

Class Activity: Incidence and Prevalence

STAT 244NF: Infectious Disease Modeling

1. In the following question, you will consider incidence and prevalence. Decide whether incidence, prevalence, or both, have the following characteristics, and briefly explain why.

(a) Measure of risk.

(b) Generally preferred for chronic diseases without clear date of onset

(c) Affected by duration of illness

2. Which of the following is true?

(a) All proportions are ratios, but all ratios are not proportions.

(b) All ratios are proportions, but all proportions are not ratios.

3. Proportionate mortality is the proportion of deaths in a specified population during a period of time that are attributable to different causes. Each cause is expressed as a percentage of all deaths, and the sum of the causes adds up to 100%.

- Does proportionate mortality satisfy the definition of a rate? What about a proportion?
- Consider the following table. What is the proportionate mortality associated with COVID-19 in 2020?
- Using the same table, what is the proportionate mortality associated with COVID-19 in 2015-2020?
- Let's compare the proportionate mortality associated with COVID-19 and cancer in 2020. Calculate an appropriate statistic to quantify this relationship and explain in one sentence how to interpret it.



From: **The Leading Causes of Death in the US for 2020**

JAMA. 2021;325(18):1829-1830. doi:10.1001/jama.2021.5469

Table. Number of Deaths for Leading Causes of Death, US, 2015-2020^a

Cause of death	No. of deaths by year					
	2015	2016	2017	2018	2019	2020
Total deaths	2 712 630	2 744 248	2 813 503	2 839 205	2 854 838	3 358 814
Heart disease	633 842	635 260	647 457	655 381	659 041	690 882
Cancer	595 930	598 038	599 108	599 274	599 601	598 932
COVID-19 ^b						345 323
Unintentional injuries	146 571	161 374	169 936	167 127	173 040	192 176
Stroke	140 323	142 142	146 383	147 810	150 005	159 050
Chronic lower respiratory diseases	155 041	154 596	160 201	159 486	156 979	151 637
Alzheimer disease	110 561	116 103	121 404	122 019	121 499	133 382
Diabetes	79 535	80 058	83 564	84 946	87 647	101 106
Influenza and pneumonia	57 062	51 537	55 672	59 120	49 783	53 495
Kidney disease	49 959	50 046	50 633	51 386	51 565	52 260
Suicide	44 193	44 965	47 173	48 344	47 511	44 834

^a Leading causes are classified according to underlying cause and presented according to the number of deaths among US residents. For more information, see the article by Heron.⁴ Source: National Center for Health Statistics. National Vital Statistics System: mortality statistics (<http://www.cdc.gov/nchs/deaths.htm>). Data for 2015-2019 are final; data for 2020 are provisional.

^b Deaths with confirmed or presumed COVID-19, coded to *International Statistical Classification of Diseases and Related Health Problems*, Tenth Revision code U071 as the underlying cause of death.

Table Title:

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^b Deaths with confirmed or presumed COVID-19, coded to *International Statistical Classification of Diseases and Related Health Problems*, Tenth Revision code U07.1 as the underlying cause of death.