You and your partner may take this test apart to answer the questions. Write your answers directly on the answer sheet.

Announcement: Global Handwashing Day — October 15, 2015

October 15, 2015, marks the 8th annual Global Handwashing Day. Handwashing with soap has an important role in child survival and health. About 1.8 million children aged <5 years die each year from diarrheal diseases and pneumonia, the top two causes of death among young children globally.

Table 2
Estimates of diarrhoea deaths among children aged less than 5 years in low- and middle-income regions of the world, 2004

<table>
<thead>
<tr>
<th>WHO region</th>
<th>Mortality stratum</th>
<th>Average of diarrhoea-proportional mortality (%)</th>
<th>Estimated diarrhoea deaths (thousands)</th>
<th>Uncertainty ranges (thousands)</th>
</tr>
</thead>
<tbody>
<tr>
<td>African (AFR)</td>
<td>D</td>
<td>17.8</td>
<td>402</td>
<td>346–455</td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>17.5</td>
<td>365</td>
<td>315–413</td>
</tr>
<tr>
<td>Americas (AMR)</td>
<td>B</td>
<td>13.3</td>
<td>35</td>
<td>30–40</td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>14.9</td>
<td>14</td>
<td>12–16</td>
</tr>
<tr>
<td>Eastern Mediterranean (EMR)</td>
<td>B</td>
<td>13.4</td>
<td>12</td>
<td>10–14</td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>16.9</td>
<td>221</td>
<td>190–250</td>
</tr>
<tr>
<td>South-East Asia (SEAR)</td>
<td>B</td>
<td>22.3</td>
<td>44</td>
<td>34–53</td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>24.5</td>
<td>651</td>
<td>500–795</td>
</tr>
<tr>
<td>Western Pacific (WPR)</td>
<td>B</td>
<td>13.8</td>
<td>105</td>
<td>90–118</td>
</tr>
</tbody>
</table>

WHO subregions are defined on the basis of levels of child and adult mortality: A, very low child and very low adult mortality; B, low child and low adult mortality; C, low child and high adult mortality; D, high child and high adult mortality; E, high child and very high adult mortality.

1. What does WHO stand for?

2. According to Table 2 above, which WHO region has the highest proportional mortality rate for diarrhea deaths in the world?

3. What was the estimated total diarrhea deaths worldwide in 2004?

4. Which subregion has the lowest probability of dying from diarrhea as a small child: A, B, C, D, or E?
The effect of handwashing with water or soap on bacterial contamination of hands.

Burton M, Cobb E, Donachie P, Judah G, Curtis V, Schmidt WP.

**Abstract**

Handwashing is thought to be effective for the prevention of transmission of diarrhoea pathogens. However it is not conclusive that handwashing with soap is more effective at reducing contamination with bacteria associated with diarrhoea than using water only. In this study 20 volunteers contaminated their hands deliberately by touching door handles and railings in public spaces. They were then allocated at random to (1) handwashing with water, (2) handwashing with non-antibacterial soap and (3) no handwashing. Each volunteer underwent this procedure 24 times.

**Figure 1**

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5. What is the control group in this study?

6. What was the total sample size for this study?

7. According to this study, after touching public spaces, how often will you have bacteria of potential faecal origin on your hands?

8. According to this study, is hand washing with soap and water more effective at removing bacteria than by washing with water alone?
Effects of Hand Hygiene Campaigns on Incidence of Laboratory-confirmed Influenza and Absenteeism in Schoolchildren, Cairo, Egypt

Maha Talaat, Salma Afifi, Erica Dueger, Nagwa El-Ashry, Anthony Marfin, Amr Kandeel, Emad Mohareb, and Nasr El-Sayed


Table 2
Incidence of absences caused by illness and reasons for absence in control and intervention schools, Cairo, Egypt, February 16–May 12, 2008*

<table>
<thead>
<tr>
<th>Absence caused by illness</th>
<th>Control, n = 282,832 student-weeks</th>
<th>Intervention, n = 250,584 student-weeks</th>
<th>Reduction, %</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. episodes</td>
<td>Median (IQR)</td>
<td>No. episodes</td>
<td>Median (IQR)</td>
</tr>
<tr>
<td>Overall illness</td>
<td>19,094</td>
<td>7.2 (3.3–9.5)</td>
<td>13,247</td>
<td>5.7 (3.4–7.6)</td>
</tr>
<tr>
<td>ILI</td>
<td>1,671</td>
<td>0.5 (0.3–1.1)</td>
<td>917</td>
<td>0.3 (0.1–0.7)</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>1,316</td>
<td>0.3 (0.1–0.6)</td>
<td>639</td>
<td>0.2 (0.0–0.5)</td>
</tr>
<tr>
<td>Conjunctivitis</td>
<td>1,214</td>
<td>0.3 (0.1–0.6)</td>
<td>530</td>
<td>0.1 (0.0–0.4)</td>
</tr>
</tbody>
</table>

*AQR, interquartile range; ILI, influenza-like illness.

9. According to this study, determine the median % reduction in episodes of missed school for each group above.

A.

B.

C.

D.

10. What disease were scientists tracking in this study?

11. Describe three modes of transmission for this disease.

A.

B.

C.

12. As the population in an area increases, explain why this disease is more likely to spread.

13. With this information about a simple way to decrease disease and death, explain 2 reasons why people in developing countries do not routinely wash their hands with soap.
For each of the variables for your patient listed below, identify what type of variable it is.

A. Nominal  
B. Ordinal  
C. Interval  
D. Ratio

14. _____ DOB: November 12, 1948
15. _____ Raleigh, NC
16. _____ 67 years old
17. _____ Male
18. _____ 6cm tumor
19. _____ Stage 3 Liver Cancer

At an influenza immunization clinic at a retirement community, residents were asked in how many previous years they had received influenza vaccine. The answers from the first 19 residents are listed below.

20. Organize these data into a frequency distribution.
   
   2, 0, 3, 1, 0, 1, 2, 2, 4, 8, 1, 3, 3, 12, 1, 6, 2, 5, 1
21. Determine the mean, median and mode for the data set above.
   Mean:

   Median:

   Mode:

   **People infected with the outbreak strain of *E. coli* O26, by date of illness onset**

22. Using the data above, what is N equal to?
   
   \[ N = \square \]

23. Is this graph positively or negatively skewed?
24. Should this incident be considered:
   a. An epidemic
   b. A pandemic
   c. An outbreak
   d. A coincidence

Information about *E. coli* is provided on the following page. After studying this information, outline the chain of infection by identifying the following:

25. Reservoirs:

26. Portals of exit:

27. Modes of transmission:

28. Portals of entry:

29. Factors in host susceptibility:

30. Incubation period:

31. Agent:
*Escherichia coli* (*E. coli*) bacteria normally live in the intestines of people and animals. Most *E. coli* are harmless and actually are an important part of a healthy human intestinal tract. However, some *E. coli* are pathogenic, meaning they can cause illness, either diarrhea or illness outside of the intestinal tract. The types of *E. coli* that can cause diarrhea can be transmitted through contaminated water or food, or through contact with animals or persons.

*E. coli* consists of a diverse group of bacteria. Pathogenic *E. coli* strains are categorized into pathotypes. Six pathotypes are associated with diarrhea and collectively are referred to as diarrheagenic *E. coli*.

Compared with STEC O157 infections, identification of non-O157 STEC infections is more complex. First, clinical laboratories must test stool samples for the presence of Shiga toxins. Then, the positive samples must be sent to public health laboratories to look for non-O157 STEC. Clinical laboratories typically cannot identify non-O157 STEC. Other non-O157 STEC serogroups that often cause illness in people in the United States include O26, O111, and O103. Some types of STEC frequently cause severe disease, including bloody diarrhea and hemolytic uremic syndrome (HUS), which is a type of kidney failure. People of any age can become infected. Very young children and the elderly are more likely to develop severe illness and hemolytic uremic syndrome (HUS) than others, but even healthy older children and young adults can become seriously ill.

The symptoms of STEC infections vary for each person but often include severe stomach cramps, diarrhea (often bloody), and vomiting. If there is fever, it usually is not very high (less than 101°F/less than 38.5°C). Most people get better within 5–7 days. Some infections are very mild, but others are severe or even life-threatening.

Around 5–10% of those who are diagnosed with STEC infection develop a potentially life-threatening complication known as hemolytic uremic syndrome (HUS). Clues that a person is developing HUS include decreased frequency of urination, feeling very tired, and losing pink color in cheeks and inside the lower eyelids. Persons with HUS should be hospitalized because their kidneys may stop working and they may develop other serious problems. Most persons with HUS recover within a few weeks, but some suffer permanent damage or die.

The time between ingesting the STEC bacteria and feeling sick is usually 3–4 days after the exposure. The symptoms often begin slowly with mild belly pain or non-bloody diarrhea that worsens over several days. HUS, if it occurs, develops an average 7 days after the first symptoms, when the diarrhea is improving.