COVID-19 UKRAINE: Bi-Weekly Situation Overview 26 Oct - 22 Nov, 2020

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COVID-19 SITUATION IN UKRAINE

As of the 23rd of November, 635,689 laboratory-confirmed cases of COVID-19 were registered in the country. Among these, 291,060 (46%) patients recovered, 18,997 (3%) currently remain hospitalised in dedicated hospitals and 11,075 (1.7%) have died. In parallel, over Week 47 (November 16th - 22nd) the number of PCR confirmed cases increased by 63% from 54,475 to 88,782 (or from 143 to 233 cases per 100,000 inhabitants) compared to Week 44.

The period between October 26th and November 22nd recorded a significant increase in confirmed cases among healthcare workers, shown through the 23% increase in Week 47 (12,670 or 2% of cumulative confirmed COVID-19 cases) as compared to Week 46 (9,787 cases) and a 149% increase as compared to Week 44 (5,086 cases).

The number of PCR tests conducted decreased from a daily average of 108 tests per 100,000 inhabitants (288,569 in total) in Week 44 to 99 (264,464 in total) in Week 47. Daily positivity rate (share of positive test results out of all PCR tests conducted per day) has increased from 29% to 36% in Week 47 as compared to Week 44.

As of November 22nd, there were 18,997 confirmed COVID-19 hospitalisations in dedicated hospitals[1]. This constitutes an 8% increase as compared to Week 44. Between Week 44 and Week 47, the weekly number of COVID-19 attributed deaths has increased by 48%, from 952 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.

635,689 cumulative confirmed COVID-19 cases as of Nov 22, including:

12,670

active cases for **healthcare workers**

18,997

currently **hospitalised** in dedicated hospitals

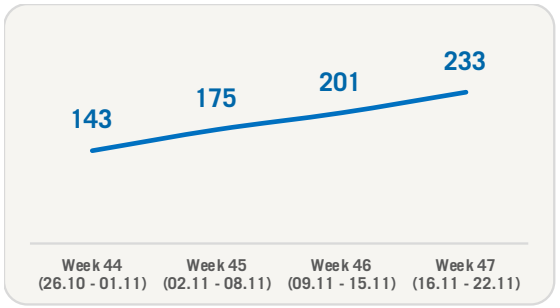
11,075

total **deaths**

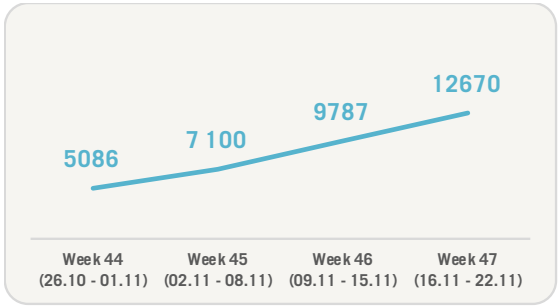
[1]The number does not include hospitalised patients with suspected COVID-19; the total number of all hospitalisations in dedicated hospitals is **27,792** (as of 23.11.2020)

KEY TRENDS

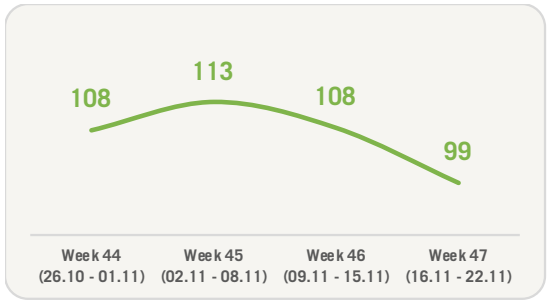
Confirmed COVID-19 cases per 100,000 inhab.:



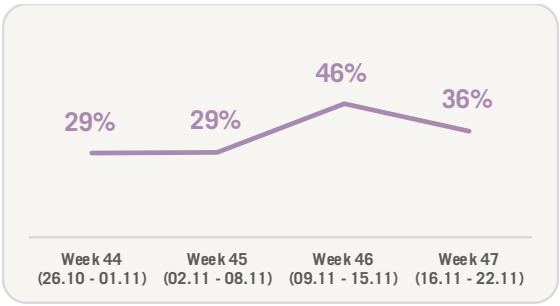
Active COVID-19 cases for healthcare workers:



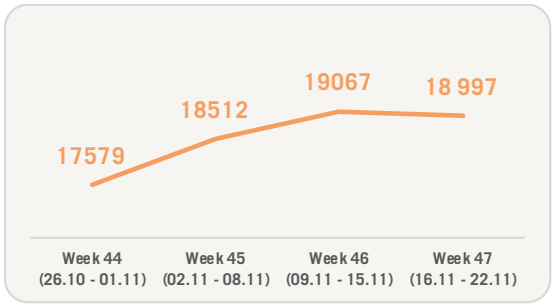
Daily average of PCR tests per 100,000 inhab.:



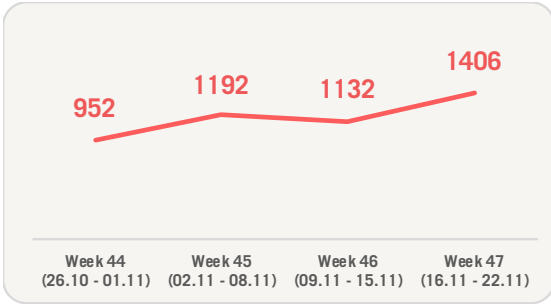
Daily testing positivity rate:



Confirmed COVID-19 hospitalisations in dedicated hospitals:



Weekly deaths from COVID-19:

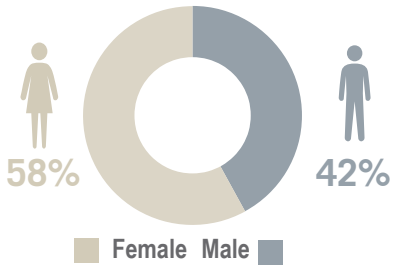


(Data Source: Ukraine Public Health Center and Cabinet of Ministers of Ukraine)

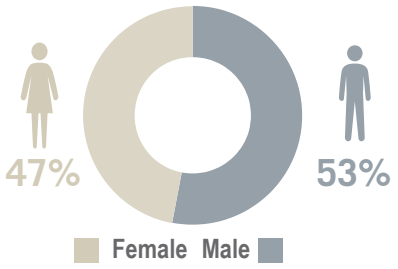
DESCRIPTIVE STATISTICS AND DISAGGREGATION OF THE TOTAL # OF CASES

TOTAL COVID-19 CASES BY GENDER AND AGE

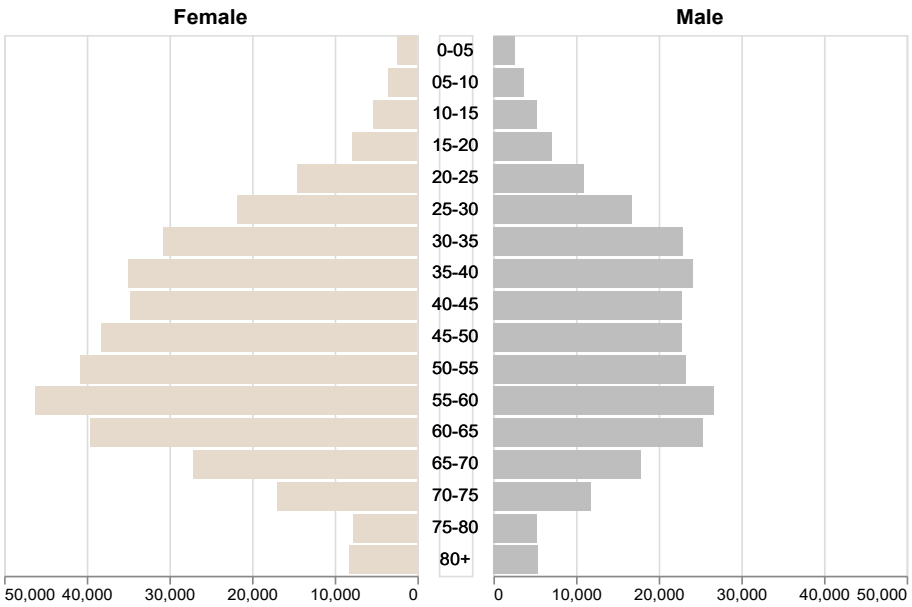
Confirmed and Hospitalised Cases



Deaths due to COVID-19



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



[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 22/11

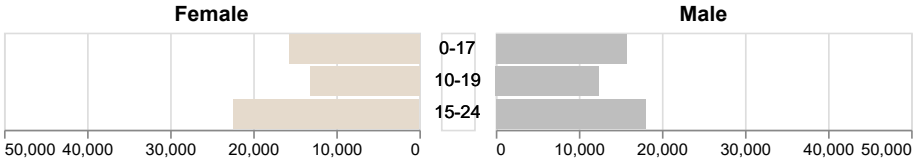
Since March 1st, out of the total number of laboratory confirmed COVID-19 registered in Ukraine, 58% (or 380,910 cases) were registered among women, while 42% (or 254,741 cases) were among men.

While the share of confirmed cases is higher among the female population (58%), in stark contrast, the death rate due to COVID-19 is significantly higher for men (53% or 5,915 persons) as compared to women (47% or 5,160 persons).

Further disaggregation by age and gender groups suggests that both female and male individuals aged 50-60 have the highest chance of receiving a confirmed COVID-19 infection and therefore, remain the most vulnerable groups.

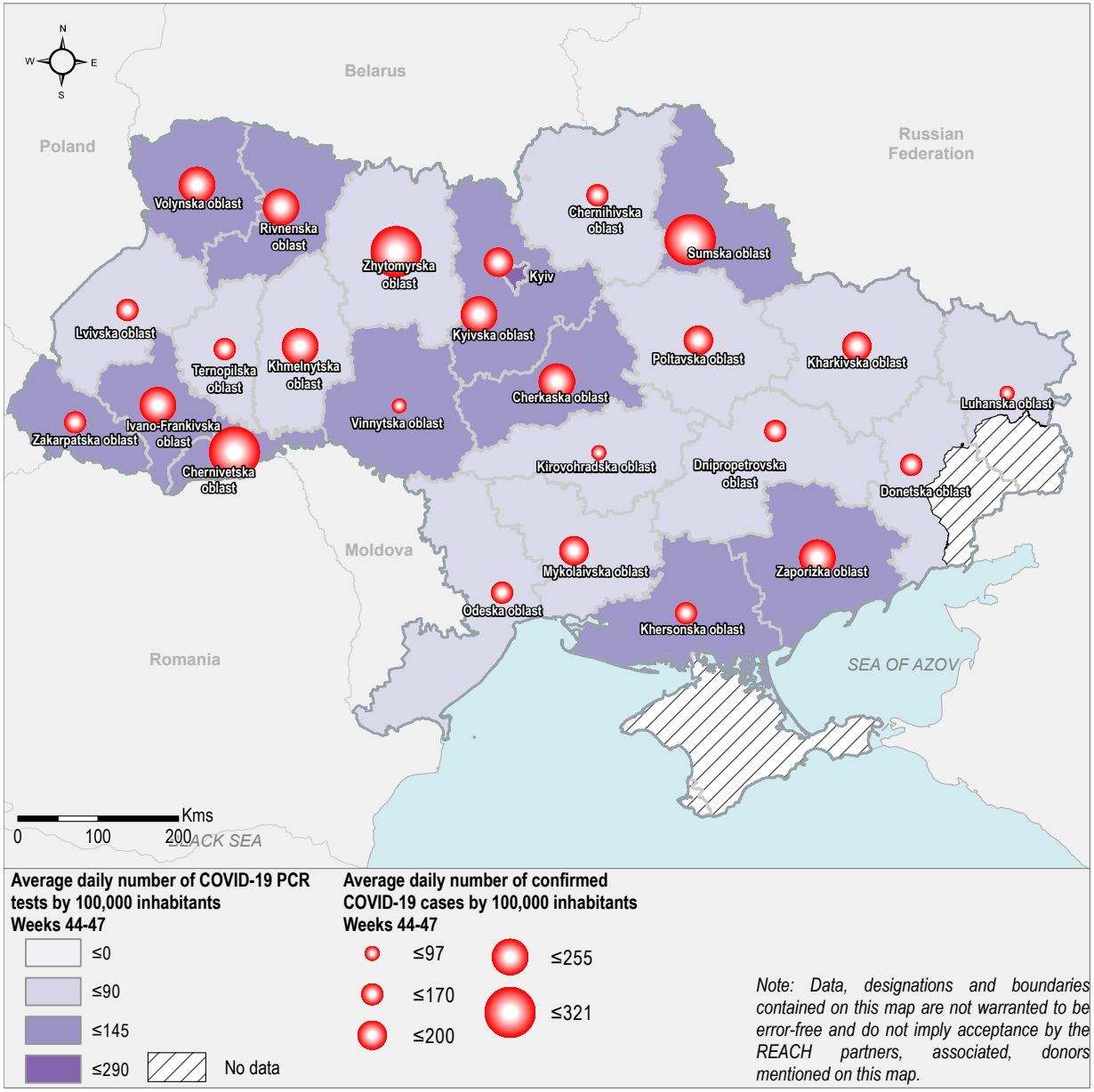
As for the children (0-17 years old), there have been 31,398 cases confirmed in total, with nearly 50% of these (15,662) being girls and another 50% (15,736) - boys. Generally, this trend constitutes a 21% rise when compared to previous Bi-Weekly Situation Overview (Weeks 42-45). Further disaggregation 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 3,053 cases), but has still grown by 23% as compared to Week 45.

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



(Data Source: Ukraine Public Health Center as of 22/11/2020)

Number of COVID-19 tests conducted and confirmed cases per 100,000 inhabitants by region for Weeks 44 - 47



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 22nd of November, laboratory-confirmed cases of COVID-19 were cumulatively highest in Kyiv city (60,218), Kharkivska (51,637) Lvivska (41,279) and Odeska (37,901) oblasts while the lowest numbers of cumulative totals were reported in Khersonska (8,704), Luhanska (5,679) and Kirovohradska (4,358) oblasts.

The highest accumulated number of total deaths was reported in Lvivska oblast (1,150), followed by Kyiv city (1,142) and Dnipropetrovska oblast (758). The areas reporting the highest cumulative number of active cases among healthcare workers were Kyiv city (1,675), Zaporizka (1,449), Kyivska (1,407) and Khmelnytska (976) oblasts.

Over Week 47, the prevalence of laboratory-confirmed cases was highest in Kyiv city (8,676), Dnipropetrovska (7,539), Kyivska (5,777), and Zaporizka (5,155) oblasts. Additionaly, over the same period (16-22 November), the prevalence of new laboratory-confirmed cases per 100,000 inhabitants was highest in Sumska (441), Cherkaska (408), Zhytomyrska (340) oblasts, followed by Chernivetska (332) and Kyivska (324) oblasts. In parallel, Zakarpatska (from 189 to 154 cases), Luhanska (from 194 to 178 cases) and Odeska (from 197 to 190 cases) oblasts showed a decrease in the number of new laboratory-confirmed cases per 100,000 inhabitants from Week 46 to Week 47.

The highest number of weekly deaths over Week 47 was registered in Dnipropetrovska (173), Kyiv city (167), Donetska (99) and Lvivska (87) oblasts.

As of the end of Week 47, 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 (32%), Volynska (31%) and Zhytomyrska (30%) oblasts. This contrasts with the total cumulative number of PCR tests per 100,000 inhabitants which has been the highest in Kyiv city (30,462), Chernivetska (15,403) and Ternopilska (13,380) oblasts.

(Data Source: Ukraine Public Health Center as of 22/11/2020)

KEY FINDINGS[1] BY OBLAST (Weeks 44 - 47 between October 26h and November 22nd)

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	44	45	46	47	44	45	46	47	44	45	46	47	44	45	46	47	44	45	46	47
Kyiv City	29%	29%	47%	35%	154	103	222	292	1931	2051	2039	1980	1052	1167	1502	1675	91	85	104	167
Cherkaska	19%	13%	43%	59%	110	109	231	408	368	360	501	516	238	344	466	874	17	19	22	27
Chernihivska	31%	40%	59%	40%	101	112	141	323	432	470	496	538	N/A	N/A	7	N/A	1	1	0	2
Chernivetska	33%	39%	43%	37%	305	325	325	332	700	730	717	658	393	456	437	547	37	36	48	60
Dnipropetrovska	15%	18%	46%	55%	73	80	129	238	1164	1097	1341	1442	N/A	N/A	22	60	65	146	74	173
Donetska	30%	29%	43%	28%	146	155	158	166	529	566	572	498	17	85	167	194	47	61	75	99
Ivano-Frankivska	30%	33%	52%	41%	190	243	289	279	993	1167	1245	1240	451	455	438	439	28	35	44	50
Kharkivska	32%	38%	49%	33%	181	223	160	127	1054	1235	1353	1233	154	166	121	134	38	54	58	65
Khersonska	13%	15%	32%	16%	108	125	153	165	280	359	304	396	77	87	63	68	17	25	39	33
Khmelnytska	42%	40%	47%	46%	246	272	263	241	978	1027	979	1045	570	843	754	976	25	112	23	30
Kirovohradska	16%	14%	26%	14%	64	52	61	69	243	223	243	275	91	118	162	185	11	10	17	17
Kyivska	20%	24%	42%	36%	130	182	265	324	910	967	998	947	666	892	1053	1407	79	64	90	65
Luhanska	22%	18%	31%	11%	83	116	94	78	258	233	226	239	145	218	154	185	19	30	14	15
Lvivska	24%	27%	41%	31%	121	246	148	150	1220	1297	1261	1142	168	242	224	371	108	98	78	87
Mykolaivska	31%	27%	45%	35%	128	184	185	237	538	502	506	595	223	288	284	401	39	41	35	32
Odeska	38%	29%	46%	40%	134	143	197	190	682	731	765	802	221	307	429	544	46	41	40	54
Poltavska	28%	39%	59%	42%	134	170	221	241	246	288	405	351	166	203	192	221	38	42	70	84
Rivnenska	21%	26%	51%	39%	161	223	266	253	538	619	684	653	208	327	300	438	25	32	39	31
Sumska	57%	58%	60%	43%	140	262	324	441	419	395	444	470	242	284	291	377	37	35	37	43
Ternopilska	22%	18%	46%	35%	162	121	148	200	694	584	554	613	220	316	276	433	18	30	19	39
Vinnytska	16%	20%	31%	19%	91	115	90	93	496	541	487	473	233	354	351	430	24	39	14	27
Volynska	47%	37%	52%	40%	156	238	242	284	575	579	504	512	264	393	288	424	26	39	50	35
Zakarpattia	31%	37%	49%	32%	142	182	189	154	789	941	908	742	456	625	517	634	24	50	43	38
Zaporizhia	33%	32%	46%	44%	130	222	308	306	789	759	781	815	760	944	1174	1449	31	25	28	63
Zhytomyrska	44%	49%	55%	48%	260	299	321	340	753	791	754	822	111	128	115	197	61	42	71	70

[1]The severity shading is adjusted by week horizontally

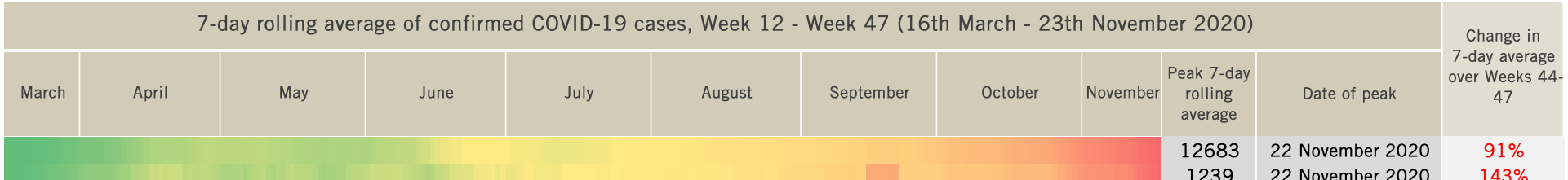
(Data Source: Ukraine Public Health Center as of 22/11/2020)

CONFIRMED COVID-19 CASES: 7-Day Rolling Average (March 16th to November 22nd)

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 November 22nd.

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 Cherkaska, Dnipropetrovska, Zaporizka and Kyivska oblasts, with new 'peaks' recorded in Week 47 (November 22).



	Peak 7-day rolling average	Date of peak	Change in 7-day average over Weeks 44-47
Ukraine	12683	22 November 2020	91%
Kyiv City	1239	22 November 2020	143%
Cherkaska	697	20 November 2020	303%
Dnipropetrovska	1077	22 November 2020	272%
Sumska	672	22 November 2020	216%
Kyivska	825	22 November 2020	190%
Chernihivska	457	22 November 2020	190%
Zaporizka	778	17 November 2020	179%
Khersonska	255	19 November 2020	137%
Mykolaivska	379	22 November 2020	132%
Donetska	563	04 November 2020	121%
Volynska	418	22 November 2020	99%
Ivano-Frankivska	564	15 November 2020	98%
Zhytomyrska	586	22 November 2020	71%
Poltavska	478	22 November 2020	63%
Rivnenska	457	14 November 2020	60%
Chernivetska	440	20 November 2020	47%
Vinnytska	270	06 November 2020	45%
Lvivska	564	21 November 2020	40%
Zakarpatska	374	11 November 2020	39%
Odeska	691	16 November 2020	37%
Kirovohradska	91	22 November 2020	24%
Ternopilska	345	18 September 2020	16%
Khmelnytska	502	12 November 2020	16%
Kharkivska	871	07 November 2020	-21%
Luhanska	111	08 November 2020	-30%

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 44-47'

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 48-49 (Nov 30 - Dec 7, 2020)

OBLAST	Average predicted value for Nov, 30	for Dec,7	Predicted range	R, as of Nov 23
National	**14,684**	**17,644**	**11,215 - 23,173**	**1,11**
Kyiv City	**1662**	**2070**	**1317-2029**	**1,17**
Cherkaska	**1325**	**2372**	**1043-1627**	**1,31**
Chernihivska	**1036**	**1999**	**813-1277**	**1,58**
Chernivetska	482	503	383-586	1,02
Dnipropetrovska	**2068**	**3674**	**1527-2541**	**1,38**
Donetska	474	484	377-576	1,00
Ivano-Frankivska	614	642	488-746	1,02
Kharkivska	431	360	345-522	0,83
Khersonska	259	278	206-315	1,02
Khmelnytska	505	512	402-614	1,00
Kirovohradska	109	121	87-133	1,13
Kyivska	**1,223**	**1607**	**968-1495**	**1,21**
Luhanska	64	55	51-78	0,87
Lvivska	631	684	502-767	1,03
Mykolaivska	497	601	394-606	1,13
Odeska	732	782	582-890	1,01
Poltavska	559	621	444-680	1,08
Rivnenska	475	497	378-577	1,03
Sumska	**1010**	**1371**	**799-1235**	**1,23**
Ternopilska	399	506	316-488	1,18
Vinnytska	238	245	189-289	1,03
Volynska	502	565	398-611	1,11
Zakarpattia	269	244	215-326	0,93
Zaporizhia	884	990	703-1076	1,03
Zhytomyrska	669	715	532-814	1,06

[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 47). For calculation purposes it is assumed that R remains constant for the forecasted period (Nov, 30 and Dec, 7).

Based on the analysis, **Dnipropetrovska, Kyivska, Sumska, Cherkaska, Chernihivska** oblasts together with **Kyiv city** are expected to have the highest number of newly infected people per day in Weeks 48-49 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 7, 2020:

- reproductive number (R) - ***1.11*** (the average value for Week 47 has had a neutral trend);
- number of new infections within a range [**11,215 - 23,173**] with an average increase of ***17,644*** 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 23/11/2020)