



INSTRUCTIONS FOR COMPLYING WITH THE 2017 ANTIBIOGRAM REPORTING REQUIREMENTS

The following instructions relate to the Health Officer Order for Reporting of Carbapenem-Resistant Enterobacteriales (CRE) and Antimicrobial Resistance of Bacterial Pathogens, issued on January 19th, 2017. These instructions were updated March 2021.

*Updated information and instructions for antibiogram reporting can be found at:
<http://publichealth.lacounty.gov/acd/antibiogram.htm>*

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1 Submission of Cumulative Antibiogram Data to LACDPH

The annual Los Angeles County regional antibiogram will be limited to inpatients from acute care hospitals, inpatients from long-term acute care hospitals, and residents of skilled nursing facilities (SNFs) in LA County.

Skilled nursing facilities that already obtain antibiogram data should work with their reference laboratories to make sure that antibiogram data are being submitted to the Los Angeles County Department of Public Health (LACDPH) in a timely manner, and to ensure that antibiogram preparation is consistent with LACDPH recommendations.

Mandated facilities must submit their annual antibiograms by email to hai@ph.lacounty.gov.

For healthcare facilities in Long Beach and Pasadena, please refer to your Health Department's instructions.

1.1 Requirements

In order to generate meaningful analyses, LACDPH has set the following requirements for submission of annual facility-level antibiogram data:

- Data must **only** be submitted in an Excel format (.xls, .xlsx).
 - PDF formats are **no longer** acceptable.
- Susceptibility results (%S) from all specimen sources must be included.
- Results should be reported both as percentage of susceptible isolates and number of isolates tested for each pathogen-drug combination.
- Report 1 year of data with exact dates of collection period (ie. January 1 to December 31).
- Complete the checklist on tabs #2 and #3 to indicate methods used to generate your data.

1.2 Deadlines

Mandated facilities are required submit their annual cumulative antibiograms no later than June 1st of the following year.

1.3 Drug-Pathogen Combinations of Interest to LACDPH

LACDPH has identified several pathogens of epidemiological and clinical importance. The suggested drug-pathogen ("drug-bug") combinations of interest to include in your submitted antibiograms are:

- **Gram-negative pathogens:**
 - *Enterobacteriales* group: *Escherichia coli*, *Enterobacter cloacae*, *Enterobacter* spp. (other than *E. cloacae*), *Klebsiella (Enterobacter) aerogenes*, *Klebsiella oxytoca*, *Klebsiella pneumoniae*, *Proteus mirabilis*, *Morganella morganii*, *Citrobacter freundii*, *Citrobacter koseri*, *Serratia marcescens*
 - Non-*Enterobacteriales*: *Pseudomonas aeruginosa*, *Acinetobacter baumannii*, *Stenotrophomonas maltophilia*.
- **Antimicrobial susceptibility for gram-negative pathogens:** ampicillin-sulbactam, cefazolin, piperacillin-tazobactam, ceftriaxone, ceftazidime, cefepime, meropenem, doripenem, ertapenem, imipenem, gentamicin, tobramycin, amikacin, ciprofloxacin, levofloxacin, nitrofurantoin, minocycline and trimethoprim-sulfamethoxazole.

- **Gram-positive pathogens:** methicillin-resistant *Staphylococcus aureus* (MRSA), methicillin-susceptible *Staphylococcus aureus*, *Streptococcus pneumoniae*, *Streptococcus pyogenes* (Group A *Streptococcus*), *Streptococcus agalactiae* (Group B *Streptococcus*), *Enterococcus faecalis*, *Enterococcus faecium*, *Enterococcus* spp. (all enterococcal species).
- **Antimicrobial susceptibility for gram-positive pathogens:** penicillin, ampicillin, ceftriaxone, ceftaroline, doxycycline, levofloxacin, ciprofloxacin, linezolid, trimethoprim-sulfamethoxazole, clindamycin, erythromycin, vancomycin, daptomycin, nitrofurantoin

If your facility does not routinely test for any of the drugs and/or pathogens listed above, please do not include them in your antibiogram. Indicate “NT” if not tested.

1.4 Submission Templates

The LACDPH antibiogram template is available at <http://publichealth.lacounty.gov/acd/antibiogram.htm>.

LACDPH will no longer be accepting any other format (e.g. Word document, PDF). Antibiogram data must be submitted in the format presented in the Excel submission form.

1.5 Use of Data

Antimicrobial resistance is a growing public health problem nationwide. LACDPH will analyze data from facility-level antibiograms to develop an understanding of patterns of antimicrobial resistance in LA County^{1,2}. These data are valuable to identify potential opportunities to prevent the spread of antimicrobial resistance and improve public health of LA County^{3,4}. These data will not be shared with outside entities without facilities’ permission. Individual results will not be publicly reported, and data will either be aggregated at the County or regional level.

2 Recommendations for Preparation of a Cumulative Antibigram

Due variation in how healthcare facilities develop and report their facility antibiograms, LACDPH has developed a set of recommendations for facilities to follow when preparing their cumulative antibiograms.

2.1 Clinical and Laboratory Standards Institute (CLSI) Guidelines

Cumulative antibiogram data are impacted by several factors, including: 1) patient population; 2) culturing practices; 3) susceptibility testing and reporting policies; and 4) methods for compiling data (ie. excluding duplicates). However, following standardized laboratory practices can generate more accurate results.

LACDPH strongly recommends that facilities follow the most-updated Clinical and Laboratory Standards Institute (CLSI) consensus document, titled “Analysis and Presentation of Cumulative Antimicrobial Susceptibility Test Data,” to prepare their cumulative antibiogram (M39-A4 is current for 2020). The CLSI guidelines provide comprehensive instructions on developing an antibiogram.

2.2 Ways to Address Common Mistakes in Preparing a Cumulative Antibigram

Mistakes in antibiogram preparation can result in misinterpretation by treating clinicians and antimicrobial stewardship programs and thus, impact both empiric antibiotic selection and survival from sepsis^{5,6}. LACDPH recommends facilities adhere to the following general guidelines to correct common mistakes^{7,8,9} when preparing their antibiograms:

- Report 1 year of data with exact dates of the calendar year (January 1 to December 31)
- Obtain the most complete data possible; include results from agents that are tested but may be selectively suppressed on patient reports
- Report percent susceptible (%S) and number of isolates tested for each drug-organism combination
- Encourage laboratory to follow most current CLSI breakpoints (M100 30th edition for 2020 data). *please note that M100 31st edition will be available in April 2021.*
- Include only final, verified results
- Include only drugs that are routinely tested- do not include those tested on special request
- Include the first isolate per patient per reporting period, irrespective of body site or antimicrobial susceptibility profile
- Exclude results obtained from surveillance studies (e.g. nasopharyngeal colonization studies for methicillin-resistant *Staphylococcus aureus* (MRSA), carbapenem-resistant *Enterobacteriales* (CRE) obtained from rectal swabbing, etc).
- Indicate number of isolates for each organism
- Separately report methicillin-susceptible *Staphylococcus aureus* (MSSA) and methicillin-resistant *Staphylococcus aureus* (MRSA) and *all S. aureus*
- For *Streptococcus pneumoniae*, list %S following analysis of data from all isolates using meningitis and non-meningitis breakpoints for penicillin, cefotaxime and ceftriaxone if appropriate

3 The Antibiogram and Antimicrobial Stewardship

The antibiogram is an important tool for the development of antimicrobial stewardship policies and protocols for empiric antimicrobial selection. Early empiric antimicrobial therapy with microbiologic activity can improve survival from sepsis^{5,6}.

The annual antibiogram is an important component of developing an effective antimicrobial stewardship program (ASP) and should be reviewed by the ASP team, at least annually. Whenever possible, the microbiology laboratory should present the results of the antibiogram to the ASP¹⁰. The antibiogram should be made available to all treating clinicians in the facility.

The ASP may request additional analysis, including but not limited to:

- Combination antibiograms against select species such as *Pseudomonas aeruginosa*, and *Acinetobacter baumannii*
- Location specific antibiograms (ICU versus Non-ICU)
- Source specific antibiograms (urine, blood, etc.)
- Age specific antibiograms (pediatrics, adults, etc.)

More information about antimicrobial stewardship can be found at:

<http://publichealth.lacounty.gov/acd/AntimicrobialStewardship.htm>

4 Resources

LACDPH has compiled other resources for healthcare facilities and clinical laboratories to use in improving their antibiogram development and laboratory testing practices.

4.1 Los Angeles County Department of Public Health (LACDPH)

The LACDPH has convened an expert task force to help facilitate the standardization and analysis of antibiogram data for Los Angeles County. The task force is available to provide guidance and support to facilities in development of their individual antibiogram and format for submitting data to LADPH.

4.2 WHONET

WHONET is a free software developed by the World Health Organization (WHO) that can be used to help develop the facility level cumulative antibiogram. The software is available at:

<http://www.whonet.org/aboutus.html>

An example of WHONET-developed antibiogram can be found here:

<http://www.asp.mednet.ucla.edu/files/view/AMIC2015online.pdf>

4.3 Clinical and Laboratory Standards Institute (CLSI)

The CLSI Guidelines, as well as other laboratory education and resources, are available at:

<http://clsi.org/>.

If you have additional questions, please contact the Acute Communicable Disease Program at (213)240-7941 or hai@ph.lacounty.gov.

5 References

1. Var SK, Hadi R, Khardori NM. Evaluation of regional antibiograms to monitor antimicrobial resistance in Hampton Roads, Virginia. *Annals of clinical microbiology and antimicrobials*. 2015 Apr 09;14:22. PubMed PMID: 25890362. Pubmed Central PMCID: 4397712.
2. Stein CR, Weber DJ, Kelley M. Using hospital antibiogram data to assess regional pneumococcal resistance to antibiotics. *Emerging infectious diseases*. 2003 Feb;9(2):211-6. PubMed PMID: 12603992. Pubmed Central PMCID: 2901936.
3. Slayton RB, Toth D, Lee BY, Tanner W, Bartsch SM, Khader K, et al. Vital Signs: Estimated Effects of a Coordinated Approach for Action to Reduce Antibiotic-Resistant Infections in Health Care Facilities - United States. *MMWR Morbidity and mortality weekly report*. 2015 Aug 07;64(30):826-31. PubMed PMID: 26247436. Pubmed Central PMCID: 4654955.
4. Lee BY, Bartsch SM, Wong KF, McKinnell JA, Cui E, Cao C, et al. Beyond the Intensive Care Unit (ICU): Countywide Impact of Universal ICU *Staphylococcus aureus* Decolonization. *American journal of epidemiology*. 2016 Mar 01;183(5):480-9. PubMed PMID: 26872710. Pubmed Central PMCID: 4772440.
5. Kollef MH, Sherman G, Ward S, Fraser VJ. Inadequate antimicrobial treatment of infections: a risk factor for hospital mortality among critically ill patients. *Chest*. 1999 Feb;115(2):462-74. PubMed PMID: 10027448.
6. Kumar A, Roberts D, Wood KE, Light B, Parrillo JE, Sharma S, et al. Duration of hypotension before initiation of effective antimicrobial therapy is the critical determinant of survival in human septic shock. *Critical care medicine*. 2006 Jun;34(6):1589-96. PubMed PMID: 16625125.

7. Moehring RW, Hazen KC, Hawkins MR, Drew RH, Sexton DJ, Anderson DJ. Challenges in Preparation of Cumulative Antibigram Reports for Community Hospitals. *Journal of clinical microbiology*. 2015 Sep;53(9):2977-82. PubMed PMID: 26179303. Pubmed Central PMCID: 4540907.
8. Zapantis A, Lacy MK, Horvat RT, Grauer D, Barnes BJ, O'Neal B, et al. Nationwide antibiogram analysis using NCCLS M39-A guidelines. *Journal of clinical microbiology*. 2005 Jun;43(6):2629-34. PubMed PMID: 15956376. Pubmed Central PMCID: 1151919.
9. Janet F. Hindler, John Stelling; Analysis and Presentation of Cumulative Antibiograms: A New Consensus Guideline from the Clinical and Laboratory Standards Institute. *Clin Infect Dis* 2007; 44 (6): 867-873. doi: 10.1086/511864.
10. Morency-Potvin P, Schwartz DN, Weinstein RA. Antimicrobial Stewardship: How the Microbiology Laboratory Can Right the Ship. *Clinical microbiology reviews*. 2017 Jan;30(1):381-407. PubMed PMID: 27974411. Pubmed Central PMCID: 5217798.