Clinical Microbiology Laboratory & Antimicrobial Stewardship

By:
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Prof & Director of Clinical Microbiology
American University of Beirut Medical Center

At:
First AMR- MOPH Lab Mtg for PT & Standardization.
USJ, Beirut, Lebanon, October 27-2015.
Aspects Involved in AMR & Stewardship Program (ASP)

Antimicrobial Resistance-Pathogens spectrum

Impact of AMR- on individual and community Cost-LOS

Health Initiative to curb R: Local-Global

Stewardship: Aspired target

Antimicrobial Stewardship & Partnership with Clinical Micro

Role of Clinical Micro & reliability of Surveillance

Antibiogram: local & National
Issues of Misuse & Inappropriate Use of Antimicrobial Agents

- Patient’s Issues
- Physician’s issue
- Drug Quality Issues
- Lab Testing Issue’s
- Governmental Policy
- Public & Media Issues
Global Common resistant bacteria found in ICUs
USA & Others

- Methicillin –R S. aureus (MRSA).
- Vancomycin-R enterococci (VRE).
- MDR (ESBL –CRE) Gram-negative pathogens:
  - E. coli
  - Klebsiella spp
  - Acinetobacter baumannii
  - Pseudomonas aeruginosa

Hit List Dangerous Bugs; Bad Bugs Need Drugs”, (IDSA)- HAI
Prevalence of *ESBL E. coli, K. pneumonia,* & MRSA AUBMC (2001-2011)

Prevalence of ESBL *E. coli* and *K. pneumoniae*, and MRSA AUBMC (2001-2011)

CML - ASP - Orchestrating the efforts
CMLs are the AWACS for ID in patient’s care

Airborne Warning And Control System
CML Role - Activities

-CML is the Minaret and gate keeper of pathogen detection and identification of infectious etiologies & reveal of new resistance.
-CML aims to provide rapid, reliable, significant and clinically relevant cost effective investigation and results.
-ASP directly depends on reports from the CML, so good communication between both is essential.
-Maintains dynamism & updates to provide rapid diagnostics (including automation & molecular) which enables real-time detection of MDR pathogens, surveillance, and swifter responses by the ASP, IC, and clinicians esp in de-escalation of antibiotics.
-Establishes & maintains current SOPs
-Conducts diagnostic & therapeutic testing [Clinically relevant-cost effective]
  -Specimen collection guidelines [Good Q specimen In - Good Q result out], [Junk In - Junk out]
  -Reliable microbiology processing & testing practice
  -Rapid tests (e.g. conventional, automated, molecular)
-Microbiology reporting – comments that
  -Interpret isolate significance: like humans, most trivial- most troublesome.
  -Provide patient-specific culture and susceptibility data to optimize individual antimicrobial management.
-Provides Indispensable support to IC & outbreak resolution.
General rules of Specimen management-basic concepts
- Collect specimens before initiating AB.
- Collect specimen from infected site using proper sterile procedure & devices.
- Collect adequate volume sufficient to permit complete examination.
- When not sure, contact CML

Unacceptable specimen and criteria for rejection
  e.g. Saliva, Foley’s catheter tips, leaky/contaminated containers, improperly labeled/completed request, replicate/multiple specimen on the same day, long delayed specimens, pooled urine or sputum over 24h, wrong source specimen for Ano² cultures.

Interpretation based on source of specimen:
- normally sterile site (e.g. blood, CSF, lung, liver)
- passing through sites with NF (e.g. Sputum),
- sites with NF (e.g. throat, Gl, Vagina).

Nonspecific terms such as “wound”, “abscess”, “eye”, “genital”, “fluid”, “swab”, “ENT” are not helpful, cause waste of resources, and could result in misleading findings.

Critical-Panic values
  e.g. CSF, blood, Pos fluid, MDR,CRE, AFB, Flu, Legi, RSV, C diff, SS, Rota.
American University of Beirut Medical Center
Department of Pathology and Laboratory Medicine

Instructions - Guidelines
for
Specimens and Tests in Clinical Microbiology:

Bacteriology
Mycobacteriology
Mycology
Parasitology - Microscopy
Serology
Antibiograms: CML & ASP

-CML provide Antibiograms, very helpful aspect to ASP for:

-Choice of empiric treatment,
-Evaluation of trends in important ABR rates
-Developing an Antimicrobial Policy
-Monitor and evaluate trends of AMR
-Facilitate decisions for AB restriction or review

Daniel J. Diekema DJ & Saubolle MA. JCM 2011;49: S57–S60
### Table 1. Percentages of Susceptible Isolates to Antibiotics Among 3125 Gram-Positive Bacteria - AUBMC 1/7/14 - 30/6/15

<table>
<thead>
<tr>
<th>Bacteria</th>
<th>7/8/9</th>
<th>10/11</th>
<th>12/13</th>
<th>14/15</th>
<th>16/17</th>
<th>18/19</th>
<th>20/21</th>
<th>22/23</th>
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<th>26/27</th>
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<th>32/33</th>
<th>34/35</th>
<th>36/37</th>
<th>38/39</th>
<th>40/41</th>
<th>42/43</th>
<th>44/45</th>
<th>46/47</th>
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<tbody>
<tr>
<td>Bacillus spp.</td>
<td>15</td>
<td>15</td>
<td>40</td>
<td>88</td>
<td>75</td>
<td>98</td>
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<tr>
<td>Enterococcus spp.</td>
<td>80</td>
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<tr>
<td>Sarcina lutea aurea</td>
<td>95</td>
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<td>Coag. Nig. Staph*</td>
<td>99</td>
<td>99</td>
<td>86</td>
<td>68</td>
<td>57</td>
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<tr>
<td>Streptococcus agalactiae</td>
<td>100</td>
<td>100</td>
<td>74</td>
<td>75</td>
<td>57</td>
<td>76</td>
<td>75</td>
<td>87</td>
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<td>Streptococcus pneumoniae</td>
<td>100</td>
<td>100</td>
<td>74</td>
<td>75</td>
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<tr>
<td>Enterococcus hirae</td>
<td>100</td>
<td>100</td>
<td>74</td>
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**Antimicrobial Susceptibility Profiles of Bacterial Isolates at the American University of Beirut Medical Center**

July 1, 2014 - June 30, 2015

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### Table 2. Percentages of Susceptible Isolates to Antibiotics Among 8202 Gram-Negative Bacteria - AUBMC 1/7/14 - 30/6/15

| Bacteria                        | 7/8/9 | 10/11 | 12/13 | 14/15 | 16/17 | 18/19 | 20/21 | 22/23 | 24/25 | 26/27 | 28/29 | 30/31 | 32/33 | 34/35 | 36/37 | 38/39 | 40/41 | 42/43 | 44/45 | 46/47 |
|---------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Acinetobacter spp.              | 98    | 97    | 96    | 98    | 90    |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| Citrobacter spp.                | 80/27 | 96/70 | 95/13 | 80/27 | 96/70 | 95/13 | 80/27 | 96/70 | 95/13 | 80/27 | 96/70 | 95/13 | 80/27 | 96/70 | 95/13 | 80/27 | 96/70 | 95/13 | 80/27 | 96/70 |
| Enterobacter spp.               | 77/04 | 88/70 | 96/70 | 80/27 | 96/70 | 95/13 | 80/27 | 96/70 | 95/13 | 80/27 | 96/70 | 95/13 | 80/27 | 96/70 | 95/13 | 80/27 | 96/70 | 95/13 | 80/27 | 96/70 | 95/13 |
| Enterobacteriaceae              | 88    | 96    | 96    | 96    | 96    | 96    | 96    | 96    | 96    | 96    | 96    | 96    | 96    | 96    | 96    | 96    | 96    | 96    | 96    | 96    |
| K. pneumoniae                   | 87/88 | 82/88 | 85/70 | 80/27 | 96/70 | 95/13 | 80/27 | 96/70 | 95/13 | 80/27 | 96/70 | 95/13 | 80/27 | 96/70 | 95/13 | 80/27 | 96/70 | 95/13 | 80/27 | 96/70 | 95/13 |
| Morganella spp.                 | 94    | 96    |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| Moraxella catarrhalis           | 100   |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| Proteus spp.                    | 42/22 | 85/89 | 96    | 99    | 98    |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| P. aeruginosa                   | 84    | 70    | 99    | 98    | 97    |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| Salmonella spp.                 | 89    |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| Shigella spp.                   | 89    |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |

For Further Information Contact

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&

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Department of Pathology & Laboratory Medicine

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What science can do
Examples of Detected Problems in Lebanon

- *Pen* vs GAS
- *FQ* vs Salmonella
- *D-Test* vs Staph & B-strep
- *Van* vs Staph
- *CRE Screeen*
- *ESBL testing*
- *VRE Testing*
PT towards Nationwide Surveillance

In God we Trust

&

In Humans we Verify
Thanks for your Attention

Successful CML & ASP

MOPH –AMR Committee –Proficiency Testing- Batch -1

<table>
<thead>
<tr>
<th>Main Objective:</th>
<th>Date:</th>
</tr>
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<tbody>
<tr>
<td>Standardize laboratory testing in microbiology</td>
<td>27-10-2015</td>
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</table>

<table>
<thead>
<tr>
<th>Description:</th>
<th>Required work:</th>
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<tbody>
<tr>
<td>Five PT specimens are prepared and delivered as follows:</td>
<td>Each lab needs to fill in the laboratory results detailed in the attached table for every PT received with the following information:</td>
</tr>
<tr>
<td>PT-1: Abscess from F/ 23 y</td>
<td>- Gram stain</td>
</tr>
<tr>
<td>PT-2: Urine from F/ 57</td>
<td>- Identify the pathogen</td>
</tr>
<tr>
<td>PT-3: Blood from F/ 74 y</td>
<td>- Perform susceptibility testing</td>
</tr>
<tr>
<td>PT-4: Sputum from F/ 79 y</td>
<td></td>
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<tr>
<td>PT-5: Blood from M/ 31 y</td>
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</tbody>
</table>

Kindly submit the results **within 10 days** from receipt to the following email or fax:
- Dr Atika Berry [aberrymd@hotmail.com], Fax: 01/611844