COVID-19 SITUATION IN UKRAINE

As of the 7th of December, 821,947 laboratory-confirmed cases of COVID-19 were registered in the country. Among these, 423,704 (51.5%) patients recovered, 19,834 (2.4%) currently remain hospitalised in dedicated hospitals and 13,733 (1.7%) have died. In parallel, over Week 49 (November 30th - December 6th) the number of PCR-confirmed cases increased by 16% from 76,671 to 89,322 (or from 201 to 234 cases per 100,000 inhabitants) compared to Week 46.

The trend for newly confirmed cases among healthcare workers continued to increase between November 9th and December 6th with a 20% increase in Week 49 (14,568 or 1,8% of cumulative confirmed COVID-19 cases) as compared to Week 48 (11,694 cases) and a 135% increase as compared to Week 46 (6,189 cases).

The number of conducted PCR tests conducted decreased from a daily average of 109 tests per 100,000 inhabitants (249,628 in total) in Week 46 to 104 (279,189 in total) in Week 49. Daily positivity rate (share of positive test results out of all PCR tests conducted per day) has increased from 32.7% to 36.4% in Week 49 as compared to Week 46.

As of December 6th, there were 19,834 confirmed COVID-19 hospitalisations in dedicated hospitals[1]. This constitutes a 4% increase as compared to Week 46. Between Week 46 and Week 49, the weekly number of COVID-19 attributed deaths has increased by 24%, from 1,132 deaths to 1,406, respectively.

For an overview of the methodology used to generate these findings, please refer to the dedicated section on Page 6.

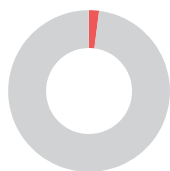## 821,947 cumulative confirmed COVID-19 cases as of Dec 7, including:

14,568
active cases for healthcare workers

19,834
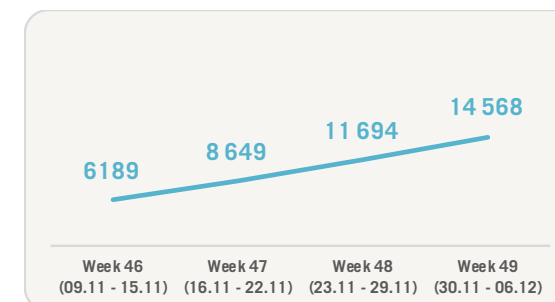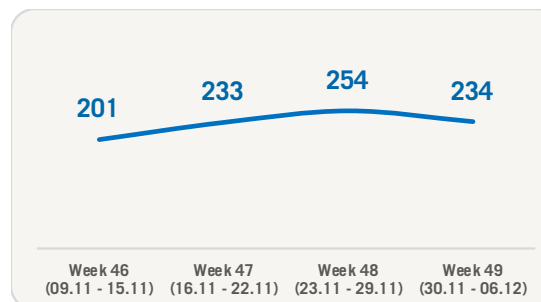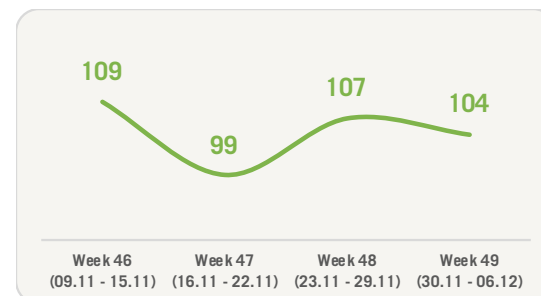currently **hospitalised** in dedicated hospitals
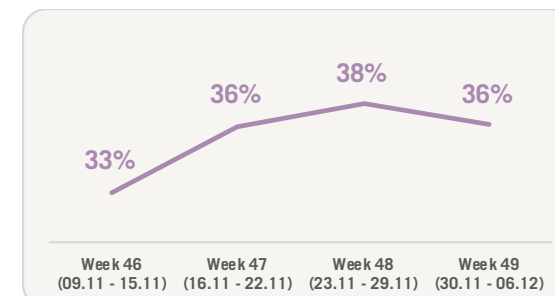
13,733
total **deaths**

[1]The number does not include hospitalised patients with suspected COVID-19

KEY TRENDS

Confirmed COVID-19 cases per 100,000 inhab.:

Week 46 (09.11 - 15.11)	Week 47 (16.11 - 22.11)	Week 48 (23.11 - 29.11)	Week 49 (30.11 - 06.12)
201	233	254	234

Active COVID-19 cases for healthcare workers:

Week 46 (09.11 - 15.11)	Week 47 (16.11 - 22.11)	Week 48 (23.11 - 29.11)	Week 49 (30.11 - 06.12)
6189	8 649	11 694	14 568

Daily average of PCR tests per 100,000 inhab.:

Week 46 (09.11 - 15.11)	Week 47 (16.11 - 22.11)	Week 48 (23.11 - 29.11)	Week 49 (30.11 - 06.12)
109	99	107	104

Daily testing positivity rate:

Week 46 (09.11 - 15.11)	Week 47 (16.11 - 22.11)	Week 48 (23.11 - 29.11)	Week 49 (30.11 - 06.12)
33%	36%	38%	36%

Confirmed COVID-19 hospitalisations in dedicated hospitals:

Week 46 (09.11 - 15.11)	Week 47 (16.11 - 22.11)	Week 48 (23.11 - 29.11)	Week 49 (30.11 - 06.12)
19 067	18 997	19 939	19 834
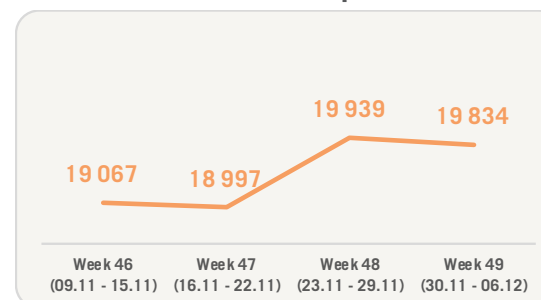
Weekly deaths from COVID-19:

Week 46 (09.11 - 15.11)	Week 47 (16.11 - 22.11)	Week 48 (23.11 - 29.11)	Week 49 (30.11 - 06.12)
1 132	1 406	1 252	1 406

(Data Source: Ukraine Public Health Center and Cabinet of Ministers of Ukraine)

DESCRIPTIVE STATISTICS AND DISAGGREGATION OF THE TOTAL # OF CASES

TOTAL COVID-19 CASES BY GENDER AND AGE

Confirmed COVID-19 Cases

60% Female   Male 40%
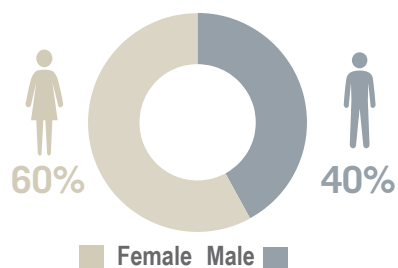
Deaths due to COVID-19

47% Female   Male 53%

Cumulative confirmed COVID-19 cases[1] by population size

Female / Male

Age groups: 0-05, 05-10, 10-15, 15-20, 20-25, 25-30, 30-35, 35-40, 40-45, 45-50, 50-55, 55-60, 60-65, 65-70, 70-75, 75-80, 80+

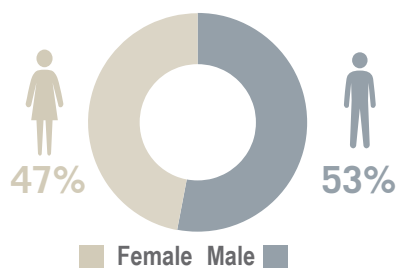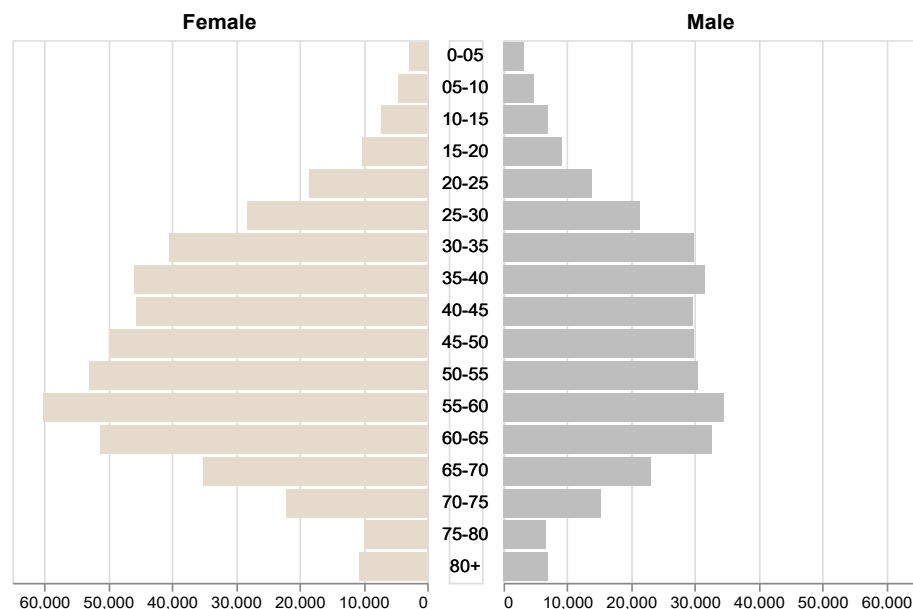[1]The indicator is calculated by dividing cumulative total number of COVID-19 cases by population size for respective age and gender group and normalised by 100,000

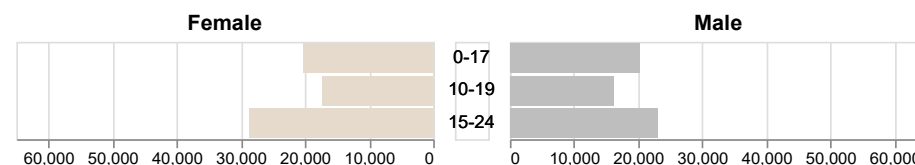### OVERVIEW OF CUMULATIVE GENERAL DISAGGREGATED TRENDS AS OF 07/12

Since March 1st, out of the total number of laboratory confirmed COVID-19 registered in Ukraine, 60% (or 494,880 cases) were registered among women, while 40% (or 330,098 cases) were among men.

While the share of confirmed cases is higher among the female population (60%), in stark contrast, the death rate due to COVID-19 is significantly higher for men (53% or 7,398 persons) as compared to women (47% or 6,502 persons).

Further disaggregation by age and gender groups suggests that both female and male individuals aged 50-65 have the highest chance of receiving a confirmed COVID-19 infection and therefore, remain the most vulnerable groups.

As for the children (0-17 years old), there have been 40,399 cases confirmed in total, with nearly 50% of these (20,209) being girls and another 50% (20,190) - boys. Generally, this trend constitutes a 11% rise when compared to previous Bi-Weekly Situation Overview (Weeks 44-47). Further disaggregation by age groups shows that the highest number of confirmed cases has been recorded for youth (15-24) as compared to children (0-17) and adolescents (10-19).The total number of children hospitalised remains low (total of 3,685 cases), but has still grown 18 % as compared to Week 47.

Cumulative confirmed COVID-19 cases[1] for children (0-17), adolescents (10-19) and youth (15-24)

Female / Male

Age groups: 0-17, 10-19, 15-24

(Data Source: Ukraine Public Health Center as of 07/12/2020)

Number of COVID-19 tests conducted and confirmed cases per 100,000 inhabitants by region for Weeks 46 - 49

Average daily number of COVID-19 PCR tests by 100,000 inhabitants Weeks 46-49
- ≤50
- ≤100
- ≤150
- ≤285
- No data

Average daily number of confirmed COVID-19 cases by 100,000 inhabitants Weeks 46-49
- ≤100
- ≤200
- ≤350
- ≤430

Note: Data, designations and boundaries contained on this map are not warranted to be error-free and do not imply acceptance by the REACH partners, associated, donors mentioned on this map.

REGIONAL PERSPECTIVE

As of the 7th of December, laboratory-confirmed cases of COVID-19 were cumulatively highest in Kyiv city (81,335), Kharkivska (59,393), Odeska (51,810) and Lvivska (50 175) oblasts while the lowest numbers of cumulative totals were reported in Khersonska (12,159), Luhanska (7,088) and Kirovohradska (6,360) oblasts.

The highest accumulated number of total deaths was reported in Kyiv city (1,441) followed by Lvivska (1,373) and Dnipropetrovska oblast (1,029). The areas reporting the highest cumulative number of active cases among healthcare workers were Kyiv city (2,461), Zaporizka (1,851), Kyivska (1,843) and Cherkaska (1,224) oblasts.

Over Week 49, the prevalence of new laboratory-confirmed cases was highest in Kyiv city (10,857), Odeska (6,861), Dnipropetrovska (6,251) and Kyivska (6,167) oblasts. Additionaly, over the same period (30 November - 6 December), the prevalence of new laboratory-confirmed cases per 100,000 inhabitants was highest in Sumska oblast (452), Kyiv city (366), Zaporizka (360) and Cherkaska (356) oblasts. In parallel, Kyivska (from 363 to 346 cases), Chernihivska (from 335 to 310 cases) and Vinytska (from 125 to 85 cases) oblasts showed the highest decreases in the number of new laboratory-confirmed cases per 100,000 inhabitants from Week 48 to Week 49.

The highest number of weekly deaths over Week 47 was registered in Kyiv city (149), Lvivska (138), Dnipropetrovska (137) and Donetska (122) oblasts.

As of the end of Week 49, the areas reporting the highest positivity rates (number of positive results out of total PCR tests conducted since the beginning of the pandemic) were Sumska (34%), Zhytomyrska (32%) and Volynska (32%) oblasts. This contrasts with the total cumulative number of PCR tests per 100,000 inhabitants which has been the highest in Kyiv city (35,084), Chernivetska (17,114) and Ternopilska (14,865) oblasts.

(Data Source: Ukraine Public Health Center as of 07/12/2020)

KEY FINDINGS[1] BY OBLAST (Weeks 46 - 49 between November 9th and December 6th)

OBLAST	Daily Positivity Rate (Positive / Total PCR Tests)				Weekly confirmed cases per 100,000 Inhab.				COVID-19 hospitalisations in dedicated hospitals				Active cumulative cases for healthcare workers				Deaths			
WEEK	46	47	48	49	46	47	48	49	46	47	48	49	46	47	48	49	46	47	48	49
Kyiv City	32%	35%	36%	36%	222	292	346	366	2039	1980	2115	2105	1502	1675	2142	2461	104	167	150	149
Cherkaska	31%	59%	55%	38%	231	408	389	356	501	516	571	538	466	874	912	1224	22	27	35	30
Chernihivska	48%	40%	61%	53%	141	323	335	310	496	538	573	659	7	0	51	52	0	2	0	0
Chernivetska	33%	37%	37%	29%	325	332	262	183	717	658	639	538	437	547	497	538	48	60	37	33
Dnipropetrovska	29%	55%	46%	45%	129	238	288	197	1341	1442	1421	1458	22	60	71	148	74	173	134	137
Donetska	30%	28%	31%	38%	158	166	134	157	572	498	705	699	167	194	107	164	75	99	41	122
Ivano-Frankivska	39%	41%	49%	42%	289	279	303	220	1245	1240	1213	1099	438	439	468	485	44	50	65	60
Kharkivska	35%	33%	38%	37%	160	127	139	153	1353	1233	1284	1316	121	134	80	89	58	65	45	61
Khersonska	15%	16%	14%	18%	153	165	141	196	304	396	389	527	63	68	48	49	39	33	27	56
Khmelnytska	37%	46%	50%	51%	263	241	251	227	979	1045	937	922	754	976	549	740	23	30	33	48
Kirovohradska	13%	14%	18%	19%	61	69	100	115	243	275	325	348	162	185	197	216	17	17	18	21
Kyivska	28%	36%	34%	35%	265	324	363	346	998	947	975	892	1053	1407	1456	1843	90	65	52	68
Luhanska	17%	11%	9%	13%	94	78	89	122	226	239	256	266	154	185	74	139	14	15	29	20
Lvivska	27%	31%	41%	41%	148	150	191	163	1261	1142	1242	1122	224	371	331	392	78	87	85	138
Mykolaivska	31%	35%	39%	37%	185	237	287	259	506	595	629	684	284	401	336	436	35	32	38	37
Odeska	35%	40%	39%	38%	197	190	297	289	765	802	905	1019	429	544	574	711	40	54	66	85
Poltavska	53%	42%	50%	57%	221	241	252	260	405	351	474	518	192	221	164	240	70	84	89	77
Rivnenska	37%	39%	32%	37%	266	253	240	239	684	653	668	659	300	438	206	317	39	31	25	35
Sumska	50%	43%	53%	48%	324	441	531	452	444	470	511	594	291	377	313	419	37	43	64	65
Ternopilska	28%	35%	30%	26%	148	200	196	187	554	613	629	596	276	433	223	333	19	39	26	24
Vinnytska	17%	19%	23%	15%	90	93	125	85	487	473	595	495	351	430	408	513	14	27	24	24
Volynska	38%	40%	35%	35%	242	284	220	201	504	512	458	465	288	424	302	390	50	35	28	29
Zakarpattia	31%	32%	31%	31%	189	154	132	117	908	742	788	681	517	634	442	509	43	38	25	26
Zaporizhia	37%	44%	51%	48%	308	306	382	360	781	815	824	918	1174	1449	1544	1851	28	63	68	23
Zhytomyrska	48%	48%	47%	41%	321	340	244	199	754	822	813	716	115	197	199	309	71	70	48	38

[1]The severity shading is adjusted by week horizontally

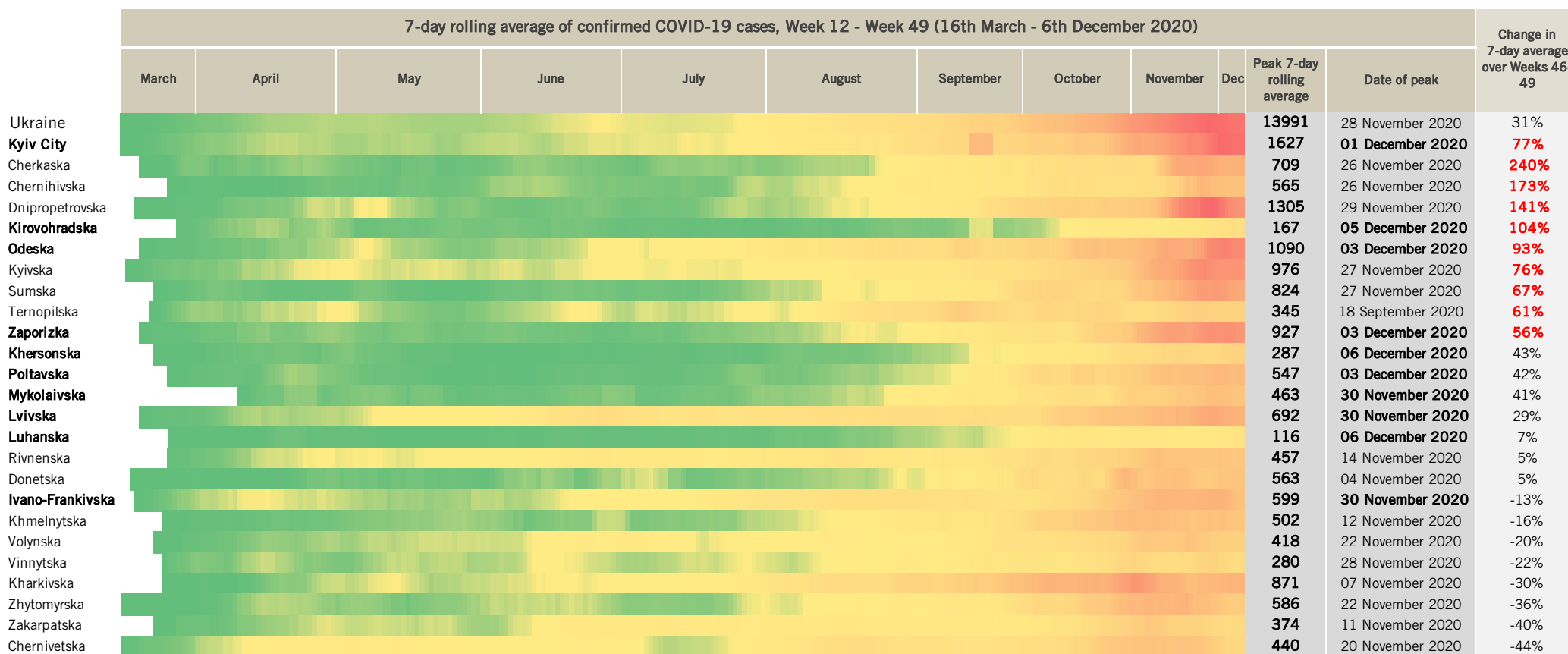(Data Source: Ukraine Public Health Center as of 07/12/2020)

CONFIRMED COVID-19 CASES: 7-Day Rolling Average (March 16th to December 6th)

How to read a HEATMAP:

The chart below includes a heatmap tracking the 7-day rolling average number of confirmed COVID-19 cases in each of Ukraine's 24 oblasts between March16th and December 6th.

The heatmap is shaded to indicate trends in the daily rolling averages in each oblast. For example, it can be seen that the average number of confirmed cases peaked in Kharkivska oblast at the beginning of November (average of 871 cases on November 7th). The heat map shows current increasing trends in Kirovohradska, Odeska, Zaporizka and Khersonska oblasts, with new 'peaks' recorded in Week 49 (December 6th).

	7-day rolling average of confirmed COVID-19 cases, Week 12 - Week 49 (16th March - 6th December 2020)										Peak 7-day rolling average	Date of peak	Change in 7-day average over Weeks 46-49
	March	April	May	June	July	August	September	October	November	Dec			
Ukraine											13991	28 November 2020	31%
Kyiv City											1627	**01 December 2020**	**77%**
Cherkaska											709	26 November 2020	**240%**
Chernihivska											565	26 November 2020	**173%**
Dnipropetrovska											1305	29 November 2020	**141%**
Kirovohradska											167	**05 December 2020**	**104%**
Odeska											1090	**03 December 2020**	**93%**
Kyivska											976	27 November 2020	**76%**
Sumska											824	27 November 2020	**67%**
Ternopilska											345	18 September 2020	**61%**
Zaporizka											927	**03 December 2020**	**56%**
Khersonska											287	**06 December 2020**	43%
Poltavska											547	**03 December 2020**	42%
Mykolaivska											463	30 November 2020	41%
Lvivska											692	30 November 2020	29%
Luhanska											116	**06 December 2020**	7%
Rivnenska											457	14 November 2020	5%
Donetska											563	04 December 2020	5%
Ivano-Frankivska											599	**30 November 2020**	-13%
Khmelnytska											502	12 November 2020	-16%
Volynska											418	22 November 2020	-20%
Vinnytska											280	28 November 2020	-22%
Kharkivska											871	07 November 2020	-30%
Zhytomyrska											586	22 November 2020	-36%
Zakarpatska											374	11 November 2020	-40%
Chernivetska											440	20 November 2020	-44%

Cases in **bold** print correspond to a new peak in the **last week**

Table sorted largest to smallest by 'Change in 7-day average over Weeks 46-49'

Further data can be found via the following online resources:

📍 Public Health Center of Ukraine   📍 COVID-19 PHC Dashboard

COVID-19 FORECASTING[1] by the NATIONAL ACADEMY OF SCIENCES for Weeks 50-51 (December 14 - 21, 2020)

⦿ OBLAST	Average predicted value for Dec, 14	for Dec,21	Predicted range	R, as of Dec 7
National	13,089	12,939	10,374 -16,109	0,97
Kyiv City	1829	1991	1,454 - 2,226	1,04
Cherkaska	615	595	490-747	0,98
Chernihivska	450	438	358-546	0,96
Chernivetska	178	137	142-215	0,79
Dnipropetrovska	808	709	646-978	0,85
Donetska	479	504	381-583	1,05
Ivano-Frankivska	393	346	314-475	0,81
Kharkivska	646	674	514-785	1,03
Khersonska	373	441	296-455	1,17
Khmelnytska	402	380	321-488	0,94
Kirovohradska	210	257	166-256	1,11
Kyivska	930	927	740-1129	0,99
Luhanska	154	185	122-188	1,19
Lvivska	594	572	473-720	0,94
Mykolaivska	438	438	349-532	0,96
Odeska	1180	1303	938-1437	1,03
Poltavska	567	585	451-689	1,02
Rivnenska	404	394	322-491	0,98
Sumska	701	676	559-851	0,93
Ternopilska	285	279	227-346	0,98
Vinnytska	164	140	131-198	0,83
Volynska	276	249	220-334	0,91
Zakarpattia	188	166	150-228	0,93
Zaporizka	955	984	761-1161	0,99
Zhytomyrska	288	241	231-349	0,84

[1]Cases in bold print correspond to the oblasts with highest **average forecasted value;** the severity shading is adjusted accordingly

KEY FORECASTED FIGURES

The forecasting technique is based on compartmental mathematical model of infectious diseases using SIR labels - *Susceptible, Infectious, Recovered* - depending on the specific group exposed to COVID-19. Relatedly, R denotes basic reproduction number that shows the expected number of cases directly generated by one case in a population. The value can then be aggregated to age groups or other population groups for further analysis.

The forecast of new confirmed cases of COVID-19 for each region is based on the daily averages for each region over the last week (Week 48). For calculation purposes it is assumed that R remains constant for the forecasted period (December 14 - 21).

Based on the analysis, **Dnipropetrovska, Zaporizka, Kyivska, Odeska** oblasts together with **Kyiv city** are expected to have the highest number of newly infected people per day in Weeks 50-51 in absolute terms.

When taken together with simulation results for all regions the model predicts the following forecast on the national level[2] as of Dec 21, 2020:

- reproductive number (R) - *0.97* (the average value for Week 48 has had a negative trend);

- number of new infections within a range [*10,988-15,423*] with an average increase of *12,939* new cases each day.

[2]The nationwide forecast is calculated as a sum of all regional predicted values

METHODOLOGY

The Situation Overview is built on secondary data received from multiple data sources: the Public Health Centre, providing raw data on COVID-19 cases along with different aggregations (e.g. by region), Cabinet of Ministers of Ukraine (bed occupancy levels in dedicated hospitals); the National Statistics Service, and 2020 population figures provided by the United Nations' Children's Fund (UNICEF), allowing age-group disaggregation.

Predictive analysis is calculated by the Mathematical Modeling Team on COVID-19 related issues from the National Academy of Sciences using Public Health Centre's and Ministry of Health figures as the input data.

(Data Source (p.6): National Academy of Sciences as of 07/12/2020)