



## QUIZ ANSWER SHEET

<p><b>Question 1.</b> Overuse of broad spectrum antibiotics can drive antimicrobial resistance. True or false?</p>	<p><b>True:</b> When antimicrobials are necessary to treat an infection that is not life-threatening, a narrow-spectrum antibiotic should generally be first choice. Indiscriminate use of broad-spectrum antibiotics creates a selective advantage for bacteria resistant to these 'last-line' broad-spectrum agents, and also kills normal commensal flora leaving people susceptible to antibiotic-resistant harmful bacteria such as <i>Clostridium difficile</i> (<b>C. difficile</b>).</p> <p>Collignon P. Antimicrobial resistance. Med J Aust 2002; 177: 325-329</p>
<p><b>Question 2.</b> The risk of mortality without access to effective antibiotics may make some treatments and surgical procedures too risky to continue. True or false?</p>	<p><b>True:</b> Modern medicine, especially surgery and cancer treatments, depends on effective antibiotics to minimise the risk of infection. Currently, antibiotics reduce post-operative infection rates to below 2.0%. Without effective antibiotics, this could increase to around 40% to 50%. Up to 30% of these patients could die from resistant bacterial infections. The risk of mortality without access to effective antibiotics may make some treatments and surgical procedures too risky to continue</p> <p>Teillant A, Gandra S, Barter D, Morgan DJ, Laxminarayan R. Potential burden of antibiotic resistance on surgery and cancer chemotherapy antibiotic prophylaxis in the USA: a literature review and modelling study. Lancet Infect Dis 2015; 15: 1429–37</p>
<p><b>Question 3.</b> Use of antibiotics only has an impact on the patient taking them. True or false?</p>	<p><b>False:</b> Use of antibiotics has an impact not just for the patient using them but the global community as well. The more antimicrobials are used, the more likely it is that resistance will develop.</p> <p>Jasper Littmann, A. M. Viens; The Ethical Significance of Antimicrobial Resistance, <i>Public Health Ethics</i>, Volume 8, Issue 3, 1 November 2015, Pages 209–224, <a href="https://doi.org/10.1093/phe/phv025">https://doi.org/10.1093/phe/phv025</a></p>



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<p><b>Question 4.</b> The development of antibiotic resistance took many years to emerge and was completely unexpected. True or false?</p>	<p><b>False:</b> Antibiotics were first prescribed in the 1940's, and penicillin resistance became a substantial clinical issue in the 1950's. In an interview shortly after winning the Nobel Prize in 1945 for discovering penicillin, Alexander Fleming said: "The thoughtless person playing with penicillin treatment is morally responsible for the death of the man who succumbs to infection with the penicillin-resistant organism."</p> <p>John G. Bartlett, David N. Gilbert, Brad Spellberg; Seven Ways to Preserve the Miracle of Antibiotics, <i>Clinical Infectious Diseases</i>, Volume 56, Issue 10, 15 May 2013, Pages 1445–1450, <a href="https://doi.org/10.1093/cid/cit070">https://doi.org/10.1093/cid/cit070</a></p>
<p><b>Question 5.</b> Antimicrobial use is unrelated to the development of antimicrobial resistance. True or false?</p>	<p><b>False:</b> Antimicrobial use is a key factor in the development of antimicrobial resistance – the more antimicrobials are used, the more likely it is that resistance will develop.</p> <p>Bronzwaer SLAM, Cars O, Buchholz U, et al. The Relationship between Antimicrobial Use and Antimicrobial Resistance in Europe. <i>Emerging Infectious Diseases</i>. 2002;8(3):278-282. doi:10.3201/eid0803.010192.</p>
<p><b>Question 6.</b> There are some antimicrobials where oral administration is as effective as intravenous such as azithromycin, metronidazole and moxifloxacin. True or false?</p>	<p><b>True:</b> Wherever possible it is preferable to use the oral formulation of antimicrobials over the intravenous form if they have equivalent bioavailability. Using oral formulation reduces the risk of cannula site infections, is usually cheaper and easier to administer.</p> <p>Whilst this is true, there are some situations where this may not be possible. For example if the patient is nil by mouth, has compromised oral absorption, mucositis or a serious infection such as endocarditis.</p> <p>Cyriac JM, James E. Switch over from intravenous to oral therapy: A concise overview. <i>Journal of Pharmacology &amp; Pharmacotherapeutics</i>. 2014;5(2):83-87. doi:10.4103/0976-500X.130042.</p>



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<p><b>Question 7.</b> Approximately 22% of all prescriptions in Australian hospitals are inappropriate. True or false?</p>	<p><b>True:</b> The 2017 Hospital National Antimicrobial Prescribing Survey (NAPS) demonstrated that 22.4% of all prescriptions surveyed were inappropriate.</p> <p><a href="https://www.safetyandquality.gov.au/antimicrobial-use-and-resistance-in-australia/naps-2/?section=4">https://www.safetyandquality.gov.au/antimicrobial-use-and-resistance-in-australia/naps-2/?section=4</a></p>
<p><b>Question 8.</b> Antimicrobial Stewardship (AMS) aims to improve patient outcomes and safety whilst reducing antimicrobial resistance. True or false?</p>	<p><b>True:</b> This is correct. Read Antimicrobial Stewardship in Australian Hospitals for more information.</p> <p><a href="https://www.safetyandquality.gov.au/wp-content/uploads/2018/05/AMSAH-Book-WEB-COMPLETE.pdf">https://www.safetyandquality.gov.au/wp-content/uploads/2018/05/AMSAH-Book-WEB-COMPLETE.pdf</a></p>
<p><b>Question 9.</b> Antimicrobial Stewardship (AMS) is about the getting the right antibiotic to the right patient at the right time, in the right dose, via the right route for the right duration. True or false?</p>	<p><b>True:</b> This is correct. Read Antimicrobial Stewardship in Australian Hospitals for more information.</p> <p><a href="https://www.safetyandquality.gov.au/wp-content/uploads/2018/05/AMSAH-Book-WEB-COMPLETE.pdf">https://www.safetyandquality.gov.au/wp-content/uploads/2018/05/AMSAH-Book-WEB-COMPLETE.pdf</a></p>
<p><b>Question 10.</b> Only infectious diseases doctors have a role in antimicrobial stewardship (AMS). True or false?</p>	<p><b>False:</b> Antimicrobial stewardship is a multidisciplinary effort.</p> <p><a href="https://www.safetyandquality.gov.au/wp-content/uploads/2018/05/AMSAH-Book-WEB-COMPLETE.pdf">https://www.safetyandquality.gov.au/wp-content/uploads/2018/05/AMSAH-Book-WEB-COMPLETE.pdf</a></p>
<p><b>Question 11.</b> Upper respiratory tract infections only get better with antibiotics. True or false?</p>	<p><b>False:</b> Upper respiratory tract infections are usually caused by viruses. Antibiotics are not effective against viruses.</p> <p>Hirschmann JV. Antibiotics for Common Respiratory Tract Infections in Adults. <i>Arch Intern Med.</i>2002;162(3):256–264. doi:10.1001/archinte.162.3.256</p>



<p><b>Question 12.</b> Selection pressure for resistant organisms can develop within a patient over time when they have prolonged surgical prophylaxis to an antibiotic such as cefazolin. True or false?</p>	<p><b>True:</b> Individuals can develop resistance to the antimicrobials they are exposed to.</p> <p><a href="#">Harbarth S, Samore MH, Lichtenberg D, Carmeli Y. Prolonged antibiotic prophylaxis after cardiovascular surgery and its effect on surgical site infections and antimicrobial resistance. <i>Circulation</i>. 2000 Jun 27;101(25):2916-21.</a></p>
<p><b>Question 13.</b> There are no adverse effects associated with antibiotic use. True or false?</p>	<p><b>False:</b> All medications can be associated with adverse effects in varying degrees of likelihood.</p> <p>Tamma PD, Avdic E, Li DX, Dzintars K, Cosgrove SE. Association of Adverse Events With Antibiotic Use in Hospitalized Patients. <i>JAMA Intern Med</i>. 2017;177(9):1308–1315. doi:10.1001/jamainternmed.2017.1938</p>
<p><b>Question 14.</b> All antimicrobials have a standard dosage. True or false?</p>	<p><b>False:</b> All antimicrobials have different pharmacokinetic profiles. Some are lipophilic, meaning they are distributed into fat. Dosing for these antimicrobials should take a patient's weight into consideration and be calculated as mg/kg. Other factors for antimicrobial dosing would be to consider whether the patient is critically unwell, as these patients have different haemodynamic parameters.</p> <p>Onufrak NJ, Forrest A, Gonzalez D. Pharmacokinetic and Pharmacodynamic Principles of Anti-Infective Dosing. <i>Clinical therapeutics</i>. 2016;38(9):1930-1947. doi:10.1016/j.clinthera.2016.06.015.</p>
<p><b>Question 15.</b> Hand hygiene is critically important in preventing the spread of antimicrobial resistance. True or false?</p>	<p><b>True:</b> Good infection control practice, such as hand hygiene, is essential in preventing the spread of antimicrobial resistance, as resistant bacteria can spread to other patients.</p> <p>Weinstein RA. Controlling antimicrobial resistance in hospitals: infection control and use of antibiotics. <i>Emerging Infectious Diseases</i>. 2001;7(2):188-192.</p>



<p><b>Question 16.</b> Good antibiotic prescribing practice includes clearly documenting the indication and review date. True or false?</p>	<p><b>True:</b> Antibiotics should be used for short defined periods of time. Prescribers should clearly document the indication and review plan for the antibiotic they are prescribing so they are used in the most appropriate way for the shortest possible period of time.</p> <p><a href="https://www.safetyandquality.gov.au/wp-content/uploads/2018/05/AMSAH-Book-WEB-COMPLETE.pdf">https://www.safetyandquality.gov.au/wp-content/uploads/2018/05/AMSAH-Book-WEB-COMPLETE.pdf</a></p>
<p><b>Question 17.</b> Many patients who are labelled with antibiotic allergies may not actually have a true allergy. True or false?</p>	<p><b>True:</b> The prevalence of antibiotic allergy labels has been estimated to be 10–20%; they have a significant impact on the use of antimicrobials. Many reported allergies are actually adverse effects rather than allergies.</p> <p>Trubiano J, Phillips E. Antimicrobial stewardship's new weapon? A review of antibiotic allergy and pathways to 'de-labeling'. <i>Curr Opin Infect Dis</i> 2013;26(6):526–37</p>
<p><b>Question 18.</b> The most common critical antimicrobial resistance (CAR) reported for Australian hospitals is Carbapenemase-producing Enterobacterales (CPE). True or false?</p>	<p><b>True:</b> Read the latest CARAlert report using the link below.</p> <p><a href="https://www.safetyandquality.gov.au/antimicrobial-use-and-resistance-in-australia/what-is-aura/national-alert-system-for-critical-antimicrobial-resistances-caralert/">https://www.safetyandquality.gov.au/antimicrobial-use-and-resistance-in-australia/what-is-aura/national-alert-system-for-critical-antimicrobial-resistances-caralert/</a></p>
<p><b>Question 19.</b> There is little variation in community antibiotic use across geographic regions in Australia. True or false?</p>	<p><b>False:</b> There is significant variation in antibiotic use across geographical areas of Australia. See the Australian Atlas of Healthcare Variation for more information.</p> <p><a href="http://atlas-acsqhc.opendata.arcgis.com/">http://atlas-acsqhc.opendata.arcgis.com/</a></p>
<p><b>Question 20.</b> <i>Clostridium difficile</i> is a common complication of antibiotic use. True or false?</p>	<p><b>True:</b> The use of antibiotics disturbs normal gastrointestinal flora and <i>Clostridium difficile</i> infections can occur as a result.</p> <p>Balch A, Wendelboe AM, Vesely SK, Bratzler DW. Antibiotic prophylaxis for surgical site infections as a risk factor for infection with <i>Clostridium difficile</i>. Conly J, ed. <i>PLoS ONE</i>. 2017;12(6):e0179117. doi:10.1371/journal.pone.0179117.</p>