

# “Analysis of nCov-2019 Data on 2/4/2020” by Michael Levitt, Stanford University, CA

Date	Day	Cases Confirmed			Number Deaths			Death Rate (%)			Ratio Hubei/ Others	Fraction Change Cases Confirmed			Fraction Change Number Deaths		
		Total	Hubei	Others	Total	Hubei	Others	Total	Hubei	Others		Total	Hubei	Others	Total	Hubei	Others
1/22/2020	54	555	444	111	0	0	0	0.00%	0.00%	0.00%	0.0						
1/23/2020	55	653	444	209	18	17	1	2.76%	3.83%	0.48%	8.0	1.18	1.00	1.88	-	-	-
1/24/2020	56	941	549	392	26	24	2	2.76%	4.37%	0.51%	8.6	1.44	1.24	1.88	1.44	1.41	2.00
1/25/2020	57	2019	1052	967	56	52	4	2.77%	4.94%	0.41%	11.9	2.15	1.92	2.47	2.15	2.17	2.00
1/26/2020	58	2794	1423	1371	80	76	4	2.86%	5.34%	0.29%	18.3	1.38	1.35	1.42	1.43	1.46	1.00
1/27/2020	59	4473	2714	1759	107	100	7	2.39%	3.68%	0.40%	9.3	1.60	1.91	1.28	1.34	1.32	1.75
1/28/2020	60	6047	3554	2493	132	125	7	2.18%	3.52%	0.28%	12.5	1.35	1.31	1.42	1.23	1.25	1.00
1/29/2020	61	7783	4586	3197	170	162	8	2.18%	3.53%	0.25%	14.1	1.29	1.29	1.28	1.29	1.30	1.14
1/30/2020	62	9776	5806	3970	213	204	9	2.18%	3.51%	0.23%	15.5	1.26	1.27	1.24	1.25	1.26	1.13
1/31/2020	63	11374	7153	4221	259	249	10	2.28%	3.48%	0.24%	14.7	1.16	1.23	1.06	1.22	1.22	1.11
2/1/2020	64	14562	9074	5488	305	294	11	2.09%	3.24%	0.20%	16.2	1.28	1.27	1.30	1.18	1.18	1.10
2/2/2020	65	17373	11177	6196	362	350	12	2.08%	3.13%	0.19%	16.2	1.19	1.23	1.13	1.19	1.19	1.09
2/3/2020	66	20679	13522	7157	427	414	13	2.06%	3.06%	0.18%	16.9	1.19	1.21	1.16	1.18	1.18	1.08

Table 1. Showing data for New Coronavirus 2019 (nCoV) from 22 January to 3 February 2020. The raw data of Cases Confirmed and of Deaths is taken from <https://www.kaggle.com/sudalairajkumar/novel-corona-virus-2019-dataset/data#> and checked against data from <https://gisanddata.maps.arcgis.com/apps/opsdashboard/index.html#/bda7594740fd40299423467b48e9ecf6> and for regional data from <https://jobtube.cn/wv/?from=groupmessage&isappinstalled=0>. We divide data into Hubei and Others or non-Hubei as almost all deaths are in a 90 km x 35 km area centered on Wuhan and Tianmen in Hubei (see Fig. 1). The Death Rate is Number Deaths divided by Number Cases Confirmed, and Ratio Hubei/Others is the ratio of the Death Rate for Hubei to Others. The Fraction Change for all raw data is Value\_Today divided by Value\_Yesterday.

Plots of this data against time are shown in Fig. 2. Panel (A) shows expected increase in Number of Cases. Panel (B) confirms that almost all the deaths are in Hubei (over 95%). Panel (C) shows that the Death Rate (Mortality) is high in Hubei, but elsewhere it is 16 times lower. At 0.2 %, the rate is comparable to the mortality of influenza. Panel (D) shows that the number of reported cases changes unpredictably in all three regions (Hubei, non-Hubei & Total); of all the measures these numbers seem least reliable. Most interesting is Panel (E), which shows that the number of deaths is increasing more and more slowly. Specifically, the ratio of Deaths\_Today to Deaths\_Yesterday is decreasing. This decrease is almost monotonic for Total Deaths and Hubei Death since 1/25/2020 and fairly linear for them both since 1/29/2020. Linear extrapolation that the number of new deaths will decrease very rapidly over the next week.

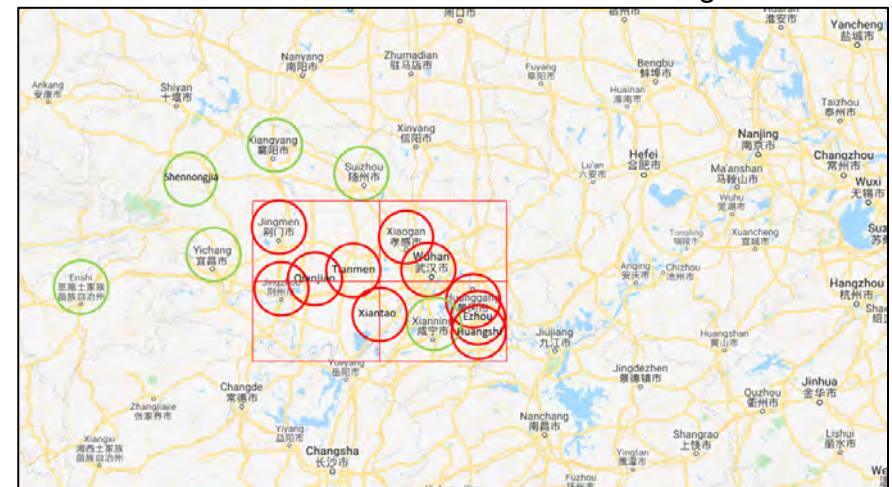


Figure. 1. Map of Hubei circling in red cities with a death rate > 0.9% and in green those with rate < 0.4%. Deaths are localized to a 90km x 35km area centered near Tianmen near (data 12/31/2020, [jobtube.cn](https://jobtube.cn))

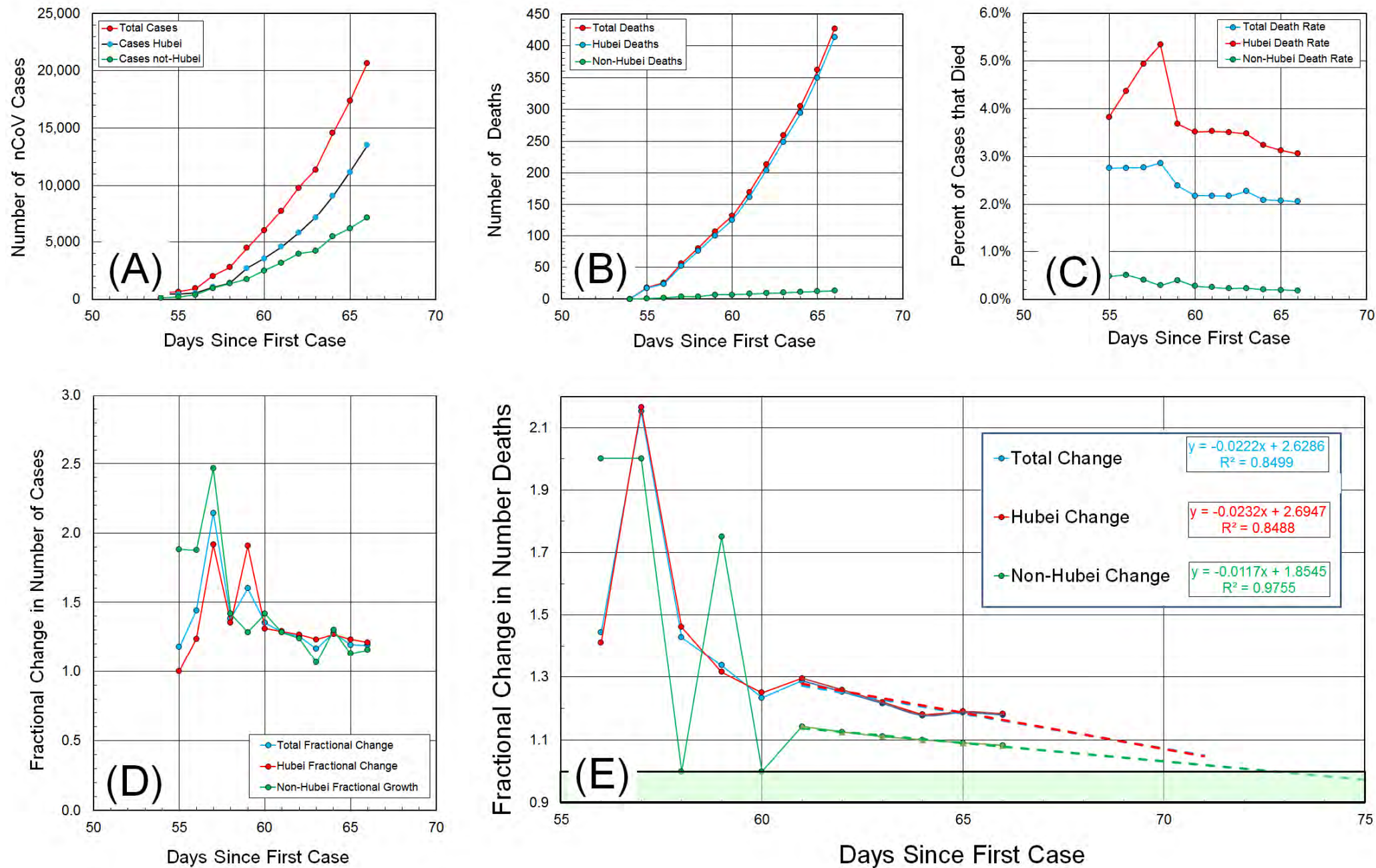


Figure 2. Variation of nCoV-2019 data against time in days since 29 Nov 2019 (guessed first case). Table 1 data is plotted from 22 January to 3 February 2020. In Panel (E) linear trend-lines are added using data for last four days from 1/29/2020. For Total Change, Hubei Change and non-Hubei Change, the fit is excellent (correlation coefficient or  $\sqrt{R^2} > 0.92$ ). This suggests the Fractional Change will decrease to about 1.0 within a week, after which time numbers will grow slowly.



3-Feb					2-Feb					1-Feb					31-Jan				
Hubei	13522	414	3.06%	1.18	Hubei	11177	350	3.13%	1.19	Hubei	9074	294	3.24%	1.18	Hubei	7153	249	3.48%	
Wuhan	6384	313	4.90%	1.18	Wuhan	5142	265	5.15%	1.18	Wuhan	4109	224	5.45%	1.17	Wuhan	3215	192	5.97%	
Huanggang	1422	19	1.34%	1.12	Huanggang	1246	17	1.36%	1.13	Huanggang	1002	15	1.50%	1.07	Huanggang	726	14	1.93%	
Xiaogan	1120	17	1.52%	1.21	Xiaogan	918	14	1.53%	1.00	Xiaogan	749	14	1.87%	1.17	Xiaogan	628	12	1.91%	
Suizhou	641	6	0.94%	1.20	Suizhou	458	5	1.09%	1.67	Suizhou	384	3	0.78%	3.00	Suizhou	304	1	0.33%	
Xiangyang	632	1	0.16%	1.00	Xiangyang	548	0	0.00%	1.00	Xiangyang	441	0	0.00%	1.00	Xiangyang	347	0	0.33%	
Jingzhou	613	7	1.14%	1.17	Jingzhou	499	6	1.20%	1.50	Jingzhou	333	4	1.20%	1.00	Jingzhou	287	4	1.39%	
Yichang	452	3	0.66%	3.00	Yichang	392	1	0.26%	1.00	Yichang	353	1	0.28%	1.00	Yichang	276	1	0.36%	
Huangshi	405	2	0.49%	1.00	Huangshi	334	2	0.60%	1.00	Huangshi	252	2	0.79%	1.00	Huangshi	209	2	0.96%	
Jingmen	400	14	3.50%	1.27	Jingmen	345	11	3.19%	1.57	Jingmen	329	7	2.13%	1.40	Jingmen	251	5	1.99%	
Xianning	348		0.00%	1.00	Xianning	296	0	0.00%	1.00	Xianning	246	0	0.00%	1.00	Xianning	206	0	0.00%	
Ezhou	332	18	5.42%	1.20	Ezhou	306	15	4.90%	1.15	Ezhou	278	13	4.68%	1.44	Ezhou	227	9	3.96%	
Shiyan	291		0.00%	1.00	Shiyan	256	0	0.00%	1.00	Shiyan	212	0	0.00%	1.00	Shiyan	177	0	0.00%	
Xiantao	188	3	1.60%	1.00	Xiantao	169	3	1.78%	1.00	Xiantao	140	3	2.14%	3.00	Xiantao	97	1	1.03%	
Enshi	123		0.00%	1.00	Enshi	111	0	0.00%	1.00	Enshi	105	0	0.00%	1.00	Enshi	87	0	0.00%	
Tianmen	117	10	8.55%	1.00	Tianmen	115	10	8.70%	1.43	Tianmen	99	7	7.07%	1.00	Tianmen	82	7	8.54%	
Qianjiang	44	1	2.27%	NA	Qianjiang	35	1	2.86%	0.00	Qianjiang	35	1	2.86%	0.00	Qianjiang	27	0	0.00%	
Shennongjia	10		0.00%	1.00	Shennongjia	7	0	0.00%	1.00	Shennongjia	7	0	0.00%	1.00	Shennongjia	7	0	0.00%	

