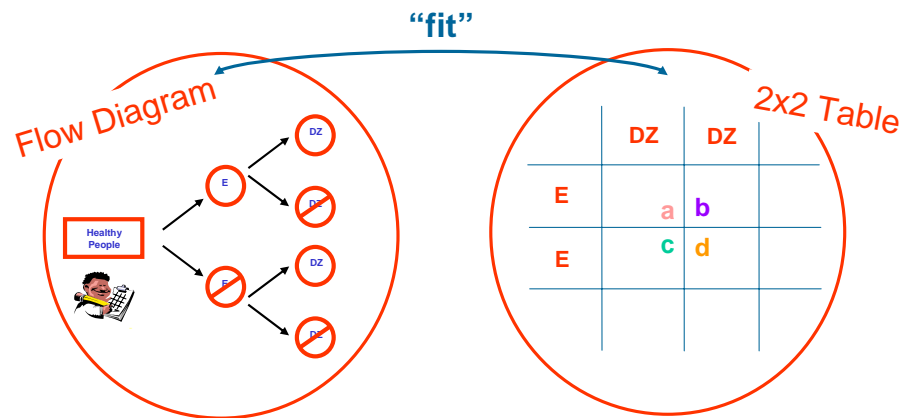


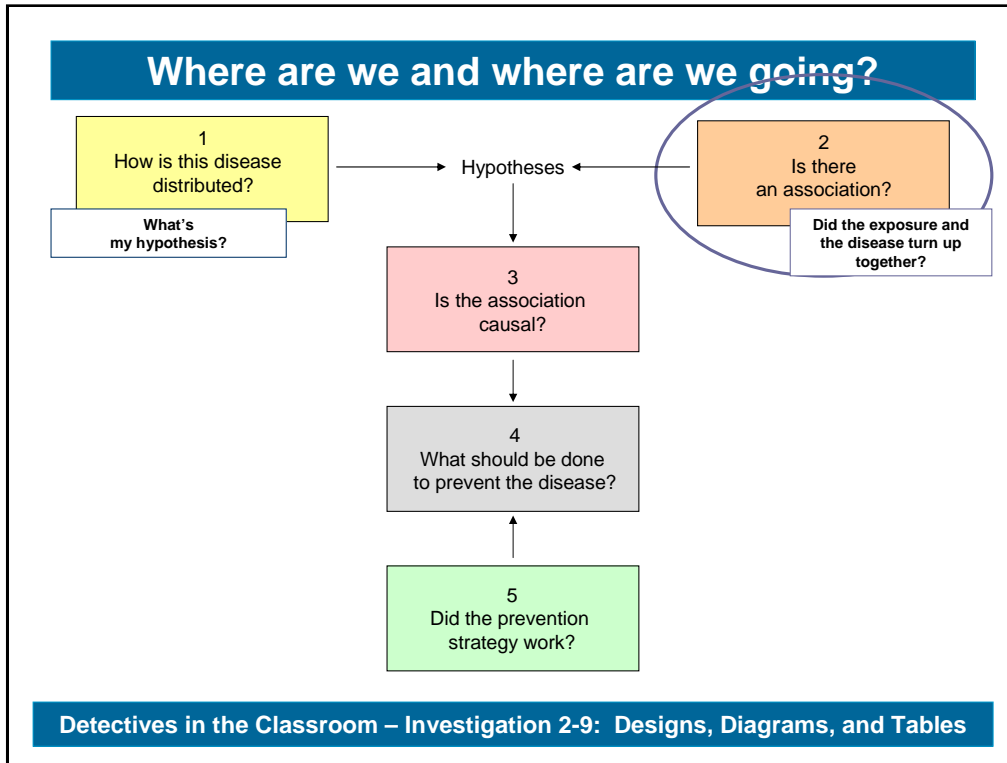
Designs, Diagrams, and Tables



Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

In **Investigation 2-9: Designs, Diagrams, and Tables**, students will identify, for each of the four basic epidemiologic study designs, where data from a flow diagram “fit” into a 2 x 2 table.


Next Slide



Remind students again that in the Module 2 investigations, they are learning how to answer the second Essential Question: “Is there an association between the hypothesized cause and the disease?”

Next Slide


Review



E **Controlled Trial** **DZ**

+++++

+++++



E **Cohort Study** **DZ**


+++++

+++++

Case-Control Study

+++++


+++++



Cross-Sectional Study

+++++

+++++



E

DZ

E

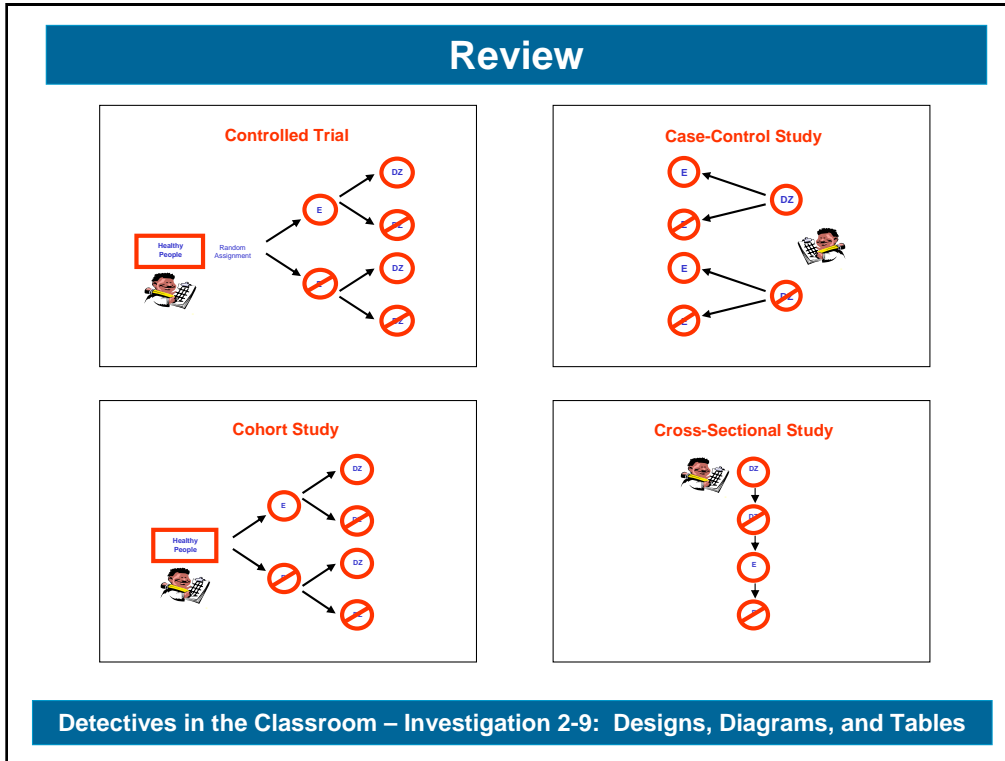
DZ

Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

By now, students have learned a great deal about the four basic study designs: controlled trial, cohort study, case-control study, and cross-sectional study.

Review two major points. First, each design can be depicted as a train ride that shows when the investigator begins to be involved in the study, when he or she assesses exposure status, and when he or she assesses disease status.

Next Slide



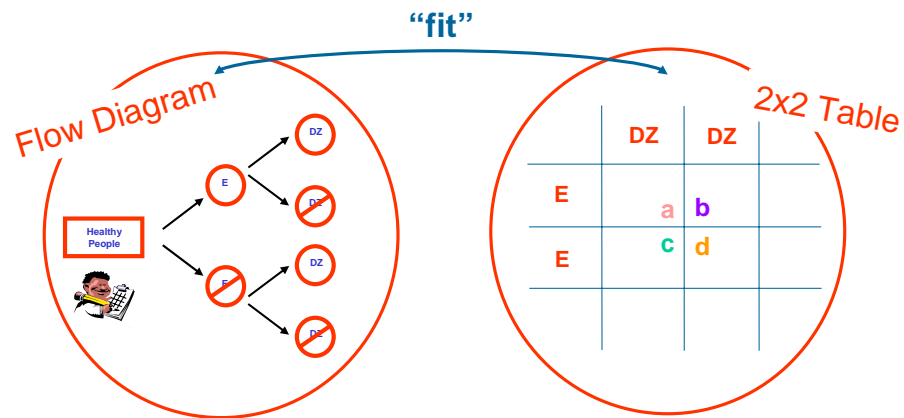
Second, each of the four basic study designs can also be depicted in a flow diagram that shows, in more detail, the sequence of recording disease occurrence and classifying it according to exposure status. Show students these four diagrams and be sure they remember and understand the flow for each.

Ask students:

- How do you think the 2 x 2 table relates to what you have learned about the four study designs?
- Do you think the 2 x 2 table idea works with all the designs?

Next Slide

Designs, Diagrams, and Tables



Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

Review the structure of the 2 x 2 table: 2 rows, 2 columns, and 4 cells.

Review the flow diagram for a cohort study.

By completing **Investigation 2-9: Designs, Diagrams, and Tables**, students will identify, for each of the four basic epidemiologic study designs, where data from a flow diagram fit into a 2 x 2 table. They will also appreciate how, for any study design, the 2 x 2 table is a tool for

- Recording the occurrence of disease
- Classifying disease occurrence according to exposure status
- Calculating the risks of disease among the exposed and unexposed
- Analyzing the differences between risks
- Making inferences based on those differences

Next Slide

Designs, Diagrams, and Tables



Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

Divide the class into Epi Teams of four or five students per team.

Next Slide

Controlled Trial

Flow Diagram

Where do these people "fit" in the 2x2 table?

	DZ	\bar{DZ}	
E	a		
\bar{E}			

2x2 Table

Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

Ask students, working in their Epi Teams, to identify where the people who are circled in the trial flow diagram would fit in the 2 x 2 table. (Cell a)

Next Slide

Controlled Trial

The flow diagram starts with a box labeled "Healthy People". An arrow labeled "Random Assignment" points to two circles: "E" and "~~E~~". From "E", two arrows point to "DZ" and "~~DZ~~". From "~~E~~", two arrows point to "DZ" and "~~DZ~~". The "~~DZ~~" circle in the second row is circled in purple.

Flow Diagram

Where do these people "fit" in the 2x2 table?

	DZ	\overline{DZ}
E		
\overline{E}		b

2x2 Table

Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

Ask students, working in their Epi Teams, to identify where the people who are circled in the trial flow diagram would fit in the 2 x 2 table. (Cell b)

Next Slide

Controlled Trial

Flow Diagram

Where do these people "fit" in the 2x2 table?

	DZ	\overline{DZ}
E		
\overline{E}	c	

2x2 Table

Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

Ask students, working in their Epi Teams, to identify where the people who are circled in the trial flow diagram would fit in the 2 x 2 table. (Cell c)

Next Slide

Controlled Trial

Flow Diagram

Where do these people "fit" in the 2x2 table?

	DZ	\bar{DZ}
E		
\bar{E}		d

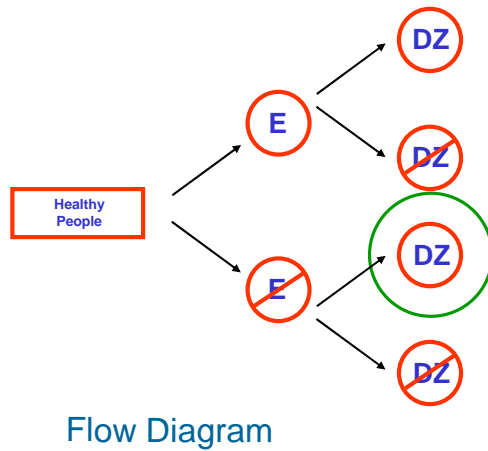
2x2 Table

Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

Ask students, working in their Epi Teams, to identify where the people who are circled in the trial flow diagram would fit in the 2 x 2 table. (Cell d)

Next Slide

Cohort Study



Flow Diagram

Where are these people in the flow diagram?

	DZ	\overline{DZ}
E		
\overline{E}	c	

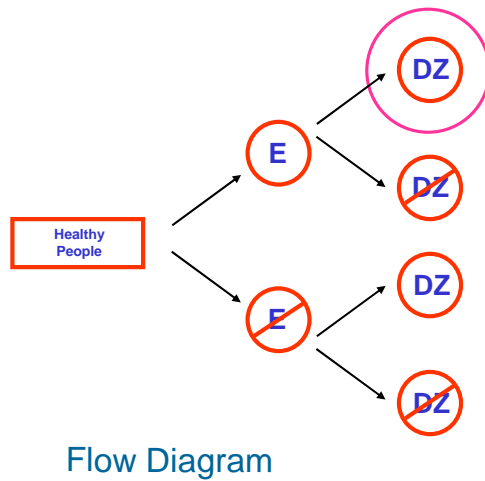
2x2 Table

Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

Now try it backwards for the cohort study. Ask students, working in their Epi Teams, where the people identified in the 2 x 2 table should be located in the flow diagram.

Next Slide

Cohort Study



Where are these people in the flow diagram?

	DZ	\overline{DZ}
E	a	
\overline{E}		

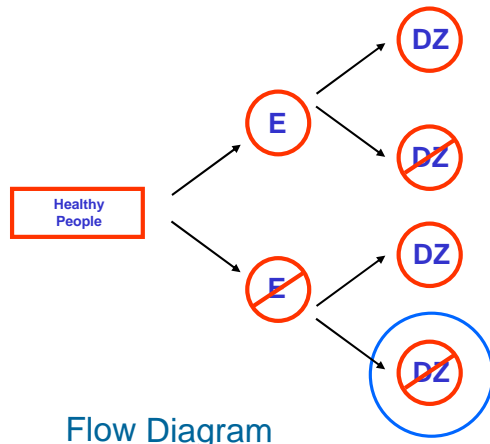
2x2 Table

Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

Ask students, working in their Epi Teams, where the people identified in the 2 x 2 table should be located in the flow diagram.

Next Slide

Cohort Study



Where are these people in the flow diagram?

	DZ	\overline{DZ}	
E			
\overline{E}		d	

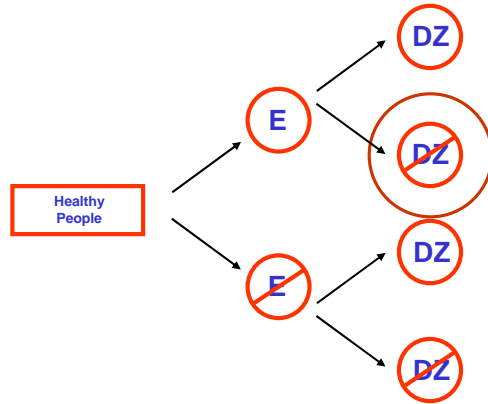
2x2 Table

Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

Ask students, working in their Epi Teams, where the people identified in the 2 x 2 table should be located in the flow diagram.

Next Slide

Cohort Study



Flow Diagram

Where are these people in the flow diagram?

	DZ	\overline{DZ}	
E		b	
\overline{E}			

2x2 Table

Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

Ask students, working in their Epi Teams, where the people identified in the 2 x 2 table should be located in the flow diagram.

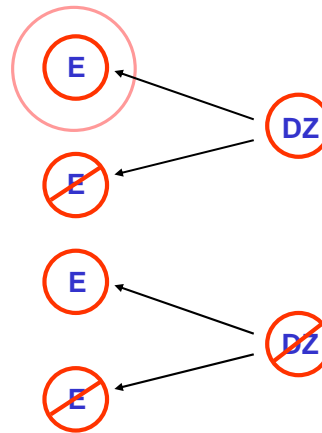
Next Slide

Case-Control Study

Where do these people go in the 2x2 table?

	DZ	\overline{DZ}
E	a	
\overline{E}		

2x2 Table



Flow Diagram

Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

Ask students, working in their Epi Teams, to identify where the people who are circled in the case-control study flow diagram would fit in the 2 x 2 table. (Cell a)

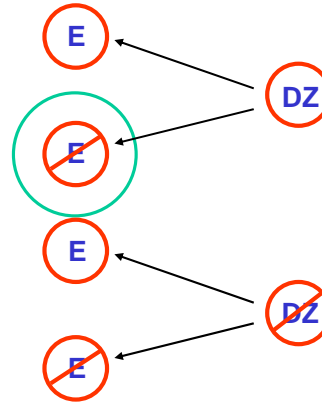
Next Slide

Case-Control Study

Where do these people go in the 2x2 table?

	DZ	\overline{DZ}
E		
\overline{E}	c	

2x2 Table



Flow Diagram

Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

Ask students, working in their Epi Teams, to identify where the people who are circled in the case-control study flow diagram would fit in the 2 x 2 table. (Cell c)

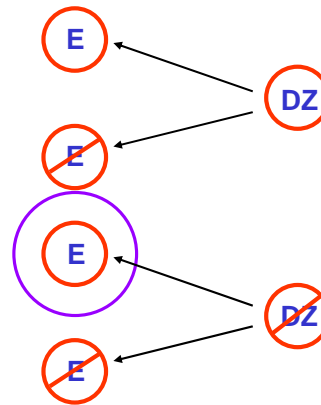
Next Slide

Case-Control Study

Where do these people go in the 2x2 table?

	DZ	\overline{DZ}
E		b
\overline{E}		

2x2 Table



Flow Diagram

Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

Ask students, working in their Epi Teams, to identify where the people who are circled in the case-control study flow diagram would fit in the 2 x 2 table. (Cell b)

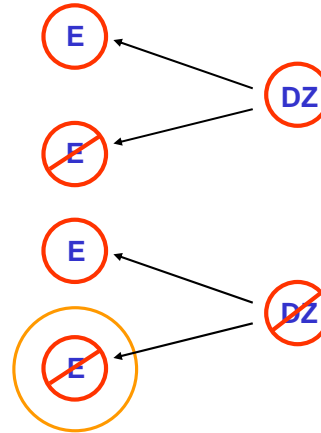
Next Slide

Case-Control Study

Where do these people go in the 2x2 table?

	DZ	\overline{DZ}
E		
\overline{E}		d

2x2 Table



Flow Diagram

Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

Ask students, working in their Epi Teams, to identify where the people who are circled in the case-control study flow diagram would fit in the 2 x 2 table. (Cell d)

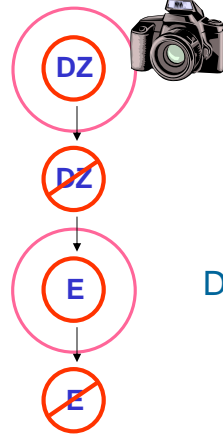
Next Slide

Cross-Sectional Study

Where do these people go in the 2x2 table?

	DZ	\overline{DZ}
E	a	
\overline{E}		

2x2 Table



Flow Diagram

Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

Ask students, working in their Epi Teams, to identify where the people who are circled in the cross-sectional study flow diagram would fit in the 2 x 2 table. (Cell a)

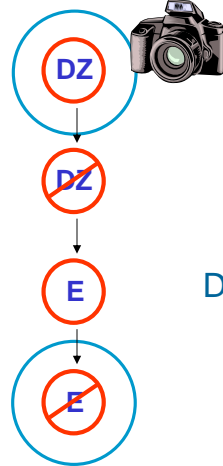
Next Slide

Cross-Sectional Study

Where do these people go in the 2x2 table?

	DZ	\overline{DZ}
E		
\overline{E}	c	

2x2 Table



Flow Diagram

Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

Ask students, working in their Epi Teams, to identify where the people who are circled in the cross-sectional study flow diagram would fit in the 2 x 2 table. (Cell c)

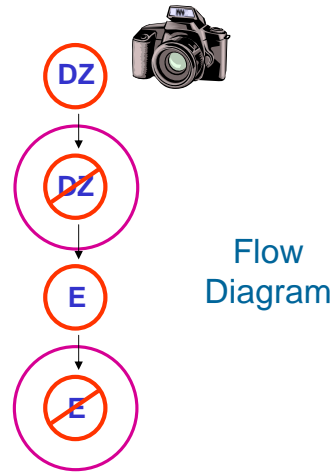
Next Slide

Cross-Sectional Study

Where do these people go in the 2x2 table?

	DZ	\overline{DZ}
E		
\overline{E}		d

2x2 Table



Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

Ask students, working in their Epi Teams, to identify where the people who are circled in the cross-sectional study flow diagram would fit in the 2 x 2 table. (Cell d)

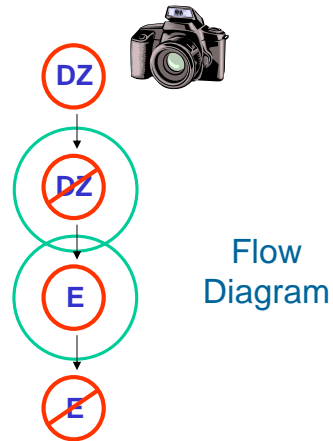
Next Slide

Cross-Sectional Study

Where do these people go in the 2x2 table?

	DZ	\overline{DZ}	
E		b	
\overline{E}			

2x2 Table



Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

Ask students, working in their Epi Teams, to identify where the people who are circled in the cross-sectional study flow diagram would fit in the 2 x 2 table. (Cell b)

Next Slide

Assessment

Detectives in the Classroom Name: _____
Investigation 2-9: Epi Log Worksheet Date: ____/____/____

Assessment

Circle the cell, where the group of people who are circled in the flow diagram "fit" into the 2x2 table.

Questions	Cells			
1	a	b	c	d
2	a	b	c	d
3	a	b	c	d
4	a	b	c	d
5	a	b	c	d
6	a	b	c	d
7	a	b	c	d
8	a	b	c	d
9	a	b	c	d
10	a	b	c	d

Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

Give each student an **Investigation 2-9: Epi Log Worksheet**.

You are now going to show students a series of flow diagrams, each representing one of the four epidemiologic study designs with a particular group of participants circled. Tell students to identify the cell—a, b, c, or d—of the 2 x 2 table where data from the flow diagram would fit.

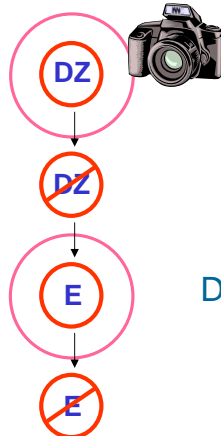
Next Slide

1.

Where do these people "fit" in the 2x2 table?

	DZ	\overline{DZ}	
E	a	b	
\overline{E}	c	d	

2x2 Table



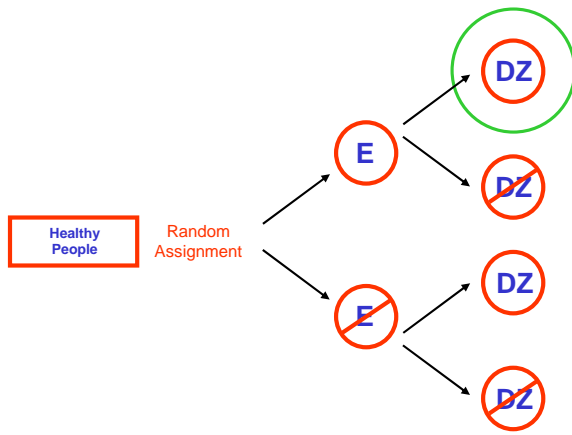
Flow Diagram

Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

Present Flow Diagram 1.

Next Slide

2.



Where do these people "fit" in the 2x2 table?

	DZ	\overline{DZ}	
E	a	b	
\overline{E}	c	d	

Flow Diagram

2x2 Table

Present Flow Diagram 2.

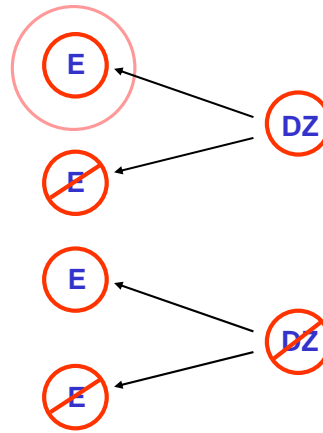
Next Slide

3.

Where do these people "fit" in the 2x2 table?

	DZ	\overline{DZ}	
E	a	b	
\overline{E}	c	d	

2x2 Table



Flow Diagram

Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

Present Flow Diagram 3.

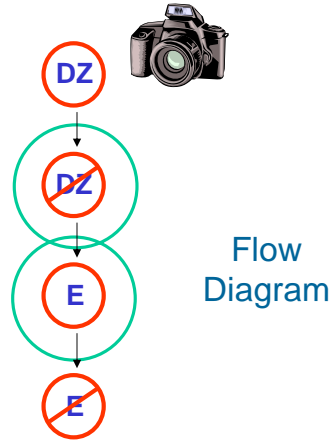
Next Slide

4.

Where do these people "fit" in the 2x2 table?

	DZ	\overline{DZ}	
E	a	b	
\overline{E}	c	d	

2x2 Table

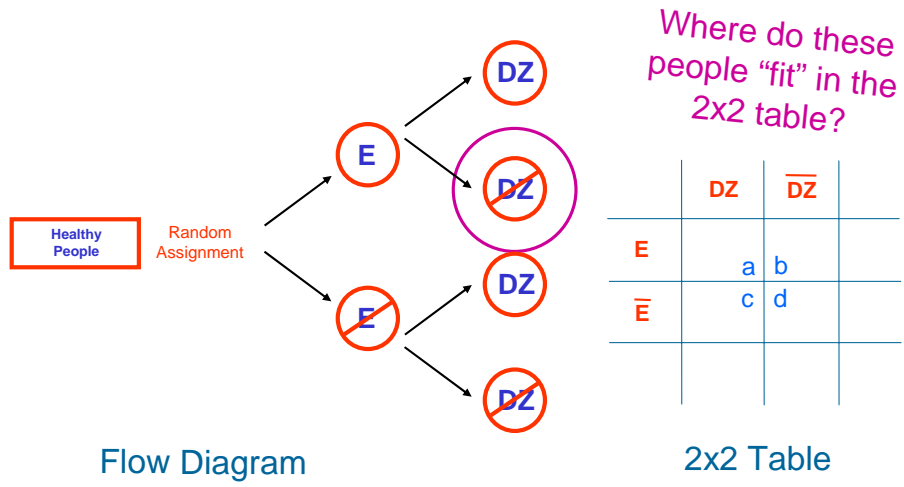


Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

Present Flow Diagram 4.

Next Slide

5.



Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

Present Flow Diagram 5.

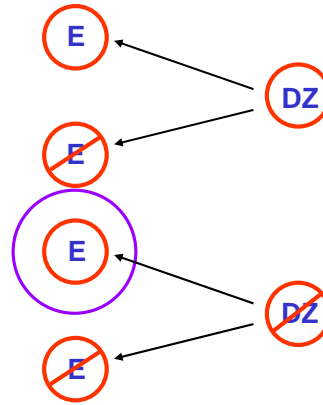
Next Slide

6.

Where do these people "fit" in the 2x2 table?

	DZ	\overline{DZ}	
E	a	b	
\overline{E}	c	d	

2x2 Table



Flow Diagram

Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

Present Flow Diagram 6.

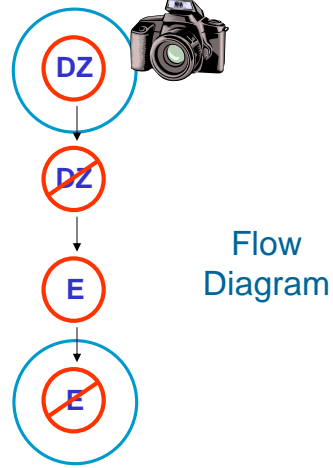
Next Slide

7.

Where do these people "fit" in the 2x2 table?

	DZ	\overline{DZ}
E	a	b
\overline{E}	c	d

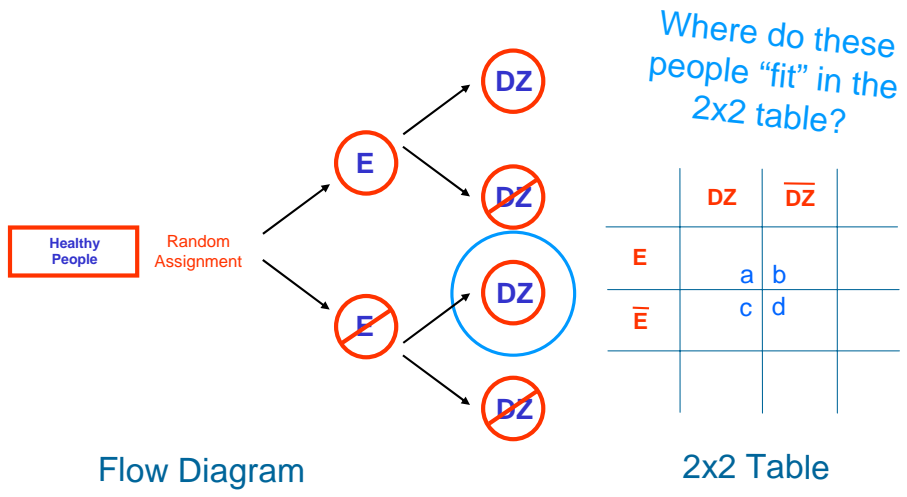
2x2 Table



Present Flow Diagram 7.

Next Slide

8.



Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

Present Flow Diagram 8.

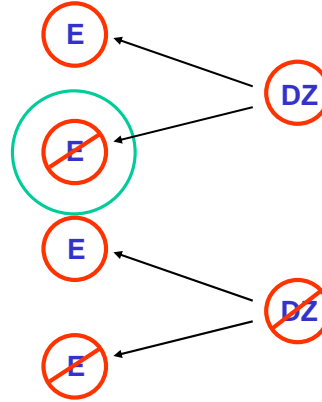
Next Slide

9.

Where do these people "fit" in the 2x2 table?

	DZ	\overline{DZ}
E	a	b
\overline{E}	c	d

2x2 Table



Flow Diagram

Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

Present Flow Diagram 9.

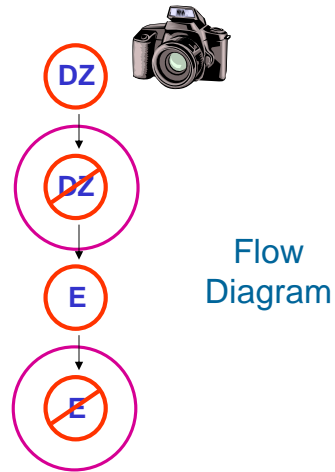
Next Slide

10.

Where do these people "fit" in the 2x2 table?

	DZ	\overline{DZ}
E	a	b
\overline{E}	c	d

2x2 Table



Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

Present Flow Diagram 10.

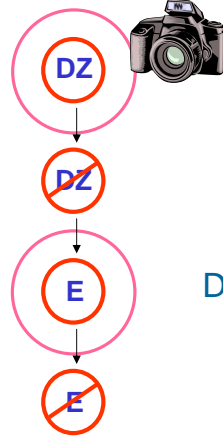
Next Slide

1. (Answer)

Where do these people "fit" in the 2x2 table?

	DZ	\overline{DZ}
E	a	
\overline{E}		

2x2 Table



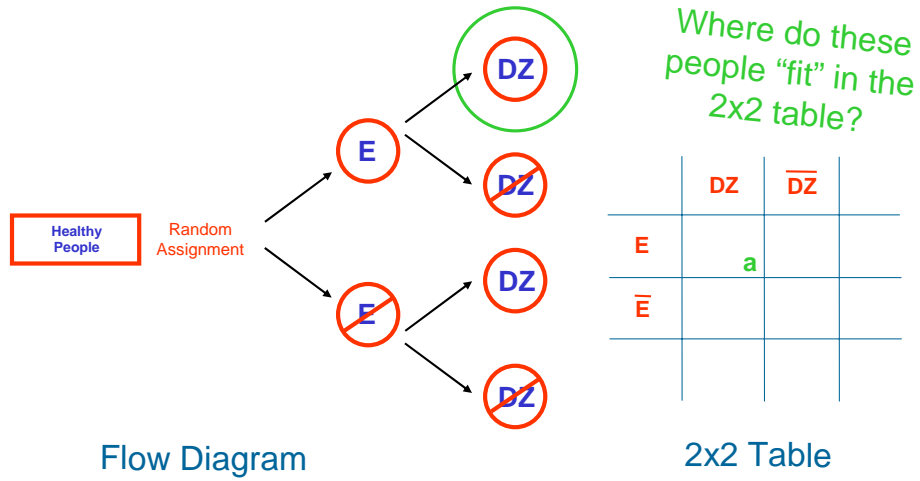
Flow Diagram

Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

Show the answer to Flow Diagram 1. (Participants identified in the flow diagram are in cell a of the 2 x 2 table.)

Next Slide

2. (Answer)



Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

Show the answer to Flow Diagram 2. (Participants identified in the flow diagram are in cell a of the 2 x 2 table.)

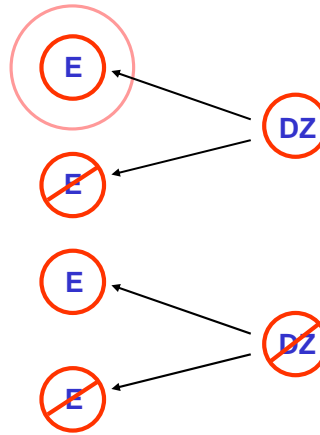
Next Slide

3. (Answer)

Where do these people "fit" in the 2x2 table?

	DZ	\overline{DZ}
E	a	
\overline{E}		

2x2 Table



Flow Diagram

Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

Show the answer to Flow Diagram 3. (Participants identified in the flow diagram are in cell a of the 2 x 2 table.)

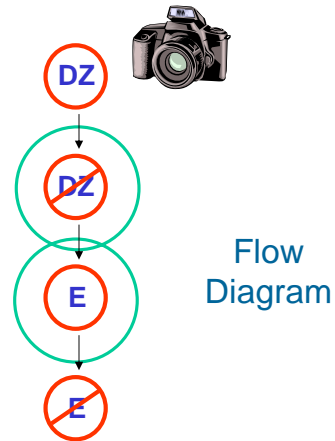
Next Slide

4. (Answer)

Where do these people "fit" in the 2x2 table?

	DZ	\overline{DZ}
E		b
\overline{E}		

2x2 Table

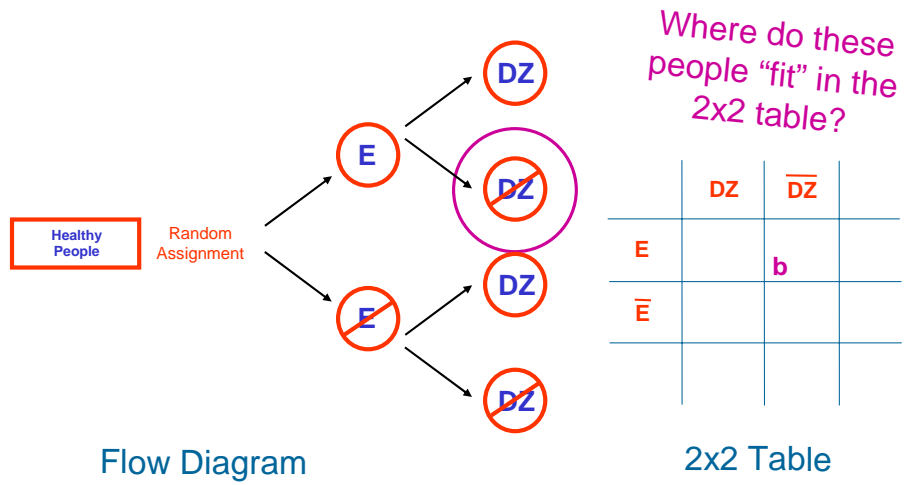


Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

Show the answer to Flow Diagram 4. (Participants identified in the flow diagram are in cell b of the 2 x 2 table.)

Next Slide

5. (Answer)



Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

Show the answer to Flow Diagram 5. (Participants identified in the flow diagram are in cell b of the 2 x 2 table.)

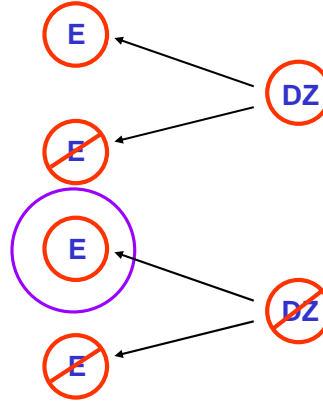
Next Slide

6. (Answer)

Where do these people "fit" in the 2x2 table?

	DZ	\overline{DZ}
E		b
\overline{E}		

2x2 Table



Flow Diagram

Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

Show the answer to Flow Diagram 6. (Participants identified in the flow diagram are in cell b of the 2 x 2 table.)

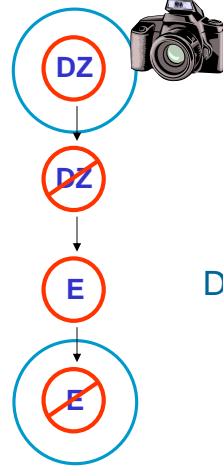
Next Slide

7. (Answer)

Where do these people "fit" in the 2x2 table?

	DZ	\overline{DZ}
E		
\overline{E}	c	

2x2 Table



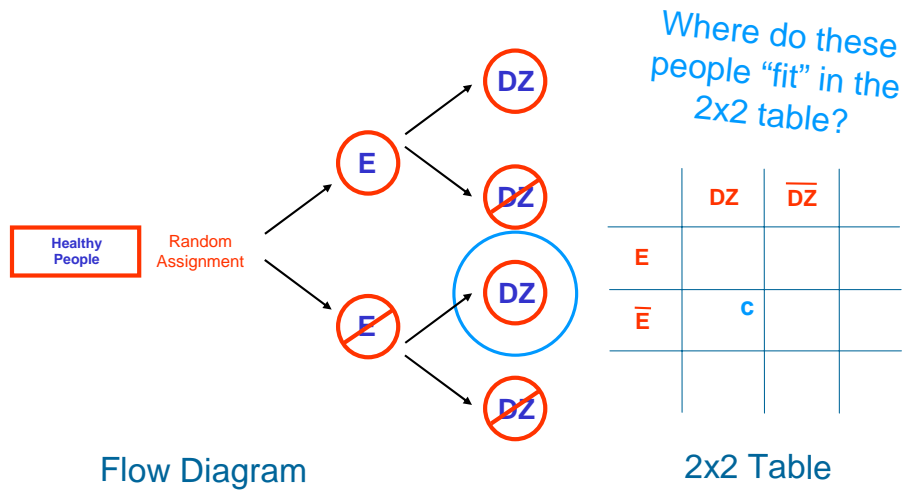
Flow Diagram

Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

Show the answer to Flow Diagram 7. (Participants identified in the flow diagram are in cell c of the 2 x 2 table.)

Next Slide

8. (Answer)



Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

Show the answer to Flow Diagram 8. (Participants identified in the flow diagram are in cell c of the 2 x 2 table.)

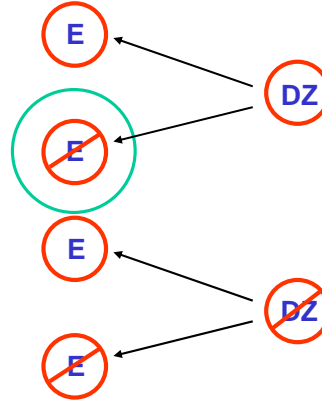
Next Slide

9. (Answer)

Where do these people "fit" in the 2x2 table?

	DZ	\overline{DZ}
E		
\overline{E}	c	

2x2 Table



Flow Diagram

Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

Show the answer to Flow Diagram 9. (Participants identified in the flow diagram are in cell c of the 2 x 2 table.)

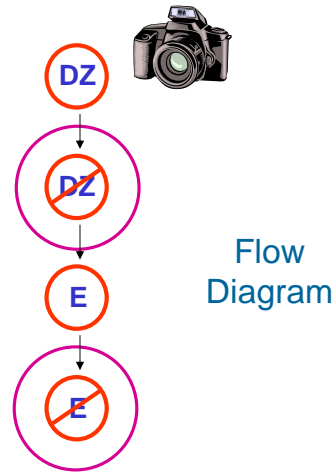
Next Slide

10. (Answer)

Where do these people "fit" in the 2x2 table?

	DZ	\overline{DZ}
E		
\overline{E}		d

2x2 Table



Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

Show the answer to Flow Diagram 10. (Participants identified in the flow diagram are in cell d of the 2 x 2 table.)

Next Slide

Making Sense

There are four basic study designs for testing hypotheses.

Each design has a different plan for assessing exposure and disease.

The plan for each design can be understood by: 1) thinking of a train ride from exposure to disease, and 2) constructing a flow diagram.

Whatever the study design, the assessment of exposure and disease “fits” into a 2x2 table so that a sample’s exposure and disease can be classified, risks calculated, risks compared, and inferences made.

Does this all make sense to you?



Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

In the last few investigations, students have been learning the four basic study designs that epidemiologists use to test hypotheses. Review the following four statements:

1. There are four basic study designs for testing hypotheses.
2. Each design has a different plan for assessing exposure and disease.
3. The plan for each design can be understood by (a) thinking of a train ride from exposure to disease, and (b) constructing a flow diagram.
4. Whatever the study design, data from the assessment of exposure and disease fit into a 2 x 2 table so that a sample’s exposure and disease can be classified, risks calculated, risks compared, and inferences made.

Address any remaining questions.

Next Slide

Designs, Diagrams, and Tables



Detectives in the Classroom – Investigation 2-9: Designs, Diagrams, and Tables

This concludes **Investigation 2-9: Designs, Diagrams, and Tables** and students can now put away their **Epi Logs**.