COVID-19 UKRAINE:
Bi-Weekly Situation Overview 12 Oct - 8 Nov, 2020

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COVID-19 SITUATION IN UKRAINE

As of the 9th of November, 469,018 laboratory-confirmed cases of COVID-19 were registered in the country. Among these, 209,143 (45%) patients recovered, 33,154 (7%) currently remain hospitalised and 8,565 (1.8%) have died. In parallel, over Week 45 (November 2nd -08th) the number of PCR confirmed cases increased by 75% from 38,184 to 66,824 (or from 100 to 175 cases per 100,000 inhabitants) compared to Week 42.

The trend for newly confirmed cases among healthcare workers continued to increase between October 12th and November 8th with a 29% increase in Week 45 (9,353 or 2% of cumulative confirmed COVID-19 cases) as compared to Week 44 (7,237 cases) and a 151% increase as compared to Week 42 (3,722 cases).

The number of PCR tests conducted increased from a daily average of 79 tests per 100,000 inhabitants (211,187 in total) in Week 42 to 113 (301,575 in total) in Week 45. Daily positivity rate (share of positive test results out of all PCR tests conducted per day) has increased from 25% to 29% in Week 45 as compared to Week 42.

In Week 45, a cumulative total of 33,154 actively hospitalised patients were confirmed to have COVID-19. This constitutes a 111% increase as compared to Week 42. Between Week 42 and Week 45, the weekly number of COVID-19 attributed deaths has increased with 81%, from 658 deaths to 1,192, respectively.

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

469,018 cumulative confirmed COVID-19 cases as of Nov 9, including:

9,353

active cases for **healthcare workers**

33,154

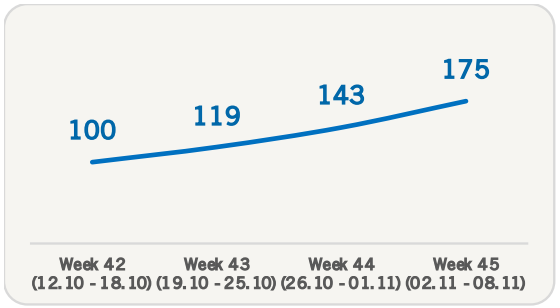
active cumulative **hospitalisations**

8,565

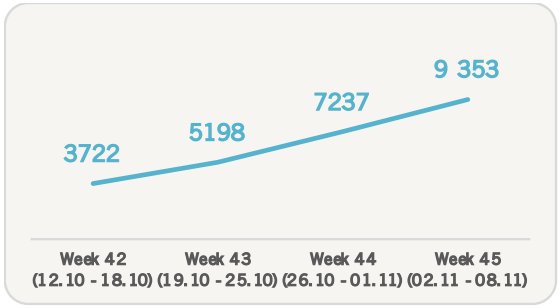
total **deaths**

KEY TRENDS

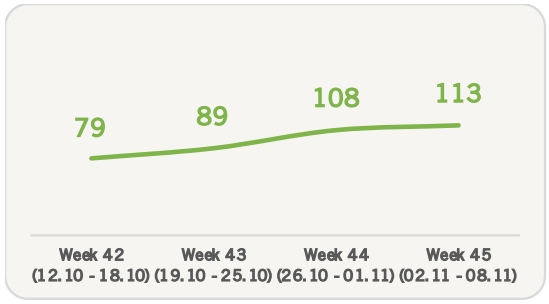
Confirmed COVID-19 cases per 100,000 inhab.:



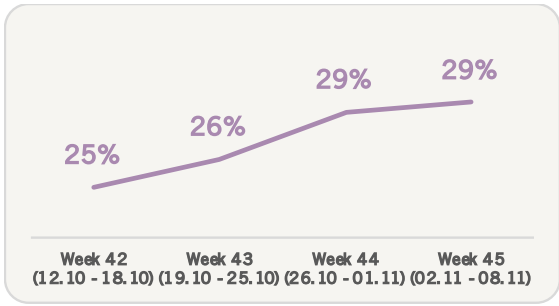
Active COVID-19 cases for healthcare workers:



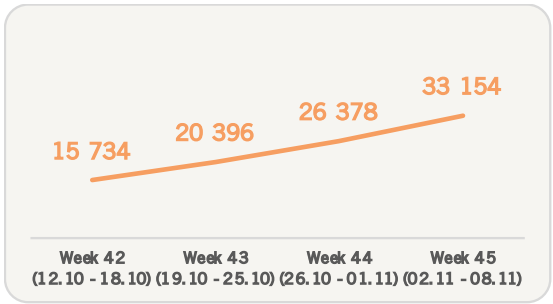
Daily average of PCR tests per 100,000 inhab.:



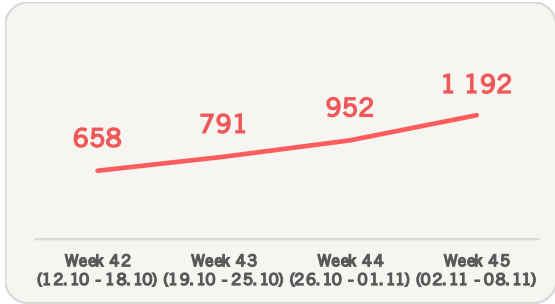
Daily testing positivity rate:



Active cumulative COVID-19 hospitalisations:



Weekly deaths from COVID-19:

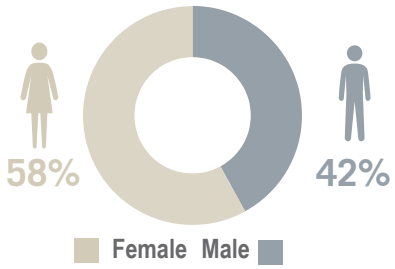


(Data Source: Ukraine Public Health Center as of 09/11/2020)

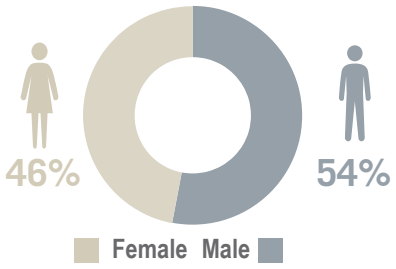
DESCRIPTIVE STATISTICS AND DISAGGREGATION OF THE TOTAL # OF CASES

TOTAL COVID-19 CASES BY GENDER AND AGE

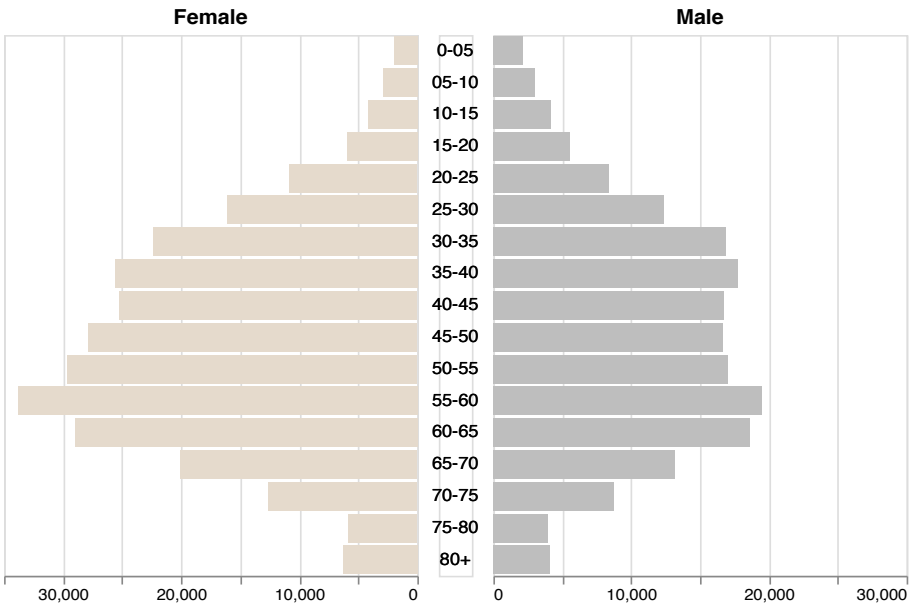
Confirmed and Hospitalised Cases



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 09/11

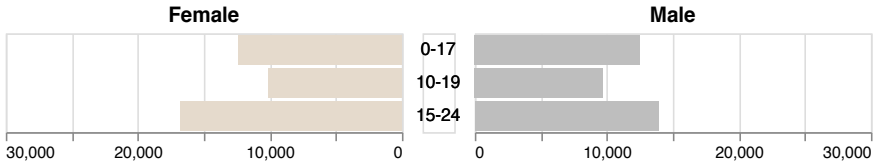
Since March 1st, out of the total number of laboratory confirmed COVID-19 registered in Ukraine, 58% (or 280,224 cases) were registered among women, while 42% (or 188,755 cases) were among men.

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 (54% or 4,527 persons) as compared to women (46% or 4,040 persons).

Further disaggregation by age and gender groups suggests that both female and male individuals aged 55-65 have the highest chance of receiving a confirmed COVID-19 infection and therefore, remain the most vulnerable groups.

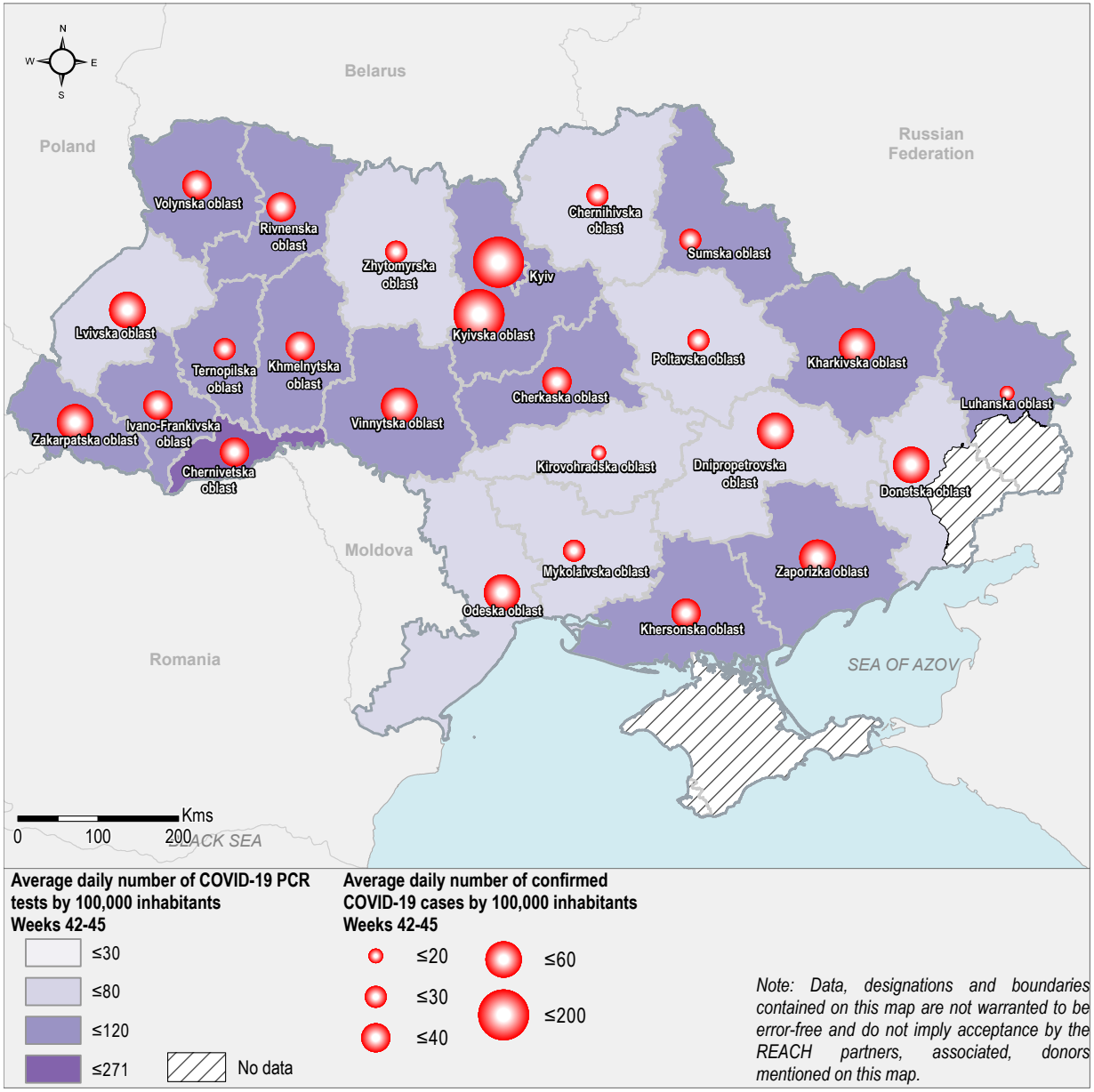
As for the children (0-17 years old), there have been 24,902 new cases confirmed in total, with 49% of these (12,396) being girls and 51% (12,506) - boys. Generally, this trend constitutes a 17% rise when compared to previous Bi-Weekly Situation Overview (Weeks 40-43). Further disaggregation by age groups 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 2,478 cases) as compared to adults (80,781).

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 09/11/2020)

Number of COVID-19 tests conducted and confirmed cases per 100,000 inhabitants by region for Weeks 42 - 45



REGIONAL PERSPECTIVE

As of the 9th of November, laboratory-confirmed cases of COVID-19 were cumulatively highest in Kyiv city (44,920), Kharkivska (43,930) Lvivska (33,754) and Odeska (28,728) oblasts while the lowest number of cumulative totals was reported in Khersonska (5,558), Luhanska (4,539) and Kirovohradska (3,142) oblasts.

The highest accumulated number of total deaths was reported in Lvivska oblast (988), followed by Kyiv city (872) and Kharkivska oblast (585). The areas reporting the highest cumulative number of cases for healthcare workers were Kyiv city (1,167), Zaporizka (944), Kyivska (892) and Khmelnytska (843) oblasts.

Over Week 45, the prevalence of laboratory-confirmed cases was highest in Lvivska (6,175), Kharkivska (5,933), Zaporizka (3,735) and Zhytomyrska (3,607) oblasts. Additionaly, over the same period, the prevalence of new laboratory-confirmed cases per 100,000 inhabitants was highest in Chervivetska (325), Zhytomyrska (299), followed by Khmelnytska (272) and Sumska (262) oblasts. In parallel, Ternopilska (from 162 to 121 cases) and Kirovohradska (from 64 to 52 cases) oblasts showed a decrease in the number of new laboratory-confirmed cases per 100,000 inhabitants from Week 44 to Week 45.

The highest number of deaths in Week 45 was registered in Dnipropetrovska (146), Khmelnytska (112) and Lvivska (98) oblasts.

As of the end of Week 45, the areas reporting the highest general positivity rates (number of positive results out of total PCR tests conducted since the beginning of the pandemic) were Volynska (30%), Sumska (29%), and Kharkivska (27%) oblasts. This contrasts the total number of PCR tests per 100,000 inhabitants which has been the highest in Kyiv city (26,752), Chernivetska (13,411) and Ternopilska (12,178) oblasts.

(Data Source: Ukraine Public Health Center as of 09/11/2020)

KEY FINDINGS[1] BY OBLAST (Weeks 43 - 45 between October 12th and November 8th)

OBLAST	Daily Positivity Rate (Positive / Total PCR Tests)				Weekly confirmed cases per 100,000 Inhab.				Active cumulative hospitalisations				Active cumulative cases for healthcare workers				Deaths			
WEEK	42	43	44	45	42	43	44	45	42	43	44	45	42	43	44	45	42	43	44	45
Kyiv City	**22%**	25%	29%	29%	106	118	154	103	3330	3719	4 009	4266	761	900	1052	1167	100	112	91	85
Cherkaska	20%	17%	19%	13%	103	105	110	109	135	184	261	340	122	160	238	344	7	16	17	19
Chernihivska	36%	28%	31%	40%	117	120	101	112	89	94	99	120	N/A	N/A	N/A	N/A	N/A	N/A	1	1
Chernivetska	30%	27%	33%	39%	153	207	305	325	974	1141	1377	1580	252	336	393	456	22	26	37	36
Dnipropetrovska	15%	16%	15%	18%	67	64	73	80	1058	1656	2091	2716	N/A	N/A	N/A	N/A	43	76	65	146
Donetska	26%	29%	30%	29%	75	82	146	155	13	31	127	329	5	8	17	85	11	10	47	61
Ivano-Frankivska	20%	24%	30%	33%	101	133	190	243	1109	1502	2199	2678	236	315	451	455	27	29	28	35
Kharkivska	34%	35%	32%	38%	148	156	181	223	2166	2739	3185	3841	123	146	154	166	31	50	38	54
Khersonska	10%	9%	13%	15%	57	65	108	125	70	111	161	209	6	29	77	87	14	19	17	25
Khmelnytska	39%	36%	42%	40%	161	195	246	272	459	715	1106	1503	188	330	570	843	17	22	25	112
Kirovohradska	11%	15%	16%	14%	29	56	64	52	77	168	259	377	38	62	91	118	6	10	11	10
Kyivska	17%	18%	20%	24%	91	108	130	182	440	575	774	1004	353	492	666	892	49	49	79	64
Luhanska	14%	24%	22%	18%	92	114	83	116	96	145	182	236	61	109	145	218	20	18	19	30
Lvivska	22%	21%	24%	27%	92	100	121	246	844	1236	1603	2055	19	80	168	242	75	79	108	98
Mykolaivska	29%	26%	31%	27%	103	108	128	184	324	396	542	841	129	162	223	288	13	15	39	41
Odeska	26%	22%	38%	29%	97	130	134	143	2072	2439	3062	3540	158	179	221	307	38	45	46	41
Poltavska	40%	38%	28%	39%	103	145	134	170	162	242	357	439	66	102	166	203	29	52	38	42
Rivnenska	22%	21%	21%	26%	116	147	161	223	26	108	204	329	50	100	208	327	15	21	25	32
Sumska	35%	47%	57%	58%	171	141	140	262	65	75	91	221	145	190	242	284	37	25	37	35
Ternopilska	36%	31%	22%	18%	146	169	162	121	75	159	287	380	44	103	220	316	25	13	18	30
Vinnytska	12%	15%	16%	20%	51	64	91	115	189	286	434	661	73	134	233	354	16	18	24	39
Volynska	41%	38%	47%	37%	116	137	156	238	366	482	644	885	146	200	264	393	21	25	26	39
Zakarpattia	30%	34%	31%	37%	71	105	142	182	790	996	1240	1565	230	337	456	625	13	20	24	50
Zaporizhia	31%	39%	33%	32%	53	98	130	222	661	811	952	1124	380	546	760	944	7	2	31	25
Zhytomyrska	35%	39%	44%	49%	135	202	260	299	144	386	1132	1915	26	67	111	128	22	39	61	42

[1]The severity shading is adjusted by week horizontally

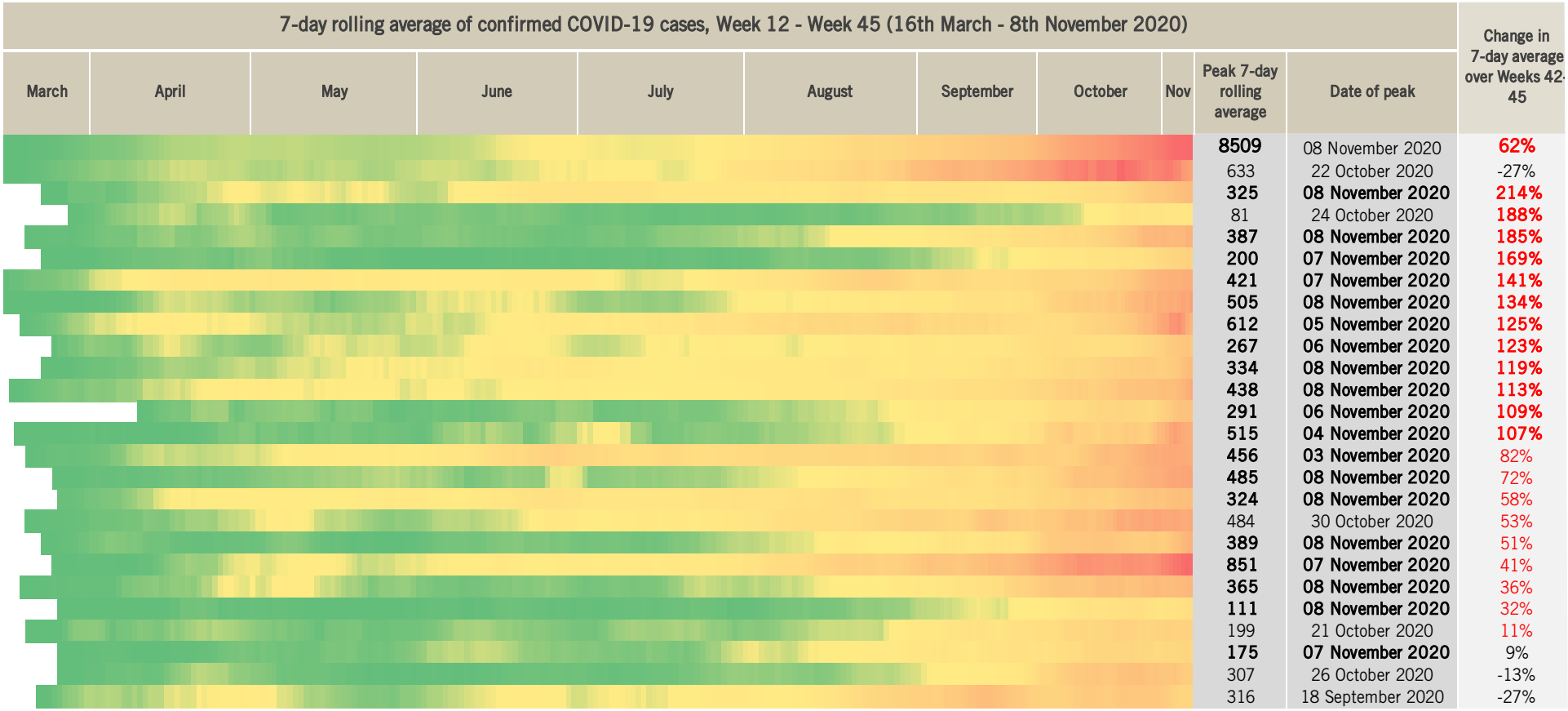
(Data Source: Ukraine Public Health Center as of 09/11/2020)

CONFIRMED COVID-19 CASES: 7-Day Rolling Average (March 16th to November 8th)

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 8th.

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 is peaking in Kharkivska oblast towards November (average of 851 cases on November 7th). The heat map shows current increasing trends in Zakarpatska, Zaporizka, Khersonska and Chernivetska oblasts, with new 'peaks' recorded in Week 45 (November 2nd - 8th).



	Peak 7-day rolling average	Date of peak	Change in 7-day average over Weeks 42-45
Ukraine	**8509**	08 November 2020	**62%**
Kyiv City	633	22 October 2020	-27%
Zakarpatska	**325**	**08 November 2020**	**214%**
Kirovohradska	81	24 October 2020	**188%**
Zaporizka	**387**	**08 November 2020**	**185%**
Khersonska	**200**	**07 November 2020**	**169%**
Chernivetska	**421**	**07 November 2020**	**141%**
Zhytomyrska	**505**	**08 November 2020**	**134%**
Ivano-Frankivska	**612**	**05 November 2020**	**125%**
Vinnytska	**267**	**06 November 2020**	**123%**
Volynska	**334**	**08 November 2020**	**119%**
Kyivska	**438**	**08 November 2020**	**113%**
Mykolaivska	**291**	**06 November 2020**	**109%**
Donetska	**515**	**04 November 2020**	**107%**
Lvivska	**456**	**03 November 2020**	82%
Khmelnytska	**485**	**08 November 2020**	72%
Rivnenska	**324**	**08 November 2020**	58%
Odeska	484	30 October 2020	53%
Sumska	**389**	**08 November 2020**	51%
Kharkivska	**851**	**07 November 2020**	41%
Dnipropetrovska	**365**	**08 November 2020**	36%
Luhanska	**111**	**08 November 2020**	32%
Cherkaska	199	21 October 2020	11%
Chernihivska	**175**	**07 November 2020**	9%
Poltavska	307	26 October 2020	-13%
Ternopilska	316	18 September 2020	-27%

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 42-45'

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 Week 46 (Nov 9 - 13, 2020)

OBLAST	Predicted average value for Nov, 11	Forecasted range	R, as of Nov, 6
National	**10949**	**9079-13,968**	**1,15**
Kyiv city	**1156**	**915-1414**	1,25
Cherkaska	217	173-264	1,03
Chernihivska	180	143-219	1,06
Chernivetska	530	420-647	1,12
Dnipropetrovska	377	300-458	1,04
Donetska	**948**	**746-1165**	1,36
Ivano-Frankivska	**632**	**500-772**	1,22
Kharkivska	**1000**	**793-1220**	1,15
Khersonska	265	209-324	1,23
Khmelnytska	578	459-705	1,10
Kirovohradska	78	62-95	0,98
Kyivska	490	389-598	1,15
Luhanska	94	75-115	1,04
Lvivska	535	426-652	1,06
Mykolaivska	471	372-578	1,37
Odeska	528	420-642	1,05
Poltavska	357	284-435	1,10
Rivnenska	386	307-471	1,12
Sumska	390	309-476	1,22
Ternopilska	166	133-201	0,82
Vinnytska	409	323-500	1,28
Volynska	373	295-455	1,21
Zakarpattia	431	341-527	1,22
Zaporizhia	529	419-647	1,20
Zhytomyrska	**638**	**506-779**	1,19

[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 45). For calculation purposes it is assumed that R remains constant for the forecasted period (Nov, 6).

Based on the analysis, **Donetska, Zhytomyrska, Ivano-Frankivska and Kharkivska** oblasts together with **Kyiv city** are expected to have the highest number of newly infected people per day in Week 46 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 November 11, 2020:

- reproductive number (R) - ***1.15*** (the average value for Week 45 has a neutral trend);
- number of new infections within a range [9079-13968] with an average increase of ***10,949*** 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 analysis received from multiple data sources: the Public Health Centre, providing raw data on COVID-19 cases along different aggregations, the National Statistics Service, and 2020 population group 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 06/11/2020)