

201922 SNOMED CT and Antimicrobial Stewardship

W. Scott Campbell, University of Nebraska Medical Center, (US)

Co-authors

1. James Campbell

Summary

Antibiograms represent the antibiotic susceptibility patterns of organisms present in a health care environment. Use of SNOMED CT for use in a functional, automated antibiogram creation tool for use in antimicrobial stewardship and antibiotic decision support is discussed and demonstrated.

Audience

Clinical, Policy/administration, Research/academic, Technical

Learning Objectives

1. Practical and useful implementation of SNOMED CT
2. Integration of multiple terminologies to achieve a single clinical objective (SNOMED CT, LOINC, RxNORM)
3. Implementation of SNOMED CT in clinical practice for clinical decision support

Abstract

The antibiogram is a profile of the types of microorganisms and their susceptibility patterns to antimicrobial agents within a population over a period of time. It is used by health care providers as empirical data to initiate appropriate antimicrobial agents for patient therapy prior to definitive culture and susceptibility results availability. Antibiograms are used by public health entities to identify trends, patterns and changes in a population or regional microbiome. The Clinical and Laboratory Standards Institute (CLSI) and the Joint Commission (JC) certification standards require US health care institutions to calculate antibiograms annually, at a minimum, and are used as a foundation for antimicrobial stewardship programs. Calculation and maintenance of an institutional antibiogram can be a labor and time intensive exercise that increases with the size and complexity of the health care institution. While the World Health Organization (WHO), CLSI and other authoritative bodies provide formulas, algorithms and basic software tooling (i.e., WHOnet) to calculate antibiograms to aid the clinical microbiologist and infectious disease professionals complete this task, the process remains burdensome. As a result, antibiograms are rarely calculated more frequently than once per year for any given entity, hospital, or hospital ward, and thus, limit their utility. However, use of healthcare information standards, terminologies and systems provide an avenue to improve the precision and utility of the antibiogram for patient care and antimicrobial stewardship.

This presentation describes and demonstrates the use of SNOMED CT and other international standards to design, develop and implement a dynamic antibiogram calculation tool. Standards employed include SNOMED CT, LOINC, RxNorm and HL7 laboratory result messaging. The designed and implemented system generates antibiograms by organism and organism phenotypes by physical location within a healthcare setting to assist providers in antibiotic



selection to improve patient care and reduce antibiotic resistance. Furthermore, the tool provides trending and drill down capabilities into organism subpopulations to further assist clinicians and microbiologists understand the microbiome within their institution. The presentation will demonstrate the working system as designed and developed at the University of Nebraska Medical Center (UNMC) using actual clinical data. The antibiogram calculations have been validated for three years against UNMC official antibiograms as calculated manually and using WHOnet algorithms and database tools. The system consumes data live from the laboratory information system, runs in real-time, eliminates the need for manual calculations and allows for dynamic, on-demand antibiogram production. To date, several thousand transactions have been processed and are incorporated into the UNMC antibiogram database. Ultimately, attendees will see first hand how SNOMED CT in conjunction with other standards are put to practical, day-to-day use in a clinical environment to improve healthcare and improve efficiency within the health care environment.