Glossary

Agar Seaweed- derived, jelly-like culture medium used to grow bacteria in laboratories.

Aminoglycosides A class of antibiotics, principally active against Gram-negative bacteria.

AMR Antimicrobial Resistance

Antibiogram The result of laboratory testing for the sensitivity of an isolated bacterial strain to different antibiotics. Antibiograms can be collated to form cumulative antibiograms, which can help to form prescribing guidelines at a hospital, regional or national level.

Antibiotic A chemical substance –strictly one produced by a microorganism that kills or inhibits the growth of bacteria at very low concentrations. The term is frequently used interchangeably with antibacterial and antimicrobial.

Antibiotic susceptibility testing (AST) Generic term for the laboratory measurement, achievable using different methods, of the levels of susceptibility or resistance shown by bacterial isolates to antibiotics. It may, for example, involve disc diffusion testing or MIC determination.

Antimicrobial A chemical substance that kills or inhibits the growth of microorganisms such as bacteria, viruses or fungi. (See also: antibiotic, which is a class of antimicrobials).

Area under the curve (AUC) The area under the curve (mathematically known as definite integral) in a plot of concentration of drug in blood plasma against time (Wikipedia).

AUC/MIC A PK/PD index that divides the area under the concentration–time curve over 24 h by the MIC.

Bacteraemia A bacterial infection of the blood or the lymph system.

Bacteriology The study of bacteria.

Bacterial isolate The separation of mixed bacterial strains in to single strains for identification.

Beta-lactamase A family of enzymes produced by bacteria that destroy beta-lactam antibiotics.

Biomarker Tests that can be used to follow body processes and diseases in humans and animals. They can be used to predict how a patient will respond to a medicine or whether they have, or are likely to develop, a certain disease.

Blood culture Is a microbiological culture of blood, which usually is a sterile environment. It is employed to detect infections that are spreading through the bloodstream, mainly in patients with sepsis.

Bloodstream infection The presence of live pathogens in the blood, causing an infection. (See also: pathogen, infection).

Breakpoints Agreed threshold criteria used to interpret MICs or disc diffusion zone sizes to define whether a bacterial isolate is susceptible or resistant to a particular antibiotic and aid clinical decisions the likely outcomes of treatment.

Broad-spectrum antimicrobials Antimicrobials that have activity against several microorganisms harboring different mechanisms of resistance. These antimicrobials should preferably be used empirically in the setting of patients with severe infections or when antimicrobial resistance is present.

Cmax Peak (antibiotic) serum level or maximum serum concentration achieved.

C-reactive protein (CRP) CRP is an acute phase protein of hepatic origin that is used as biomarker of infection.

Cell wall The outer coat of a bacterial cell.

Chromosomal DNA DNA contained within the chromosome – the DNA responsible for the reproduction of the organism.

Clostridium difficile A Gram-positive bacterium responsible for what can be a severe form of antibiotic-associated diarrhoea.

Colonisation A process in which an organism (such as a bacterium) grows inside someone without causing illness.

Computer decision support systems (CDSS) Computer applications designed to aid clinicians in making diagnostic and therapeutic decisions in patient care.

Concentration dependent antibiotics Those antibiotics whose killing response is dependent on the maximum concentration achieved at the site of infection.

CPE Carbapenemase-producing Enterobacteriaceae

CPO refers to bacteria such as Klebsiella, Escherichia coli (E. coli), Acinetobacter, and Pseudomonas, that are found in normal human intestines. In some parts of the world this group of bacteria have acquired genes that make them resistant to a broad spectrum type of antibiotics including those known as carbapenem antibiotics.

Deoxyribonucleic acid (DNA) A complex molecule that serves as the genetic material responsible for heredity, the transfer of characteristics to subsequent generations. It is fundamental to and critical for most life on Earth (exceptions would include some viruses).

Defined daily dose (DDD) The DDD is the assumed average maintenance dose per day for a drug used for its main indication in adults.

Disc diffusion A laboratory method widely used to measure of the activity of a specific antibiotic against a particular bacterial isolate. It is used together with breakpoint to determine whether the bacterial isolate is susceptible or resistant to that antibiotic.

Disease Surveillance Surveillance is an epidemiological practice by which the spread of disease is monitored in order to establish patterns of progression. The main role of disease surveillance is to predict, observe and minimise the harm caused by outbreak, epidemic and pandemic situations, as well as increase our knowledge as to what factors might contribute to such circumstances.

ESBL Extended-spectrum beta-lactamases are enzymes that confer resistance to most beta-lactam antibiotics, including penicillins, cephalosporins, and the monobactam aztreonam.

Enterobacteriaceae A large family of Gram-negative bacteria that are intrinsically the common cause of infections in humans.

Enterococci A Gram-positive species that are intrinsically resistant to many groups of antibiotics.

Escherichia coli (E. coli) A Gram negative bacterial species responsible for many different types of infections in humans

Eukaryotes Cells with a membrane-bound nucleus – more advanced than bacteria.

Epidemiology The study of factors that have an impact on disease in the human community. Often used in the control of health problems. Healthcare associated infection (HAI): Infections acquired as a direct or indirect result of health care.

Febrile morbidity Any infectious complication following surgery.

Fusidic acid An antimicrobial used against staphylococci.

Gene A piece or unit of DNA that encodes for a specific protein.

Genetic code The set of rules by which a the information in a piece of DNA is translated into a specific protein

Gonorrhoea A sexually transmitted infection caused by the Gram- negative bacterium Neisseria gonorrhoeae.

Gram-negative Bacteria with only a thin peptidoglycan layer in their cell wall, rendering them unable to retain the crystal violet stain used in laboratories.

Gram-positive Bacteria with a thick peptidoglycan layer in their cell wall, which can retain the crystal violet stain used in laboratories.

Gram staining Also known as Gram´s method, is a method of differentiating bacterial species into two large groups (gram-positive and gram-negative). The name comes from the Danish bacteriologist Hans Christian Gram, who developed the technique. Gram staining differentiates bacteria by the chemical and physical properties of their cell walls by detecting peptidoglycan, which is present in a thick layer in gram-positive bacteria. In a Gram stain test, gram- positive bacteria

retain the crystal violet dye, while a counterstain (commonly safranin or fuchsine) added after the crystal violet gives all Gram-negative bacteria a red or pink colouring.

hVISA Heterogeneous vancomycin-intermdieate S. aureus - a strain of S.aureus that has cells that are not fully sensitive to vancomycin.

ID Infection Disease

Immuno-compromised Having an immune system that has been impaired by disease or treatment.

Immune response Part of the body's protective mechanism against infection.

Infection The invasion and reproduction of pathogenic (disease- causing) organisms inside the body. This can cause tissue injury and progress to disease.

Infection control or infection control measures Measures that aim to prevent the spread of pathogens between people in a healthcare setting. Examples of infection control measures include hand washing, protective clothing, isolation procedures and audits of compliance with hygiene measures.

Inflammatory response The body's reaction to many infections, mediated by the immune system.

Isoniazid An antibiotic used to treat tuberculosis.

Inpatient A patient who visits a healthcare facility for diagnosis or treatment and stays in the hospital for at least one night.

Intravenous Within or into a vein for example an intravenous catheter would be a catheter that is inserted into a vein.

In vitro An event-taking place in a test tube, culture dish, or elsewhere outside a living organism.

Klebsiella pneumoniae A Gram-negative bacterial species responsible for infections in humans.

Lipopeptides A group of antibiotics with activity against Gram- positive bacteria.

MALDI-TOF MS Stands for Matrix Assisted Laser Desorption/Ionization Time of Flight Mass Spectrometry. It is a soft ionization technique used in mass spectrometry, allowing the analysis of biomolecules (biopolymers such as DNA, proteins, peptides and sugars) and large organic molecules (such as polymers and other macromolecules), which tend to be fragile and fragment when ionized by more conventional ionization methods. It is used in Microbiology for the identification of microorganisms (bacteria and fungi).

MBCA Minimum bactericidal concentration: the lowest concentration of antibiotic that kills a bacterial strain.

MDT Multidisciplinary Team

Methicillin An antibiotic, no longer used, that was developed to treat beta-lactamase-producing strains of S. aureus.

MIC (Minimum Inhibitory Concentration) A numerical measure (expressed as mg/L or ug/ml) of the activity of a specific antibiotic against a particular bacterial isolate. It is determined in the laboratory and used together with breakpoints to decide whether the bacterial isolate is susceptible or resistant to that antibiotic.

Model for Improvement Developed by Associated in Process Improvement from the work of Clarence Lewis, Walter Shewhart and W Edwards Demming. The Model for Improvement combines Plan Do Study Act cycles with three questions: What are we trying to accomplish? How will we know that change is an improvement? What changes can we make that will result in an improvement? The Model for Improvement was adopted by the Inistitute for Healthcare Improvement (IHI) over 40 years ago.

Molecular epidemiology The laboratory characterisation of bacteria and the genetic elements responsible for any resistance to antibiotics. Can be used to investigate transmission of bacteria or resistance in healthcare settings

Morbidity The state of being ill, diseased or injured. ('Morbidity rate' describes the occurrence of a disease or condition that causes morbidity).

Mortality Death, or the frequency or number of deaths. For example: infections are a major cause of mortality worldwide, and the mortality rate of [this type of] infection is 30%.

MRSA Meticillin resistant Staphylococcus aureus; strains of S. aureus that are resistant to methicillin, and therefore also resistant to almost all other beta-lactam antibiotics.

Mutant An organism with a different genetic character due to a change in its DNA.

Mutation A change in the genetic code of an organism.

MTB Mycobacteria tuberculosis

Nosocomial infection An infection acquired in hospital.

Outbreak A classification used in epidemiology to describe a small, localised group of people infected with a disease.

Outpatient A patient who visits a healthcare facility for diagnosis or treatment without spending the night. Sometimes called a day patient, day-stay patient or day-only patient.

Parenteral Getting a drug or substance into the body by injection.

Pathogen A disease-causing agent. The term is often used to refer to infectious microorganisms, such as bacteria, viruses or fungi.

PCR It stands for Polymerase-chain reaction. It is a technology in molecular biology used to amplify a single copy or a few copies of a piece of DNA across several orders of magnitude, generating thousands to millions of copies of a particular DNA sequence. It is used in Microbiology to identify the presence of bacterial, fungal or viral DNA or RNA in clinical samples.

Petri dish A shallow cylindrical glass or plastic lidded dish that microbiologists use to culture microorganisms.

Pharmacodynamics (PD) Is the study of the biochemical and physiological effects of drugs on the body or on microorganisms or parasites within or on the body and the mechanisms of drug action.

Pharmacokinetics (PK) The characteristic interactions of a drug and the body in terms of its absorption, distribution, metabolism, and excretion" (Merriam-Webster).

PK/PD Relationship between drug concentration and effect.

Plasmids Circular pieces of DNA, highly variable in size and properties, which may carry the genetic instructions to make bacteria resistant to antibiotics. Plasmids may be transferred between bacteria, so aiding the spread of resistance.

Point prevalence survey (PPS) A prevalence survey is a count of the number of patients with a particular condition/treatment at a particular time.

Prophylactic Medications or treatments that are preventive in the treatment of disease. For example, antimicrobials are sometimes given prophylactically before surgery to prevent infection.

Prophylaxis Treatment given or action taken to prevent infection

Quinolones A family of antibiotics with a broad-spectrum of activity.

Resistance A property of some bacteria which renders certain antibiotics ineffective against them in the laboratory or when they are used to treat infections. Resistance may be an intrinsic characteristic, or may be acquired and selected by exposure to antibiotics. The latter category frequently has greater public health significance.

Rifampicin A broad-spectrum antibiotic principally used to treat tuberculosis.

Risk factor An activity or factor that may increase the chance of developing a disease. For example, smoking is a risk factor for lung cancer.

Sepsis A serious medical condition that is characterised by a whole- body inflammatory state (called a systemic inflammatory response syndrome or SIRS) and the presence of a known or suspected infection.

Solid tumours Cancers of solid organs, such as lung, breast, prostate, liver etc.

Spectrum The range of organisms against which an antimicrobial has an effective action.

Staphylococcus aureus (S. aureus) A Gram positive bacterium responsible for many types of human infections, particularly infections of the skin.

Strain A strain is a genetic variant or subtype of a microorganism (e.g. a virus, bacterium or fungus). Some strains may be more dangerous or difficult to treat than others.

Streptococcus pneumoniaE (S. pneumoniae, pneumococcus) A Gram-positive bacterium that causes several severe human infections, particularly infections of the lung, meninges, ear and sinuses

Superbug A pathogenic microorganism and especially a bacterium that has developed resistance to the medications normally used against it

Super-infection An infection that happens following or in addition to an earlier infection

Surgical site infection An infection at the site of a surgical operation that is caused by the operation.

Surveillance Surveillance of antimicrobial resistance is the tracking of changes in microbial populations

Therapeutic window The range of concentrations in which an antibiotic is effective but not toxic.

Therapeutic drug monitoring (TDM) Measuring the concentration of antibiotic in the body – usually the concentration in the blood.

Time-dependent antibiotics Those classes of antibiotics whose killing response is dependent on the amount of time their concentration exceeds the MIC for the microorganism.

Time > MIC The cumulative percentage of time over a 24 h period that the drug concentration exceeds the MIC.

Tolerance The ability of a bacterial strain to not be killed by an antibiotic at relatively high concentrations even though it may be inhibited by much lower concentrations.

Toxicity Poisoning; side effects produced by higher concentrations than the body can normally tolerate.

Toxins Poisons: chemicals that produce disease.

Urinary tract infection (UTI) Infection of the bladder, ureters or kidneys.

Urine culture A urine culture is a test to find and identify germs (usually bacteria) that may be causing a urinary tract infection (UTI). In order to avoid culture contaminations, urine collection process must be carefully followed.

Vancomycin An antibiotic of the glycopeptide group, with activity almost exclusively against Gram-positive bacteria.

Ventilator associated pneumonia A pneumonia occurring in a patient within 48 hours or more after intubation (insertion of a breathing tube, via the mouth or through a tracheostomy, into the airway) which was not present before.

VRSA Vancomycin resistant Staphylococcus aureus; S. aureus resistant to vancomycin.