the regional LRN Reference Laboratory serving Westchester, Rockland, Putnam, Dutchess, Orange, Sullivan and Ulster counties.

Laboratory services provided:

A. General Microbiology Laboratories:

1. **Bacteriology**: The Bacteriology Laboratory tests for pathogenic bacteria causing infections of the throat, brain, skin, blood, spinal fluid, urine, wound, other body organs, etc. The laboratory also provides culture tests for Legionella, Mycoplasma and *Neisseria gonorrhea*. Rapid antigen tests are run for the detection of bacterial meningitis and strep throat. Food-borne and water-borne outbreak samples are tested for pathogenic bacteria. The lab employs special testing to enhance the detection of *E.coli O157:H7* using immunomagnetic separation techniques.

2. **Biodefense**: This laboratory is a certified Biosafety Level 3 enhanced LRN Reference Laboratory equipped to provide testing for Anthrax, Brucellosis, Burkholderia, Tularemia, Plague, Ricin and Orthopox viruses in environmental and clinical samples in New York State. The laboratory provides this service to seven counties in the lower Hudson Valley region and also serves to provide surge testing capacity in New York State. CDC and LRN approved molecular and conventional methods are used for the detection of these select agents.
DIVISION OF MICROBIOLOGICAL SERVICES

3. **Parasitology**: Routine Ova and Parasite tests are conducted on stool specimens. Immunofluorescence tests are done for the diagnosis of Giardia and Cryptosporidium. Special stains are used for select parasites.

4. **Molecular Diagnostics**: Nucleic Acid Amplification and DNA probe procedures are performed for the direct detection of *Neisseria gonorrhoea* and *Chlamydia trachomatis* in urine and genital specimens. DNA probe procedures are performed for the rapid detection of *Mycobacterium tuberculosis* and other Mycobacteria.

5. **Mycobacteriology**: Testing is conducted for TB and other Mycobacterial infections. AFB smear test results are provided within 24 hours for management of suspect TB patients. An automated MGIT instrument is employed for detection of Mycobacterial growth. Radiometric drug sensitivity tests are performed for *M. tuberculosis*.

6. **Mycology**: Routine diagnostic tests are conducted for the detection of yeasts and molds in clinical and environmental specimens. Immunofluorescence tests are performed for detection of *Pneumocystis carinii*.

**B. Virology Laboratories:**

1. **Tissue Culture Virology**: Direct specimen tests are performed for the rapid detection of Rotavirus, Respiratory Syncytial Virus, Herpes Simplex Virus, Varicella Zoster Virus and Influenza A & B Viruses. Tissue Culture procedures are performed for the isolation and detection of all culturable viruses. CMV pp65 Antigenemia tests are run to monitor CMV infection in transplant patients.

2. **Diagnostic Immunology**: Enzyme immuno-assays for IgG and IgM antibodies are performed for viruses such as CMV, HSV, VZV, EBV, Rubella, Measles, Mumps and HIV. Western Blot tests are used for confirming HIV infections. Other tests performed in Diagnostic Immunology include Legionella urinary antigens, antibodies to Legionella, Toxoplasma, Mycoplasma and Enterohemorrhagic *E.coli* toxins.

3. **Syphilis Serology**: Serological tests such as VDRL and RPR are used as screening methods and TPPA and FTA-ABS Tests are used as the confirmatory methods for the diagnosis of Syphilis.

DIVISION OF MICROBIOLOGICAL SERVICES
**Laboratory Revenues:**

The Microbiological Laboratories generate revenue for some of its services. Services for TB and sexually transmitted diseases are provided at no cost to residents of Westchester County as mandated by the New York State Department of Health. The main sources of revenue are Westchester Medical Center, other area health centers and state aid from New York State Department of Health. Additionally, revenue is generated from private testing for Legionella in waters, molds in the environment and out-of-county referrals.

**Laboratory Certifications:**

The Division of Microbiological Laboratory Services maintains certificates of approval from New York State Department of Health in the following categories:

- Bacteriology (General)
- Diagnostic Immunology
- HIV (General)
- Mycobacteriology (General S)
- Mycology (General)
- Parasitology (General)
- Virology (General)

CLIA approval in the above categories is also maintained through the certification from the New York State Department of Health.

The laboratories are also certified by the College of American Pathologists and participate in the proficiency testing program offered by the College in the categories listed above. The laboratories are also inspected by the College of American Pathologists as part of the certification process.

The laboratory has received certification in electronic communicable disease reporting through New York State Department of Health Electronic Clinical Laboratory Reporting System (ECLRS).

**Positioning for the Future:**

The future of diagnostic testing in microbiological sciences is moving towards molecular diagnostic technology. Molecular diagnostic techniques such as PCR, b-DNA, NASBA, TMA and Biochip microarray technologies are planned for future implementation. Construction of a Molecular Diagnostic Laboratory is planned to accommodate the implementation of various molecular diagnostic techniques.

The laboratory has made preparations for surge capacity for testing for future influenza pandemics. New testing protocols for 2009 H1N1 (swine Flu) and H5N1 avian Influenza have been implemented.
DIVISION OF MICROBIOLOGICAL SERVICES

Accomplishments for 2009:

- An updated web-based application for querying of patient test results was implemented for use by Westchester Medical Center and the Westchester County Health Department Clinics. This is useful in rapid patient care, disease control and epidemiological investigations and especially for the control of TB in the community.
- Implemented testing for the pandemic 2009 H1N1 Influenza (swine Flu) virus for responding to the pandemic situation in Westchester County.

Goals for 2010

- Construct a Molecular Diagnostic Laboratory for performing molecular testing for rapid identification of infectious agents causing serious communicable and life threatening diseases.
- Implement a PCR assay system for detection of HIV viral load in HIV positive patients.
- Implement fluorescent microscopy in TB laboratory to increase smear sensitivity and efficiency.
- Implement non-radiometric drug susceptibility testing in the TB laboratory.
- Generate more revenue to reduce tax levy on the County.
- Interface Laboratory Information System to Westchester Medical Center to provide real time test results to enhance patient care.

Agencies Utilizing Microbiological Laboratory Services:

The Microbiological laboratories serve over 75 clients, many of which are nursing homes and area hospitals. Agencies and clients include:

- Westchester County Health Department
- Westchester County Department of Emergency Services
- Westchester County Medical Examiner
- Westchester Medical Center
- Westchester Area Health Centers
- Westchester Institute of Human Development
- Westchester County Police
- Westchester County Department of Corrections
- Other hospitals in Westchester County
- New York Medical College
- Nursing Homes in Westchester and surrounding Counties
- Rockland County Department of Health
- Taylor Care Center
- Local Police Departments
- United States Postal Service
- Federal Bureau of Investigation
- Private laboratories and other agencies
Types of Specimens/Samples analyzed:

The Microbiological laboratories analyze clinical specimens as well as environmental samples for the isolation and identification of microbial pathogens. The specimens are collected and processed according to the guidelines established by the New York State Department of Health and the College of American Pathologists. Types of specimens/samples include:

- **Clinical Specimens** - for the detection, isolation and identification of bacteria, viruses, parasites and fungi (yeasts/molds) and the presence of IgG and IgM antibodies to various infectious agents.
- **Environmental Samples** – for the detection and isolation of Legionella, Salmonella, Mycobacteria, *E. coli* **0157** and molds such as Stachybotrys.
- **Food Samples** – for the isolation and identification of pathogens and toxins that may be the etiologic agents for food borne outbreaks.
- **Biothreat Samples** – for detection and identification of Select Agents and Toxin.

Epidemiological Disease Tracking Service:

The laboratory uses a laboratory information system (LIS) where all laboratory data is stored. The system has a web based inquiry module which allows outside physicians to look up patient results. Epidemiological data for various diseases (Anthrax, Plague, TB, Syphilis, Gonorrhea, Chlamydia, HIV, Influenza, Herpes, etc.) is retrieved from the LIS and reports for tracking these diseases are generated for the Westchester County Health Department, the New York State Department of Health and other agencies. These retrievals and reports play an important role in the tracking and control of diseases and in the maintenance of public health surveillance.

The laboratory has also been certified as a member of ECLRS (Electronic Clinical Laboratory Reporting System) for New York State Department of Health to actively contribute to the reporting infrastructure of public health.

Laboratory Training:

The laboratory provides a training program for the Residents and Fellows of the Westchester Medical Center and New York Medical College particularly in the area of Mycobacteriology (TB), Virology and sexually transmitted diseases. Pathology and Infectious Disease Residents and Fellows spend up to a month training in the various laboratories for board certification. The laboratory conducts educational tours for college students from area colleges and universities.

The laboratory offers student internship programs for college students. Students spend up to a semester gaining skills and knowledge in microbiological sciences and acquire college credits for their degrees.
**DIVISION OF MICROBIOLOGICAL SERVICES**

**TABLE I**

<table>
<thead>
<tr>
<th></th>
<th>Number of Specimens</th>
<th>Actual Tests</th>
<th>Number of Specimens</th>
<th>Actual Tests</th>
<th>Number of Specimens</th>
<th>Actual Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BACTERIOLOGY</strong></td>
<td>2958</td>
<td>3566</td>
<td>2992</td>
<td>3601</td>
<td>2751</td>
<td>3326</td>
</tr>
<tr>
<td><strong>BIODEFENSE</strong></td>
<td>5</td>
<td>98</td>
<td>4</td>
<td>108</td>
<td>307</td>
<td>414</td>
</tr>
<tr>
<td><strong>PARASITOLOGY</strong></td>
<td>39</td>
<td>107</td>
<td>110</td>
<td>178</td>
<td>70</td>
<td>105</td>
</tr>
<tr>
<td><strong>MOLECULAR DIAGNOSTIC</strong></td>
<td>4510</td>
<td>9020</td>
<td>5031</td>
<td>10062</td>
<td>4425</td>
<td>8850</td>
</tr>
<tr>
<td><strong>MYCOBACTERIOLOGY (TB)</strong></td>
<td>6241</td>
<td>13507</td>
<td>6205</td>
<td>10908</td>
<td>5917</td>
<td>11336</td>
</tr>
<tr>
<td><strong>MYCOLOGY</strong></td>
<td>138</td>
<td>140</td>
<td>150</td>
<td>150</td>
<td>186</td>
<td>188</td>
</tr>
<tr>
<td><strong>VIROLOGY</strong></td>
<td>3944</td>
<td>6270</td>
<td>3896</td>
<td>6350</td>
<td>4499</td>
<td>5400</td>
</tr>
<tr>
<td><strong>DIAGNOSTIC IMMUNOLOGY</strong></td>
<td>10765</td>
<td>10855</td>
<td>10467</td>
<td>10642</td>
<td>9636</td>
<td>10387</td>
</tr>
<tr>
<td><strong>SYPHILIS SEROLOGY</strong></td>
<td>6362</td>
<td>6873</td>
<td>7006</td>
<td>8388</td>
<td>6592</td>
<td>7824</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>34962</td>
<td>50436</td>
<td>35861</td>
<td>50387</td>
<td>34383</td>
<td>47830</td>
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</tbody>
</table>

**TABLE II**

<table>
<thead>
<tr>
<th></th>
<th>Non-reportable tests (estimated)</th>
<th>Reportable Tests *</th>
<th>Non-reportable tests (estimated)</th>
<th>Reportable Tests *</th>
<th>Non-reportable tests</th>
<th>Reportable Tests *</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BACTERIOLOGY</strong></td>
<td>4216</td>
<td>27458</td>
<td>4966</td>
<td>33018</td>
<td>6802</td>
<td>31158</td>
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<tr>
<td><strong>BIODEFENSE</strong></td>
<td>3514</td>
<td>980</td>
<td>1215</td>
<td>117</td>
<td>7335</td>
<td>4140</td>
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<tr>
<td><strong>PARASITOLOGY</strong></td>
<td>156</td>
<td>588</td>
<td>253</td>
<td>198</td>
<td>210</td>
<td>630</td>
</tr>
<tr>
<td><strong>MOLECULAR DIAGNOSTIC</strong></td>
<td>891</td>
<td>45100</td>
<td>862</td>
<td>40062</td>
<td>662</td>
<td>44250</td>
</tr>
<tr>
<td><strong>MYCOBACTERIOLOGY (TB)</strong></td>
<td>2519</td>
<td>135070</td>
<td>2529</td>
<td>129300</td>
<td>2650</td>
<td>113360</td>
</tr>
<tr>
<td><strong>MYCOLOGY</strong></td>
<td>442</td>
<td>1242</td>
<td>356</td>
<td>1650</td>
<td>391</td>
<td>1692</td>
</tr>
<tr>
<td><strong>VIROLOGY</strong></td>
<td>6106</td>
<td>51414</td>
<td>5988</td>
<td>42076</td>
<td>5541</td>
<td>4320</td>
</tr>
<tr>
<td><strong>DIAGNOSTIC IMMUNOLOGY</strong></td>
<td>13208</td>
<td>43060</td>
<td>15529</td>
<td>46325</td>
<td>15312</td>
<td>40551</td>
</tr>
<tr>
<td><strong>SYPHILIS SEROLOGY</strong></td>
<td>1823</td>
<td>13360</td>
<td>1754</td>
<td>8643</td>
<td>2317</td>
<td>13184</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>32875</td>
<td>318272</td>
<td>33452</td>
<td>301389</td>
<td>41220</td>
<td>253285</td>
</tr>
</tbody>
</table>

*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.*
# DIVISION OF MICROBIOLOGICAL SERVICES

## TABLE III

### MICROBIOLOGICAL SERVICES

<table>
<thead>
<tr>
<th>CLIENT</th>
<th>BACTERIOLOGY &amp; PARASITOLOGY &amp; BIODEFENSE</th>
<th>MOLECULAR DIAGNOSTICS</th>
<th>MYCOBACTERIOLOGY &amp; MYCOLOGY</th>
<th>VIROLOGY</th>
<th>DIAGNOSTIC IMMUNOLOGY</th>
<th>SYPHILIS SEROLOGY</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>WESTCHESTER MEDICAL CENTER *</td>
<td>601</td>
<td>1325</td>
<td>1493</td>
<td>2676</td>
<td>8713</td>
<td>3719</td>
<td>18527</td>
</tr>
<tr>
<td>WESTCHESTER COUNTY DEPT. OF HEALTH</td>
<td>2066</td>
<td>2671</td>
<td>1213</td>
<td>288</td>
<td>741</td>
<td>2542</td>
<td>9521</td>
</tr>
<tr>
<td>WESTCHESTER COUNTY DEPT. OF CORRECTIONS</td>
<td>0</td>
<td>427</td>
<td>11</td>
<td>4</td>
<td>103</td>
<td>174</td>
<td>719</td>
</tr>
<tr>
<td>HOSPITALS IN COUNTY</td>
<td>141</td>
<td>0</td>
<td>3182</td>
<td>877</td>
<td>81</td>
<td>155</td>
<td>4436</td>
</tr>
<tr>
<td>MISCELLANEOUS</td>
<td>320</td>
<td>2</td>
<td>204</td>
<td>654</td>
<td>2</td>
<td>2</td>
<td>1180</td>
</tr>
<tr>
<td>TOTAL SPECIMENS</td>
<td>3128</td>
<td>4425</td>
<td>6103</td>
<td>4499</td>
<td>9636</td>
<td>6592</td>
<td>34383</td>
</tr>
</tbody>
</table>

* Includes hospital inpatient, outpatient, and related facilities including Psychiatric Institute, Westchester Institute for Human Development, and Taylor Care Center

TABLE III shows the diversity of major clients served by the laboratories in 2009. Many of these specimens had a variety of tests performed on them.
### INCIDENCE OF SEXUALLY TRANSMITTED DISEASES (2006-2008)

<table>
<thead>
<tr>
<th>SEXUALLY TRANSMITTED DISEASES</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TOTAL SPECIMENS</td>
<td>PERCENT POSITIVE</td>
<td>TOTAL SPECIMENS</td>
</tr>
<tr>
<td>GONORRHEA</td>
<td>6224</td>
<td>2.0</td>
<td>6756</td>
</tr>
<tr>
<td>SYPHILIS</td>
<td>6362</td>
<td>4.7</td>
<td>7006</td>
</tr>
<tr>
<td>CHLAMYDIA</td>
<td>4922</td>
<td>9.0</td>
<td>5031</td>
</tr>
<tr>
<td>HERPES</td>
<td>281</td>
<td>22.4</td>
<td>339</td>
</tr>
<tr>
<td>HIV</td>
<td>1707</td>
<td>1.5</td>
<td>1632</td>
</tr>
</tbody>
</table>

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

A. GENERAL MICROBIOLOGY LABORATORIES:

1. Bacteriology

The Bacteriology Laboratory performs diagnostic tests for the detection, isolation and identification of bacteria from clinical specimens and specific environmental samples. The most common bacterial diseases identified include gonorrhea, meningitis, and streptococcal, gastrointestinal, vaginal, wound and respiratory infections. The bacteriology laboratory provides testing and consultative services for the Westchester County Department of Health, Westchester County Medical Examiner, Westchester Medical Center and other area hospitals. The laboratory provides special microbiology reference services to area hospitals for bacteria that are difficult to identify, such as *E.coli* 0157:H7, Legionella, Bordetella, Mycoplasma and Ureaplasma. The bacteriology laboratory also plays an important role in the investigation and management of foodborne and waterborne diseases in the county by providing laboratory services for the isolation of suspect pathogens. Investigations for food and waterborne diseases are initiated by Westchester County Department of Health. The suspected food and water samples are then brought to the bacteriology laboratory for isolation and confirmation of disease causing organisms.

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

**TABLE V**

<table>
<thead>
<tr>
<th>Samples</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food sample</td>
<td>5</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>General Bacteria</td>
<td>3566</td>
<td>2942</td>
<td>3326</td>
</tr>
<tr>
<td>Gonorrhea</td>
<td>1714</td>
<td>1725</td>
<td>1739</td>
</tr>
<tr>
<td>Legionella</td>
<td>275</td>
<td>212</td>
<td>288</td>
</tr>
<tr>
<td>Mycoplasma</td>
<td>504</td>
<td>228</td>
<td>135</td>
</tr>
<tr>
<td>Susceptibility testing</td>
<td>123</td>
<td>115</td>
<td>180</td>
</tr>
</tbody>
</table>
2. Biodefense

Biodefense Laboratory is a certified Biosafety Level 3 (BSL-3) laboratory. Centers for Disease Control and Prevention (CDC) and New York State Department of Health (NYSDOH) have designated it as an LRN Reference Laboratory. It provides reference testing for agents of bioterrorism for seven counties in the Lower Hudson Valley region. It participates in the proficiency testing programs conducted by NYSDOH and CDC. This laboratory is certified to accept environmental samples for *Bacillus anthracis*, *Yersinia pestis*, *Francisella tularensis*, *Burkholderia*, *Brucella*, *Orthopox* virus and *Ricin*. In addition, the Biodefense Laboratory is certified to test for avian Influenza H5N1 virus and novel H1N1 (swine flu). All samples for biothreat significance undergo a rigorous threat assessment before they are accepted for testing. Threat assessment is coordinated with Westchester County Department of Emergency Services (WCDES) and Westchester County Department of Health (WCDOH). All laboratory diagnosis is coordinated with FBI and various other 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 isolate of biothreat significance to the Biodefense Laboratory for confirmation. Biodefense Laboratory will perform confirmatory tests and forward the isolated organisms to NYSDOH or CDC for further characterization.
DIVISION OF MICROBIOLOGICAL SERVICES

3. Parasitology

The Parasitology Laboratory provides services for the detection and identification of parasites from clinical specimens. Most of the parasites identified in this laboratory were detected in stool specimens. Parasites are examined by macroscopic, microscopic and immunofluorescent methods. All stool specimens are routinely tested for Giardia and Cryptosporidium using an immunofluorescent method with monoclonal antibodies for definitive diagnosis.

In 2008, the most predominant organism detected was *Giardia duodenalis*. Though *Giardia duodenalis* is a common pathogenic parasite, it warrants monitoring. This parasite is more often found in the southern and western regions of the United States but an increase in the number of these parasites detected can indicate a movement to the northeast. Recent water samples of reservoirs supplying parts of Westchester County have shown low levels of Giardia and Cryptosporidium in the water supply. The significance of finding small numbers of Giardia and Cryptosporidium is unknown but severely immunocompromised patients are considered to be at risk.

The parasitology laboratory maintains the expertise and proficiency to detect Cyclospora and therefore serves as the regional reference laboratory for area hospitals in the detection and confirmation of this parasite. This laboratory also provides training to other hospitals and laboratories for the identification of Cyclospora in clinical specimens.
4. Molecular Diagnostics

In the Molecular Diagnostics Laboratory, Nucleic Acid Amplification (NAA) procedures are used to detect *Chlamydia trachomatis* and *Neisseria gonorrhoea* directly in the clinical specimens. Direct molecular diagnostic procedures provide rapid testing of organisms that may otherwise take several days to identify in culture. Transcription Mediated Amplification (TMA) based test for Chlamydia and Gonorrhoea in urine and genital specimens are used that enhance the sensitivity of detection. Urine specimens allow the patients to submit specimens without invasive procedures and discomfort.

![Figure 1](image)

In future, Molecular Diagnostics laboratory will offer a variety of other tests to enhance the detection of infectious disease.
5. 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 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. The laboratory provides automated MGIT procedures for rapid growth of Mycobacteria; and DNA probe procedures for the quick identification of TB and other Mycobacteria. Rapid TB drug sensitivity tests are performed using radiometric procedures.

The laboratory serves as a central resource for tracking the majority of tuberculosis patients in the county through its laboratory information management system, thus providing an important vehicle for tuberculosis control in Westchester County. This laboratory provides 7-day a week service for detection of acid fast bacilli on specimens, thus enabling health authorities to promptly control and manage active tuberculosis patients.

<p>| TABLE VI |
| SPECIMENS RECEIVED IN THE TB LABORATORY |</p>
<table>
<thead>
<tr>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total specimens</td>
<td>6300</td>
<td>6241</td>
<td>6205</td>
</tr>
<tr>
<td>Total positive TB</td>
<td>51 (0.8%)</td>
<td>173 (3.0%)</td>
<td>374 (6.0%)</td>
</tr>
<tr>
<td>Other Mycobacteria</td>
<td>364 (5.7%)</td>
<td>656 (11.0%)</td>
<td>561 (9.0%)</td>
</tr>
</tbody>
</table>
6. Mycology

The mycology laboratory provides services for the isolation and identification of yeasts and molds from clinical specimens. An immunofluorescence method is used to identify *Pneumocystis carinii* in respiratory specimens for the diagnosis of pneumocystis pneumonia in immunocompromised and AIDS patients. Routine cultures and microscopic and biochemical tests are done to identify other yeasts and molds.

**TABLE VII**

<table>
<thead>
<tr>
<th>MYCOLOGY TESTS PERFORMED*</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yeast / Mold</td>
<td>171</td>
<td>147</td>
<td>189</td>
</tr>
<tr>
<td><em>Pneumocystis carinii</em></td>
<td>468</td>
<td>516</td>
<td>516</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>639</td>
<td>663</td>
<td>705</td>
</tr>
</tbody>
</table>

*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.*
DIVISION OF MICROBIOLOGICAL SERVICES

B. VIROLOGY LABORATORIES:

1. Tissue Culture Virology

The Virology Laboratory provides state-of-the-art rapid direct methods and tissue culture methods for the detection and identification of viruses and chlamydiae from various clinical specimens. The laboratory specializes in offering customized diagnostic services for bone marrow, kidney, liver and heart transplant patients. Special diagnostic services are also provided for pediatric, infectious disease and emergency patients.

Immunofluorescent and enzyme-linked immunosorbent assays are used to detect Herpes, Varicella, Adeno-, Influenza, Parainfluenza, Respiratory Syncytial and Rota-viruses directly in clinical specimens within two hours. Culture amplified (shell vial) techniques are employed to identify Herpes, Entero-, Cytomegalo-, Adeno-, Influenza and other respiratory viruses within 24-48 hours. Traditional tissue culture methods are employed to grow and identify cultureable viruses and Chlamydiae. Chlamydia culture tests are also performed for specimens submitted for investigation of sex abuse cases.

Cytomegalovirus infection poses the greatest threat in transplant patients. CMV caused pneumonia can be life threatening in transplant and immunocompromised patients. The CMV antigenemia test that detects CMV pp65 antigen in blood leukocytes provides a definitive diagnosis of CMV infection. The laboratory offers the CMV pp65 antigenemia test for such patients. The results are provided to physicians within 6 hours of receiving fresh blood specimen.

The laboratory works with the Westchester County Health Department and New York State Department of Health to identify and control Influenza virus outbreaks in nursing homes in Westchester and Rockland counties. 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 flu season to help formulate flu vaccines for the following season. New Influenza isolates are sent to CDC for further characterization and possible inclusion in the influenza vaccine. The influenza vaccine distributed worldwide for 2005-2006 season contained Influenza A H3N2 virus isolated in this laboratory.

<table>
<thead>
<tr>
<th>Table VIII</th>
<th>CMV Antigenemia (pp65) Tests Performed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2006</td>
</tr>
<tr>
<td># of specimens</td>
<td>1012</td>
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</tbody>
</table>

CMV pp65
DIVISION OF MICROBIOLOGICAL SERVICES

TABLE IX

VIRUSES ISOLATED / DETECTED IN 2009

<table>
<thead>
<tr>
<th>VIRUS</th>
<th>NUMBER ISOLATED/DETECTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adenovirus</td>
<td>45</td>
</tr>
<tr>
<td>Chlamydia trachomatis (bacterial agent)</td>
<td>5</td>
</tr>
<tr>
<td>Coxsackie Virus</td>
<td>4</td>
</tr>
<tr>
<td>Cytomegalovirus</td>
<td>5</td>
</tr>
<tr>
<td>Echovirus</td>
<td>5</td>
</tr>
<tr>
<td>Herpes Simplex Virus</td>
<td>64</td>
</tr>
<tr>
<td>Influenza Virus A</td>
<td>353</td>
</tr>
<tr>
<td>Influenza Virus B</td>
<td>81</td>
</tr>
<tr>
<td>Mumps</td>
<td>1</td>
</tr>
<tr>
<td>Parainfluenza Viruses</td>
<td>94</td>
</tr>
<tr>
<td>Respiratory Syncytial Virus</td>
<td>190</td>
</tr>
<tr>
<td>Varicella Zoster</td>
<td>1</td>
</tr>
</tbody>
</table>

FIGURE 3

![Virology Laboratory Graph](image-url)
2. Diagnostic Immunology

The Diagnostic Immunology Laboratory receives blood/serum and cerebrospinal fluid specimens for immunologic evaluation of viral, bacterial, Mycoplasmal and parasitic infections. This laboratory performs serological tests for Toxoplasma, Chickenpox, Rubella, Measles, Mumps, Herpes, Cytomegalovirus, Epstein-Barr virus, Legionella, Mycoplasma, Chlamydia, infectious mononucleosis, enterohemorrhagic *E.coli* toxins and Human Immunodeficiency Virus. Both screening (ELISA) and confirmatory (western blot) tests are performed for the detection of HIV antibodies. STAT HIV tests are also performed to provide rapid results for needlestick injuries and other occupational exposures for health care workers.

The laboratory employs, in addition to ELISA, immunofluorescent methods for the detection of IgG and IgM antibodies to the various infectious agents indicated above. Presence of IgG indicates past infection or vaccination, whereas IgM indicates recent infection or re-activation. These methods have the highest sensitivity and specificity in diagnosing the presence of antibodies due to infections or vaccinations. Most specimens submitted are tested for antibodies to multiple infectious agents.

**TABLE X**

<table>
<thead>
<tr>
<th>TEST</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlamydia IgG</td>
<td>22</td>
<td>13</td>
<td>19</td>
</tr>
<tr>
<td>Cytomegalovirus IgG</td>
<td>1206</td>
<td>1216</td>
<td>957</td>
</tr>
<tr>
<td>Cytomegalovirus IgM</td>
<td>1182</td>
<td>1211</td>
<td>951</td>
</tr>
<tr>
<td>Epstein Barr Virus (EBNA)</td>
<td>934</td>
<td>902</td>
<td>756</td>
</tr>
<tr>
<td>Epstein Barr Virus (EBV-IgG)</td>
<td>934</td>
<td>902</td>
<td>756</td>
</tr>
<tr>
<td>Epstein Barr Virus (EBV IgM)</td>
<td>934</td>
<td>902</td>
<td>756</td>
</tr>
<tr>
<td>Human Immunodeficiency virus (HIV)-1</td>
<td>1754</td>
<td>1673</td>
<td>1184</td>
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<tr>
<td>Measles IgG</td>
<td>276</td>
<td>246</td>
<td>195</td>
</tr>
<tr>
<td>Measles IgM</td>
<td>9</td>
<td>5</td>
<td>13</td>
</tr>
<tr>
<td>Mumps IgG</td>
<td>43</td>
<td>40</td>
<td>49</td>
</tr>
<tr>
<td>Mycoplasma IgG</td>
<td>229</td>
<td>232</td>
<td>188</td>
</tr>
<tr>
<td>Mycoplasma IgM</td>
<td>225</td>
<td>232</td>
<td>185</td>
</tr>
<tr>
<td>Rubella IgG(German Measles)</td>
<td>501</td>
<td>522</td>
<td>525</td>
</tr>
<tr>
<td>Rubella IgM(German Measles)</td>
<td>73</td>
<td>81</td>
<td>82</td>
</tr>
<tr>
<td>Toxoplasma IgM</td>
<td>161</td>
<td>247</td>
<td>193</td>
</tr>
<tr>
<td>Toxoplasma IgG</td>
<td>575</td>
<td>664</td>
<td>567</td>
</tr>
<tr>
<td>Varicella IgG(Chicken Pox)</td>
<td>810</td>
<td>794</td>
<td>668</td>
</tr>
<tr>
<td>West Nile IgG</td>
<td>48</td>
<td>59</td>
<td>27</td>
</tr>
<tr>
<td>West Nile IgM</td>
<td>49</td>
<td>54</td>
<td>27</td>
</tr>
<tr>
<td>Other tests ( EHEC toxin, HSV IgG, Legionella IgG/IgM and antigen)</td>
<td>967</td>
<td>647</td>
<td>785</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>10932</strong></td>
<td><strong>10642</strong></td>
<td><strong>8883</strong></td>
</tr>
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</table>
3. Syphilis Serology

The Syphilis Serology Laboratory provides syphilis screening and confirmatory tests to hospitals, clinics, and other institutions in Westchester County. The RPR and VDRL tests are the screening methods for blood and cerebral spinal fluid specimens. The TPPA and FTA-ABS tests are the confirmatory methods for the diagnosis of syphilis. This laboratory serves as a reference center for most hospitals in the county for confirming the diagnosis of syphilis. Through the laboratory information management system (LIMS), the laboratory provides pertinent data on syphilis patients to the health department for tracking patients and their contacts to control the spread of syphilis in Westchester County. In 2008 a total of 7066 specimens were submitted to this laboratory for syphilis testing (TABLE- I).

FIGURE 4

[Bar chart showing syphilis serology 2009 specimens submitted by agency]

FIGURE 5

[Bar chart showing syphilis serology for 2007, 2008, and 2009]
IV. MEDIA / GLASSWARE PREPARATION

The Media/Glassware section cleans and sterilizes laboratory glassware for the entire Department of Laboratories and Research. Special media for isolation of pathogens from food-borne outbreaks and other infections are prepared for the Microbiology laboratories. It also prepares culture media for the Environmental Bacteriology laboratory. Plating efficiency tests are performed routinely on media and solution 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 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, private physicians, hospitals and schools. These kits are used by various clinics and agencies to send patient specimens to our laboratories for various tests.

<table>
<thead>
<tr>
<th>WORKLOAD IN MEDIA/ GLASSWARE (2005-2009)</th>
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<tbody>
<tr>
<td></td>
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<tr>
<td>DIAGNOSTIC KITS / CONTAINERS</td>
</tr>
<tr>
<td>2005</td>
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<td>9300</td>
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<table>
<thead>
<tr>
<th>MEDIA PREPARED (units)</th>
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<tbody>
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<td>2005</td>
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<tr>
<td>122622</td>
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<table>
<thead>
<tr>
<th>GLASSWARE MACHINE CYCLES</th>
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<tbody>
<tr>
<td>2005</td>
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<tr>
<td>1901</td>
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<table>
<thead>
<tr>
<th>STERILIZER CYCLES</th>
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<tbody>
<tr>
<td>2005</td>
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<tr>
<td>-----</td>
</tr>
<tr>
<td>2278</td>
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</table>
### SUMMARY OF PROFESSIONAL QUALIFICATIONS

**Syed H. Abid**  
Chief of Microbiological Services, Laboratory Director  
B.S. (Hons), Biochemistry, University of Karachi, Karachi, Pakistan  
M.Sc., Biochemistry, University of Karachi, Karachi, Pakistan  
M.S., Microbiology, Northern Illinois University, DeKalb, IL  
Ph.D., Microbiology (Virology) University of Illinois College of Medicine, Chicago, IL  

**Professional Experience:**  
- Westchester County Department of Laboratories & Research - 26 years  
- Metropolitan Sanitary District of Chicago - 8 years  
- Rush Presbyterian Hospital, Chicago - 5 years  

**Professional Affiliations:**  
- American Society for Microbiology  
- Association of Public Health Laboratories  

**Academic Affiliations:**  
- Adjunct Assistant Professor, Department of Microbiology & Immunology, NYMC  
- Adjunct Assistant Professor, Department of Pathology, New York Medical College  

**Committees:**  
- Chairman, Radiation Safety Committee  
- Emergency Preparedness Committee  
- Biosafety/Biosecurity Committee for select agents  

**Other Functions:**  
- Director Biodefense Laboratory  
- Radiation Safety Officer, Public Health Labs  
- Coordinator, Department’s Employee Health Testing & Evaluation  

**Diane Anton**  
Director of Program Development II  
BS Biology (Cum Laude), Mercy College, Dobbs Ferry, NY  
MS Medical Microbiology (Hons), Long Island University, Dobbs Ferry, NY  
M (ASCP) Certified  
NYS Licensed Clinical Lab Technologist  

**Professional Experience:**  
- Westchester County Department of Laboratories & Research - 26 years  
- Northern Western Hospital Center - 1 year  

**Professional Affiliations:**  
- American Society for Microbiology, New York City Branch  
- American Society for Clinical Pathologists  
- New York State Public Health Association  

**Conferences/Meetings:**  
- Cepheid Training – Labs & Research  
- LRN-RM Training – Labs & Research  
- Lean 6 Sigma Webinar  
- H1N1 Planning – TMC – Westchester County  
- Practical Solutions for Lab Documents & Records Teleconference  

**Committees:**  
- Radiation Safety Committee  
- Information Technology Committee  
- Biosafety/Biosecurity Committee for select agents  
- Soft Computer Users Group  
- Dangerous Goods Shipping Trainer  

**Other Functions:**  
- Technical Director Biodefense Laboratory  
- Information Technology (Coordinator)  
- Health Provider Network Coordinator  
- First Responder  
- Fire Marshall
## DIVISION OF MICROBIOLOGICAL SERVICES

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Experience/Professional Experience</th>
<th>Education/Experience</th>
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<tbody>
<tr>
<td>Gina Arena</td>
<td>Office Assistant</td>
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<td></td>
<td></td>
<td>Professional Westchester County Department of Laboratories and Research – 2 year Private business – 14 years</td>
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<tr>
<td>Barbara Brunagel</td>
<td>Virologist</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Professional Westchester County Department of Laboratories and Research – 21 years Microbiology - 15 years (Poland)</td>
<td></td>
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<tr>
<td>Jeffrey Bush</td>
<td>Virologist</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Professional Westchester County Department of Laboratories &amp; Research – 5 years Charles River Laboratories – 2 years</td>
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<tr>
<td>Jessica Davis</td>
<td>Senior Laboratory Technician</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Professional Westchester County Department of Laboratories and Research – 1 year Children’s and Women’s Physicians of Westchester – 2 years Quest Diagnostics – VBH – 2 ½ years NYMC – Pharmacology Department – 7 years NYS Licensed Clinical Lab Technologist</td>
<td></td>
</tr>
<tr>
<td>Helen Engel</td>
<td>Assistant Microbiologist</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>Professional Westchester County Department of Laboratories and Research – 7 years Lab Support 1 year Advanced Viral Research – 2 years</td>
<td></td>
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<tr>
<td>Nicholas Hoover</td>
<td>Microbiologist</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Professional Westchester County Department of Laboratories &amp; Research – 4 years Pathco Medical, P.C. – 1.5 years MDS Hudson Valley Laboratories – 2 years</td>
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<tr>
<td></td>
<td></td>
<td>Conferences/Meetings: Agents of BioTerrorism: LRN Conventional Methods Training Virginia Division of Consolidated Laboratory Services, Richmond, VA</td>
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</table>
DIVISION OF MICROBIOLOGICAL SERVICES

Maureen Kennedy
Microbiologist
BS/BA Medical Technology/Biology, Bloomsburg University, Bloomsburg, PA
MS Epidemiology, NYMC School of Public Health, Valhalla, NY
MT (ASCP) Certified
NYS Licensed Clinical Lab Technologist

Professional Experience:
Westchester County Department of Laboratories and Research – 6 years
Lawrence Hospital, Bronxville, NY - 7 years
United Hospital, Portchester, NY – 7 years
Northern Westchester Hospital, Mt.Kisco, NY -1 year
University of VA Medical Center -1 year

Conferences:
LRN Level B training- Biodefense, Albany, NY

Meetings:
LRN NE Preparedness meeting, Albany, NY
Pandemic Flu H5N1 training, Albany NY
Pandemic Flu H5N1 Training, Atlanta, GA

Committees:
Quality Assurance Committee

Ayo Majekodunmi
Microbiologist
MS Information Technology, Pace University, White Plains, NY
BS Medical and Research Technology, University of Maryland, School of Medicine, Baltimore, MD
MT (ASCP) Certified
NYS Licensed Clinical Lab Technologist

Professional Experience:
Westchester County Department of Laboratories & Research – 7 years
Lab Support/Dept of Labs 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
Training Xpert™, Valhalla, NY

Aleyamma Mathews
Microbiologist
MBBS (Bachelor of Medicine: Bachelor of Surgery) Gandhi Medical College, Bhopal, India

Professional Experience:
Westchester County Department of Laboratories and Research – 11 years.
Long Island College Hospital Brooklyn, NY – 11 years
New York Methodist Hospital – 1 year
NYS Licensed Clinical Lab Technologist

Committees:
Quality Assurance Committee

Natalie McBride
Lab Assistant
AAS Business Administration- Westchester Community College, Valhalla, NY
EKG Tech, American Career School
Phlebotomy Technician Certified

Professional Experience:
Westchester County Department of Laboratories and Research – 7 years
Westchester County Health Department-23 years
Mount Vernon Hospital – 2 years
Westchester Medical Group – 1 year
Greenburg Health Center – 7 years

Committees:
Quality Assurance Committee
DIVISION OF MICROBIOLOGICAL SERVICES

Tonya McLaughlin
Assistant Microbiologist
BA Biology, Cheyney University of Pennsylvania, Cheyney, PA
MS Microbiology & Immunology, New York Medical College GSBMS, Valhalla, NY

Professional Experience
Westchester County Department of Laboratories and Research – 9 years

Committees:
NYS Licensed Clinical Lab Technologist
Quality Assurance Committee

Raymond Padovani
Assistant Microbiologist
BS Medical Technology, Mercy College, Dobbs Ferry, NY
MT (ASCP) Certified

Professional Experience
Westchester County Department of Laboratories & Research – 16 years
Yorktown Medical Laboratory, Yorktown Heights, NY - 10 years
Northern Westchester Hospital, Mt. Kisco, NY - 1 year
Westchester County Department of Health – 6 months

Professional Experience
American Society of Clinical Pathologists

Kay Patel
Assistant Microbiologist
MS Microbiology, School of Sciences, Gujrat University, India
BS Major: Microbiology, Minor: Chemistry, Gujrat University, India

Professional Experience
Westchester County Department of Laboratories and Research – 1 year
St. John’s Riverside Hospital – 7 years
Nyack Hospital – 5 years
Mt. Vernon Hospital – 7 ½ years
Montifore Hospital, Bronx, NY – 2 years

Professional Experience
Member of American Society of Microbiology, NY Branch

Diana Ramirez-Michel
Assistant Microbiologist
BS Medical Technology, Mercy College, Dobbs Ferry, NY
MT (ASCP) Certified

Professional Experience
Westchester County Department of Laboratories & Research – 19 years
Lawrence Hospital, Bronxville, NY - 8 years
St. Joseph’s Hospital, Yonkers, NY - 3 years
NYS Licensed Clinical Lab Technologist

Professional Experience
American Society of Clinical Pathologists
American Society for Microbiology, New York City Branch

Lauren Singelakis
Senior Virologist
BS Biology and Chemistry Manhattan College, Riverdale, NY

Professional Experience
Westchester County Department of Laboratories and Research – 11 years
Montefiore Medical Center, Bronx, NY - 3 years
Pepsico, Valhalla, NY – 1 year
NYS Licensed Clinical Lab Technologist

Professional Experience
A.I.B.S. Biological Society
Pan American Society for Clinical Virology
DIVISION OF MICROBIOLOGICAL SERVICES

Committees: Quality Assurance Committee

Aliyya Suraleigh
Assistant Microbiologist
BS Biology, Marymount College of Fordham University
Professional Experience: Westchester County Department of Laboratories and Research – 2 year
NYPH – 6 months
New York Blood Center – 5 years
NYS Licensed Clinical Lab Technologist

Nycil Varghese
Assistant Microbiologist
MS, Microbiology, Sri Ramakrishna College of Science, India
BS, Microbiology, MGR College, Madras University, India
NYS Licensed Clinical Lab Technologist
Professional Experience: Westchester County Department of Laboratories and Research – 1 year
NY Presbyterian Hospital – 2 years
Par Pharmaceuticals – 4 years
Professional American Society for Microbiology, New York Branch

Sharon E. Weekes-Threash
Senior Microbiologist/Quality Assurance
BS Health Science, Hunter College, New York, NY
NYS Licensed Clinical Lab Technologist
Professional Experience: Westchester County Department of Laboratories and Research - 16 years
Westchester County Medical Center - 8 years
Kaiser Foundation Health Plan - 3 years
Our Lady of Mercy (Misericordia) - 2 years (Internship)
Columbia University, Parkinsons Disease Foundation - 3 months (Fellowship)
Professional American Society for Microbiology
Affiliations: American Society for Microbiology, New York City Branch
Committees: Chairperson, Labor Management Committee
Quality Assurance Committee
Health & Safety Committee – CSEA
Environmental Management Safety Committee
Chemical Hygiene Committee
Safety Committee
Other Functions: Fire Marshall
Conferences/Meetings: CLMA – Tarrytown, NY
DIVISION OF MICROBIOLOGICAL SERVICES

GLASSWARE / MEDIA PREPARATION

Linda Faga  
Senior Laboratory Technician  
Professional Experience: Westchester County Department of Laboratories and Research – 19 years

Danielle Ponga  
Laboratory Assistant  
Professional Experience: Westchester County Department of Laboratories and Research – 1 year  
Licensed Funeral Director

Eleanor Walsh  
Laboratory Assistant  
Professional Experience: Westchester County Department of Laboratories and Research – 3 years