

Consider a family with a mother, father, and two children. Define the following events.

- A_1 : the event that the mother has influenza
- A_2 : the event that the father has influenza
- A_3 : the event that the first child has influenza
- A_4 : the event that the second child has influenza
- B : the event that at least one child has influenza
- C : the event that at least one person in the family has influenza

1. What does $A_1 \cup A_2$ mean?
2. What does $A_1 \cap A_2$ mean?
3. Are A_3 and A_4 mutually exclusive?
4. What does $A_3 \cup B$ mean?
5. What does $A_3 \cap B$ mean?
6. What does $\overline{A_1}$ mean?
7. What does \overline{C} mean?
8. What does $A_1 \cup A_2 \cup A_3 \cup A_4$ mean?
9. What does $\overline{A_1 \cup A_2}$ mean?

HAVE NONE OF ABOVE AS RESPONSE FOR AT LEAST ONE

According to an NIH-sponsored study, condom failure rates (e.g., breakage, slippage) during intercourse range from 0.4-2.3%. Suppose that the failure rate of Brand X is 2%. A Brand X Pleasure Pack contains 12 condoms. What is the probability that at least one of the condoms in the pack will fail during intercourse?

ANSWER: 0.2153

Which of the following is a correct representation of the given information in a two-way probability table?

Table A

	G	not G	Total
M	.10		.87
F			
Total	.56		

Table B

	G	not G	Total
M			.87
F		.10	
Total	.56		

Table C

	G	not G	Total
M			.87
F			.10
Total	.56		

Table D

	G	not G	Total
M	.56		.87
F		.10	
Total			

A suicide prevention website reports that 87% of all suicides were committed by males, 56% of all suicides were committed using a gun, and 10% of all suicides were committed by women not using a gun. Let M be the event that a suicide is committed by a male, with F as the event that suicide is committed by a female, and G the event suicide was committed using a gun. Which of the following four probability tables is a correct representation of the information provided?

Given that a gun was used for the suicide, what is the conditional probability the victim was female?

CMMS score	Definitive diagnosis	
	Demented	Not demented
0-5	2	0
6-10	1	0
11-15	4	3
16-20	5	9
21-25	3	16
26-30	1	18
Total	16	46

The Chinese Mini-Mental Status Test (CMMS) consists of 114 items intended to identify people with Alzheimer's disease and senile dementia among people in China. An extensive clinical evaluation of this instrument was performed, in which participants took the CMMS and then were interviewed by psychiatrists and nurses, and a definitive diagnosis of dementia was made. Results obtained for a subgroup of participants with formal education are presented in the table.

Suppose a score of ≤ 20 on the CMMS is used to classify people as testing positive for dementia.

1. What is the sensitivity of the CMMS test?
2. What is the specificity of the CMMS test?
3. What is the positive predictive value of the CMMS test?
4. Suppose your parent is Chinese with formal education and scores >20 on the CMMS. What is the probability that your parent is truly not demented? PUT FUNNY ANSWER ON SHEET.

Suppose a group of 100 women aged 60-64 get a new influenza vaccine, and 5 of these women independently die within the next year. Is this event unusual, or can it be expected of people in this gender-age group?

1. Assume that 0.9% of women in this age group would die in a one-year period. What is the probability that 5 or more women in a group of 100 would die in a one-year period?

IN RESPONSE MENTION THEY SHOULD PULL THE VACCINE OR THINK ABOUT IT