Epi 3 Lab Warm-up

At the beginning of each in-person lab session, students will complete a warm-up together as a class using a series of interactive poll questions that provide immediate feedback. These activities will not be graded. However, participating gives students an opportunity to self-assess their comprehension and ask questions.

NOTE: Although I want these to be questions that generate discussion, it has been my experience that using more than one or two “short answer” type questions can sort of gum up the works. Instead, it’s best if you can create multiple-choice or T/F questions that are a little bit tricky and discussion generating. Or, even if the question itself isn’t tricky, following up with “why is that the right answer” can generate some good discussion.

[Socrative](https://b.socrative.com/teacher/#edit-quiz/44842774)

| Question Template | | |
| --- | --- | --- |
|  | Placeholder |  |
|  |  |  |
| X |  | Answer/source |
|  |  |  |

| **Q1**. In general, which conditions must be met for a variable to be a confounder according to traditional (i.e., non-structural) definitions of confounding? (Choose all that apply) | | |
| --- | --- | --- |
| X | The variable needs to be associated with the exposure. | Taken from chapter 5 exercises in Szklo. |
| X | The variable needs to be associated with the outcome. |  |
| X | The variable must not be in the causal pathway between exposure and outcome. |  |
|  | There is a backdoor path from the confounder to the outcome |  |

| **Q2**. The traditional definition of a confounder is sufficient to control confounding in epidemiologic research. | | |
| --- | --- | --- |
|  | True |  |
| X | False | With the help of causal graphs, we can see that there are situations where the traditional criteria and structural definitions of confounding sometimes agree. However, we can also identify situations in which they don’t agree. For example, when the traditional criteria for confounding are met, but adjusting for that variable will actually introduce bias into our effect estimates. |

| **Q3**. In the context of causal research, we say that there is a systematic bias if there is an association between exposure and outcome that does not arise from the causal effect of exposure on outcome. | | |
| --- | --- | --- |
| X | True | Hernan, lesson 2, video 2 |
|  | False |  |

| **Q4**. Confounding can be defined as a source of bias that arises from a shared cause of exposure and outcome. | | |
| --- | --- | --- |
| X | True | Hernan, lesson 2, video 2 |
|  | False |  |

| **Q5**. Any arrow-based route between two variables on a causal graph. Some follow the direction of the arrows and some do not. | | |
| --- | --- | --- |
|  | DAG |  |
|  | Confounder |  |
|  | Cause |  |
| X | Path | Hernan, lesson 2, video 2 |
|  | None of the above |  |

| **Q6**. A \_\_\_\_\_\_ between exposure and outcome is a path that connects exposure and outcome without using any of the arrows that leave from the exposure. | | |
| --- | --- | --- |
|  | path |  |
| X | backdoor path | Hernan, lesson 2, video 2 |
|  | causal path |  |
|  | confounded path |  |
|  | None of the above |  |

| **Q7**. We can identify the causal effect of the exposure on the outcome if we have sufficient data to block all backdoor paths between exposure and outcome. | | |
| --- | --- | --- |
| X | True | Hernan, lesson 2, video 2. This is known as the backdoor path criterion. |
|  | False |  |

| **Q8**. \_\_\_\_\_\_ rules tell us whether a given path is blocked or open. | | |
| --- | --- | --- |
|  | Pearl’s |  |
|  | Path |  |
| X | D-separation | Hernan, lesson 1, video 6. Go look these up if you don’t know them. |
|  | Confounding |  |

| **Q9**. A \_\_\_\_\_\_ is a variable that, possibly together with other variables, can be used to block all backdoor paths between treatment and outcome. | | |
| --- | --- | --- |
| X | Confounder | Hernan, lesson 2, video 3 |
|  | Mediator |  |
|  | Separator |  |
|  | Cause |  |

| **Q10**. Which of the following methods should be used when time-varying confounders are affected by prior treatment? (check all that apply) | | |
| --- | --- | --- |
|  | Stratification |  |
|  | Matching |  |
| X | Inverse probability weighting | Hernan, lesson 2, video 6 |
| X | Standardization |  |
| X | G-estimation |  |

Other ideas and notes:

| **QX**. Confounding is a causal concept. | | |
| --- | --- | --- |
| X | True | Confounding only makes sense in the context of causality. Think about if/how you want to use this. |
|  | False |  |

| **QX**. Generally, we need to use our expert knowledge of the causal structure of a problem to determine whether confounding is present. | | |
| --- | --- | --- |
| X | True | Think about if/how you want to use this. |
|  | False |  |

| **Qx**. Which concept should be of primary concern in epidemiologic studies? | | |
| --- | --- | --- |
| X | Confounding | Go back and look at what Hernan said in the video. |
|  | Confounders |  |
|  | They are the same thing |  |
|  | They are different, but neither is of primary concern. |  |

| **QX**. Stratification-based analysis approaches do not require knowledge about the true causal DAG - False. | | |
| --- | --- | --- |
|  | True |  |
| X | False | Think about if/how you want to use this. |

Path:

* Any arrow-based route between two variables on the graph. Some paths follow the direction of the arrows and some do not.

Backdoor path:

* A backdoor path between A and Y is a path that connects A and Y without using any of the arrows that leave from A.

Backdoor path criterion:

* We can identify the causal effect of A on Y if we have sufficient data to block all backdoor paths between A and Y.

D-Separation rules. Determine if a path is blocked:

1. If there are no variables being conditioned on, a path is blocked if an only if two arrowheads on the path collide at some variable on the path.
2. Any path that contains a non-collider that has been conditioned on is blocked.
3. A collider that has been conditioned on does not block a path.
4. A collider that has a descendant that has been conditioned on does not block a path.

Confounder

* A variable that, possibly together with other variables, can be used to block all backdoor paths between treatment and outcome.
* Once we’ve identified and eliminated confounding, labeling a variable as a confounder (which is context-specific anyway) is not all that relevant.

On average, gender determines age, but does not determine disease through any other mechanism.

