ALY6150 - Healthcare Analytics
Assignment 1
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Massachusetts COVID - 19 Statistics
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Introduction

We will be using the Massachusetts COVID-19 database from the Massachusetts government's official website to deliver high-quality analysis and visualization of data, by using different methods and approaches. This database consists of 41 columns and 411 rows. The database consists of both categorical and numerical data.

Analysis

Table 1 shows the Summary statistics (code retrieved from Kabacoff, R. I. (2015)) table of COVID-19 in Massachusetts

	date	state*	death	deathConfirmed	deathIncrease	deathProbable
vars	1	2	3	4	5	6
n	411	411	355	309	411	280
mean		1	9001.85	9939.19	39.94	235.75
sd		0	4018.08	2770.75	42.87	42.03
min	Inf	1	2	4004	-41	136
max	-Inf	1	16417	16085	252	332
range	-Inf	0	16415	12081	293	196
se		0	213.26	157.62	2.11	2.51

Table 1 continued

	hospitalized	Hospitalized Cumulative	Hospitalized Currently	Hospitalized Increase	inIcu Cumulative	inIcu Currently
vars	7	8	9	10	11	12
n	352	352	338	411	0	327
mean	12131.89	12131.89	1313.41	47.96		287.02
sd	4566.26	4566.26	1006.61	102.89		262.22
min	61	61	290	-91	Inf	47
max	19713	19713	3977	971	-Inf	1089
range	19652	19652	3687	1062	-Inf	1042
se	243.38	243.38	54.75	5.08		14.5

Table 1 continued

	negative	negativeIncrease	negativeTestsAntibody	negativeTestsPeopleAntibody	negativeTestsViral	onVentilatorCumulative
vars	13	14	15	16	17	18
n	360	411	0	0	0	0
mean	1924693	10717.26				
sd	1449497	7124.58				
min	92	0	Inf	Inf	Inf	Inf
max	4404792	37244	-Inf	-Inf	-Inf	-Inf
range	4404700	37244	-Inf	-Inf	-Inf	-Inf
se	76395.2	351.43				

Table 1 continued

	onVentilatorCurrently	positive	Positive CasesViral	Positive Increase	positiveScore	Positive TestsAntibody
vars	19	20	21	22	23	24
n	280	369	369	411	411	0
mean	111.23	193251.3	185143.1	1438.82	0	
sd	89.2	168596.5	159829.2	1836.9	0	
min	15	2	2	-7757	0	Inf
max	299	591356	559083	9003	0	-Inf
range	284	591354	559081	16760	0	-Inf
se	5.33	8776.79	8320.38	90.61	0	

Table 1 continued

	positiveTest Antigen	Positive TestsPeopleAntibody	Positive TestsPeopleAntigen	Positive TestsViral	recovered
vars	25	26	27	28	29
n	0	122	0	411	284
mean		13242.66		206835.3	184355.9
sd		1121.71		192159.7	126671.3
min	Inf	11842	Inf	0	78108
max	-Inf	15425	-Inf	668145	508745
range	-Inf	3583	-Inf	668145	430637
se		101.55		9478.54	7516.56

Table 1 continued

	totalTest PeopleAntibody	totalTests People Antigen	totalTest People Viral	Total Tests People ViralIncrease	Total TestsViral	Total Tests Viral Increase
vars	36	37	38	39	40	41
n	279	208	299	411	411	411
mean	117576	277565.3	2516167	12077.55	4480452	40938.08
sd	28315.93	158647.6	1452953	21183.57	5064169	38421
min	46565	62738	401496	0	1	0
max	156185	580372	4963875	401496	16825551	143342
range	109620	517634	4562379	401496	16825550	143342
se	1695.23	11000.23	84026.42	1044.91	249797.1	1895.17

Table 1 continued

	totalTest Encounters Viral	totalTest Encounters Viral Increase	Total Test Results	Total TestResultsIncrease	totalTests Antibody	Total Tests Antigen
vars	30	31	32	33	34	35
n	0	411	411	411	0	0
mean		0	4480452	40938.08		
sd		0	5064169	38421		
min	Inf	0	1	0	Inf	Inf
max	-Inf	0	16825551	143342	-Inf	-Inf
range	-Inf	0	16825550	143342	-Inf	-Inf
se		0	249797.1	1895.17		

From the table 1 we can see different statistics of 41 variables, it is interesting to note that there were only 2 minimum deaths in 2021 and highest death rate was 16,417 out of positive cases being 591,356 in 2021 compared to other states, would be due to Massachusetts following early detection of COVID – 19 therefore decreasing severity of disease, from the data now we know approximate 574,939 individuals recovered. In 2021 only 19,713 were hospitalized in Massachusetts whereas 591,356 were positive, these can be due to multiple reasons, such as fear of visiting hospitals or not enough beds available to admit therefore doctors recommended patients to be at home until they develop any severe symptoms such as difficulty breathing, but lack of data on spread of COVID is what resulted in fast spread of COVID-19, in the table we can also see there was an increase in COVID-19 patients by 9000 every month. Total test results also contain repeated test taken by one patient. Doctors prefer more to have antigen test rather than having an undergoing an antibody test, this is because antigen test have high specificity and sensitivity and antigen of a virus is present in blood of patients whereas it taken weeks or sometimes moth to develop antibody against the virus therefore making it hard to detect in blood.

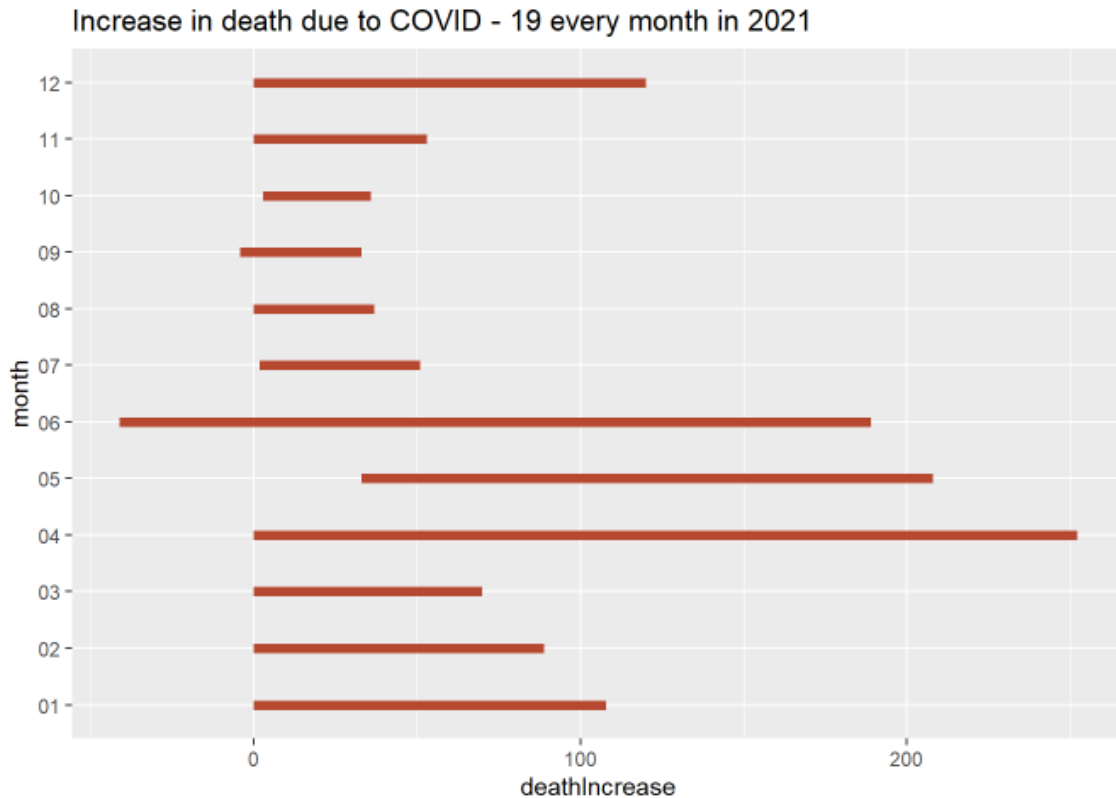Increase in death due to COVID - 19 every month in 2021

Figure 1 shows increase in death due to COVID – 19 in respect to every month in 2021.

Above figure shows increase in death every month due to COVID-19, we can see the peak was in April 2021 which was also called highly average death month of COVID-19, this was due to cases peaked in April 2022, due to lack of dedicated treatment and administering patients with empirical treatment. As we can see there was decrease in death in consecutive months after June due to proper lockdown initiatives and increase vaccine availability along with decreased viral spread across states and countries, but peak back in December due to new variants of COVID 19 which were not covered by vaccine.

Conclusion

Details in this report pertains to spread of COVID-19 during 2021 in Massachusetts. This report suggests variations and spikes in cases, death and number of people being positive or negative and lastly number of doctors prescribing antibody vs number of doctors prescribing antigen testing for patients. Antibody test is less since it is basically carried out when patient is recovering through the disease and antigen test is high because it is carried out when patient presents with symptoms and to confirm it is important to locate viral antigens in serum of patient, Chau, C. H. (2020), similar evidence was also stated in another study Ejazi, S. A (2021). Due to vaccination and social distancing and using preventive measures early deaths were relapsed after June 2021 but spiked in December due to presence of new variant in patients' blood and its rapid spread. Zawbaa, H. (2021).

References

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