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RESEARCH ARTICLE

New COVID-19 Pandemic Waves Caused by Omicron and Efficiency of Vaccinations

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ABSTRACT

The sharp increase in the number of new COVID-19 cases in late 2021 and early 2022, which is associated with the spread of a new strain of coronavirus - omicron - is of great concern and makes it necessary to make at least approximate forecasts for the pandemic dynamics. As this rapid growth occurs even in countries with high levels of vaccinations, the question arises as to their effectiveness. The smoothed daily number of new cases and deaths per capita and the ratio of these characteristics were used to reveal the appearance of new coronavirus strains and to estimate the effectiveness of quarantine, testing and vaccination. The third year of the pandemic allowed us to compare the pandemic dynamics in the period from September 2020 to January 2021 with the same period one year later for Ukraine, EU, the UK, USA, India, Brazil, South Africa, Argentina, Australia, and in the whole world. Record numbers of new cases registered in late 2021 and early 2022 once again proved that existing vaccines cannot prevent new infections, and vaccinated people can spread the infection as intensively as non-vaccinated ones. Fortunately, the daily number of new cases already diminishes in EU, the UK, USA, South Africa, and Australia. In late January - early February 2022, the maximum averaged numbers of new cases are expected in Brazil, India, EU, and worldwide. "Omicron" waves can increase the numbers of deaths per capita, but in highly vaccinated countries, the deaths per case ratio significantly decreases.

Highlights: Vaccinated persons can get and pass the new coronavirus variants. The probability of death is much lower for vaccinated persons.

INTRODUCTION

The averaged daily numbers of new COVID-19 Cases per Capita (DCC) and Deaths per Capita (DDC) may indicate the effectiveness of quarantine, testing, vaccination, treatment, and also the virulence of coronavirus strains circulating in particular regions at some fixed periods of time. The DCC and DDC values can be calculated with the use of the accumulated number of Cases per Capita (CC) and Deaths per Capita (DC) and the simple smoothing procedure proposed in [1-3]. The CC and DC numbers are regularly reported by the World Health Organization, [4] and COVID-19 Data Repository by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU), [5].

Since we are already in the third year of the pandemic, it is reasonable to compare the DCC and DDC numbers for the same periods in 2020, 2021, and 2022 in order to find some seasonal and global trends. Since the influence of vaccinations in 2020 and early 2021 can be neglected, the comparison of the COVID-19 pandemic dynamics for the same period one year later enables us to reveal some influences of vaccination levels.

In [6] the DCC values for Argentina, Brazil, India, South Africa, Ukraine, EU, the

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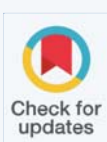
Keywords

- COVID-19 pandemic
- Epidemic dynamics in Ukraine, EU, USA, the UK, India, Brazil, South Africa, Argentina, and Australia
- Efficiency of vaccinations
- Mathematical modeling of infection diseases
- Statistical methods

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UK, USA and the whole world for the period from March to August 2020 were compared with the corresponding values in 2021. In this paper we will compare the DCC, DDC, DDC/DCC values and vaccination levels in the same countries and Australia for the period from September to January in 2020-2021 and 2021-2022, and will try to reveal some trends and make some predictions.

DATA AND SMOOTHING PROCEDURE

The CC figures (per million) registered by JHU, [5] are shown in table 1 (August 25, 2020 - January 25, 2021) and table 2 (August 25, 2021 - January 20, 2022). The accumulated numbers of deaths per capita DC (per million) are shown in table 3 (August 25, 2020 - January 25, 2021) and table 4 (August 25, 2021 - January 20, 2022). We denote these values as V_j corresponding time moments t_j measured

in days. Similar to the approach proposed in [1-3], we will use the averaged CC and DC values which can be calculated with the use of smoothing

$$\bar{V}_i = \frac{1}{7} \sum_{j=i-3}^{j=i+3} V_j, \tag{1}$$

and averaged new daily numbers DCC and DDC as follows:

$$\left. \frac{d\bar{V}}{dt} \right|_{t=t_i} \approx \frac{1}{2} (\bar{V}_{i+1} - \bar{V}_{i-1}) \tag{2}$$

Formulas (1)- (2) can yield the averaged DCC and DDC values which are closer to the characteristics at the moments of time t_i in comparison with ones calculated by JHU [5] with the use of V_j corresponding only to previous moments of time.

Tables 5,6 represent the accumulated numbers of

Table 1: Accumulated number of laboratory-confirmed COVID-19 cases per million in different regions for the period August 25, 2020 - January 25, 2021, [5].

	Argentina	Brazil	India	South Africa	United States	Ukraine	European Union	United Kingdom	Australia	World
2020-08-25	7885.791	17188.75	2314.142	10209.8	17403.84	2552.499	4014.002	4815.011	977.346	3039.414
2020-08-26	8117.121	17413.76	2375.637	10254.51	17531.85	2591.701	4049.832	4830.42	981.921	3075.218
2020-08-27	8338.672	17611.25	2431.088	10297.56	17682.18	2637.943	4116.519	4852.734	986.807	3111.653
2020-08-28	8595.591	17817.27	2485.969	10328.3	17823.12	2695.665	4171.747	4871.471	990.646	3147.77
2020-08-29	8797.977	17991.53	2542.493	10368.59	17952.86	2754.998	4201.316	4887.716	995.416	3180.812
2020-08-30	8955.567	18059.45	2598.838	10410.31	18053.82	2805.128	4227.249	4912.86	998.363	3208.572
2020-08-31	9159.686	18294.15	2649.018	10443.37	18155.54	2855.787	4301.327	4933.474	1001.194	3242.299
2020-09-01	9390.007	18501.31	2705.252	10463.66	18280.52	2905.181	4346.102	4952.533	1005.227	3276.125
2020-09-02	9629.735	18718.38	2765.452	10502.57	18401.24	2963.939	4400.627	4974.657	1010.112	3311.959
2020-09-03	9893.43	18937.12	2825.263	10542.87	18537.09	3020.695	4457.715	5000.094	1013.486	3348.215
2020-09-04	10127.7	19121.89	2887.292	10577.23	18682.07	3084.398	4523.528	5028.537	1016.239	3386.472
2020-09-05	10345.3	19280.11	2952.336	10607.31	18810.95	3151.047	4562.73	5055.118	1018.993	3421.075
2020-09-06	10498.48	19348.67	3017.501	10634.51	18901.63	3201.775	4595.021	5098.852	1020.66	3450.237
2020-09-07	10700.54	19393.14	3071.906	10648.58	18976.31	3253.608	4682.769	5142.103	1022.676	3477.969
2020-09-08	10964.26	19480.92	3136.285	10666.55	19055.63	3310.893	4739.078	5178.184	1026.244	3509.175
2020-09-09	11233.06	19654.23	3204.991	10699.69	19155.55	3370.64	4802.098	5217.198	1028.532	3545.405
2020-09-10	11494.1	19844.71	3274.282	10733.12	19273.23	3431.261	4874.947	5259.994	1030.083	3583.921
2020-09-11	11746.42	20038.8	3344.304	10765.77	19408.51	3505.501	4951.943	5311.909	1031.75	3624.119
2020-09-12	11982.7	20182.73	3412.032	10796.01	19544.62	3578.776	5004.536	5363.18	1033.456	3660.71
2020-09-13	12181.27	20248.24	3478.108	10822.31	19664.79	3637.763	5040.662	5412.001	1035.046	3692.16
2020-09-14	12398.55	20344.56	3538.255	10838.23	19765.25	3696.59	5137.857	5450.429	1036.869	3726.224
2020-09-15	12659.3	20506.02	3602.933	10851.09	19874.03	3765.585	5205.187	5496.01	1038.381	3761.776
2020-09-16	12915.28	20680.31	3673.188	10883.12	19991.09	3834.971	5284.936	5554.523	1039.738	3800.512
2020-09-17	13193.78	20850.43	3742.388	10918.56	20124.57	3919.61	5373.701	5604.371	1041.6	3840.403
2020-09-18	13455.69	21036.1	3809.372	10952.78	20278.28	3996.22	5474.028	5667.737	1042.53	3882.044
2020-09-19	13659.09	21174.22	3875.832	10986.58	20412.31	4073.176	5538.159	5732.569	1043.034	3919.015
2020-09-20	13843.96	21246.39	3938.241	11012.48	20540.66	4143.827	5591.09	5789.733	1043.577	3951.463
2020-09-21	14036.52	21328.79	3992.125	11024.55	20637.68	4207.807	5703.237	5853.891	1044.741	3984.547
2020-09-22	14300.24	21492.2	4051.94	11046.97	20749.33	4276.595	5786.515	5926.112	1045.904	4020.548
2020-09-23	14577.06	21645.13	4114.024	11078.71	20875.07	4359.371	5880.189	6016.718	1046.214	4060.134

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2020-09-24	14872.36	21794.73	4175.78	11109.71	21020.51	4439.386	5983.603	6113.996	1046.99	4100.801
2020-09-25	15156.73	21945.72	4237.042	11134.36	21163.19	4523.703	6094.567	6214.777	1047.61	4142.783
2020-09-26	15403.38	22061.23	4300.627	11150.5	21292.44	4614.232	6166.619	6303.345	1048.541	4178.765
2020-09-27	15597.24	22125.66	4359.597	11171.61	21396.41	4688.611	6226.31	6386.797	1048.696	4210.245
2020-09-28	15856.13	22204.49	4410.256	11186.65	21509.5	4752.567	6341.679	6446.204	1049.123	4243.652
2020-09-29	16151.64	22357.99	4468.008	11201.69	21634.76	4838.38	6401.848	6550.93	1050.014	4279.443
2020-09-30	16467.22	22511.74	4530.317	11231.12	21751.36	4933.556	6528.595	6655.156	1050.712	4320.748
2020-10-01	16774.22	22678.96	4588.795	11260.19	21890.43	5029.698	6634.293	6756.524	1051.217	4361.2
2020-10-02	17096.26	22832.32	4645.832	11289.32	22050.38	5139	6750.177	6858.859	1051.682	4402.991
2020-10-03	17340.29	22939.83	4700.252	11320.68	22198.03	5249.084	6843.104	7047.579	1052.225	4440.578
2020-10-04	17508.42	22980.56	4753.676	11346.88	22297.32	5347.159	6919.248	7384.215	1052.729	4473.464
2020-10-05	17754.93	23102.31	4797.645	11362.3	22409.83	5436.997	7036.903	7568.961	1053.698	4513.181
2020-10-06	18078.13	23249.63	4849.352	11379.4	22542.72	5540.111	7150.324	7782.297	1054.009	4553.148
2020-10-07	18438.76	23394.2	4905.706	11411.26	22690.98	5652.541	7293.825	7989.973	1054.978	4597.438
2020-10-08	18777.62	23519.58	4956.298	11440.18	22864.53	5780.11	7455.497	8247.146	1055.753	4643.1
2020-10-09	19108.7	23649.18	5008.883	11464.51	23030.59	5917.249	7636.252	8450.409	1056.451	4688.824
2020-10-10	19380.9	23760.14	5062.265	11506.88	23196.08	6053.008	7800.328	8672.746	1057.188	4733.788
2020-10-11	19607.28	23817.1	5110.156	11533.11	23334.87	6167.118	7919.843	8861.466	1058.041	4770.262
2020-10-12	19816.11	23857.46	5149.873	11547.9	23466.45	6273.083	8089.458	9066.869	1059.011	4807.58
2020-10-13	20107.85	23919.89	5195.451	11567.52	23615.37	6395.269	8250.958	9319.57	1060.058	4848.199
2020-10-14	20435.26	24050	5244.043	11598.78	23789.17	6528.244	8466.412	9608.807	1060.833	4896.572
2020-10-15	20810.13	24192.19	5289.522	11628.26	23982.13	6649.255	8718.625	9887.092	1061.376	4948.434
2020-10-16	21172.93	24325.82	5334.17	11661.89	24190.08	6792.008	8971.812	10116.32	1061.648	5000.447
2020-10-17	21469.17	24422.9	5378.572	11694	24354.86	6944.515	9201.75	10353.41	1062.113	5047.258
2020-10-18	21700.74	24479.22	5418.562	11721.68	24511.72	7069.783	9407.694	10602.37	1062.462	5089.167
2020-10-19	21985.39	24556.69	5452.141	11746.01	24717.89	7184.491	9661.658	10878.32	1062.695	5137.209
2020-10-20	22343.62	24667.75	5490.927	11763.5	24903.55	7315.166	9909.978	11191.06	1064.168	5186.684
2020-10-21	22745.45	24788.58	5531	11797.73	25085.98	7475.633	10224.92	11582.43	1064.75	5242.964
2020-10-22	23103.41	24904.3	5570.017	11833.63	25321.76	7644.037	10585.84	11893.94	1065.448	5303.234
2020-10-23	23448.06	25044.5	5608.319	11865.23	25569.72	7823.024	10982.65	12195.11	1066.185	5366.436
2020-10-24	23710.48	25161.25	5644.295	11895.77	25802.39	7990.393	11326.51	12532.49	1066.883	5423.517
2020-10-25	23913.37	25218.51	5676.696	11922.79	25987.77	8137.77	11564.79	12822.64	1067.348	5469.114
2020-10-26	24170.18	25305.48	5702.869	11937.63	26182.94	8267.179	12054.02	13128.92	1067.891	5530.955
2020-10-27	24483.91	25445.59	5734.369	11955.82	26413.52	8425.576	12440.41	13464.83	1068.434	5590.701
2020-10-28	24789.23	25578.07	5770.167	11986.84	26671.27	8604.793	12870.32	13827.12	1068.899	5656.529
2020-10-29	25080.13	25702.84	5805.08	12021.09	26945.95	8780.582	13362.16	14165.33	1069.442	5726.562
2020-10-30	25373.49	25816.65	5839.72	12052.93	27246.25	8978.618	13882.08	14523.21	1069.675	5799.463
2020-10-31	25587.17	25878.19	5873.424	12082.41	27512.58	9187.007	14273	14844.51	1070.062	5859.201
2020-11-01	25732.09	25925.8	5905.885	12105.24	27741.69	9376.646	14637.26	15185.44	1070.295	5914.428
2020-11-02	25942.54	25964.35	5933.378	12118.1	27990.54	9537.55	15249.37	15463.33	1070.644	5985.608
2020-11-03	26208.85	26032.49	5966.572	12138.77	28361.61	9747.273	15731.38	15757.32	1071.109	6056.01
2020-11-04	26442.41	26141.45	6002.606	12167.28	28663.85	9972.94	16073.83	16126.65	1071.42	6120.413
2020-11-05	26685.8	26252.88	6036.795	12198.36	29049.48	10206.18	16615.33	16480.72	1071.962	6199.084
2020-11-06	26944.24	26347.27	6072.933	12227.69	29424.84	10434.74	17171.69	16822.37	1072.273	6277.96
2020-11-07	27120.46	26430.19	6105.712	12256.52	29810.72	10688.57	17697.66	17188.27	1072.505	6353.336
2020-11-08	27237.36	26479.27	6138.655	12279.37	30164.86	10910.51	18060.85	17489.88	1072.777	6415.206
2020-11-09	27419.72	26541.95	6165.978	12300.14	30527.02	11115.44	18432.48	17803.33	1072.932	6479.221
2020-11-10	27682.34	26758.89	6197.757	12328.94	30933.36	11354.5	18842.79	18102.91	1073.009	6552.591
2020-11-11	27920.91	26881.54	6232.137	12364.58	31373.91	11604.78	19343.04	18439.59	1073.165	6632.14

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2020-11-12	28165.68	27040.05	6264.345	12403.52	31852.38	11865.49	19812.42	18930.55	1073.203	6713.913
2020-11-13	28425.71	27220.98	6296.413	12440.38	32387.41	12142.78	20275.43	19330.81	1073.436	6797.688
2020-11-14	28611.39	27343.78	6325.909	12477.63	32883.78	12436.91	20655.33	19724.61	1074.561	6871.402
2020-11-15	28735.17	27408.76	6347.832	12508.31	33301.14	12688.6	20950.98	20090.59	1076.034	6931.887
2020-11-16	28908.24	27482.33	6368.762	12529.05	33770.78	12919.76	21309.02	20404.43	1076.383	6999.199
2020-11-17	29141.13	27648.18	6396.476	12562.14	34259.21	13199.91	21761.68	20698.4	1077.12	7076.709
2020-11-18	29367.68	27810.58	6429.184	12610.24	34776.48	13493.56	22183.24	20986.21	1077.43	7156.315
2020-11-19	29589.07	27978.16	6462.112	12652.11	35353.52	13807.13	22609.88	21322.34	1077.701	7239.442
2020-11-20	29799.75	28159.34	6495.291	12703.83	35957.13	14148.4	23033.46	21619.27	1078.244	7324.855
2020-11-21	29956.31	28300.56	6527.736	12747.89	36501.31	14490.36	23364.16	21910.87	1078.826	7399.481
2020-11-22	30048.05	28384.33	6559.355	12785.7	36940.02	14774.83	23600.95	22184.48	1079.33	7461.312
2020-11-23	30141.57	28469.19	6586.609	12820.34	37490.06	15033.12	23870.55	22410.99	1079.679	7529.335
2020-11-24	30298.65	28630.56	6618.456	12861.86	38008.64	15321.3	24227.99	22577.09	1080.067	7604.506
2020-11-25	30487.07	28839.11	6650.384	12915.99	38549.91	15647.15	24588.91	22844.45	1080.532	7684.639
2020-11-26	30685.36	29030.17	6681.302	12967.11	38900.16	16006.58	24946.53	23101.83	1080.842	7759.649
2020-11-27	30857.4	29186.75	6710.958	13023.24	39541.77	16386.04	25294.25	23318.96	1081.347	7847.624
2020-11-28	30991.11	29427.34	6740.963	13076.5	40053.4	16767.59	25562.64	23551.65	1081.579	7923.967
2020-11-29	31110.22	29525.53	6768.788	13119.18	40467.96	17072.91	25756.43	23729.86	1081.967	7985.342
2020-11-30	31235.77	29636.26	6791.121	13157.52	40940.73	17308.44	25970.9	23911.82	1082.355	8049.863
2020-12-01	31412	29879.19	6817.39	13195.75	41529.44	17602.32	26261.59	24109.32	1082.781	8128.972
2020-12-02	31577.17	30105.71	6842.904	13265.25	42121.56	17911.59	26568.38	24347.21	1083.402	8211.032
2020-12-03	31744.46	30340.01	6869.167	13338.53	42781.18	18252.36	26899.51	24566.24	1083.79	8298.875
2020-12-04	31895.73	30562.78	6895.471	13420.67	43486.08	18607.94	27206.45	24806.18	1084.061	8386.234
2020-12-05	32009.77	30751.02	6921.314	13498.04	44158.73	18933.64	27489.44	25034.34	1084.41	8468.572
2020-12-06	32081.65	30874.53	6944.984	13566.59	44694.28	19208.05	27697.09	25288.96	1084.681	8536.694
2020-12-07	32151.79	31000.82	6964.05	13621.77	45284.72	19414.76	27872.13	25505.2	1085.263	8603.806
2020-12-08	32230.95	31224.17	6987.073	13688.57	45959.13	19671.42	28166.12	25686.31	1085.496	8685.408
2020-12-09	32347.23	31479.27	7009.694	13800.31	46621.88	19969.05	28478.91	25929.92	1085.767	8770.824
2020-12-10	32500.59	31729.52	7030.774	13936.31	47325.21	20285.06	28829.79	26238.13	1086.194	8961.714
2020-12-11	32656.53	31975.08	7052.326	14074.87	48047.49	20604.68	29167.29	26557.07	1086.737	9051.48
2020-12-12	32772.18	32172.87	7074.038	14206.14	48715.72	20908.8	29454.31	26873.05	1086.931	9132.814
2020-12-13	32850.19	32275.81	7093.466	14339.36	49291.98	21129.77	29684.96	27144.84	1087.202	9200.812
2020-12-14	32961.19	32403.76	7109.302	14425.35	49928.94	21287.98	29872.68	27442.86	1087.629	9270.069
2020-12-15	33114.26	32628.21	7128.235	14551.13	50599.38	21491.36	30198.32	27714.24	1088.094	9353.726
2020-12-16	33264.31	32937.21	7145.466	14717.82	51310.7	21745.74	30566.98	28084.59	1088.559	9445.615
2020-12-17	33424.94	33258.24	7161.893	14869.81	52028.55	22032.71	30936.91	28604.77	1089.373	9539.857
2020-12-18	33578.48	33505.23	7179.944	15015.12	52780.99	22333.31	31298.2	29022.72	1090.653	9631.722
2020-12-19	33705.54	33730.67	7199.051	15197.31	53378.12	22613.5	31583.8	29421.35	1092.282	9710.294
2020-12-20	33795.79	33845.08	7216.517	15354.62	53959.11	22815.1	31785.17	29949.6	1093.445	9778.797
2020-12-21	33924.13	33974.27	7230.552	15501	54562.65	22975.64	32007.03	30440.36	1094.259	9849.159
2020-12-22	34102.64	34239.06	7247.74	15659.24	55173.76	23181.52	32354.57	30980.49	1094.957	9933.6
2020-12-23	34290.91	34452.52	7265.475	15893.18	55842.16	23424.74	32712.99	31556.94	1095.927	10021.47
2020-12-24	34290.91	34724.55	7282.029	16131.43	56477.54	23699.11	33068.41	32129.6	1096.392	10108.91
2020-12-25	34525.28	34823.54	7298.014	16377.85	56840.11	23962.71	33290.2	32609.38	1097.284	10171
2020-12-26	34606.7	34905.47	7311.457	16570.25	57521.93	24149.85	33423.86	33118.03	1097.711	10236.52
2020-12-27	34716.99	34987.78	7325.825	16728.51	57929.77	24300.49	33561.34	33593.34	1098.835	10288.97
2020-12-28	34875.22	35115.99	7337.618	16852.72	58451.3	24411.12	33744.29	34200.52	1099.301	10352.71
2020-12-29	35130.67	35379.42	7352.365	17012.28	59059.84	24581.42	34080.04	34979.77	1100.541	10437.9
2020-12-30	35388.64	35639.24	7368.026	17307.24	59720.4	24774.76	34496.79	35713.46	1101.472	10531.58

2020-12-31	35642.69	35893.77	7382.404	17607.03	60657.64	25007.51	34885.88	36533.4	1102.248	10636.85
2021-01-01	35732.15	36000.97	7396.097	17885.6	61175.46	25234.3	35179.81	37314.64	1103.605	10709.38
2021-01-02	35847.05	36072.71	7409.142	18135.46	62023.71	25358.56	35324.58	38160.95	1104.535	10784.5
2021-01-03	35976.06	36153.04	7420.986	18332.97	62636.53	25470.85	35499.56	38968.08	1105.311	10850.88
2021-01-04	36156.35	36270.05	7432.738	18542.84	63193.82	25574.24	35725.95	39830.23	1105.815	10921.92
2021-01-05	36458.72	36541.48	7445.719	18782.84	63884.18	25703.65	36128.01	40723.66	1106.552	11016.39
2021-01-06	36753.44	36833.57	7460.321	19146.45	64665.84	25869.89	36504.54	41637.81	1106.94	11117.19
2021-01-07	37056.8	37244.66	7473.338	19496.19	65530.55	26084.31	37008.93	42409.49	1107.909	11230.49
2021-01-08	37349.44	37523.1	7473.338	19862.26	66445.2	26222.3	37390.97	43407.42	1108.336	11335.32
2021-01-09	37591.89	37763.27	7499.796	20222.11	67236.54	26340.62	37700.94	44286.72	1108.84	11431.3
2021-01-10	37763.09	37898.91	7511.502	20512.26	67876.18	26463.06	37910.05	45092.45	1109.577	11506.15
2021-01-11	37953.95	38042.59	7520.533	20762.85	68487.85	26568.54	38195.14	45769.67	1110.352	11584.16
2021-01-12	38256.17	38343.65	7531.993	20981.12	69150.16	26692.61	38544.24	46437.4	1110.973	11673.45
2021-01-13	38535.19	38623.22	7544.154	21290.15	69840.4	26847.1	38940.91	47134.38	1111.36	11768.72
2021-01-14	38826.51	38942.53	7555.343	21598.32	70544.67	27040	39317.82	47848.31	1111.709	11864.83
2021-01-15	39096.92	39265.42	7566.221	21846.14	71289.38	27238.32	39653.18	48666.07	1112.485	11963.15
2021-01-16	39292.77	39538.53	7577.09	22078.86	71936.83	27425.84	39896.21	49272.24	1113.222	12045.9
2021-01-17	39452.05	39685.34	7586.985	22283.17	72473.12	27573.03	40082.62	49838.23	1113.726	12113.12
2021-01-18	39631.52	39820.55	7594.197	22433.23	72898.4	27650.84	40388.47	50388.64	1114.113	12179.15
2021-01-19	39897.73	40110.97	7604.112	22596.12	73362.43	27748.18	40698.52	50877.9	1114.462	12254.07
2021-01-20	40163.31	40412.28	7615.053	22807.8	73928.76	27856.97	41094.58	51448.48	1114.811	12343.08
2021-01-21	40413.2	40687.75	7625.491	22997.35	74503.55	27993.31	41435.4	52004.15	1115.044	12426.44
2021-01-22	40648.98	40952.27	7635.722	23193.23	75084.02	28123.96	41787.09	52594.53	1115.238	12510.82
2021-01-23	40832.33	41224.7	7646.379	23397.61	75618.22	28245.06	42026.51	53086.68	1115.471	12583.71
2021-01-24	40942.65	41357.97	7655.854	23533.3	76043.06	28342.65	42218.57	53527.06	1115.897	12642.44
2021-01-25	41108.81	41500.64	7662.386	23609.09	76431.83	28407.23	42540.42	53852.8	1116.014	12703.56

Table 2: Accumulated number of laboratory-confirmed COVID-19 cases per million in different regions for the period August 25, 2021 - January 20, 2022, [5].

	Argentina	Brazil	India	South Africa	United States	Ukraine	European Union	United Kingdom	Australia	World
2021-08-25	113035.5	96510.72	23366.1	45338.3	115383.4	54567.94	81364.06	96780.89	1855.111	27238.28
2021-08-26	113185.7	96655.22	23398.15	45551	115947.2	54616.65	81520.01	97338.04	1892.958	27332.1
2021-08-27	113313	96784.92	23431.7	45751.61	116663.6	54675.52	81615.48	97891.33	1936.349	27426.2
2021-08-28	113394.7	96892.16	23464.06	45921.04	116882.5	54735.06	81769.74	98361.76	1987.574	27496.97
2021-08-29	113440.1	96944.79	23494.85	46049.95	117019.6	54790.13	81859.27	98844.66	2040.118	27553.85
2021-08-30	113557.6	97004.61	23517.06	46143.95	117739.1	54818.11	81978.8	99229.18	2088.861	27638.82
2021-08-31	113705.2	97130.06	23547.17	46261.94	118280.6	54859.41	82106.18	99699.12	2136.363	27718.88
2021-09-01	113822	97250.38	23580.97	46420.89	118871.4	54916.64	82296.2	100220.1	2193.25	27811.04
2021-09-02	113924.1	97376.66	23613.52	46574.15	119399.7	54982.7	82441.89	100775.3	2257.155	27896.49
2021-09-03	114018.8	97486.97	23644.1	46727.36	120112.5	55053.53	82563.05	101392.8	2324.666	27987.65
2021-09-04	114073.3	97581.94	23674.8	46867.43	120344.3	55113.67	82666.3	101930	2389.425	28050
2021-09-05	114103.9	97641.11	23702.75	46966.21	120501.2	55162.95	82751.7	102465.3	2448.987	28106.91
2021-09-06	114189.3	97688.64	23725.15	47034.8	120743.1	55189.22	82838.14	103065.5	2505.834	28163.29
2021-09-07	114279.3	97752.22	23752.34	47130.91	121470.8	55248.16	82991.4	103611.3	2571.601	28252.39
2021-09-08	114356.7	97818.49	23783.38	47246.48	122005.3	55320.01	83101.22	104175.9	2638.492	28332.01
2021-09-09	114437	97971.87	23808.48	47350.89	122502.2	55412.26	83271.92	104726	2711.006	28413.9
2021-09-10	114498.7	98048.77	23832.44	47448.87	123200	55503.09	83379.92	105265.2	2791.469	28494.99
2021-09-11	114538.1	98113.08	23852.95	47537.29	123434.7	55599.63	83475.44	105688.3	2854.133	28554.03
2021-09-12	114558.5	98149.81	23872.51	47603.26	123569.6	55657.49	83549.68	106107.8	2920.83	28601.1

2021-09-13	114608.9	98190.22	23890.74	47647.23	124276.2	55692.5	83638.01	106553.3	2982.021	28675.56
2021-09-14	114675	98253.64	23910.25	47708.84	124704.8	55776.24	83768.79	106938.7	3045.732	28745.16
2021-09-15	114730	98315.68	23932.19	47786.57	125234.5	55889.85	83878.46	107376.7	3117.703	28817.82
2021-09-16	114784.7	98481.33	23956.88	47856.75	125705.9	56029.03	84021.44	107763.4	3187.502	28891.35
2021-09-17	114835.3	98646.46	23982.47	47917.51	126338.6	56188.7	84139.47	108237.5	3259.473	28970
2021-09-18	114867.1	99230.02	24004.55	47972.24	126552.8	56339.71	84233.74	108669.1	3320.431	29036.37
2021-09-19	114880.8	99272.89	24026.27	48010.23	126682.5	56439.37	84304.25	109094.4	3378.597	29082.62
2021-09-20	114928.2	99316.28	24045.01	48035.28	127221	56499.94	84386.06	109618.8	3439.943	29148.64
2021-09-21	114968.5	99388.15	24064.36	48071.87	127572.6	56627.44	84500.88	110075.2	3504.275	29209.66
2021-09-22	115013.1	99540.42	24087.27	48121.29	127983	56791.98	84623.42	110567.6	3574.423	29277.95
2021-09-23	115051.1	99656.85	24109.79	48167.64	128366.2	56982.5	84743.21	111092.4	3642.826	29346.2
2021-09-24	115091.6	99744.08	24131.05	48205.29	128896.5	57200.94	84856.31	111615.2	3715.146	29415.59
2021-09-25	115113.4	99808.86	24151.38	48232.51	129073.7	57401.67	84946.09	112051.3	3783.084	29463.01
2021-09-26	115125.7	99850.24	24170.06	48248.61	129230.7	57519.69	85020.1	112535.1	3840.165	29507.8
2021-09-27	115159.4	99893.91	24183.55	48258.24	129710.6	57600.48	85103.33	113085.1	3913.066	29565.95
2021-09-28	115199.4	99972.81	24197.1	48281.01	130049.2	57763.16	85226.12	113592.4	3983.331	29623.39
2021-09-29	115232.2	100051.7	24213.98	48281.01	130412.6	57997.94	85364.39	114106.9	4076.397	29686.84
2021-09-30	115268.2	100154.3	24233.16	48344.03	130747	58281.26	85498.6	114631.3	4156.2	29747.86
2021-10-01	115302.5	100238.7	24250.64	48371.26	131211.4	58571.2	85623.33	115138.8	4246.746	29813.41
2021-10-02	115321.9	100296.6	24267.03	48393.01	131352.6	58856.39	85727.41	115569.6	4319.337	29857.86
2021-10-03	115330.4	100339.4	24281.96	48406.49	131483.6	59053.66	85806.99	116004.6	4397.784	29897.17
2021-10-04	115351.9	100393.2	24295.13	48413.63	131920.6	59179.09	85899.42	116507.5	4490.423	29952.55
2021-10-05	115378.6	100496.7	24308.64	48426.42	132207	59420.45	86029.04	116992.5	4568.986	30005.86
2021-10-06	115406.7	100583.3	24324.74	48445.56	132546.4	59726.8	86179.31	117560.1	4654.917	30069.96
2021-10-07	115430.5	100651.6	24340	48462.03	132851.2	60090.15	86325.36	118143.1	4752.791	30126.34
2021-10-08	115447.1	100738.2	24354.16	48477.42	133246.9	60482.34	86467.37	118655.4	4850.316	30187.31
2021-10-09	115457.4	100807.4	24367.2	48491.01	133360.1	60864.74	86584.66	119233.3	4942.994	30230.21
2021-10-10	115464.6	100846.7	24380.21	48501.8	133477	61143.16	86674.11	119725.8	5024.271	30270.52
2021-10-11	115473.7	100879.4	24390.48	48505.15	133769.8	61364.14	86780.88	120306.2	5095.932	30318.16
2021-10-12	115497.1	100913.8	24401.84	48515.01	134103.6	61657.97	86930.76	120859.2	5174.611	30373.78
2021-10-13	115525.9	100952.9	24415.47	48530.7	134430.6	62051.37	87095.46	121467.6	5281.017	30431.06
2021-10-14	115555.5	101024.1	24427.57	48546.47	134691.9	62504.39	87267.02	122121.8	5379.201	30487.71
2021-10-15	115585.3	101090.9	24439.04	48558.68	135021.8	62837.01	87438.26	122770.6	5468.815	30545.64
2021-10-16	115602.6	101136.5	24449.19	48568.99	135139.7	63155.41	87579.53	123398.3	5553.079	30588.87
2021-10-17	115611.4	101165.4	24458.95	48575.88	135233.1	63435.23	87689.15	124053.6	5632.921	30628.71
2021-10-18	115631.4	101209	24468.32	48579.38	135533.5	63674.84	87827.76	124769.9	5711.95	30681.02
2021-10-19	115659.9	101270.8	24478.81	48586.91	135777.7	64054.07	88043.82	125406.3	5793.266	30737.23
2021-10-20	115686.6	101344.2	24492.06	48596.75	136053.9	64510.12	88276.78	126118.9	5891.916	30797.14
2021-10-21	115720.4	101423.6	24503.38	48605.41	136288	65047.04	88505.87	126874.6	5990.682	30855.07
2021-10-22	115750.8	101486.2	24515.1	48614.02	136577.5	65615.77	88736.28	127590	6063.7	30916.75
2021-10-23	115770.7	101541.8	24526.52	48621.5	136673.1	66172.03	88911.56	128249.5	6148.002	30962.91
2021-10-24	115782.5	101563	24536.78	48626.5	136728.9	66672.67	89066.29	128817.5	6213.303	31002.98
2021-10-25	115809.4	101599.6	24545.7	48628.93	137062.7	67031.95	89256.5	129349.4	6282.559	31057.3
2021-10-26	115840.5	101662	24555.36	48634.44	137270.7	67494.65	89531.04	129987.2	6354.297	31113.58
2021-10-27	115873	101742	24566.95	48642.3	137578.2	68037.16	89832.51	130632.3	6433.326	31178.84
2021-10-28	115907.9	101805.9	24577.25	48651.18	137805.8	68660.55	90079.8	131205.4	6506.46	31236.71
2021-10-29	115938	101865.2	24587.52	48659.09	138091.5	69302.74	90394.59	131838.2	6568.077	31301.1
2021-10-30	115955.8	101912	24596.73	48664.04	138193.3	69929.57	90632.22	132435.3	6614.028	31349.8
2021-10-31	115967.8	101940.6	24605.71	48667.87	138289.5	70354.99	90785.62	132987.6	6670.876	31390.6

Subject Area(s): PUBLIC HEALTH | EPIDEMIOLOGY

2021-11-01	115992.8	101962.2	24613.19	48669.64	138624.3	70700.48	90968.48	133573.1	6714.888	31443.89
2021-11-02	116022.1	101989.9	24621.73	48672.45	138837.5	71172.93	91222.44	134065.9	6757.97	31497.38
2021-11-03	116049.9	102066.1	24630.98	48678.18	139093.9	71736.09	91618.25	134664.1	6817.571	31564.85
2021-11-04	116081.4	102128	24640.11	48683.49	139339.5	72391.24	92005.88	135202.8	6878.839	31630.81
2021-11-05	116109.3	102188.8	24647.96	48689.14	139629.9	73026.34	92362.62	135698.5	6938.324	31696.24
2021-11-06	116129.6	102241	24655.72	48695.1	139733.9	73628.82	92693.52	136140.5	6992.108	31750.08
2021-11-07	116142.6	102267.4	24663.96	48698.51	139842.9	74055.73	92918.84	136578	7041.123	31793.98
2021-11-08	116170.9	102299.6	24671.23	48700.45	140170.5	74382.66	93243.89	137051.1	7091.223	31854.48
2021-11-09	116200.5	102354.8	24679.46	48704.53	140410.7	74846.21	93605.87	137531.8	7137.795	31915.89
2021-11-10	116234.8	102424.8	24688.85	48709.61	140698.2	75408.6	94104.55	138111.6	7198.132	31989.27
2021-11-11	116266.8	102497.4	24697.84	48715.54	140868.4	76004.96	94537.92	138736	7252.964	32054.98
2021-11-12	116302.2	102565.6	24706.34	48722.08	141303.5	76585.63	94974.87	139308.4	7309.268	32130.28
2021-11-13	116326.2	102609.3	24714.43	48727.18	141434.2	77155.26	95330.29	139860.6	7352.505	32184.37
2021-11-14	116339.1	102629.4	24721.77	48731.54	141528	77516.3	95597.9	140390.3	7391.089	32229.17
2021-11-15	116370.2	102642.3	24728.13	48733.81	141932.9	77792.64	96010.93	140973.8	7430.409	32297.82
2021-11-16	116405.8	102672.9	24735.45	48738.35	142194.5	78195.57	96491.03	141515.6	7478.028	32364.23
2021-11-17	116439.8	102734.2	24744	48747.78	142533	78652.91	97094.02	142073.8	7527.159	32443.89
2021-11-18	116478.3	102787.5	24751.97	48757.52	142864	79154.67	97659.17	142762.7	7585.519	32521.83
2021-11-19	116511.6	102845.3	24759.37	48770.66	143245.3	79644.03	98211.91	143413.9	7638.256	32600.03
2021-11-20	116535.6	102883.7	24766.89	48785.44	143379.8	80092.05	98683.1	143998.6	7695.065	32660.92
2021-11-21	116549.8	102907.5	24772.99	48796.88	143497.7	80364.81	99039.83	144577.1	7741.869	32711.43
2021-11-22	116563.8	102926.8	24778.42	48802.08	143935.2	80562.94	99611.32	145237.1	7780.724	32790.35
2021-11-23	116599.9	102985	24785.09	49111.63	144209.5	80881.02	100150.3	145865.1	7837.494	32867.63
2021-11-24	116648.9	103042.2	24791.63	49132.86	144544.5	81233.66	100858	146490	7896.707	32952.87
2021-11-25	116698.4	103099.6	24799.2	49173.92	144661.8	81644.85	101526.6	147178.4	7959.798	33028.56
2021-11-26	116740.3	103150.5	24805.17	49221.02	144820.2	82031.39	102189.3	147904.9	8017.189	33104.19
2021-11-27	116773.7	103189.3	24811.47	49274.64	144898.3	82377.11	102679.5	148485	8065.079	33162.26
2021-11-28	116793.2	103205.8	24817.43	49322.24	145026	82566.79	103073.2	149020.2	8109.867	33213.95
2021-11-29	116836.3	103226.8	24822.45	49360.1	145589.9	82716.19	103628.2	149646.3	8152.483	33297.5
2021-11-30	116887.4	103274.9	24828.87	49432.93	145942.4	82974.14	104256.2	150232.9	8207.431	33376.93
2021-12-01	116928.7	103332.3	24835.88	49575.52	146353.9	83264.04	104959.5	150928.7	8273.43	33466.6
2021-12-02	116987.5	103388	24842.5	49767.63	146772.1	83589.87	105661.8	151710.4	8332.449	33556.26
2021-12-03	117039.7	103437.6	24848.67	50035.03	147248.6	83920.95	106331.6	152455.4	8398.681	33646.94
2021-12-04	117076.8	103472.3	24848.67	50307.61	147445.7	84238.57	106845.5	153063.2	8447.114	33711.69
2021-12-05	117105.1	103494.2	24861.01	50492.89	147608.7	84404.47	107234.9	153697.8	8496.943	33767.47
2021-12-06	117159.4	103522.3	24865.91	50599.17	148147.8	84520.53	107640.6	154451.8	8552.549	33842.76
2021-12-07	117227.2	103569.7	24871.97	50818.13	148488	84732.31	108397	155116.5	8618.665	33931.14
2021-12-08	117268.4	103617	24878.73	51148.6	148937.5	84959.95	108968.7	155861.4	8682.803	34015.89
2021-12-09	117328.6	103657.9	24884.76	51521.47	149305.3	85256.36	109725.1	156598.6	8749.151	34108.35
2021-12-10	117406.9	103690.9	24890.49	51838.2	149788	85528.22	110335.2	157454.1	8817.283	34195.62
2021-12-11	117460.5	103703.5	24896.14	52123.88	149955.7	85772.22	110789.3	158220.6	8877.116	34258.67
2021-12-12	117495	103711	24901.42	52754.69	150109.8	85903.84	111146.2	158925.4	8948.583	34314.64
2021-12-13	117572	103724	24905.57	52976	150671.8	86005.6	111636.9	159716.4	9024.974	34394.79
2021-12-14	117671.9	103744.4	24910.58	53373.34	151016.7	86183.11	112248.3	160592.4	9133.9	34478.23
2021-12-15	117777.5	103768.2	24916.3	53812.85	151448	86377.77	112917.9	161735.4	9266.635	34571.97
2021-12-16	117893.8	103785.3	24921.65	54225.65	151873.3	86605.94	113535.2	163022.7	9414.067	34665.66
2021-12-17	118017.6	103805.7	24921.65	54570.62	152452.3	86817.94	114086.1	164382	9569.836	34758.62
2021-12-18	118108.9	103816.8	24926.78	54838.43	152686	86997.53	114617.6	165687.9	9719.594	34831.88
2021-12-19	118180.2	103823.6	24936.57	55096	152949.7	87087	114932.4	166889.5	9875.906	34892.69

2021-12-20	118297.3	103835.9	24940.39	55237.75	153677.9	87151.74	115431.9	168243.8	10050.09	34988.31
2021-12-21	118502	103853.4	24944.92	55494.62	154213.7	87296.24	116138.9	169553	10264.57	35088.64
2021-12-22	118745.8	103868.5	24950.3	55846.01	154936.8	87447.82	116866.6	171101.6	10588.63	35203.06
2021-12-23	119040.9	103886.1	24955.07	56198.37	155747	87621.13	117657.1	172901.5	10907.31	35328.95
2021-12-24	119397.8	103903.3	24960.23	56512.26	156448.3	87778.21	118215.8	174687.3	11289.46	35436.18
2021-12-25	119555.3	103920.5	24965.25	56759.22	156667	87903.62	118842.2	176474	11656.25	35521.41
2021-12-26	119722.5	103943.7	24969.94	56852.54	157254.8	87972.36	119082.5	178217.8	12039.53	35595.63
2021-12-27	120166.8	103976.2	24974.5	56915.46	158782.6	88019.25	120008.9	179796.8	12496.99	35758.42
2021-12-28	120910.2	104018.5	24981.1	57035.65	159851.9	88074.9	121205.7	181820.5	13182.49	35924.41
2021-12-29	121831.8	104064.1	24990.54	57185.87	161348.9	88204.1	122708	184525.1	14011.13	36145.88
2021-12-30	122939.2	104123	25002.57	57402.02	163116	88344.19	124379.7	187295	15322.23	36391.52
2021-12-31	123984.3	104170.7	25018.91	57597.79	164587.3	88509.48	125735.3	190088.6	16499.63	36608.88
2022-01-01	124423.3	104188.3	25038.69	57760.89	165086.8	88628.45	126889.7	192472.1	17952.19	36755.39
2022-01-02	124872.9	104196.8	25062.91	57833.45	166000.3	88674.65	127354.9	194450.5	19100.31	36872.88
2022-01-03	125846.3	104251.2	25089.73	57884.69	169233.7	88719.6	129015.3	197198.2	20835.41	37181.37
2022-01-04	127627	104340.8	25131.43	58019.22	171653.4	88763.06	131020.2	200441.6	23607.8	37505.14
2022-01-05	129713.6	104447.6	25196.68	58204.19	173589.2	88871.44	133295.8	203294.9	26532.62	37829.87
2022-01-06	132117	104615	25280.72	58368.38	176036.2	89027.17	135091.5	205942.9	29566.14	38162.66
2022-01-07	134540.6	104910.8	25382.62	58522.59	178609.8	89195.2	137375	208565.3	33369.89	38535.24
2022-01-08	136770.4	105141.2	25497.18	58651.81	179768.5	89272.02	139020.7	210626.2	37709.35	38804.52
2022-01-09	138378	105279.8	25626.16	58726.46	181197.5	89339.77	140464	212699.2	40533.67	39059.36
2022-01-10	140315.3	105438.3	25746.78	58766.58	185307.8	89388.09	142149.1	214808.5	44171.22	39463.87
2022-01-11	143263.2	105780.6	25746.78	58860.99	187618.4	89515.95	144798.8	216506.5	47444.34	39828.93
2022-01-12	146137.4	106191.3	26064.08	58973.57	190350.5	89683.12	147384	218412.2	54240.9	40300.24
2022-01-13	148952.9	106649	26064.08	59072.12	192874	89918.44	149643.3	219967.5	59211.58	40666.37
2022-01-14	152019.4	107168.2	26446.62	59159.31	195454.1	90164.2	152118.6	221418.2	62557.6	41120.78
2022-01-15	154138.7	107395.1	26641.25	59235.76	196636.3	90412.64	153866.6	222601.8	66934.29	41426.84
2022-01-16	155569.3	107550.6	26826.48	59280.04	198040.2	90565.21	155343.1	223630.4	69256.71	41694.83
2022-01-17	157815.9	107898.2	26997.29	59307.17	200021.4	90688.09	157325.3	224936.4	72527.78	42040.97
2022-01-18	160468.7	108554	27200.37	59368.08	203335.2	90891.72	160167.3	226318.7	75808.93	42510.65
2022-01-19	163282.4	109467.8	27428.25	59368.08	206312.2	91194.08	163298.5	227899.4	78430.43	43048.11
2022-01-20	166126.5	110261.2	27677.46	59506.02	208250.9	91627.08	166315.3	229466.3	80909.9	43502.64

Table 3: Accumulated number of deaths per million in different regions for the period August 25, 2020 - January 25, 2021, [5].

	Argentina	Brazil	India	South Africa	United States	Ukraine	European Union	United Kingdom	Australia	World
2020-08-25	165.834	545.624	42.598	221.645	535.341	54.34	311.635	608.397	21.289	109.528
2020-08-26	171.886	550.666	43.399	224.876	538.879	55.192	311.74	608.632	22.181	110.361
2020-08-27	176.513	555.269	44.157	226.974	542.228	56.342	312.098	608.807	22.607	111.151
2020-08-28	181.358	559.237	44.89	228.89	545.055	57.492	312.384	608.939	23.266	111.892
2020-08-29	183.156	563.428	45.57	232.854	548.008	58.435	312.567	609.115	23.693	112.631
2020-08-30	185.437	565.302	46.267	233.636	549.356	59.241	312.717	609.13	25.283	113.173
2020-08-31	189.888	568.326	46.855	235.652	550.84	59.931	313.167	609.159	25.477	113.735
2020-09-01	195.567	573.7	47.605	237.55	554.027	61.058	313.621	609.203	25.709	114.573
2020-09-02	199.931	579.326	48.353	239.649	557.187	62.231	314.03	609.35	26.291	115.371
2020-09-03	205.259	583.378	49.14	242.547	560.284	63.474	314.399	609.541	28.579	116.146
2020-09-04	211.004	587.345	49.921	244.462	563.225	64.693	314.983	609.687	29.005	116.891
2020-09-05	213.547	590.168	50.686	246.144	565.688	65.866	315.231	609.863	29.199	117.541
2020-09-06	216.179	592.308	51.415	247.976	567.009	66.672	315.416	609.892	29.548	118.065

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2020-09-07	222.099	593.803	52.228	249.892	567.971	67.408	315.859	609.936	29.859	119.285
2020-09-08	228.151	596.257	53.028	251.257	569.376	68.742	316.349	610.406	30.285	119.938
2020-09-09	233.698	601.663	53.869	252.623	572.696	69.8	316.767	610.523	30.557	120.732
2020-09-10	239.158	606.215	54.737	254.239	575.471	70.836	317.185	610.728	30.906	121.496
2020-09-11	244.442	610.178	55.599	256.121	578.943	72.055	317.67	610.816	31.138	122.258
2020-09-12	246.964	613.762	56.398	256.937	581.193	73.757	317.903	610.948	31.41	122.9
2020-09-13	248.916	615.654	57.214	257.27	582.395	74.517	318.104	611.021	31.642	123.401
2020-09-14	255.823	617.795	57.97	258.136	583.665	75.299	318.621	611.153	31.642	123.985
2020-09-15	259.879	622.851	58.896	260.501	587.276	76.518	319.39	611.549	31.953	124.82
2020-09-16	265.668	627.346	59.708	261.567	590.145	78.313	320.32	611.842	32.263	125.567
2020-09-17	273.211	631.407	60.551	262.683	592.746	79.716	321.063	612.15	32.457	126.283
2020-09-18	277.508	635.276	61.446	264.098	595.629	81.326	321.917	612.546	32.728	127.027
2020-09-19	280.644	638.459	62.259	265.481	597.765	82.477	322.23	612.942	32.922	127.702
2020-09-20	286.213	640.099	63.07	265.697	598.576	83.42	322.516	613.206	33	128.206
2020-09-21	295.62	642.277	63.825	266.347	599.817	84.018	323.239	613.367	33.116	128.766
2020-09-22	305.926	645.987	64.604	268.445	602.926	85.49	324.283	613.91	33.31	129.55
2020-09-23	315.223	650.342	65.414	269.911	606.125	87.055	325.128	614.452	33.387	130.381
2020-09-24	323.774	654.057	66.233	271.194	608.849	88.297	325.837	615.038	33.698	131.102
2020-09-25	333.466	657.899	67.015	271.677	611.597	89.954	326.805	615.537	33.736	131.866
2020-09-26	340.812	661.273	67.821	272.742	613.949	91.748	327.355	616.05	33.814	132.556
2020-09-27	345.329	662.857	68.567	273.109	614.887	93.036	327.689	616.299	33.93	133.044
2020-09-28	353.31	664.684	69.124	276.24	615.911	93.911	328.57	616.49	34.202	133.562
2020-09-29	362.213	668.693	69.97	277.589	618.62	95.567	329.187	617.531	34.357	134.337
2020-09-30	371.378	673.282	70.818	278.705	621.42	97.109	330.658	618.572	34.434	135.156
2020-10-01	444.855	676.895	71.604	280.903	624.171	98.65	331.609	619.437	34.512	136.287
2020-10-02	451.675	679.951	72.371	281.62	626.697	100.237	332.648	620.404	34.628	137.008
2020-10-03	455.972	682.698	73.045	282.103	628.758	102.4	333.165	621.123	34.667	137.609
2020-10-04	460.862	684.371	73.693	282.735	629.866	103.412	333.652	621.607	34.667	138.12
2020-10-05	470.729	686.208	74.328	283.402	631.314	104.217	334.594	621.885	34.706	139.018
2020-10-06	478.601	689.993	75.035	284.851	633.42	106.38	336.076	623	34.783	139.761
2020-10-07	487.35	693.381	75.732	287.266	636.18	108.289	337.219	624.026	34.783	140.509
2020-10-08	497.963	696.816	76.424	289.93	639.13	110.59	338.304	625.155	34.783	141.317
2020-10-09	509.255	699.872	77.089	292.245	642.053	112.707	339.686	626.43	34.783	142.103
2020-10-10	517.061	702.367	77.747	294.344	644.035	115.26	340.464	627.618	34.822	142.724
2020-10-11	523.354	703.666	78.333	296.126	645.438	117.285	341.126	628.571	34.822	143.247
2020-10-12	530.327	704.573	78.84	297.508	646.633	118.32	342.476	629.304	34.861	143.763
2020-10-13	538.791	706.339	79.364	300.257	648.967	120.874	343.872	631.4	35.055	144.452
2020-10-14	546.443	709.76	79.852	302.305	651.968	123.427	345.661	633.409	35.055	145.237
2020-10-15	555.675	713.564	80.494	304.937	654.506	125.222	347.291	635.432	35.055	146.023
2020-10-16	564.029	716.569	81.095	305.953	657.339	127.707	349.301	637.426	35.055	146.812
2020-10-17	572.449	718.508	81.836	306.585	659.802	130.421	350.444	639.625	35.055	147.535
2020-10-18	575.957	719.606	82.252	307.635	661.193	132.561	351.537	640.608	35.094	148.026
2020-10-19	585.802	721.13	82.673	307.984	662.664	134.217	353.409	641.781	35.094	148.627
2020-10-20	594.222	724.158	83.187	310.716	665.479	136.84	355.918	645.314	35.094	149.47
2020-10-21	603.41	726.826	83.691	312.132	669.005	140.176	358.286	648.114	35.094	150.341
2020-10-22	613.014	729.186	84.186	313.83	671.58	142.937	360.813	650.885	35.094	151.093
2020-10-23	621.368	731.817	84.653	314.63	674.433	145.766	363.667	654.169	35.094	151.989
2020-10-24	627.398	733.625	85.068	315.512	677.326	148.688	365.887	656.72	35.094	152.733
2020-10-25	633.603	734.714	85.412	315.912	678.702	151.058	367.296	658.934	35.094	153.274
2020-10-26	642.484	736.125	85.762	316.578	680.27	152.783	370.487	660.43	35.094	153.989

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2020-10-27	651.89	738.583	86.127	317.328	683.306	155.751	374.673	665.81	35.171	154.936
2020-10-28	659.368	740.939	86.498	318.294	686.412	159.616	378.204	670.355	35.171	155.851
2020-10-29	667.502	743.513	86.902	319.177	689.425	162.377	382.017	674.46	35.171	156.766
2020-10-30	675.177	746.191	87.297	320.276	692.621	166.449	386.657	678.478	35.171	157.743
2020-10-31	679.782	747.556	87.635	321.042	695.418	170.222	390.232	683.257	35.171	158.58
2020-11-01	682.808	748.504	87.991	323.29	696.928	172.89	393.046	685.632	35.171	159.232
2020-11-02	693.398	749.275	88.342	324.19	698.602	174.478	397.565	687.626	35.171	160.016
2020-11-03	702.805	750.621	88.711	325.422	703.399	178.274	404.819	693.447	35.171	161.22
2020-11-04	713.067	753.509	89.216	326.188	706.763	182.944	412.972	700.66	35.171	162.51
2020-11-05	718.461	756.327	89.697	327.721	710.262	187.453	418.876	706.202	35.171	163.616
2020-11-06	726.574	757.593	90.111	328.92	713.909	192.285	426.081	711.407	35.171	164.772
2020-11-07	731.222	758.659	90.513	329.586	717.264	196.771	430.897	717.462	35.171	165.747
2020-11-08	735.871	759.547	90.864	329.919	718.955	200.038	434.645	719.749	35.171	166.521
2020-11-09	743.48	760.416	91.186	330.519	721.235	202.729	440.334	722.593	35.171	167.432
2020-11-10	749.531	761.341	91.553	332.284	725.488	207.469	449.024	730.393	35.171	168.71
2020-11-11	757.162	764.023	91.948	333.283	729.823	211.978	457.059	739.116	35.171	170.046
2020-11-12	762.666	768.383	92.34	334.366	733.439	216.763	463.671	747.371	35.171	171.289
2020-11-13	768.433	771.075	92.714	335.648	737.044	220.95	471.63	752.883	35.171	172.528
2020-11-14	774.177	774.505	93.034	336.531	741.168	225.597	477.327	759.657	35.171	173.678
2020-11-15	777.006	775.159	93.347	337.114	743.535	227.852	482.052	762.12	35.171	174.515
2020-11-16	783.387	776.36	93.669	338.33	745.98	230.107	488.935	765.243	35.171	175.523
2020-11-17	791.697	779.529	94.009	340.295	751.113	233.926	498.479	774.01	35.171	176.93
2020-11-18	796.982	783.052	94.429	342.36	756.947	239.976	506.941	781.766	35.171	178.384
2020-11-19	801.038	786.09	94.848	344.276	763.08	246.027	514.394	789.111	35.171	179.8
2020-11-20	806.695	788.487	95.253	345.741	768.935	251.433	523.938	796.603	35.171	181.294
2020-11-21	809.151	790.155	95.612	347.174	773.855	256.494	529.969	801.588	35.171	182.439
2020-11-22	811.344	790.987	95.979	348.14	777.042	259.784	534.652	807.423	35.171	183.382
2020-11-23	813.975	792.646	96.323	349.222	780.265	262.798	541.962	810.443	35.171	184.465
2020-11-24	820.772	795.576	96.669	351.138	786.681	267.307	552.425	819.357	35.171	186.081
2020-11-25	826.956	798.487	97.045	353.103	793.449	272.783	561.035	829.547	35.171	187.619
2020-11-26	831.933	801.805	97.398	354.568	797.663	278.166	569.653	836.848	35.171	189.017
2020-11-27	837.963	804.417	97.746	356.051	802.325	282.79	579.476	844.472	35.171	190.472
2020-11-28	840.287	806.959	98.102	357.067	806.404	287.231	585.805	851.495	35.171	191.646
2020-11-29	843.598	808.048	98.42	357.7	809.561	290.175	590.543	854.647	35.21	192.572
2020-11-30	849.234	809.688	98.766	358.666	813.502	292.89	597.815	857.623	35.21	193.706
2020-12-01	853.575	812.889	99.125	360.481	821.167	298.204	607.444	866.464	35.21	195.322
2020-12-02	858.575	816.062	99.503	361.564	829.668	302.3	616.177	875.964	35.21	196.93
2020-12-03	861.842	819.619	99.89	363.129	838.586	308.143	625.054	882.034	35.21	198.527
2020-12-04	866.381	822.787	100.258	365.794	846.432	313.826	634.048	889.423	35.21	200.107
2020-12-05	869.012	825.81	100.604	367.526	853.611	319.255	640.243	895.244	35.21	201.418
2020-12-06	872.038	827.399	100.884	369.841	857.825	323.327	644.959	898.631	35.21	202.397
2020-12-07	874.625	829.385	101.161	370.557	862.508	326.87	651.258	901.402	35.21	203.503
2020-12-08	877.278	833.114	101.449	373.605	870.267	331.586	659.677	910.184	35.21	205.063
2020-12-09	881.949	837.1	101.745	375.97	879.822	338.235	667.622	917.998	35.21	206.673
2020-12-10	886.532	840.694	102.041	378.851	888.791	344.654	676.104	925.563	35.21	208.281
2020-12-11	890.369	843.783	102.359	382.266	898.947	351.486	685.252	931.78	35.21	209.94
2020-12-12	891.728	846.947	102.64	384.831	906.556	357.238	691.545	939.403	35.21	211.301
2020-12-13	893.877	848.325	102.881	387.662	911.539	360.988	696.299	941.515	35.21	212.29
2020-12-14	899.907	850.722	103.135	390.577	916.492	363.312	702.867	944.916	35.21	213.454
2020-12-15	903.481	855.087	103.413	394.074	925.464	368.971	713.283	952.335	35.21	215.198

2020-12-16	907.011	859.484	103.667	396.839	936.677	375.321	722.592	961.307	35.21	216.959
2020-12-17	910.717	864.442	103.91	399.903	947.04	381.417	731.108	969.107	35.21	218.656
2020-12-18	913.743	868.26	104.159	404.467	955.877	387.606	740.256	976.291	35.21	220.294
2020-12-19	915.738	871.34	104.404	408.697	964.15	392.759	746.473	984.164	35.21	221.684
2020-12-20	916.835	873.298	104.643	411.229	969.463	395.727	750.679	988.944	35.21	222.711
2020-12-21	920.869	875.919	104.859	414.826	974.861	397.844	757.39	992.096	35.21	223.923
2020-12-22	926.504	880.448	105.098	420.472	984.768	403.411	767.021	1002.227	35.21	225.724
2020-12-23	927.82	884.957	105.322	427.318	994.917	410.037	775.623	1013.193	35.21	227.479
2020-12-24	927.82	888.509	105.563	432.747	1003.694	415.42	782.057	1021.624	35.21	228.98
2020-12-25	930.188	890.761	105.743	437.627	1008.215	419.975	786.444	1029.981	35.21	230.083
2020-12-26	931.92	892.144	105.943	441.708	1013.961	423.058	790.203	1033.059	35.21	231.041
2020-12-27	935.188	893.719	106.143	445.272	1018.281	424.968	794.032	1038.147	35.249	232.02
2020-12-28	939.968	896.233	106.324	450.868	1023.919	426.877	800.758	1043.381	35.249	233.249
2020-12-29	943.257	901.144	106.529	459.145	1034.78	432.537	811.512	1050.096	35.249	235.165
2020-12-30	946.436	906.832	106.744	466.89	1046.594	438.449	821.329	1064.493	35.249	237.149
2020-12-31	948.234	911.579	106.928	474.151	1056.588	443.58	828.44	1078.626	35.249	238.831
2021-01-01	949.857	913.771	107.088	481.113	1063.178	447.169	833.576	1087.643	35.249	240.06
2021-01-02	951.085	915.14	107.244	485.91	1070.985	448.572	837.465	1094.167	35.249	241.134
2021-01-03	953.431	916.594	107.398	492.605	1075.301	451.609	841.226	1100.824	35.249	242.102
2021-01-04	956.764	919.383	107.542	499.833	1081.249	453.495	848.096	1106.835	35.249	243.379
2021-01-05	960.075	924.935	107.731	508.378	1092.074	458.488	858.62	1119.707	35.249	245.337
2021-01-06	964.263	930.687	107.891	522.434	1103.861	464.055	866.723	1134.97	35.249	247.254
2021-01-07	967.464	937.781	108.059	529.779	1115.96	467.805	874.87	1152.006	35.249	249.178
2021-01-08	970.775	942.833	108.059	540.039	1128.543	470.06	883.893	1171.52	35.249	251.132
2021-01-09	973.933	947.548	108.367	546.684	1138.323	472.222	889.81	1186.694	35.249	252.759
2021-01-10	975.643	949.838	108.482	552.33	1144.643	474.868	893.969	1194.949	35.249	253.875
2021-01-11	979.129	952.132	108.602	559.259	1150.161	476.662	900.794	1202.704	35.249	255.152
2021-01-12	983.383	957.389	108.747	571.833	1163.345	481.172	910.897	1220.958	35.249	257.329
2021-01-13	986.343	963.296	108.889	585.257	1175.414	485.911	920.148	1243.903	35.249	259.473
2021-01-14	989.457	968.689	109.026	597.115	1186.804	490.029	928.91	1262.2	35.249	261.441
2021-01-15	991.694	973.992	109.152	607.358	1198.255	494.147	936.797	1280.966	35.249	263.351
2021-01-16	993.185	978.731	109.282	613.754	1208.999	497.782	943.078	1299.952	35.249	265.094
2021-01-17	995.64	981.306	109.386	617.984	1214.98	500.773	947.266	1309.819	35.249	266.25
2021-01-18	1004.959	983.53	109.484	623.713	1219.68	502.613	952.812	1318.601	35.249	267.486
2021-01-19	1010.09	988.951	109.6	637.687	1226.892	506.984	964.036	1342.206	35.249	269.596
2021-01-20	1013.379	995.47	109.709	647.114	1240.235	512.207	973.767	1368.889	35.249	271.889
2021-01-21	1016.427	1001.764	109.826	657.89	1252.662	518.119	982.263	1387.802	35.249	274.066
2021-01-22	1021.251	1006.769	109.935	667.466	1264.007	522.191	991.051	1408.343	35.249	276.113
2021-01-23	1024.803	1012.12	110.046	675.76	1274.688	525.228	996.308	1428.121	35.249	277.881
2021-01-24	1026.777	1014.9	110.14	680.757	1280.269	527.437	1000.535	1437.064	35.249	279.049
2021-01-25	1031.316	1018.125	110.224	684.804	1285.586	529.162	1007.881	1445.744	35.249	280.452

Table 4: Accumulated number of deaths per million for the period August 25, 2021 - January 20, 2022, [5].

	Argentina	Brazil	India	South Africa	United States	Ukraine	European Union	United Kingdom	Australia	World
2021-08-25	2433.154	2696.199	313.164	1340.212	1900.893	1302.511	1680.514	1936.704	38.351	566.954
2021-08-26	2436.465	2700.27	313.52	1346.158	1907.565	1304.029	1681.646	1938.771	38.428	568.428
2021-08-27	2439.82	2704.092	313.885	1352.17	1912.74	1306.031	1682.665	1940.237	38.506	569.736
2021-08-28	2441.004	2707.032	314.215	1356.734	1914.641	1307.825	1683.262	1942.187	38.739	570.811
2021-08-29	2442.298	2708.331	314.488	1358.965	1915.51	1309.044	1683.745	1943.082	38.894	571.663
2021-08-30	2447.209	2709.817	314.739	1362.879	1920.715	1309.827	1685	1943.786	39.01	572.873

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2021-08-31	2451.704	2713.934	315.069	1370.058	1925.05	1311.437	1686.384	1944.519	39.243	574.039
2021-09-01	2455.936	2717.191	315.434	1373.972	1931.159	1312.863	1687.569	1947.553	39.514	575.622
2021-09-02	2460.103	2720.845	315.697	1380.933	1940.029	1314.313	1688.837	1950.163	40.018	577.049
2021-09-03	2463.633	2724.303	315.934	1385.047	1945.941	1315.762	1689.989	1951.937	40.173	578.405
2021-09-04	2465.562	2727.285	316.155	1388.078	1947.848	1316.774	1690.678	1953.697	40.29	579.383
2021-09-05	2467.031	2728.551	316.312	1389.344	1949.038	1317.948	1691.223	1954.693	40.484	580.21
2021-09-06	2470.584	2729.579	316.52	1392.642	1950.837	1318.684	1692.473	1955.353	40.794	581.23
2021-09-07	2474.487	2731.107	316.785	1397.339	1957.082	1320.363	1693.947	1958.417	41.104	582.559
2021-09-08	2476.921	2732.271	317.028	1401.552	1963.927	1322.204	1695.215	1961.218	41.337	583.834
2021-09-09	2479.925	2736.121	317.214	1404.467	1973.792	1324.044	1696.51	1963.666	41.724	585.212
2021-09-10	2483.937	2739.093	317.435	1409.147	1981.091	1326.253	1697.664	1965.821	42.035	586.375
2021-09-11	2485.56	2742.22	317.678	1411.529	1983.47	1328.254	1698.285	1968.108	42.306	587.433
2021-09-12	2486.568	2743.617	317.835	1413.627	1984.479	1329.106	1698.82	1968.93	42.578	588.138
2021-09-13	2491.787	2744.944	318.078	1415.709	1990.952	1329.681	1700.224	1969.839	42.733	589.292
2021-09-14	2495.646	2748.112	318.282	1420.706	1996.74	1332.35	1702.111	1972.551	43.276	590.551
2021-09-15	2499.001	2751.855	318.591	1423.47	2005.049	1334.926	1703.424	1975.498	43.741	591.878
2021-09-16	2501.895	2754.954	318.821	1428.65	2015.445	1337.71	1704.672	1977.814	44.245	593.212
2021-09-17	2505.952	2757.935	319.023	1431.531	2022.792	1340.448	1705.855	1980.439	44.516	594.354
2021-09-18	2507.728	2760.673	319.244	1434.263	2025.688	1342.702	1706.678	1982.843	45.059	595.177
2021-09-19	2509.066	2761.832	319.456	1435.229	2026.73	1344.06	1707.248	1983.664	45.253	595.947
2021-09-20	2511.039	2763.071	319.637	1435.928	2033.594	1345.325	1708.726	1984.382	45.68	596.987
2021-09-21	2512.377	2766.216	319.912	1438.593	2040.668	1348.822	1710.383	1987.359	45.99	598.169
2021-09-22	2514.679	2769.323	320.114	1440.658	2049.216	1351.698	1711.939	1989.792	46.378	599.429
2021-09-23	2516.608	2772.263	320.342	1443.24	2059.03	1354.941	1713.393	1992.461	46.843	600.669
2021-09-24	2517.836	2775.44	320.551	1448.436	2066.491	1358.576	1714.757	1995.1	47.308	601.784
2021-09-25	2518.297	2777.964	320.737	1449.002	2068.864	1362.004	1715.468	1996.888	47.735	602.473
2021-09-26	2518.582	2779.207	320.935	1449.852	2070.513	1363.822	1716.148	1997.812	48.278	603.162
2021-09-27	2520.599	2780.113	321.064	1452.583	2077.434	1366.191	1717.715	1998.399	48.704	604.138
2021-09-28	2522.441	2783.931	321.335	1455.931	2085.123	1369.78	1719.372	2000.847	49.596	605.333
2021-09-29	2524.458	2787.113	321.558	1455.931	2092.972	1375.026	1720.989	2003.046	50.062	606.524
2021-09-30	2525.533	2789.955	321.757	1459.412	2101.377	1379.903	1722.416	2005.055	50.837	607.644
2021-10-01	2526.541	2792.244	321.925	1460.728	2107.793	1384.136	1723.818	2006.917	51.225	608.735
2021-10-02	2526.848	2794.366	322.1	1461.527	2110.178	1389.105	1724.737	2008.691	51.729	609.48
2021-10-03	2526.98	2795.422	322.229	1461.977	2111.677	1392.188	1725.555	2009.321	52.194	610.022
2021-10-04	2527.813	2796.375	322.418	1462.626	2117.561	1394.949	1727.179	2009.805	52.621	610.933
2021-10-05	2528.69	2799.572	322.617	1464.342	2123.289	1402.679	1729.138	2012.239	53.474	611.876
2021-10-06	2529.918	2802.235	322.846	1465.324	2131.192	1410.478	1731.061	2014.365	53.862	613.038
2021-10-07	2530.729	2804.235	323.04	1467.373	2138.639	1418.024	1732.758	2016.153	54.482	614.176
2021-10-08	2531.343	2807.179	323.218	1469.571	2144.147	1423.914	1734.69	2017.986	55.103	615.138
2021-10-09	2531.65	2809.123	323.372	1470.504	2145.415	1429.987	1735.911	2020.273	55.529	615.751
2021-10-10	2531.979	2809.829	323.51	1470.92	2146.821	1434.013	1736.786	2020.83	56.15	616.343
2021-10-11	2532.374	2810.796	323.64	1471.403	2150.131	1439.029	1738.449	2021.241	56.654	617.074
2021-10-12	2533.602	2811.614	323.802	1472.786	2157.199	1447.564	1740.672	2023.894	57.313	618.107
2021-10-13	2534.369	2812.577	323.979	1473.402	2166.892	1458.906	1742.64	2025.888	58.011	619.225
2021-10-14	2535.488	2815.25	324.251	1474.068	2173.329	1468.867	1744.666	2028.19	58.438	620.244
2021-10-15	2536.08	2817.619	324.37	1475.001	2178.817	1473.952	1746.714	2030.272	58.748	621.163
2021-10-16	2536.145	2819.792	324.473	1475.417	2180.397	1480.831	1748.107	2032.442	59.407	621.83
2021-10-17	2536.211	2820.39	324.592	1475.834	2181.755	1486.26	1749.315	2033.278	59.834	622.372
2021-10-18	2537.044	2821.334	324.71	1475.95	2186.993	1490.723	1751.386	2033.937	60.415	623.192
2021-10-19	2537.768	2823.105	324.851	1476.866	2193.412	1503.653	1754.098	2037.207	61.152	624.242
2021-10-20	2538.492	2824.97	324.966	1478.199	2203.033	1515.547	1756.5	2039.831	61.656	625.347

2021-10-21	2539.062	2827.147	325.132	1479.548	2209.005	1528.683	1758.803	2041.547	62.47	626.325
2021-10-22	2539.566	2829.236	325.61	1480.48	2214.7	1543.407	1760.907	2044.186	62.897	627.366
2021-10-23	2539.654	2830.872	326.013	1480.863	2216.319	1555.14	1762.848	2046.165	63.479	628.103
2021-10-24	2539.72	2831.428	326.331	1481.047	2217.052	1564.596	1764.248	2047.22	63.905	628.677
2021-10-25	2540.268	2832.395	326.586	1481.197	2221.299	1572.809	1766.525	2047.778	64.099	629.522
2021-10-26	2540.597	2834.278	327.006	1482.079	2226.159	1590.408	1769.635	2051.633	64.719	630.526
2021-10-27	2541.101	2836.311	327.532	1483.112	2232.395	1607.065	1772.882	2054.668	65.766	631.692
2021-10-28	2541.693	2838.054	328.11	1484.028	2237.928	1621.352	1775.434	2057.102	66.232	632.779
2021-10-29	2542.11	2839.961	328.504	1484.811	2243.143	1636.674	1778.39	2059.829	66.775	633.805
2021-10-30	2542.263	2840.97	328.824	1485.011	2244.23	1649.764	1780.431	2062.263	67.279	634.565
2021-10-31	2542.438	2841.592	329.004	1485.244	2244.93	1658.115	1782.131	2063.348	67.589	635.134
2021-11-01	2543.294	2842.073	329.322	1485.277	2248.685	1665.684	1784.727	2063.934	68.093	635.932
2021-11-02	2543.754	2842.783	329.545	1485.577	2252.544	1682.571	1788.019	2068.215	68.558	636.855
2021-11-03	2544.171	2843.671	329.876	1485.96	2258.453	1699.871	1791.559	2071.397	69.063	637.926
2021-11-04	2544.741	2845.699	330.034	1486.476	2262.081	1716.643	1795.193	2074.534	69.605	638.894
2021-11-05	2545.355	2847.484	330.316	1487.209	2268.458	1733.414	1798.52	2077.364	69.993	639.986
2021-11-06	2545.53	2848.9	330.693	1487.609	2269.843	1752.486	1801.031	2079.636	70.381	640.826
2021-11-07	2545.815	2849.228	330.884	1487.825	2270.405	1763.575	1802.621	2080.545	70.846	641.394
2021-11-08	2546.67	2849.788	331.122	1488.158	2274.051	1775.055	1805.913	2081.381	71.389	642.242
2021-11-09	2547.153	2850.76	331.453	1488.741	2278.518	1794.863	1809.945	2085.222	72.048	643.289
2021-11-10	2547.569	2852.017	331.697	1489.541	2283.57	1814.372	1814.22	2088.36	72.204	644.325
2021-11-11	2548.118	2853.139	332.056	1489.824	2286.154	1830.085	1817.876	2091.219	72.63	645.303
2021-11-12	2548.403	2856.041	332.454	1490.107	2293.636	1848.076	1821.126	2093.345	72.785	646.448
2021-11-13	2548.534	2857.475	332.659	1490.224	2295.306	1864.733	1823.865	2095.647	72.979	647.242
2021-11-14	2548.622	2857.779	332.749	1490.357	2295.877	1874.579	1825.674	2096.57	73.212	647.826
2021-11-15	2549.017	2858.106	332.89	1490.44	2299.695	1885.3	1829.458	2097.259	73.6	648.713
2021-11-16	2549.981	2858.775	333.106	1490.69	2303.72	1905.2	1833.778	2100.397	73.949	649.69
2021-11-17	2550.398	2860.536	333.443	1490.873	2308.778	1923.513	1838.651	2103.344	74.53	650.858
2021-11-18	2551.012	2861.807	333.773	1491.539	2312.764	1941.55	1842.712	2106.261	74.957	651.91
2021-11-19	2551.429	2862.92	333.964	1491.656	2318.189	1958.988	1846.831	2108.563	75.151	652.93
2021-11-20	2551.736	2863.887	334.189	1491.822	2319.535	1975.001	1849.722	2110.762	75.383	653.7
2021-11-21	2551.801	2864.335	334.368	1491.856	2320.132	1984.502	1851.336	2111.657	75.538	654.274
2021-11-22	2551.911	2864.924	334.537	1492.022	2323.845	1992.669	1855.887	2112.316	76.314	655.194
2021-11-23	2552.635	2866.303	334.851	1492.872	2327.975	2010.062	1860.487	2114.735	76.508	656.217
2021-11-24	2553.577	2867.569	335.135	1493.238	2333.229	2024.51	1865.523	2116.92	76.702	657.318
2021-11-25	2554.06	2868.915	335.485	1495.137	2334.625	2039.809	1870.23	2119.075	76.973	658.302
2021-11-26	2554.608	2870.34	335.819	1495.337	2335.728	2054.602	1874.472	2121.421	77.167	659.166
2021-11-27	2554.871	2871.401	336.265	1495.47	2336.659	2068.497	1877.464	2123.342	77.322	659.916
2021-11-28	2555.134	2871.775	336.434	1495.57	2337.323	2078.482	1879.51	2124.089	77.438	660.52
2021-11-29	2555.682	2872.326	336.57	1495.986	2343.093	2086.028	1884.045	2124.602	77.787	661.507
2021-11-30	2556.45	2873.85	336.762	1496.336	2347.671	2099.716	1889.233	2126.948	77.981	662.517
2021-12-01	2556.625	2875.102	337.104	1496.802	2353.994	2113.336	1894.269	2129.455	78.369	663.693
2021-12-02	2557.064	2876.018	337.385	1497.535	2365.705	2126.173	1899.171	2131.523	78.834	664.976
2021-12-03	2557.546	2877.112	337.683	1498.018	2370.611	2138.643	1904.204	2133.619	79.183	666.053
2021-12-04	2557.634	2877.794	337.683	1498.368	2372.605	2149.363	1907.42	2135.481	79.494	666.749
2021-12-05	2557.7	2878.126	339.841	1498.385	2373.608	2156.449	1909.12	2136.273	79.726	667.678
2021-12-06	2558.445	2878.742	339.999	1498.534	2377.651	2162.615	1913.274	2136.889	80.075	668.567
2021-12-07	2558.95	2879.962	340.138	1498.984	2382.755	2174.049	1919.509	2139.528	80.347	669.621
2021-12-08	2559.059	2881.084	340.253	1499.584	2388.21	2185.092	1924.274	2141.917	80.735	670.641
2021-12-09	2559.3	2882.018	340.517	1499.95	2392.802	2196.572	1930.162	2144.087	80.812	671.762
2021-12-10	2559.936	2883.084	340.799	1500.283	2398.296	2207.477	1935.493	2145.847	81.433	672.788

2021-12-11	2560.199	2883.331	341.202	1500.883	2400.06	2218.405	1938.512	2147.782	81.588	673.544
2021-12-12	2560.441	2883.715	341.347	1501.233	2401.003	2224.57	1940.516	2148.544	81.665	674.124
2021-12-13	2560.901	2883.925	341.528	1501.416	2405.181	2229.517	1945.122	2149.101	81.937	674.957
2021-12-14	2561.647	2884.453	341.705	1501.815	2409.72	2239.133	1950.889	2151.301	82.092	675.939
2021-12-15	2562.326	2885.845	341.951	1502.715	2416.562	2248.013	1956.473	2153.705	82.441	677.103
2021-12-16	2562.699	2886.42	342.232	1503.314	2420.329	2256.825	1961.54	2155.86	82.751	678.029
2021-12-17	2563.094	2887.346	342.232	1503.897	2425.892	2265.015	1965.874	2157.517	83.061	678.917
2021-12-18	2563.247	2887.99	342.439	1504.697	2427.793	2272.285	1970.067	2159.35	83.216	679.683
2021-12-19	2563.335	2888.247	342.723	1504.747	2428.553	2276.955	1972.059	2160.009	83.216	680.229
2021-12-20	2563.927	2888.635	343.049	1506.496	2433.215	2281.119	1976.605	2160.64	83.527	681.109
2021-12-21	2564.431	2888.967	343.277	1507.078	2439.072	2289.746	1981.635	2163.176	83.837	682.09
2021-12-22	2564.672	2889.649	343.588	1508.727	2445.425	2297.292	1986.704	2165.243	84.263	683.132
2021-12-23	2565.001	2890.238	343.857	1509.976	2455.834	2304.263	1991.362	2167.399	84.612	684.307
2021-12-24	2565.637	2891	344.134	1511.326	2457.837	2310.567	1994.743	2169.407	84.845	685.051
2021-12-25	2565.9	2891.145	344.251	1511.825	2458.378	2317.331	1997.684	2169.554	84.923	685.585
2021-12-26	2566.229	2891.36	344.477	1512.508	2458.9	2321.104	1999.104	2169.598	85.155	686.037
2021-12-27	2566.909	2891.663	344.687	1512.758	2464.478	2324.739	2003.265	2171.694	85.388	686.886
2021-12-28	2567.326	2892.509	344.904	1513.174	2471.597	2328.489	2007.954	2171.973	85.698	687.824
2021-12-29	2567.896	2893.056	345.096	1514.523	2478.422	2336.219	2013.769	2172.823	86.241	688.839
2021-12-30	2568.663	2893.776	345.254	1516.622	2482.894	2343.097	2018.368	2177.691	86.823	689.792
2021-12-31	2569.168	2894.173	345.545	1518.021	2484.88	2348.642	2022.273	2180.667	87.365	690.622
2022-01-01	2569.431	2894.327	345.749	1518.904	2485.871	2353.519	2024.753	2182.925	87.521	691.153
2022-01-02	2569.935	2894.486	345.837	1519.403	2486.796	2356.303	2026.005	2183.995	87.87	691.549
2022-01-03	2570.834	2894.822	345.926	1520.802	2492.116	2359.455	2029.798	2184.611	88.025	692.309
2022-01-04	2571.908	2895.668	346.31	1523.117	2498.832	2363.113	2034.699	2185.329	88.8	693.306
2022-01-05	2573.049	2895.668	346.543	1524.949	2505.008	2369.946	2039.921	2190.373	89.266	694.305
2022-01-06	2573.926	2895.668	346.76	1534.126	2510.79	2374.8	2044.044	2193.759	90.002	695.231
2022-01-07	2574.847	2896.453	346.964	1536.458	2517.618	2379.608	2047.309	2197.132	90.623	696.132
2022-01-08	2575.658	2896.991	347.199	1538.44	2519.763	2381.656	2049.697	2201.72	91.747	696.792
2022-01-09	2576.25	2898.458	347.304	1539.806	2521.096	2383.772	2051.086	2203.143	92.562	697.27
2022-01-10	2577.368	2898.995	347.502	1541.088	2526.74	2386.096	2054.358	2204.286	93.647	698.069
2022-01-11	2578.508	2899.654	347.502	1543.07	2533.709	2391.479	2060.194	2209.872	95.586	699.147
2022-01-12	2580.153	2900.28	348.092	1546.085	2541.201	2396.287	2065.588	2215.737	97.797	700.323
2022-01-13	2583.179	2901.164	348.161	1548.733	2546.974	2401.073	2069.872	2220.648	99.735	701.244
2022-01-14	2585.218	2902.253	348.607	1550.864	2553.979	2404.616	2074.226	2224.607	101.636	702.3
2022-01-15	2587.148	2903.047	348.832	1553.546	2556.478	2407.882	2077.209	2228.814	103.652	703.062
2022-01-16	2588.266	2903.486	349.109	1554.978	2558.175	2410.229	2078.913	2230.105	104.389	703.587
2022-01-17	2592.454	2904.192	349.331	1556.427	2561.62	2412.323	2082.979	2231.395	107.53	704.395
2022-01-18	2596.598	2905.711	349.648	1558.426	2567.321	2416.993	2088.395	2237.846	110.244	705.467
2022-01-19	2601.159	2907.215	350	1558.426	2578.766	2421.065	2092.648	2243.109	112.067	706.789
2022-01-20	2605.128	2908.856	350.504	1563.006	2586.212	2424.378	2097.286	2247.947	115.479	707.947

Table 5: Numbers of fully vaccinated persons per hundred VC for the period August 25, 2021 - January 20, 2022, [5].

	Argentina	Brazil	India	South Africa	United States	Ukraine	European Union	United Kingdom	Australia	World
2021-08-25	27.49	27.03	9.66		52.97	7.65	56.72	61.92	25.83	24.81
2021-08-26	28.32	27.48	9.78		53.09	7.93	56.99	62.13	26.4	26.38
2021-08-27	29.1	27.92	10.01	9.33	53.25	8.18	57.21	62.33	26.95	26.58
2021-08-28	29.87	28.23	10.22		53.36	8.31	57.39	62.52	27.32	26.7
2021-08-29	30.42	28.35	10.37		53.42	8.38	57.66	62.64	27.51	26.91
2021-08-30	30.99	28.69	10.49	9.69	53.55	8.61	57.92	62.74	28.01	27.04

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2021-08-31	31.55	29.3	10.61	9.97	53.67	8.84	58.19	62.91	28.58	27.21
2021-09-01	32.42	29.79	10.9	10.23	53.79	9.03	58.44	63.08	29.13	27.4
2021-09-02	33.16	30.33	11.06	10.5	53.91	9.27	58.67	63.25	29.68	27.54
2021-09-03	34.01	30.89	11.19		54.06	9.54	58.85	63.41	30.22	27.66
2021-09-04	34.64	31.2	11.25		54.14	9.66	59	63.6	30.55	27.78
2021-09-05	35.29	31.3	11.42	10.81	54.19	9.73	59.26	63.71	30.73	27.92
2021-09-06	35.79	31.64	11.53		54.22	9.95	59.44	63.83	31.2	29.06
2021-09-07	36.72	31.79	11.75	11.24	54.36	10.18	59.66	63.95	31.75	29.22
2021-09-08	37.36	32.31	11.99		54.48	10.42	59.85	64.08	32.3	29.44
2021-09-09	38.08	32.99	12.22	11.47	54.6	10.67	60.03	64.22	32.89	29.65
2021-09-10	38.77	33.73	12.28	11.91	54.75	10.93	60.19	64.36	33.47	29.79
2021-09-11	39.49	34.14	12.52	11.97	54.84	11.03	60.32	64.5	33.82	29.94
2021-09-12	39.88	34.28	12.7	11.99	54.89	11.1	60.53	64.58	34.02	30.09
2021-09-13	40.07	34.76	12.94	12.21	55	11.28	60.68	64.67	34.59	30.24
2021-09-14	40.53	35.43	12.99	12.45	55.11	11.46	60.85	64.77	35.16	30.38
2021-09-15	41.09	35.98	13.24	12.67	55.23	11.57	61.01	64.86	35.74	31.07
2021-09-16	41.82	36.44	13.53	12.88	55.35	11.69	61.15	64.95	36.3	31.23
2021-09-17	42.54	37.17	13.73		55.49	11.81	61.28	65.04	36.95	31.35
2021-09-18	43.03	37.5	14.27		55.57	11.87	61.39	65.15	37.35	31.66
2021-09-19	43.51	37.61	14.54	13.18	55.62	11.9	61.56	65.2	37.62	31.79
2021-09-20	43.88	37.97	14.76		55.73	12.01	61.72	65.27	38.21	31.93
2021-09-21	44.46	38.54	15.03	13.5	55.83	12.12	61.86	65.33	38.85	32.09
2021-09-22	45.18	39.09	15.19	13.7	55.93	12.24	62.01	65.4	39.49	32.22
2021-09-23	45.7	39.66	15.5	13.9	56.03	12.37	62.13	65.46	40.15	32.37
2021-09-24	46.05	40.24	15.81	13.93	56.15	12.51	62.25	65.53	40.8	32.51
2021-09-25	46.52	40.56	15.97		56.22	12.57	62.35	65.6	41.24	32.62
2021-09-26	46.79	40.71	16.09	13.98	56.26	12.61	62.49	65.63	41.51	32.72
2021-09-27	47.03	41.04	16.47	14.16	56.33	12.72	62.59	65.68	42.12	32.95
2021-09-28	47.44	41.64	16.61		56.42	12.85	62.69	65.73	42.81	33.4
2021-09-29	47.97	42.18	16.82		56.51	12.97	62.8	65.78	43.44	33.53
2021-09-30	48.43	42.73	17.04	14.69	56.61	13.1	62.9	65.83	44.15	33.68
2021-10-01	48.98	43.35	17.26		56.72	13.23	63	65.88	44.87	33.8
2021-10-02	49.53	43.67	17.51		56.78	13.29	63.07	65.93	45.33	33.91
2021-10-03	49.9	43.77	17.68	15.11	56.82	13.33	63.16	65.96	45.63	34.02
2021-10-04	50.18	44.08	17.86		56.9	13.44	63.25	66.01	46.02	34.16
2021-10-05	50.49	44.51	18.09	15.6	56.97	13.57	63.32	66.05	46.86	34.37
2021-10-06	50.85	45.02	18.27	15.87	57.05	13.72	63.4	66.09	47.67	34.5
2021-10-07	51.27	45.51	18.39		57.13	13.87	63.48	66.13	48.48	34.64
2021-10-08	51.67	46.01	18.66	16.13	57.22	14.04	63.56	66.18	49.33	34.81
2021-10-09	51.91	46.3	18.93		57.27	14.12	63.62	66.22	49.96	34.93
2021-10-10	52.22	46.51	19.21		57.3	14.16	63.7	66.25	50.4	35.09
2021-10-11	52.47	46.77	19.35	16.51	57.37	14.31	63.79	66.29	51.23	35.22
2021-10-12		46.88	19.57		57.44	14.48	63.88	66.33	52.14	
2021-10-13	52.7	47.13	19.73	17.02	57.51	14.66	63.96	66.37	53.02	35.46
2021-10-14	52.99	47.79	19.82		57.57	14.69	64.04	66.41	53.87	35.57
2021-10-15	53.3	48.38	19.93	17.55	57.66	14.85	64.13	66.45	54.68	35.67
2021-10-16	53.75	48.75	20		57.7	14.93	64.19	66.5	55.24	35.74
2021-10-17		48.89	20.15	17.92	57.72	14.98	64.26	66.53	55.69	
2021-10-18		49.17	20.26		57.79	15.17	64.32	66.56	56.45	
2021-10-19	54.29	49.7	20.6	18.38	57.84	15.37	64.39	66.61	57.21	36.19
2021-10-20	54.59	50.27	20.92		57.9	15.56	64.48	66.65	57.96	36.36

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2021-10-21	54.73	50.56	21.07		57.96	15.76	64.56	66.69	58.73	36.5
2021-10-22	55.04	50.93	21.35		58.03	15.96	64.63	66.73	59.49	36.63
2021-10-23	55.32	51.13	21.5	19.23	58.07	16.07	64.7	66.77	60.04	37.02
2021-10-24	55.5	51.38	21.86		58.1	16.13	64.75	66.8	60.37	37.16
2021-10-25	55.56	52.13	21.94	19.48	58.16	16.29	64.83	66.83	61.01	37.28
2021-10-26	55.8	52.61	22.23		58.22	16.47	64.9	66.86	61.63	37.41
2021-10-27	56.08	53.11	22.47		58.28	16.65	64.98	66.9	62.24	37.52
2021-10-28	56.3	53.56	22.74		58.34	16.82	65.06	66.93	62.87	37.67
2021-10-29	56.63	54	23.15		58.42	17.02	65.14	66.96	63.45	37.92
2021-10-30	56.77	54.16	23.44	20.49	58.45	17.12	65.19	67	63.86	38.08
2021-10-31	56.91	54.26	23.62	20.51	58.47	17.19	65.24	67.02	64.1	38.29
2021-11-01	56.98	54.34	23.83		58.53	17.34	65.27	67.05	64.68	38.4
2021-11-02	57.1	54.39	23.92	20.88	58.59	17.52	65.34	67.08	65.06	38.51
2021-11-03	57.16	54.68	24.15	21.02	58.64	17.72	65.41	67.11	65.56	38.61
2021-11-04	57.81	55.11	24.24	21.21	58.7	17.91	65.48	67.14	66.05	38.73
2021-11-05		55.72	24.27		58.77	18.13	65.55	67.17	66.56	
2021-11-06	58.06	55.92	24.39	21.32	58.81	18.23	65.6	67.2	66.84	38.97
2021-11-07	58.41	56.03	24.54	21.34	58.83	18.31	65.64	67.23	67.02	39.07
2021-11-08	58.59	56.49	24.79	21.54	58.88	18.54	65.7	67.26	67.43	39.18
2021-11-09	58.73	56.89	24.99	21.7	58.93	18.81	65.77	67.29	67.81	39.31
2021-11-10	58.93	57.31	25.28	21.86	58.98	19.11	65.83	67.36	68.18	39.45
2021-11-11	59.16	57.76	25.54		59.02	19.42	65.89	67.39	68.56	39.6
2021-11-12	59.4	58.14	26	22.19	59.08	19.8	65.97	67.42	68.94	39.76
2021-11-13	59.65	58.35	26.39	22.28	59.11	19.98	66.02	67.46	69.16	39.92
2021-11-14	59.95	58.47	26.57	22.32	59.13	20.11	66.07	67.48	69.3	40.05
2021-11-15	60.26	58.63	26.77	22.47	59.18	20.49	66.13	67.51	69.64	40.15
2021-11-16		58.84	27.1	22.62	59.23	20.91	66.2	67.54	69.96	
2021-11-17	61.08	59.33	27.47	22.77	59.28	21.35	66.28	67.57	70.25	40.39
2021-11-18		59.65	27.86	22.92	59.33	21.79	66.34	67.6	70.55	
2021-11-19	61.99	59.99	28.09		59.39	22.27	66.41	67.63	70.83	40.7
2021-11-20	62.23	60.21	28.59	23.1	59.42	22.51	66.47	67.67	71	40.85
2021-11-21	62.36	60.38	28.78	23.11	59.44	22.67	66.51	67.69	71.05	40.97
2021-11-22	62.5	60.67	29.15	23.23	59.49	23.11	66.57	67.72	71.39	41.1
2021-11-23	62.81	61	29.55	23.37	59.54	23.57	66.63	67.75	71.63	41.22
2021-11-24		61.32	30.05	23.51	59.59	24.02	66.7	67.78	71.87	
2021-11-25	63.57	61.55	30.29		59.59	24.46	66.77	67.82	72.1	41.47
2021-11-26		61.87	30.87	23.76	59.64	24.91	66.84	67.85	72.34	
2021-11-27	64.11	62	30.96	23.8	59.7	25.14	66.91	67.9	72.46	41.72
2021-11-28	64.29	62.1	31.47		59.74	25.28	66.96	67.94	72.53	41.89
2021-11-29	64.71	62.17	31.73	23.96	59.85	25.64	67.12	67.98	72.74	42.45
2021-11-30	65.15	62.58	32.15	24.11	59.96	26	67.18	68.03	72.94	42.62
2021-12-01	65.46	62.92	32.57	24.25	60.08	26.31	67.25	68.07	73.13	42.76
2021-12-02	65.79	63.24	33.11	24.68	60.2	26.62	67.33	68.12	73.33	43.34
2021-12-03	66.09	63.76	33.4		60.34	26.94	67.4	68.16	73.53	43.63
2021-12-04	66.25	63.94	34.02	24.87	60.47	27.11	67.46	68.22	73.64	43.8
2021-12-05	66.36	63.98	34.26	24.9	60.53	27.21	67.51	68.26	73.71	43.92
2021-12-06		64.19	34.51	25.02	60.62	27.47	67.58	68.3	73.89	
2021-12-07	66.65	64.44	34.92	25.16	60.72	27.75	67.65	68.34	74.07	44.15
2021-12-08	67.18	64.6	35.32	25.29	60.82	28	67.72	68.38	74.26	44.32
2021-12-09		64.92	35.75		60.92	28.24	67.79	68.43	74.44	
2021-12-10	67.69	65.11	35.95	25.53	61.04	28.49	67.88	68.48	74.6	45.07

2021-12-11	67.85	65.14	36.75		61.13	28.62	67.95	68.53	74.69	45.28
2021-12-12	67.94	65.15	36.94	25.58	61.17	28.71	68	68.58	74.73	45.43
2021-12-13	68.18	65.32	37.14	25.67	61.25	28.91	68.07	68.62	74.95	45.54
2021-12-14	68.48	65.49	37.7	25.77	61.34	29.13	68.15	68.68	75.13	45.7
2021-12-15	68.76	65.84	38.03	25.87	61.41	29.35	68.24	68.73	75.31	45.83
2021-12-16	68.98	65.97	38.25	25.96	61.46	29.55	68.33	68.8	75.49	45.92
2021-12-17	69.19	66.08	38.74		61.54	29.77	68.42	68.86	75.67	46.37
2021-12-18	69.32	66.11	39.16		61.58	29.87	68.49	68.93	75.77	46.48
2021-12-19	69.4	66.12	39.34	25.98	61.61	29.93	68.54	68.98	75.82	46.67
2021-12-20	69.61	66.22	39.54		61.67	30.1	68.62	69.06	75.96	46.86
2021-12-21		66.32	40	26.12	61.74	30.28	68.7	69.14	76.08	
2021-12-22	69.88	66.53	40.14		61.81	30.46	68.79	69.22	76.2	47.06
2021-12-23	70.15		40.54		61.86	30.64	68.85	69.28	76.31	47.18
2021-12-24	70.45		40.89	26.25	61.88	30.82	68.87	69.3	76.31	47.29
2021-12-25			41.4		61.88	30.86	68.88	69.3	76.31	
2021-12-26	70.45		41.44	26.26	61.9	30.91	68.9	69.31	76.39	47.6
2021-12-27	70.5	66.71	41.63	26.26	61.97	30.98	68.97	69.34	76.41	47.69
2021-12-28	71.07	66.81	42.05	26.32	62.04	31.2	69.05	69.38	76.43	47.95
2021-12-29		66.96	42.55	26.37	62.11	31.39	69.11	69.45	76.52	
2021-12-30	71.57	67.01	42.74		62.17	31.56	69.18	69.51	76.61	48.34
2021-12-31	71.61	67.03	43.29		62.2	31.65	69.2	69.54	76.61	48.47
2022-01-01	71.61	67.03	43.57	26.43	62.2	31.65	69.2	69.55	76.61	48.56
2022-01-02	71.66	67.04	43.7	26.44	62.23	31.65	69.3	69.57	76.69	48.61
2022-01-03		67.16	43.92	26.49	62.28	31.71	69.37	69.62	76.71	
2022-01-04	72.09	67.18	44.1	26.61	62.34	31.88	69.46	69.68	76.8	48.82
2022-01-05		67.23	44.33		62.41	32.04	69.54	69.74	76.9	
2022-01-06	72.56		44.56		62.47	32.14	69.61	69.79	77	49.06
2022-01-07			44.92	26.75	62.53	32.14	69.7	69.84	77.1	
2022-01-08	72.91		45		62.58	32.18	69.78	69.92	77.15	49.24
2022-01-09	72.99	67.47	45.32	26.77	62.6	32.21	69.83	69.96	77.19	49.36
2022-01-10	73.18	67.63	45.52		62.66	32.34	69.91	70	77.28	49.65
2022-01-11	73.37	67.7	45.94		62.71	32.48	70	70.04	77.35	49.77
2022-01-12	73.57	67.76	46.15		62.77	32.6	70.1	70.09	77.43	49.86
2022-01-13	73.75	67.88	46.47		62.82	32.7	70.19	70.13	77.51	49.99
2022-01-14	73.93	67.94	46.57		62.87	32.8	70.26	70.18	77.58	50.1
2022-01-15	74.02	67.97	46.9		62.89	32.85	70.31	70.27	77.62	50.2
2022-01-16	74.07	68.36	47.08		62.9	32.87	70.34	70.32	77.64	50.3
2022-01-17		68.8	47.27	26.92	62.94	32.96	70.4	70.36	77.69	
2022-01-18	74.27	68.94	47.28	27	62.97	33.04	70.48	70.4	77.75	51.45
2022-01-19	74.45	69.04	47.91	27.08	62.98	33.11	70.54	70.45	77.81	51.6
2022-01-20	74.83	69.18	48.22	27.15	62.98	33.19	70.6		77.88	51.69

fully vaccinated people and boosters per hundred for the period of August 25, 2021 to January 20, 2022 for the same countries and regions according to [5]. The highest levels of vaccinations have been achieved in Australia, Argentina, EU and the UK (as of January, 2022, the percentage of fully vaccinated people have exceeded 70%). Rather high levels have Brazil (69.2%) and USA (63.0%), but VC values in South Africa (27.2%), Ukraine (33.2%) and India (48.2%) were still

lower than the world average (51.7%). The booster figures in Ukraine, India and South Africa were negligible in 2021. They are not listed in JHU statistics [5] and in table 6. We will use datasets from tables 5,6 without any smoothing. Since JHU often changes its data sets, we have to clarify that the data in tables 1-6 correspond to the version of the file published on January 22, 2022.

Table 6: Numbers of boosters per hundred in different regions for the period August 25, 2021 - January 20, 2022, [5].

	Argentina	Brazil	United States	European Union	United Kingdom	Australia	World
2021-08-25			0.3	0.04			0.21
2021-08-26			0.33	0.04			0.22
2021-08-27			0.37	0.04			0.22
2021-08-28			0.39	0.04			0.22
2021-08-29			0.4	0.04			0.23
2021-08-30			0.43	0.04			0.23
2021-08-31			0.46	0.12			0.24
2021-09-01			0.49	0.13			0.25
2021-09-02		0	0.53	0.15			0.26
2021-09-03		0	0.56	0.16			0.27
2021-09-04		0	0.58	0.16			0.27
2021-09-05		0	0.58	0.17			0.27
2021-09-06		0.01	0.59	0.19			0.28
2021-09-07		0.01	0.62	0.2			0.28
2021-09-08		0.01	0.64	0.22			0.29
2021-09-09		0.02	0.67	0.24			0.3
2021-09-10		0.02	0.7	0.26			0.3
2021-09-11		0.03	0.72	0.26			0.31
2021-09-12		0.03	0.73	0.27			0.31
2021-09-13		0.04	0.75	0.29			0.31
2021-09-14		0.06	0.77	0.32			0.32
2021-09-15		0.09	0.79	0.35			0.33
2021-09-16		0.1	0.81	0.38			0.33
2021-09-17		0.12	0.84	0.4			0.34
2021-09-18		0.12	0.86	0.41			0.34
2021-09-19		0.12	0.86	0.42			0.35
2021-09-20		0.16	0.89	0.44			0.35
2021-09-21		0.18	0.91	0.48			0.36
2021-09-22		0.2	0.94	0.51			0.37
2021-09-23		0.21	0.97	0.55			0.37
2021-09-24		0.24	1.05	0.58			0.39
2021-09-25		0.25	1.12	0.59			0.4
2021-09-26		0.26	1.16	0.6			0.4
2021-09-27		0.38	1.31	0.63			0.42
2021-09-28		0.41	1.47	0.67			0.43
2021-09-29		0.44	1.63	0.71			0.44
2021-09-30		0.51	1.79	0.75	1.27		0.47
2021-10-01		0.61	1.97	0.78	1.5		0.49
2021-10-02		0.66	2.05	0.8	1.78		0.5
2021-10-03		0.68	2.08	0.8	1.91		0.5
2021-10-04		0.77	2.23	0.85	2.1		0.52
2021-10-05		0.88	2.38	0.95	2.33		0.55
2021-10-06		1.01	2.53	1.01	2.56		0.57
2021-10-07		1.17	2.68	1.08	2.82	0	0.59
2021-10-08		1.32	2.85	1.13	3.08	0	0.61
2021-10-09		1.42	2.91	1.15	3.45	0	0.63

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2021-10-10		1.46	2.95	1.18	3.58	0	0.63
2021-10-11		1.53	3.07	1.22	3.77	0	0.65
2021-10-12		1.55	3.21	1.28	4.01	0	0.66
2021-10-13		1.66	3.34	1.36	4.68	0.01	0.69
2021-10-14		1.75	3.48	1.43	5.03	0.01	0.71
2021-10-15		1.91	3.63	1.49	5.36	0.01	0.73
2021-10-16		2.02	3.69	1.52	5.81	0.01	0.75
2021-10-17		2.07	3.72	1.54	5.98	0.01	0.75
2021-10-18		2.26	3.84	1.6	6.24	0.01	0.77
2021-10-19		2.4	3.97	1.67	6.58	0.01	0.8
2021-10-20		2.58	4.1	1.77	6.96	0.02	0.82
2021-10-21		2.7	4.23	1.85	7.85	0.02	0.85
2021-10-22		2.86	4.48	1.93	8.29	0.02	0.88
2021-10-23		2.91	4.63	1.97	8.84	0.03	0.9
2021-10-24		2.96	4.72	1.99	9.09	0.03	0.91
2021-10-25		3.21	5.01	2.27	9.44	0.03	0.95
2021-10-26		3.43	5.33	2.37	9.83	0.03	0.99
2021-10-27		3.61	5.65	2.55	10.26	0.04	1.03
2021-10-28		3.79	5.98	2.69	10.69	0.04	1.07
2021-10-29		3.99	6.34	2.79	11.11	0.05	1.1
2021-10-30		4.06	6.49	2.86	11.66	0.07	1.12
2021-10-31		4.11	6.57	2.89	11.9	0.08	1.13
2021-11-01		4.15	6.86	2.95	12.25	0.18	1.16
2021-11-02		4.18	7.16	3.08	12.69	0.28	1.2
2021-11-03		4.33	7.47	3.25	13.21	0.39	1.24
2021-11-04		4.45	7.79	3.44	13.7	0.49	1.28
2021-11-05		4.65	8.15	3.58	14.18	0.58	1.8
2021-11-06		4.74	8.31	3.65	14.8	0.67	1.82
2021-11-07		4.75	8.38	3.73	15.1	0.69	1.83
2021-11-08		4.93	8.62	3.9	15.51	0.74	1.88
2021-11-09		5.09	8.9	4.14	16.01	0.8	1.92
2021-11-10		5.25	9.2	4.38	16.79	0.86	1.97
2021-11-11		5.41	9.46	4.61	17.33	0.92	2.01
2021-11-12		5.58	9.8	4.8	17.86	0.97	2.2
2021-11-13		5.66	9.96	4.89	18.54	1	2.23
2021-11-14		5.68	10.04	5	18.86	1.01	2.24
2021-11-15	1.96	5.77	10.31	5.25	19.28	1.05	2.29
2021-11-16		5.86	10.61	5.52	19.79	1.1	2.34
2021-11-17	2.29	6.02	10.93	5.86	20.35	1.16	2.39
2021-11-18		6.2	11.25	6.19	20.92	1.21	2.45
2021-11-19	2.64	6.39	11.63	6.47	21.45	1.26	2.71
2021-11-20	2.77	6.49	11.83	6.62	22.13	1.29	2.74
2021-11-21	2.84	6.56	11.94	6.76	22.48	1.29	2.76
2021-11-22	2.91	6.73	12.27	7.13	22.93	1.34	2.82
2021-11-23	3.11	6.89	12.6	7.52	23.46	1.4	2.88
2021-11-24		7.05	12.84	7.94	24.02	1.46	2.94
2021-11-25	3.49	7.16	12.85	8.5	24.6	1.51	2.99
2021-11-26		7.32	13.06	8.9	25.14	1.57	3.05

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2021-11-27	3.88	7.38	13.19	9.27	25.82	1.6	3.09
2021-11-28	3.94	7.43	13.28	9.46	26.24	1.61	3.12
2021-11-29	4.14	7.46	13.56	9.9	26.71	1.67	3.17
2021-11-30	4.36	7.73	13.89	10.49	27.28	1.74	3.25
2021-12-01	4.67	7.88	14.25	11.13	27.88	1.82	3.33
2021-12-02	4.99	8.05	14.64	11.77	28.5	1.92	3.41
2021-12-03	5.22	8.26	15.06	12.38	29.07	2.02	3.89
2021-12-04	5.38	8.4	15.27	12.88	29.75	2.06	3.95
2021-12-05	5.46	8.42	15.38	13.12	30.17	2.08	3.98
2021-12-06		8.63	15.7	13.74	30.66	2.17	4.06
2021-12-07	5.65	8.86	16.03	14.33	31.23	2.26	4.13
2021-12-08	5.96	9.03	16.37	14.99	31.84	2.37	4.21
2021-12-09		9.28	16.71	15.66	32.53	2.49	4.31
2021-12-10	6.43	9.49	17.08	16.4	33.15	2.6	4.71
2021-12-11	6.6	9.56	17.26	17.03	33.96	2.66	4.78
2021-12-12	6.71	9.6	17.37	17.93	34.54	2.7	4.86
2021-12-13	6.99	9.8	17.65	18.59	35.3	2.99	4.94
2021-12-14	7.28	10.01	17.96	19.43	36.26	3.37	5.05
2021-12-15	7.68	10.17	18.27	20.29	37.35	3.82	5.17
2021-12-16	8.03	10.41	18.59	21.13	38.62	4.33	5.28
2021-12-17	8.37	10.6	18.95	21.86	39.87	4.88	5.4
2021-12-18	8.56	10.66	19.14	22.56	41.24	5.15	5.52
2021-12-19	8.7	10.68	19.25	22.99	42.49	5.31	5.61
2021-12-20	9.05	10.9	19.58	23.69	43.8	5.86	5.74
2021-12-21		11.11	19.94	24.46	45.22	6.47	5.88
2021-12-22	9.39	11.34	20.28	25.2	46.45	7.12	6
2021-12-23	9.72	11.54	20.53	25.69	47.34	7.7	6.11
2021-12-24	9.98		20.6	25.84	47.59	7.7	6.15
2021-12-25			20.6	26.13	47.61	7.7	6.19
2021-12-26	10		20.67	26.31	47.64	8.12	6.22
2021-12-27	10.07	11.78	20.93	26.8	48.04	8.21	6.32
2021-12-28	11.01	12.04	21.21	27.44	48.52	8.32	6.42
2021-12-29		12.25	21.49	28	49.15	8.75	6.53
2021-12-30	12.1	12.39	21.75	28.48	49.74	9.23	6.63
2021-12-31	12.22	12.42	21.85	28.64	49.98	9.23	6.68
2022-01-01	12.26	12.42	21.86	29.03	50.01	9.23	6.71
2022-01-02	12.46	12.43	21.94	29.28	50.17	9.81	6.74
2022-01-03		12.63	22.14	29.82	50.38	9.95	6.82
2022-01-04	13.83	12.92	22.37	30.46	50.71	10.63	6.93
2022-01-05		13.18	22.6	31.03	51.07	11.5	7.03
2022-01-06	15.22		22.85	31.57	51.41	12.4	9.8
2022-01-07			23.12	32.14	51.74	13.28	9.9
2022-01-08	16.31		23.28	32.99	52.08	13.83	10
2022-01-09	16.62	13.87	23.36	33.44	52.29	14.16	10.08
2022-01-10	17.22	14.17	23.56	34.01	52.51	15	10.19
2022-01-11	17.91	14.47	23.77	34.63	52.71	15.94	10.29
2022-01-12	18.61	14.75	23.97	35.28	52.9	16.92	10.41
2022-01-13	19.31	15.01	24.17	36.54	53.06	17.91	10.69
2022-01-14	20.01	15.28	24.4	37.11	53.23	18.86	10.81
2022-01-15	20.38	15.36	24.53	37.74	53.38	19.38	10.9
2022-01-16	20.66	16.32	24.58	38.09	53.47	19.68	11
2022-01-17		17.63	24.69	38.54	53.58	20.62	11.12
2022-01-18	21.31	17.85	24.78	39.09	53.69	21.53	11.22
2022-01-19	22	18.31	24.79	39.54	53.79	22.48	11.32
2022-01-20	23.3	18.61	24.79	39.93		23.51	11.41

RESULTS AND DISCUSSION

The DCC values calculated with the use of (1), (2) and datasets presented in tables 1,2 are shown in figures 1,2 for northern and southern regions, respectively. Dashed and solid lines correspond to the years 2020-2021 and 2021-2022, respectively. The vaccination levels from tables 5,6 are represented by “circles” and “crosses”, respectively. Figure 1 illustrates that for the Nordic countries and the world as a whole, the DCC values in 2021 mostly exceeded the corresponding numbers in 2020, despite the relatively high levels of vaccinations (compare solid and dashed lines). The case of the United Kingdom is particularly significant, where the DCC values differed 1.5-25 times at the highest percentages of vaccinated individuals and persons who received a booster dose of a vaccine.

The fact that a rather high vaccination level does not prevent the appearance of new COVID-19 pandemic waves was revealed already in September, 2021 [7]. In particular, the DCC numbers in Israel in the summer of 2021 were much higher than in Ukraine, despite the huge difference in vaccination levels [7,8]. The statistical analysis performed in [9] revealed no correlation between DCC and VC values. Thus, we can conclude that existing vaccines cannot prevent new infections and vaccinated people can spread the infection as intensively as non-vaccinated ones. Probably, it is connected with new strains of coronavirus and with limited in time effectiveness of antibodies. Many countries have introduced special passports (and/or QR codes) that remove restrictions for vaccinated persons to visit crowded places. Presented results illustrate that this does not make sense, since vaccinated and non-vaccinated persons spread

the infection with more or less equal probability. Having fresh PCR (or other) tests can be a much more effective pass to crowded places in order to prevent the spread of infection.

Some interesting trends are visible in figure 2. For India, Brazil and Argentina (DCC values in 2020 and early 2021 mostly exceeded the corresponding numbers in 2021 and early 2022 (compare solid and dashed yellow, green and blue lines, respectively). In June and July (cold season for southern countries) the DCC values were higher in 2021 in comparison with 2020 for these countries (including South Africa), [6]. Probably we see the influence of the seasonal factor, since the vaccination levels in Southern countries were much lower than in the Northern ones (compare corresponding markers in figures 1,2).

Probably, a new omicron strain is responsible for very sharp increase of DCC values in South Africa after November 12, 2021 (see the solid magenta line in figure 2). Later the omicron caused a sharp increase in DCC values in all the countries and regions taken for our analysis (see solid lines, in figures 1,2). We see two severe epidemic waves in Ukraine in 2021-2022 (the solid blue line in figure 1). Probably, the first one (started in September 2021) was not connected with the omicron. Approximately in one month the daily numbers of new cases start to decrease for the “omicron” waves (see solid magenta and red lines in figure 1 and solid magenta, red and blue lines in figure 2). In January 2022, we can expect diminishing the DCC numbers in Brazil, India, EU, and worldwide. The maximum of DCC values in Ukraine is expected around February 7, 2022 (see the solid blue line in figure 1). More exact and long-term predictions can be done with the use of the generalized SIR model [2,3,8,10,11]. Recent

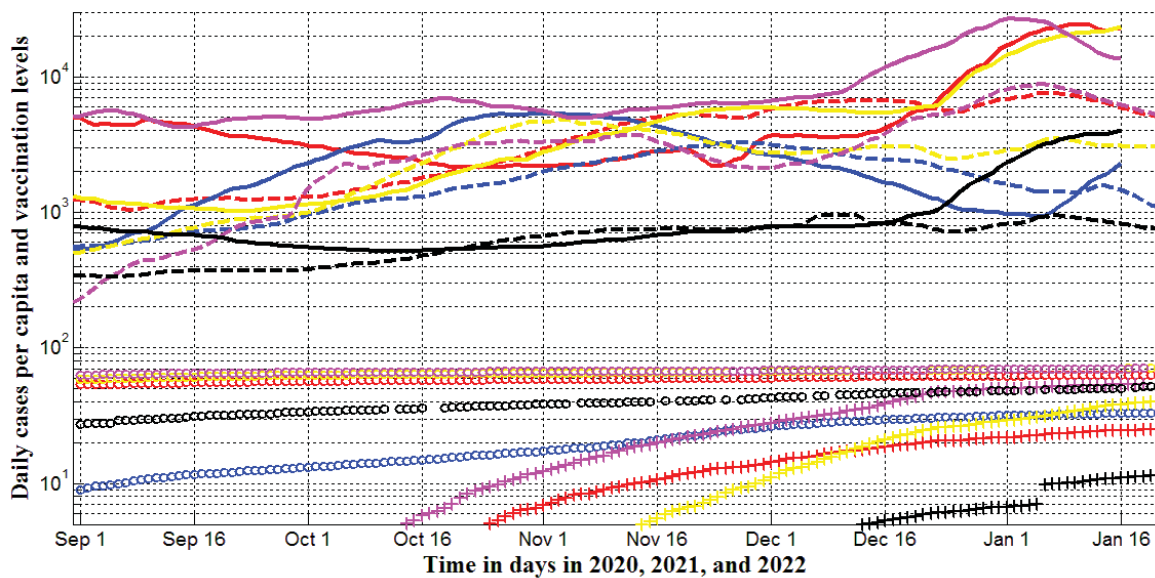


Figure 1 Averaged daily number of new cases per capita and vaccination levels for northern region in September-January, 2020, 2021, and 2022 (Ukraine – blue, EU – yellow, USA – red, UK – magenta, the whole world –black). Lines correspond to DCC¹⁰ values calculated with the use of eqs. (1), (2), table 1 (2020 and 2021, dashed), and table 2 (2021 and 2022, solid). “Circles” and “crosses” show the numbers of fully vaccinated people and boosters per hundred, respectively (2021 and 2022, tables 5,6).

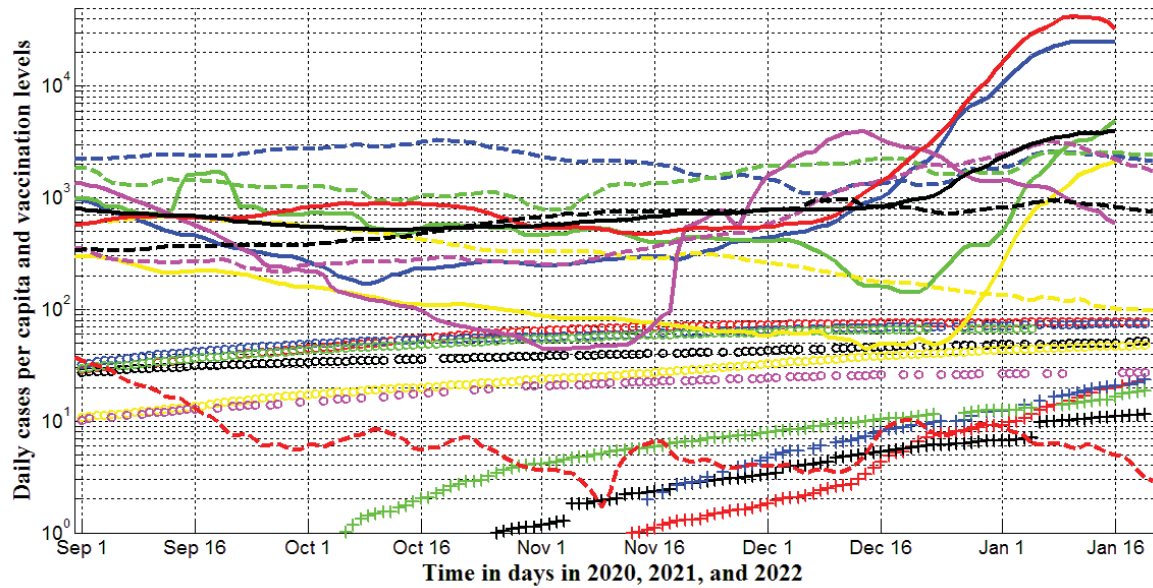


Figure 2 Averaged daily number of new cases per capita and vaccination levels for southern region in September-January, 2020, 2021, and 2022 (Argentina – blue, India - yellow, Brazil – green, South Africa – magenta, Australia-red, and the whole world –black). Lines correspond to DCC*10 values calculated with the use of eqs. (1), (2), table 1 (2020 and 2021, dashed), and table 2 (2021 and 2022, solid). “Circles” and “crosses” show the numbers of fully vaccinated people and boosters per hundred, respectively (2021 and 2022, tables 5,6).

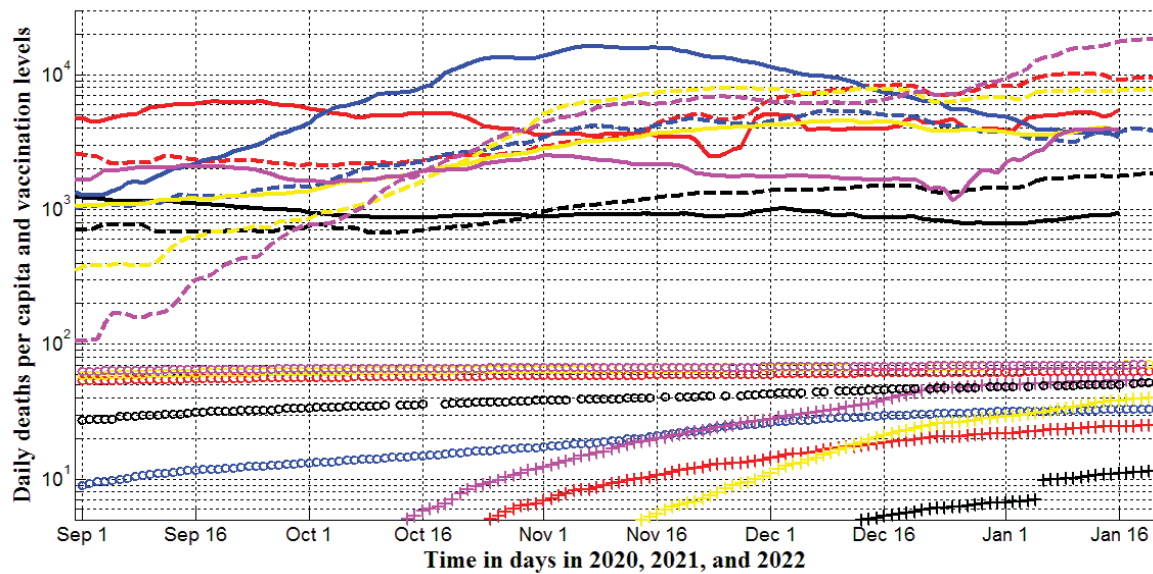


Figure 3 Averaged daily number of deaths per capita and vaccination levels for northern region in September-January, 2020, 2021, and 2022 (Ukraine – blue, EU- yellow, USA – red, UK – magenta, the whole world –black). Lines correspond to DDC*1000 values calculated with the use of eqs. (1), (2), table 3 (2020 and 2021, dashed), and table 4 (2021 and 2022, solid). “Circles” and “crosses” show the numbers of fully vaccinated people and boosters per hundred, respectively (2021 and 2022, tables 5,6).

simulations for Ukraine, Poland, Germany and the whole world [10,11] were based on the datasets corresponding to the periods before “omicron” waves and have to be updated.

The pandemic dynamics in Australia differs significantly from all other countries and regions considered in our study. The DCC values in 2020–2021 exceed 10–800 times corresponding values in 2021–2022 (compare red solid and

dashed lines in figure 2). The DDC values were close to zero in 2020–2021 and close to the corresponding values for other countries in 2021–2022 (compare solid and dashed lines in figures 3,4). This is surprising, because in early 2022, Australia has reached a relatively high level of vaccination (see tables 5,6 “circles” and “crosses” in figures 1–6). The explanation for these facts should be sought in the weakened quarantine measures and the reduction in the testing level.

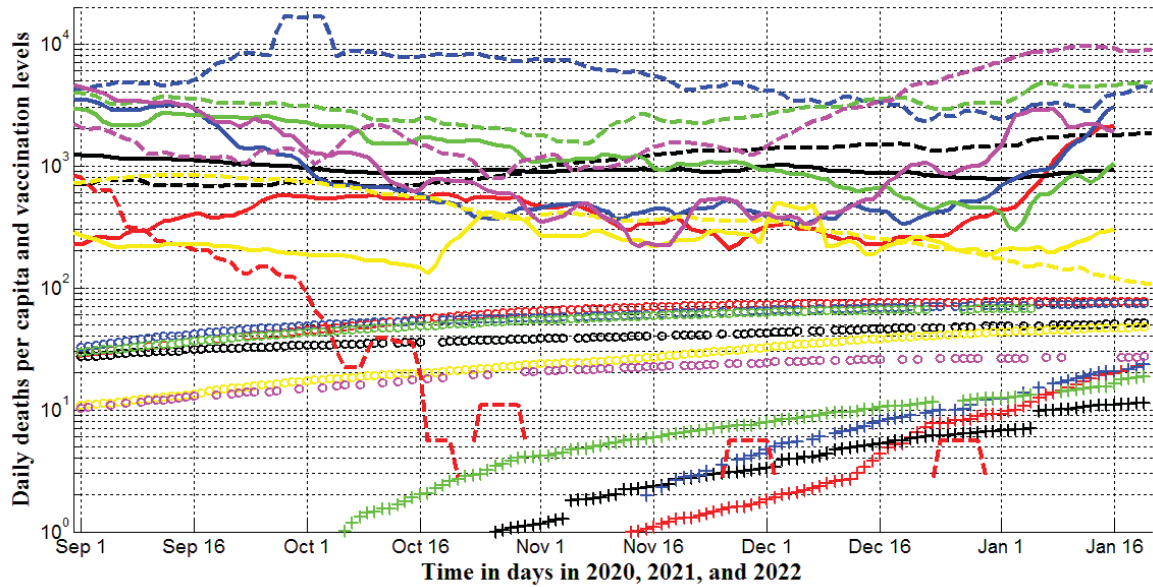


Figure 4 Averaged daily number of new deaths per capita and vaccination levels for southern region in September-January, 2020, 2021, and 2022 (Argentina – blue, India - yellow, Brazil – green, South Africa – magenta, Australia-red, and the whole world –black). Lines correspond to $DDC \cdot 1000$ values calculated with the use of eqs. (1), (2), table 3 (2020 and 2021, dashed), and table 4 (2021 and 2022 solid). "Circles" and "crosses" show the numbers of fully vaccinated people and boosters per hundred, respectively (2021 and 2022, tables 5,6).

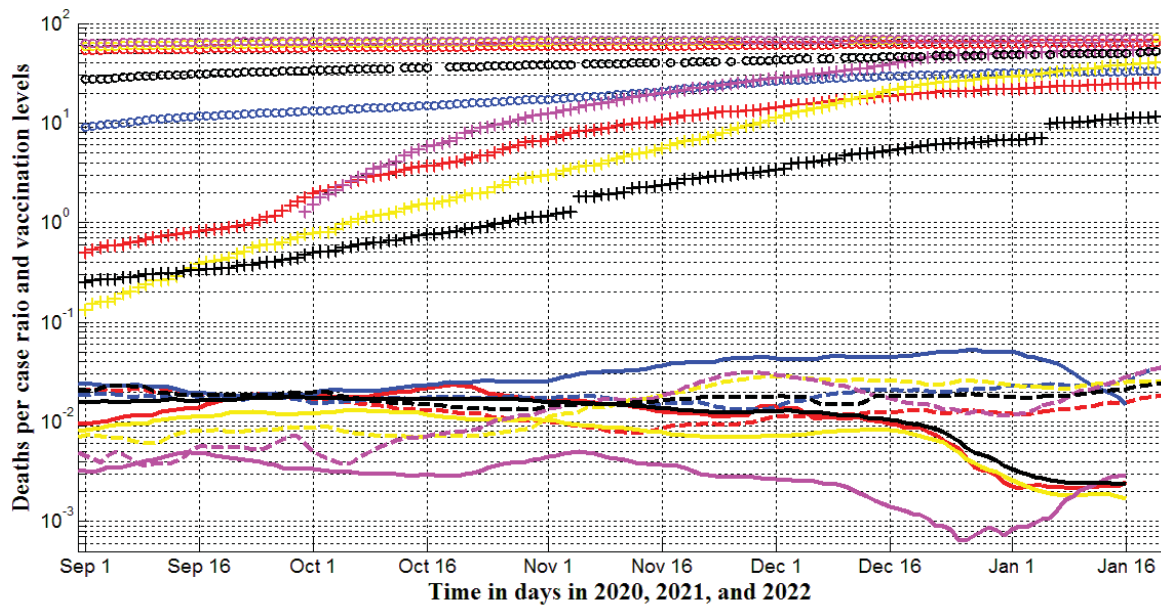


Figure 5 Averaged deaths per case ratios and vaccination levels for northern region in September-January, 2020, 2021, and 2022 (Ukraine – blue, EU- yellow, USA – red, UK – magenta, the whole world –black). Lines correspond to $DDC \cdot 1000$ values calculated with the use of eqs. (1), (2), table 3 (2020 and 2021, dashed), and table 4 (2021 and 2022, solid). "Circles" and "crosses" show the numbers of fully vaccinated people and boosters per hundred, respectively (2021 and 2022, tables 5,6).

According to the statistical analysis performed in [9], the numbers of tests per capita TC do not affect the CC , DC , and CC/DC values, but the increase in the number of tests per case TC/CC can reduce CC and DC values. In particular, CC figures can tend to zero when TC/CC exceeds some critical value 520 (in the case of DC , the critical values TC/CC are 460 and 198 for the whole world and Europe, respectively),

[9]. In Australia, the TC/CC figures were close to the critical values before September 2021 (394.45, December 30, 2020 and 562.6, September 1, 2021), but later they start to decrease rapidly (238.83, November 14, 2021 and 28.54, January 20, 2022; all the values were calculated with the use of information available in [5]). Where the level of testing was consistently maintained above the critical level (for

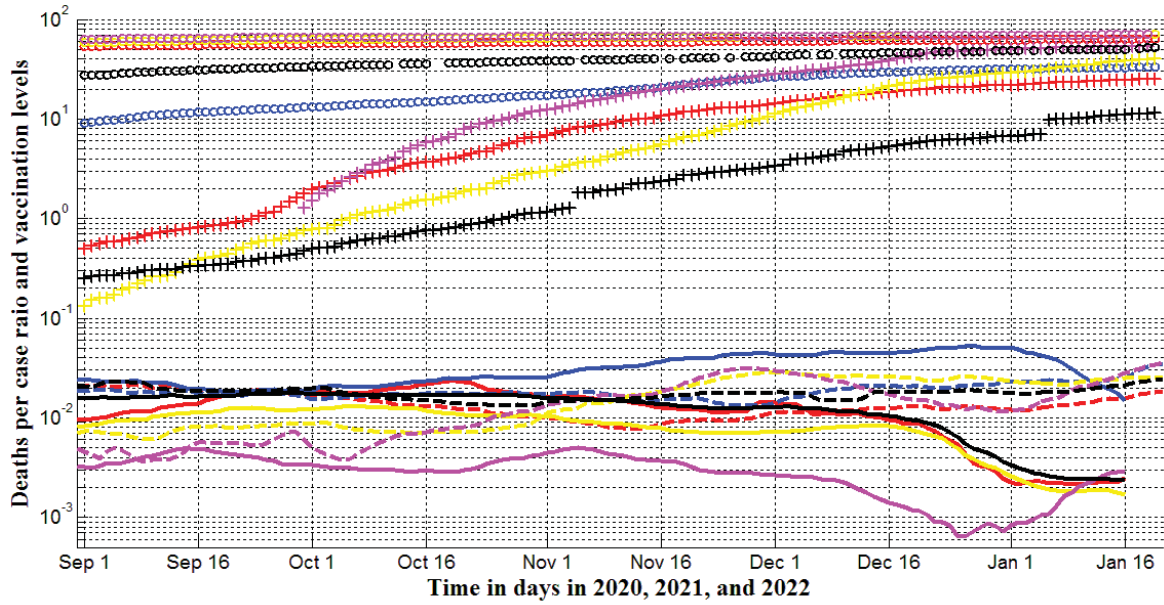


Figure 6 Averaged deaths per case ratios and vaccination levels for southern region in September-January, 2020, 2021, and 2022 (Argentina – blue, India - yellow, Brazil – green, South Africa – magenta, Australia-red, and the whole world –black). Lines correspond to DDC/DCC values calculated with the use of eqs. (1), (2), table 3 (2020 and 2021, dashed), and table 4 (2021 and 2022, solid). “Circles” and “crosses” show the numbers of fully vaccinated people and boosters per hundred, respectively (2021 and 2022, tables 5,6).

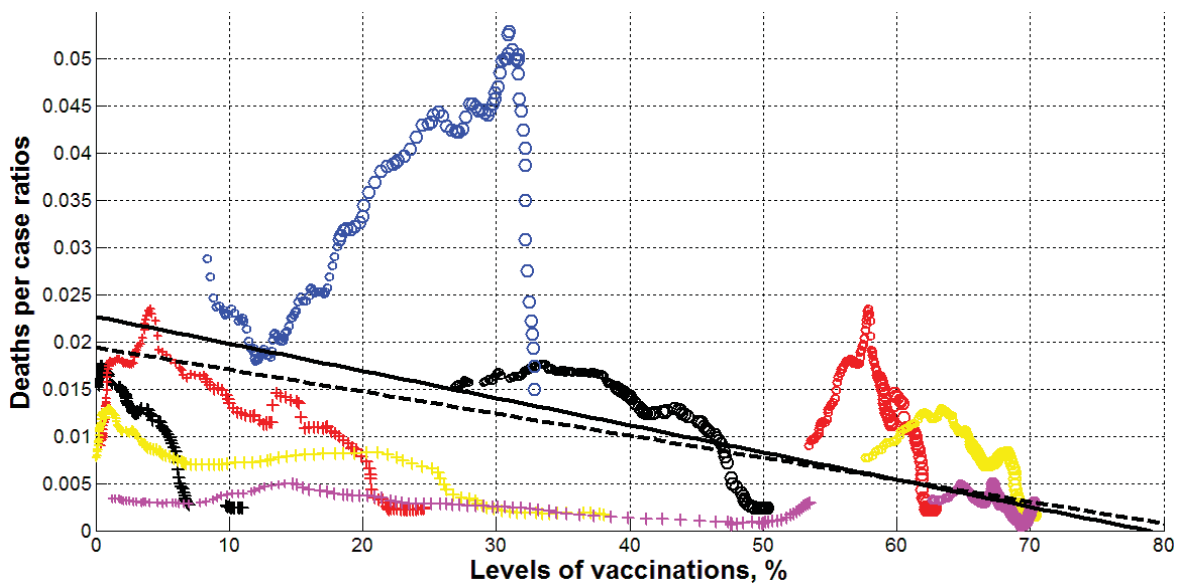


Figure 7 Averaged deaths per case ratios versus vaccination levels for northern region (Ukraine – blue, EU- yellow, USA – red, UK – magenta, the whole world –black). “Circles” and “crosses” correspond to the numbers of fully vaccinated people and boosters per hundred, respectively (Tables 5,6). Small markers correspond to the period before November 12, 2021; large - for later period. Black solid and dashed lines represent correlation equations (3) (for the whole world) and (4) (for Europe), respectively.

example, in Hong Kong $TC/CC=1984.5$ on August 31, 2021 and $TC/CC = 2386.1$ on December 28, 2021; [5]), almost complete control of the pandemic was achieved (the smoothed daily numbers of new cases per million were 0.681 on September 1, 2021 and 1.778 on December 31, 2021 in Hong Kong, [5]). Thus, the significant increase of the testing levels can be recommended as a unique way to stop the pandemic. Unfortunately, existing vaccines cannot do this.

Nevertheless, vaccinations reduce mortality. Figures 3,4 illustrate the influence of vaccination levels on the daily numbers of deaths per capita. In October–November 2021 the DDC values became smaller than corresponding values in 2020 for UK, USA, EU and the whole world (compare solid and dashed magenta, red, yellow, and black lines in figure 3) These countries and regions have much higher vaccination levels than Ukraine (see markers in figure 3), where DDC

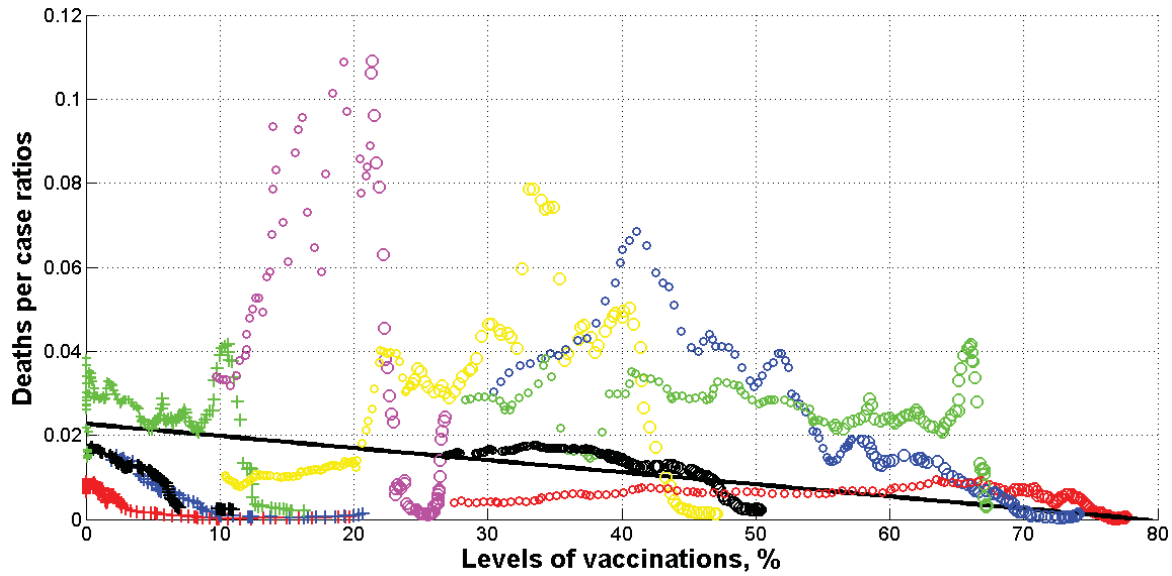


Figure 8 Averaged deaths per case ratios versus vaccination levels for southern region in September-January, 2020, 2021, and 2022 (Argentina – blue, India – yellow, Brazil – green, South Africa – magenta, Australia–red, and the whole world –black). “Circles” and “crosses” correspond to the numbers of fully vaccinated people and boosters per hundred, respectively (Tables 5,6). Small markers correspond to the period before November 12, 2021; large – for later period. The black solid line represents correlation equations (3) for the whole world.

values in 2021 were much higher than in 2020 (compare blue solid and dashed lines in figure 3). In Argentina and Brazil the DDC values were smaller in 2021 in comparison with 2020 (compare solid and dashed blue and green lines in figure 4). In less vaccinated India and South Africa (see markers in figure 4), DDC values in 2021 were sometimes higher than in 2020 (compare solid and dashed yellow and magenta lines in figure 4). These facts support the conclusion of paper [7] that vaccinations can diminish the numbers of death per capita. The efficiency of boosters needs special statistical analysis.

The case of Australia (red lines and markers in figure 4) was already discussed before. Due to the very high testing level TC/CC, this country had almost zero level of mortality in 2020 (see the dashed red line in figure 4). After a rapid diminishing of the TC/CC ratio after September 2021, the DDC values increased drastically (see the solid red line) despite a fairly high level of vaccinations (see red markers in figure 4).

The number of deaths per case is an important characteristic indicating the probability of death in the case of infection. Knowing of this ratio is important for individuals in order to decide on their vaccination. Comparing these mortality rates in different countries with the same levels of vaccinations allows making conclusions about the efficiency of treatments. The average DDC/DCC values calculated with the of smoothed DDC and DCC numbers (according to eqs. (1) and (2) and tables 1-4) are shown in figures 5,6 for northern and southern regions, respectively.

A positive impact of vaccinations is visible almost for all the countries and regions. Solid lines indicate decrease of mortality in 2021-2022 (compare with dashed lines

corresponding to 2020-2021). Opposite trend is visible for Ukraine (compare blue dashed and solid lines in figure 5) and can be explained by the lower levels of vaccination (compare markers in figure 5). The increase of DCC/DCC values in South Africa (see the magenta solid line in figure 6) can be also explained by insufficient level of vaccination in this country (compare markers in figure 6).

The mortality rates DDC/DCC versus percentage of fully vaccinated people (“circles”) and boosters (“crosses”) are shown in figures 7 and 8 for northern and southern regions, respectively. To illustrate the “omicron” waves we use large markers for the period after November 12, 2021. The best fitting lines, linking the DDC/DCC values with the percentage of fully vaccinated people VC can be written as follows:

$$(DDC/DCC) = 0.0227 - 2.8822e-04*(VC) \tag{3}$$

$$(DDC/DCC) = 0.0194 - 2.3335e-04*(VC) \tag{4}$$

They are shown in figures 7,8 by solid and dashed lines, respectively. Relationships (3) and (4) are the results of correlation analysis performed in [9] for countries and regions in the whole world and Europe, respectively with the use of JHU datasets corresponding September 1, 2021.

It can be seen that averaged DDC/DCC values can be rather scattered, especially for countries or periods with low vaccination levels : Ukraine (blue “circles” in figure 7), South Africa (magenta “circles” in figure 8), India (yellow “circles” in figure 8), Argentina (blue “circles” in figure 8). Nevertheless, the mortality rate diminishes with the increase of VC values and tends to the relationships (3) and

(4). The same trend is visible for the percentage of boosters (see “crosses” in figures 7,8). The only one exception is the UK (see magenta “crosses” in figure 8). This country has the highest level of boosters, nevertheless the DDC/DCC values have started to increase in January 2022. In any case, the influence of boosters needs special investigations.

CONCLUSION

The third year of the pandemic allowed us to compare the pandemic dynamics in the period from September 2020 to January 2021 with the same period one year later for Ukraine, EU, the UK, USA, India, Brazil, South Africa, Argentina, Australia, and in the whole world. The presented results indicate the feasibility of vaccination, although it does not prevent infection. But those who are vaccinated are much less likely to die (this may also indicate a milder course of the disease).

REFERENCES

1. Nesteruk I. Coronasummer in Ukraine and Austria. ResearchGate. 2020. doi: 10.13140/RG.2.2.32738.56002.
2. Nesteruk I. COVID19 pandemic dynamics. Springer Nature. 2021. <https://bit.ly/3HkKcBI>

3. Nesteruk I. Detections and SIR simulations of the COVID-19 pandemic waves in Ukraine. *Comput Math Biophys.* 2021;9:46-65. doi: 10.1515/cmb-2020-0117.
4. World Health Organization. "Coronavirus disease (COVID-2019) situation reports". <https://bit.ly/3s572GH>
5. COVID-19 Data Repository by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU). <https://bit.ly/3oexblz>
6. Nesteruk I, Rodionov O, Nikitin A.V, and Walczak S. Influences of seasonal and demographic factors on the COVID-19 pandemic dynamics. *EAI Endorsed Transactions on Bioengineering and Bioinformatics.* 2021. doi: 10.4108/eai.8-12-2021.172364.
7. Nesteruk I. Comparison of the COVID-19 pandemics dynamics in Ukraine and Israel in the summer of 2021. ResearchGate (Preprint). 2021. doi: 10.13140/RG.2.2.29989.22249.
8. Nesteruk I. Influence of Possible Natural and Artificial Collective Immunity on New COVID-19 Pandemic Waves in Ukraine and Israel. *Explor Res Hypothesis Med.* 2021 Nov 11. doi: 10.14218/ERHM.2021.00044.
9. Nesteruk I, Rodionov O. Impact of Vaccination and Testing Levels on the Dynamics of the COVID-19 Pandemic and its Cessation. *J Biomed Res Environ Sci.* 2021 Nov 23;2(11):1141-1147. doi: 10.37871/jbres1361.
10. Nesteruk I. Final sizes and durations of new COVID-19 pandemic waves in Ukraine and around the world predicted by generalized SIR model. *MedRxiv.* 2021. doi: 10.1101/2021.11.22.21266683.
11. Nesteruk I. Final sizes and durations of new COVID-19 pandemic waves in Poland and Germany predicted by generalized SIR model. *MedRxiv.* 2021. doi: 10.1101/2021.12.14.21267771.

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