

Disease Captain's Tryouts Key

#	Pts.	Answer + Breakdown (76 total possible points)
1	3	+1 for correct example of an epidemic (SARS, etc.) +1 for correct example of a pandemic (HIV, Spanish Flu, etc.) +1 for correct description of the difference (pandemic is a global epidemic)
2	2	+1 for correct definition of zoonosis (disease originating in animals that can be transmitted to humans) +0.5 for each correct example (ebola, H1N1, H5N1, BSE, etc.)
3	3	+1 for recognizing that a reservoir is the habitat of an infectious agent, where it lives, grows and multiples +1 for explaining that a fomite is just an inanimate object an agent can survive on, not necessarily the original habitat
4	2	+1 for John Snow +1 for spot map as the tool
5	2	+1 for explanation of Koch's postulates (set of 4 rules for identifying microbe that causes a disease) +1 for explaining that types of agents (e.g. viruses) found after Koch can't be confirmed through his postulates
6	3	+1 for each correct curve and characteristics <ul style="list-style-type: none"> • Point-source (early peak and continuous decrease) • Continuous (plateau) • Propagated (increasingly large peaks)
7	2	+1 for explaining we need to reach the herd immunity threshold +1 for identifying either children OR the elderly as being protected
8	3	+1 for each correctly defined type of bias (up to 2 points) +1 for identifying the bias as confirmation bias
9	3	+0.5 for each match of the correct study type with the correct statistic <ul style="list-style-type: none"> • Case-control goes with odds ratio • Relative risk goes with a cohort study +1 point for explaining that since the size of the cohort is unknown in a case-control study, true risk cannot be calculated so it uses odds ratio
10	1	+1 point for defining a person-year as the observation of 1 individual for the course of 1 year
11	1	+1 for telling you to stratify the study, that is by grouping participants by characteristics like age, gender, etc.

12	2	+1 DS with similar symptoms carried by the same <i>Aedes</i> mosquito vector +1 need laboratory test to identify Zika antigens since symptoms are indistinguishable at a glance
13	3	+1 for explaining the process of RT - the virus RNA is reverse-transcribed into DNA using reverse-transcriptase +1 for explaining the polymerase chain reaction - <i>Taq</i> polymerase is used with primers to amplify the amount of DNA +1 for explaining that the primers are specific to the Zika DNA sequence
14	3	+1 for saying “serologic” or “immunologic” or something to do with identifying antibodies or antigens that correspond to the virus +1 for naming a immunologic laboratory test (up to 2): <ul style="list-style-type: none"> • Western blot • Agglutination • Enzyme immunoassays • etc.
15	2	+1 for identifying it as a Type 1 error +1 for explaining that the antigens of Dengue and Zika are similar, so a large number of false positives occur with a serologic test
16	1	+1 for identifying that specificity needs to be higher <ul style="list-style-type: none"> • Reduce the number of false positives
17	4	+1 for each of the following (up to 4) <ul style="list-style-type: none"> • Get rid of standing water • Spray insecticide (or larvicide) • Put up mesh nets on windows/doors • Wear mosquito repellent
18	1	Cross-sectional
19	1	MMWR (Morbidity and Mortality Weekly Report)
20	3	+1 for identifying it as contact tracing +1 for explaining this is critical to do for highly contagious diseases +1 for an appropriate example of a highly contagious disease (e.g. ebola) <ul style="list-style-type: none"> • DON'T accept Zika virus
21	3	+1 for passive surveillance +1 for weakness of passive surveillance: <ul style="list-style-type: none"> • People don't visit healthcare facilities • Inadequate laboratory support • Under-reporting due to logistical problems +1 for active surveillance
22	1	+1 for explaining that it puts unnecessary pressure on epidemiologists that

		could lead to poor decision making									
23	1	+1 for “mode of transmission”									
24	1	+1 for explaining that incidence is new cases over a period of time, while prevalence is total cases at a specific point in time									
25	2	+0.5 each: <ul style="list-style-type: none"> • Cook • Clean • Chill • Separate 									
26	3	+1 for the correct 2 by 2 table: <table style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr> <td></td> <td style="border-right: 1px solid black; padding: 0 10px;">Disease Y</td> <td style="padding: 0 10px;">Disease N</td> </tr> <tr> <td style="padding-right: 10px;">Ate Seafood Y</td> <td style="border-right: 1px solid black; padding: 0 10px; text-align: center;">21</td> <td style="padding: 0 10px; text-align: center;">14</td> </tr> <tr> <td style="padding-right: 10px;">Ate Seafood N</td> <td style="border-right: 1px solid black; padding: 0 10px; text-align: center;">2</td> <td style="padding: 0 10px; text-align: center;">84</td> </tr> </table> +1 for correct odds ratio: <ul style="list-style-type: none"> • $ad/bc = (21 \cdot 84) / (2 \cdot 14) = 63$ +1 for showing work for odds ratio		Disease Y	Disease N	Ate Seafood Y	21	14	Ate Seafood N	2	84
	Disease Y	Disease N									
Ate Seafood Y	21	14									
Ate Seafood N	2	84									
27	1	+1 for explaining that there is a positive association between the disease and eating seafood since the OR is greater than 1									
28	2	+1 for identifying it as a virus +1 for giving an appropriate example (e.g. adenovirus, norovirus, retrovirus, parvovirus, etc.)									
Multiple Choice - Must have all correct answers for 1 point, no partial credit											
29	1	A and C									
30	1	A, B, C and D									
31	1	D only									
32	1	B and C									
33	1	D									
34	1	A, B, and C									
35	1	C and D									
Bonus-ish Question											

36	8	<p>+1 for each correct definition of the population mean (2 total)</p> <ul style="list-style-type: none"> • μ_1: mean IQ of Science Olympians • μ_2: mean IQ of speech and debaters <p>+1 for having a null hypothesis</p> <ul style="list-style-type: none"> • $H_0: \mu_1 = \mu_2$ <p>+1 for having an alternate hypothesis</p> <ul style="list-style-type: none"> • $H_a: \mu_1 > \mu_2$ <p>+1 for the correct t value</p> <ul style="list-style-type: none"> • 4.098 <p>+1 for showing work</p> <ul style="list-style-type: none"> • $t = \frac{135 - 125}{\sqrt{\frac{30^2}{132} + \frac{23^2}{100}}}$ <p>+1 for stating that we reject the null</p> <p>+1 for explaining that since t is greater than 1.66, we have sufficient evidence to reject the null</p>
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