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Epidemiological update on COVID-19 situation in Nepal -- based on epidemiological update on 3 July 2020 07:00 hours

Top line summary

This detailed epidemiological update is based on 14517 cases (30 deaths) of COVID-19 confirmed through RT-PCR. Core epidemiological variables for a few confirmed cases are under process currently. So far, more than 200,000 samples have been tested for COVID-19 through polymerase chain reaction (PCR).

Transmission pattern

We note very high daily and cumulative incidence rates in western parts of Nepal, especially Sudur Pashchim province. At the same time the **observed doubling time nationally has lengthened somewhat to more than 12 days**. This data should be interpreted keeping the lab testing rates and pending results in mind. All provinces and districts are now affected and five out of seven provinces (~71%) of the population reside in areas where there are large clusters of cases.

For the past few weeks migrant workers returning across the open southern border have been the driving force for current COVID-19 transmission in Nepal. From available data it seems the flow or returnees has lessened somewhat. However, the distribution of case load is still heavily skewed towards males (87%) in the economically productive age group (93% of males).

We could obtain international travel history from 75% of 12,089 cases and **97% (8931/9186) had history of international travel. At the same time, clear history of presence or absence of international travel could not be obtained from a quarter to a third of the cases.**

We also note fragmentation of data systems including but not limited to laboratory related data. Overall 7% samples are pending testing in the lab with a high of 21% pending in Sudur Pashchim province.

We are concerned with the rapidly increasing cases in western Nepal knowing that medical facilities including sophisticated respiratory support systems are not freely or equitably available in that part of the country. We also note in passing that recently CDC-Atlanta has identified sickle cell disease as a risk factor for severe COVID-19 disease. Knowing that some population groups in Western Nepal have a high prevalence of sickle cell disease and trait, we would like to flag this to the attention of clinicians.

Maintaining infection prevention and control protocols in all quarantine and isolation centres and at home would be paramount importance in the weeks ahead.

Deaths

Thirty persons (five female) who tested positive for COVID-19 have died. Of these, 15 persons had one or more co-morbid conditions and five persons were above 65 years of age while two were under 15 years of age.

COVID-19 update

- The COVID-19 pandemic with nearly 11 million cases and more than 500,000 deaths globally (<https://www.worldometers.info/coronavirus/#countries> accessed on 5 July 2020) has become an unprecedented public health challenge for all countries.
- As of 3 July 2020 (07:00 hours), Nepal has confirmed 14520 cases through PCR and 30 deaths. This report is based on 14517 cases for which core data is available.
- All seven provinces and all of 77 districts are now affected. Five provinces are having transmission as clusters of cases.

Summary of laboratory-confirmed COVID-19 cases, deaths and transmission by province					
Transmission classification based on WHO definitions					
Reporting Province	Total confirmed cumulative cases	Total cumulative deaths	Transmission classification*	District affected (total districts)	Date of most recent case [#]
Province 1	635	0	Cluster of cases	14 (14)	02-Jul-2020
Province 2	3916	4	Cluster of cases	8 (8)	02-Jul-2020
Bagmati	500	5	Sporadic cases	13 (13)	02-Jul-2020
Gandaki	1096	2	Sporadic cases	11 (11)	02-Jul-2020
Province 5	3841	9	Cluster of cases	12 (12)	02-Jul-2020
Karnali	1509	4	Cluster of cases	10 (10)	02-Jul-2020
Sudurpaschhim	3020	6	Cluster of cases	9 (9)	02-Jul-2020
National Total	14517	30		77 (77)	02-Jul-2020

- Date of last case is the date of onset or date of sample collection or date of lab report based on information available.
*Case classification is based on [WHO transmission classification](#)
No cases- provinces with no cases
Sporadic cases- provinces with one or more cases, imported or locally detected
Cluster of cases- provinces experiencing cases, clustered in time, geographic location and/or by common exposures
Community transmission- experiencing larger outbreaks of local transmission defined through an assessment of factors including, but not limited to:
- Large numbers of cases not linkable to transmission chains
- Large numbers of cases from sentinel lab surveillance
- Multiple unrelated clusters in several areas of the country/territory/area

• All data are provisional
• Data updated till 03 Jul 2020 Time 07:00:00

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Table 1: Nepal COVID-19 cases by province and districts affected with date of last case

Incidence and trend of cases

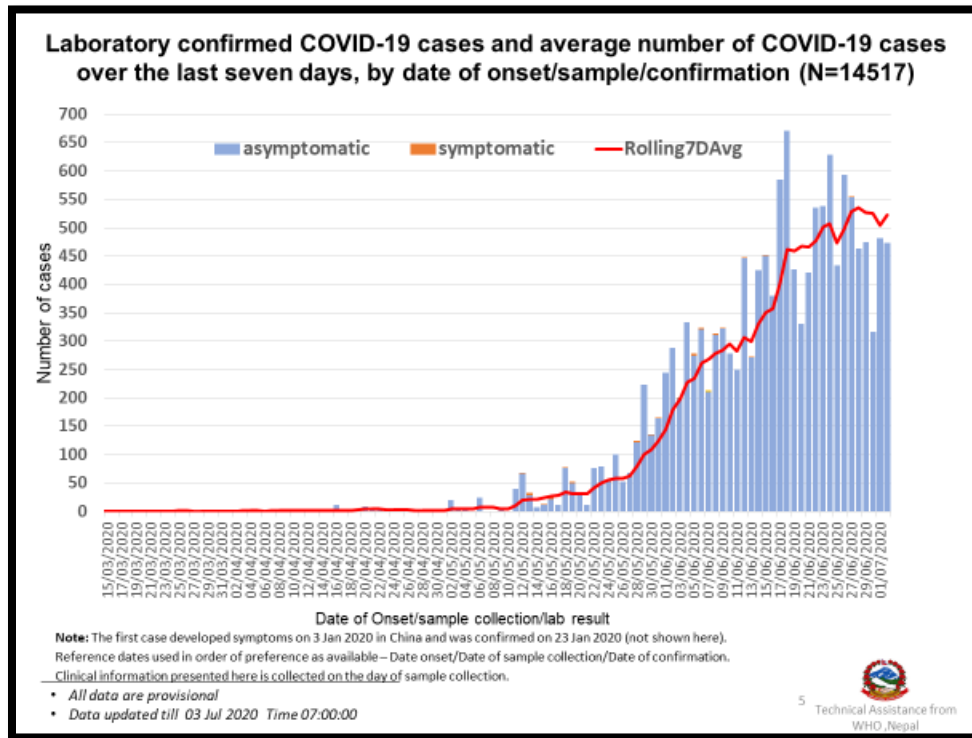
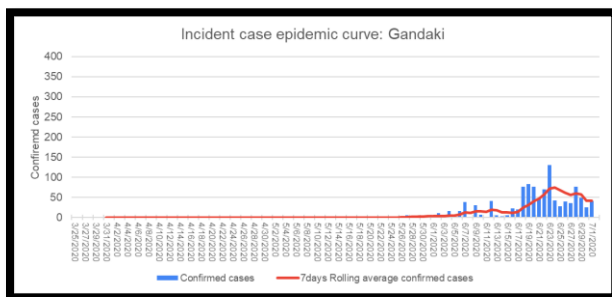
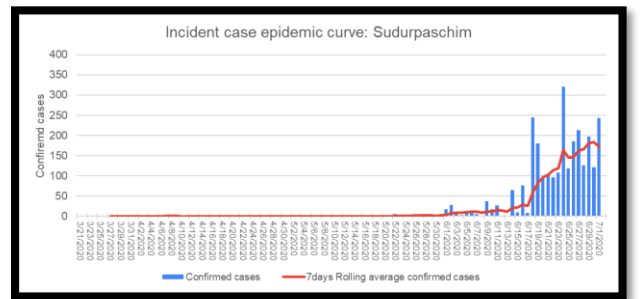
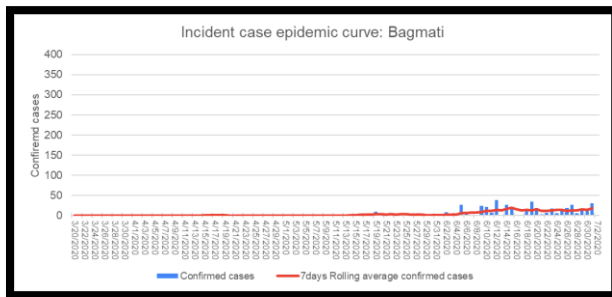
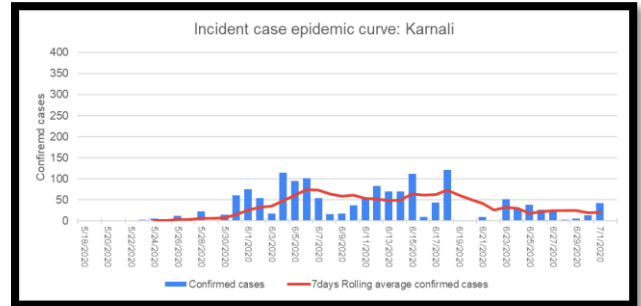
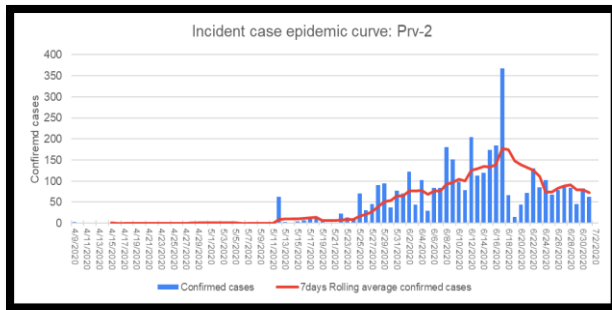
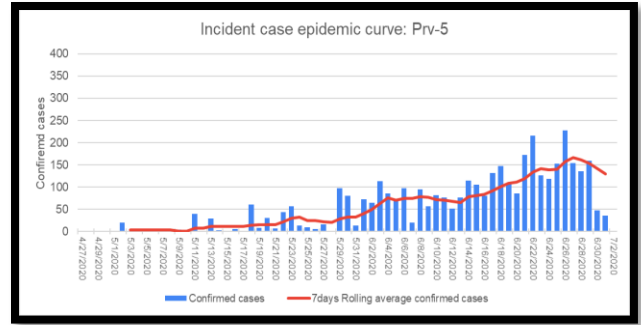
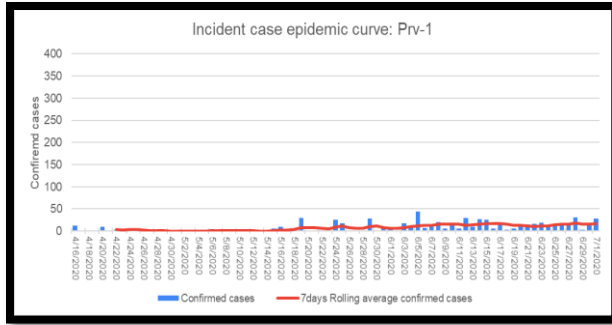


Figure 1: COVID-19 daily incident cases by symptom at presentation and 7-day rolling average of cases

- The national daily incident and cumulative cases with 7-day rolling average trendline and the daily incident cases by province are shown in Figure 1, Figure 2, and Figure 3.
- We have also shown daily incident case curve by province with 7-day rolling average trendlines. These incident curves and trendlines show an alarming increase in Sudur Paschim province while in some other provinces the curve may be flattening.
 - Please see below for a fuller description of this analysis.

Developed by WHO Nepal as technical assistance to EDCD based on available provisional data.
Inferences and projections made herein should be vetted through further discussion.



As can be seen clearly, **Provinces 1 and 3 have one of the lowest 7-day rolling average trendlines. Sudur Paschim province has the sharpest gradient in its incidence trendline. Prv-2 and Prv-5 have high caseloads but their incident trendlines show early indications of flattening, which need to be observed closely.**

All these observations should be interpreted in context. We do not know if these early indications will hold for the next weeks to months and should be watched carefully. Further, we do not know how these trends will change once the large load of samples pending testing in the labs in Prv-2, Prv-5 and Sudur Paschim are processed. [See lab results table below.]

To make a meaningful comparison between observed incidence and risk of infection, we show above a panel of province-wise incident case curves with rolling 7-day average trendline for incident cases. To make the columns visually comparable, we kept the Y-axis scale for case counts the same (0-400) for all seven provinces.

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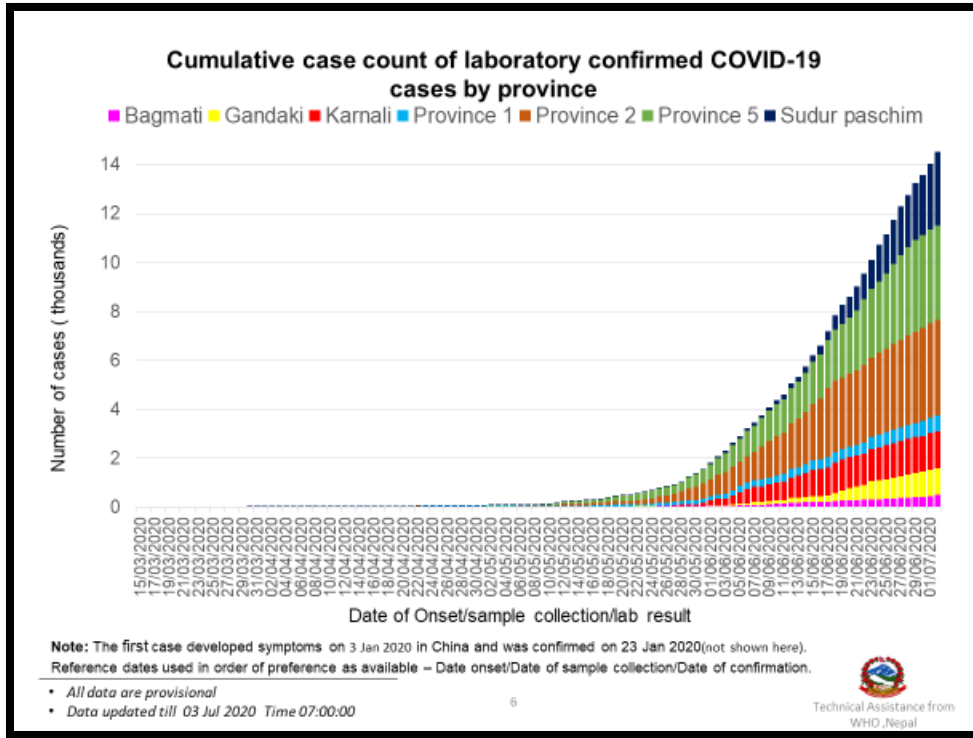


Figure 2: Cumulative incidence of COVID-19 confirmed cases by province

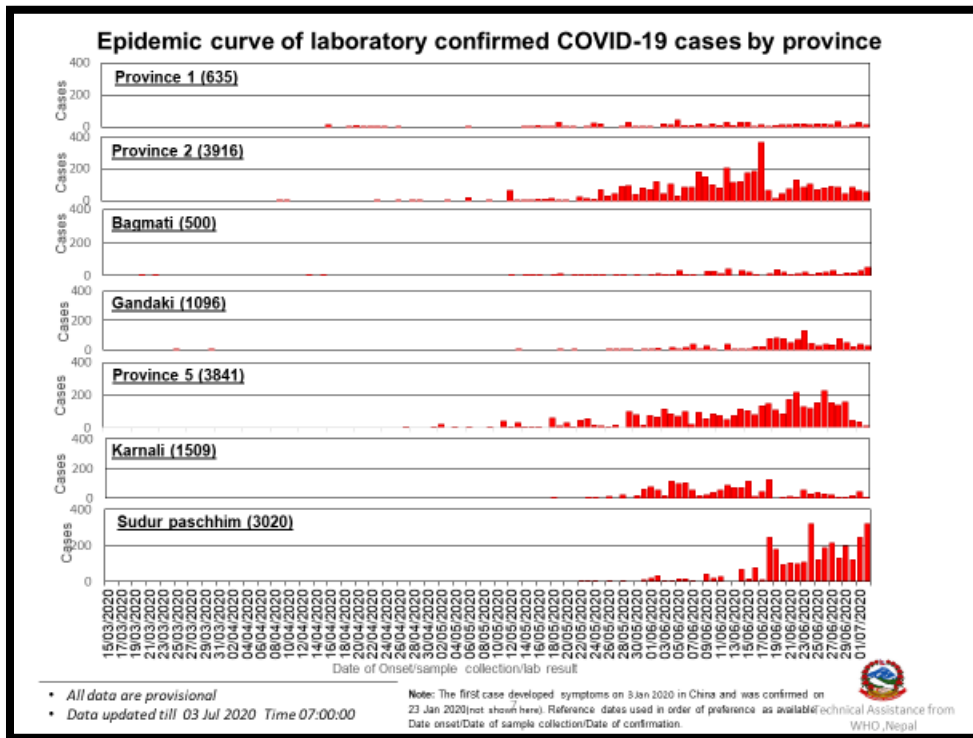


Figure 3: Panel of province wise epi-curves of confirmed COVID-19 cases

Observed doubling time for incident cases

- We estimated observed doubling time of cumulative cases at national level from 20 March to 2 July 2020. [Figure 4]
 - In the initial stages of the epidemic when the numbers were small, doubling time varied between 3-11 days. Between 14 May and 9 June, the observed doubling time varied between 4-8 days. However, the doubling time lengthened to 10 days from 9 to 19 June, and the observed case numbers have not yet doubled between 19 June and 1 July, a span of 12 days.

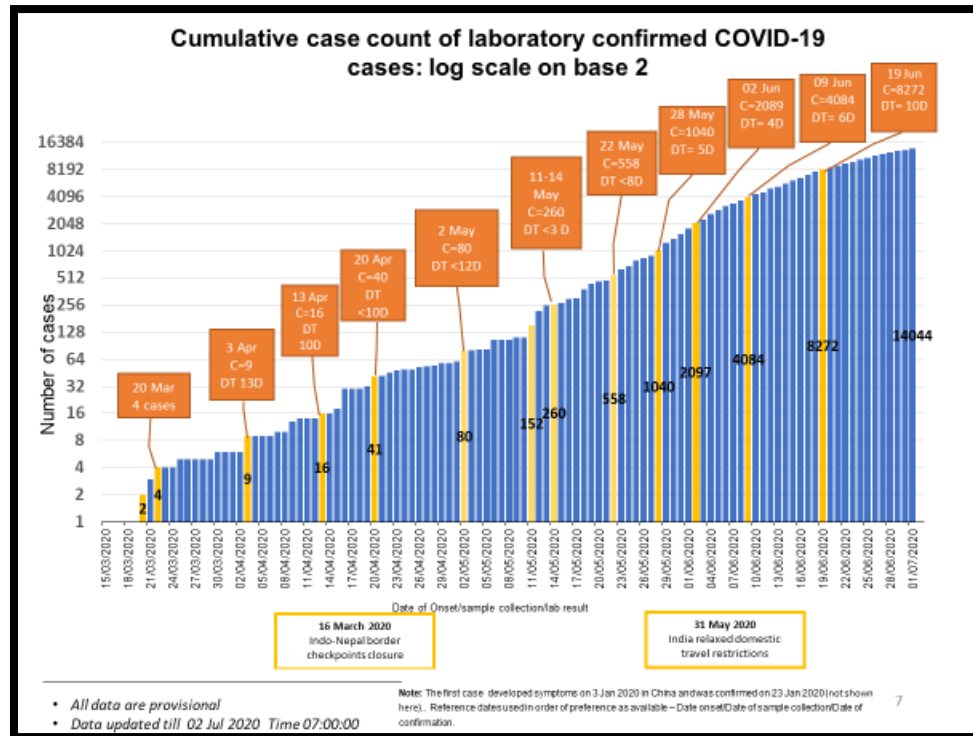


Figure 4: Observed doubling time of cumulative case count 20 March to 2 July 2020

- Aggressive testing irrespective of symptoms in such high-risk groups and locations has played a part in the prevention of apparent seeding of infection. Nearly 250,000 PCR tests have been conducted. [<https://covid19.mohp.gov.np/#/> accessed on 4 July 2020]
- However, some provinces have 9% to 20% of specimens pending testing at the lab and the confirmed case numbers may change significantly when these pending samples are tested and results fed into the surveillance system.
- The geographic distribution shown below demonstrates clustering within some municipalities. [Figure 5]
 - In the map each dot representing a confirmed case is placed randomly within municipal boundaries where the case was identified.
 - A district is shaded whenever at least one confirmed case is reported from any one municipality within the district.
- The spatial distribution of cases is therefore still clustered within a few municipalities, rather than being widespread across the districts.

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- If proper infection prevention and control protocols are not followed in the quarantine or isolation centres there is a real risk of spread of infection to health care workers and community through these infective persons who are now spread across the country.

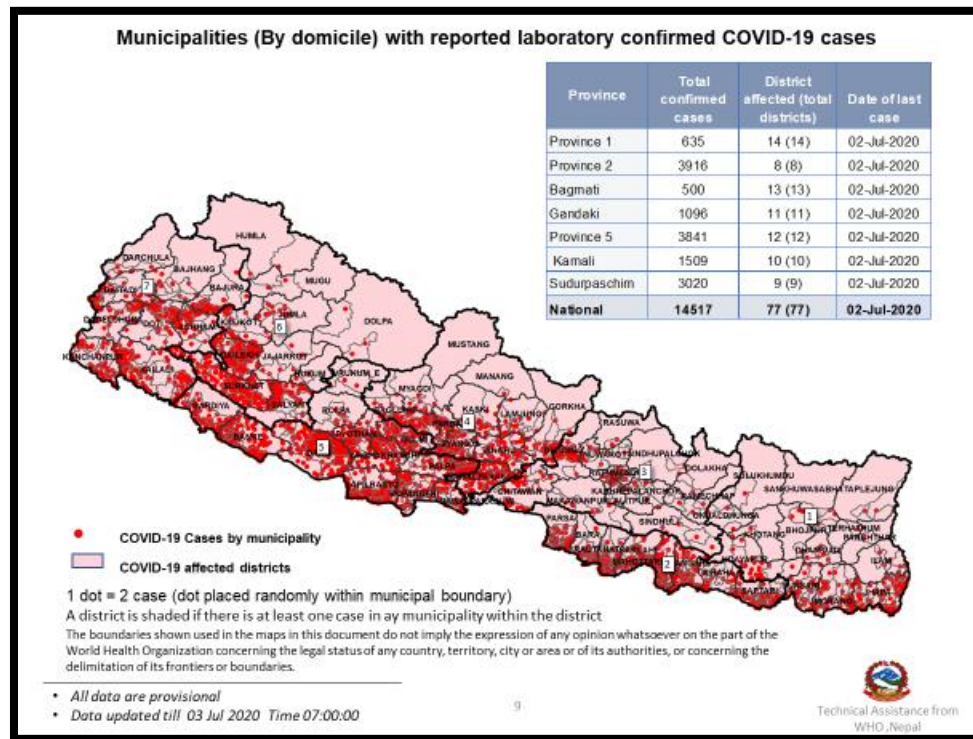


Figure 5: Geographic distribution of cases by place of confirmation or residence

- As per data available until 2 July 2020, cumulative incidence rate (attack rate) per 100,000 population is 47.12 at national level and by province it ranged from a low of 7.09 (Bagmati) to a high of 92.77 in Sudur Paschim. [Figure 6]
- Clearly, province-2, province-5 and the western provinces are experiencing a high cumulative incidence.
- Although concerns have been expressed about the state of transmission in Bagmati including environmental isolation of SARS-CoV-2, the incident case data indicate clearly that the present case load is disproportionately high in western part of Nepal. We had also flagged this trend in Karnali and Sudur Paschim in detailed epidemiological update last week (26 June 2020).
- District specific cumulative incidence rates per 100,000 varies across districts, with all Terai districts except one experiencing cumulative incidence greater than 10 per 100,000 persons, while mountain districts having relatively lower incidence. Very high incidence above 100 per 100,000 is seen in clusters of districts in province-2, province 5, Sudur Paschim and in Dailekh district in Karnali. [Figure 7]
- Across districts, the attack rate ranged from as low as 0.98 (district of Province-1) to as high as 314.28 in districts of Sudur Pashchim.

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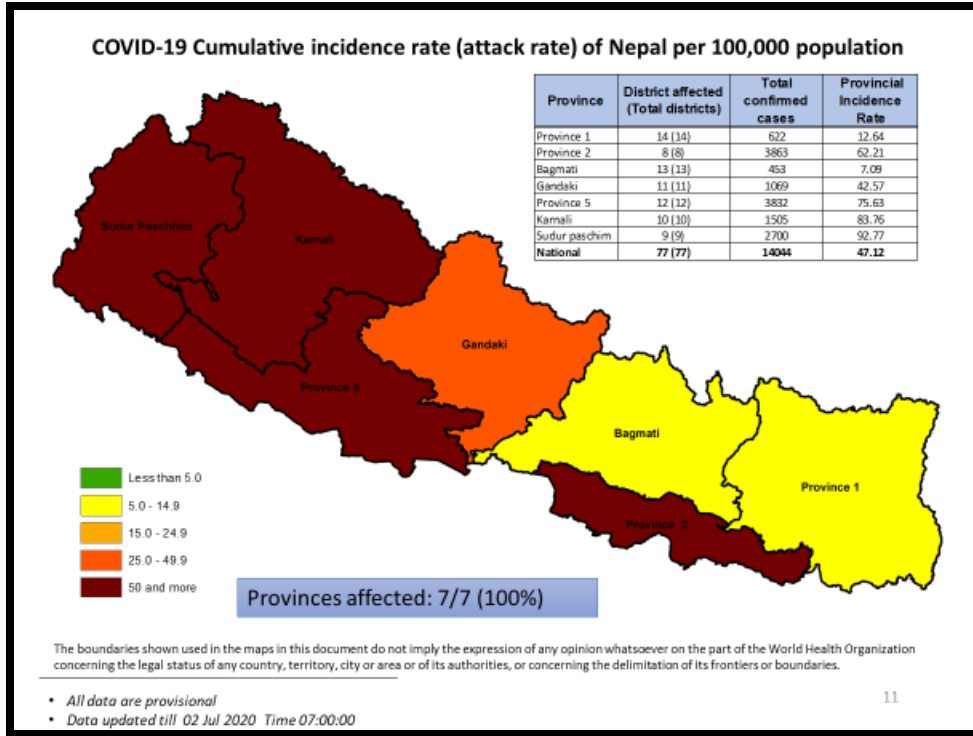


Figure 6: Cumulative incidence rate (attack rate) per 100,000 population by province

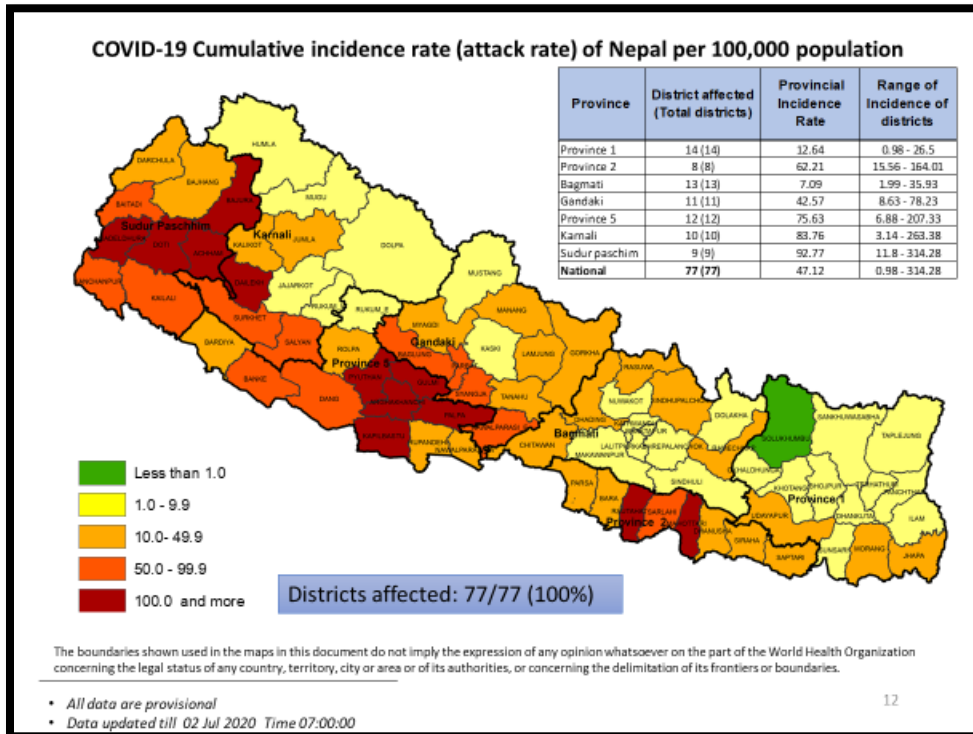


Figure 7: Cumulative incidence rate (attack rate) per 100,000 population by district

Age sex distribution

- The age sex distribution is highly skewed towards males, who constitute 87% of the confirmed cases. Of the males, 93% are in 15-54-year age group, indicating that these large increases in confirmed cases are occurring because of large groups of infected migrant workers (who are predominantly males in economically productive age group) returning to Nepal. [Figure 8 and Table 3]
- In absence of reliable contact tracing data to determine widespread community transmission, the age-sex distribution may be a useful surrogate indicator of population groups most affected by COVID-19 infection. There are important differences in per cent males between the provinces as well as within the same province over time. A more equal distribution between male and female would tend to indicate transmission in general population in the province rather than predominantly among migrant workers. It has remained less than 80% males in Bagmati and Province-1 for past two weeks and in Sudur Paschim in week 26 only. For all other provinces the case load has persistently been at or above 80% for males.

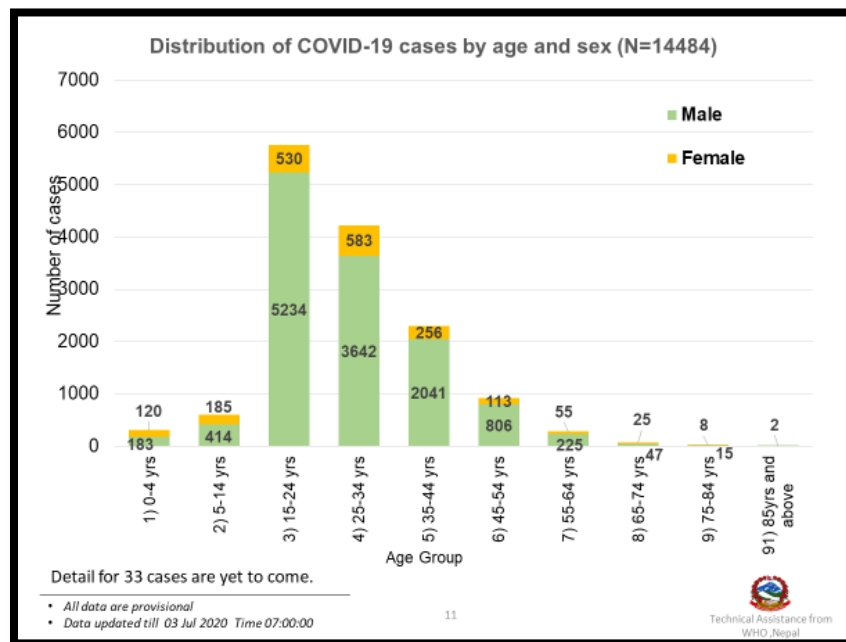


Figure 8: Age-sex distribution of confirmed COVID-19 cases

	Cumulative up to Week 22	Week 23	Week 24	Week 25	Week 26
Prv-1	93%	94%	96%	74%	69%
Prv-2	94%	96%	95%	95%	91%
Bagmati	69%	70%	85%	53%	77%
Gandaki	87%	99%	95%	90%	84%
Prv-5	94%	98%	98%	98%	98%
Karnali	92%	95%	89%	91%	84%
Sudur Paschim	81%	86%	84%	85%	74%
Nepal	93%	94%	91%	88%	83%

Table 2: Proportion (%) of males by province and by week (N = 14,044)

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Distribution of COVID-19 cases by age and sex by province (N=14517)
Percentage of male among total confirmed cases: 87% (12636/14517)
Percentage of male in 15-54 year among confirmed male cases: 93% (11723/12636)

Province	Sex	Age Group										Total	
		0-4 yrs	5-14 yrs	15-24 yrs	25-34 yrs	35-44 yrs	45-54 yrs	55-64 yrs	65-74 yrs	75-84 yrs	85+ yrs		Unknown
Province 1	Female	4	9	20	37	21	13	1	1	0	0	0	106
	Male	3	16	217	160	88	31	14	2	0	0	0	529
	Total	7	25	237	197	107	44	15	3	0	0	0	635
Province 2	Female	20	35	53	73	32	15	6	0	1	0	3	238
	Male	29	175	1628	995	587	191	40	12	2	0	9	3678
	Total	49	210	1681	1068	629	206	46	12	3	0	12	3916
Bagmati	Female	2	4	37	69	28	7	3	4	3	0	1	156
	Male	2	5	101	119	62	35	11	5	3	1	0	344
	Total	4	9	138	188	88	42	14	9	6	1	1	500
Gandaki	Female	1	10	30	44	28	10	6	4	0	0	1	134
	Male	12	18	356	288	170	86	22	6	2	1	1	962
	Total	13	28	386	332	198	96	28	10	2	1	2	1096
Province 5	Female	27	49	124	116	61	24	17	5	3	0	0	426
	Male	29	63	1399	989	607	244	59	9	5	0	11	3415
	Total	56	112	1523	1105	668	268	76	14	8	0	11	3841
Karnali	Female	7	9	46	49	13	9	4	1	1	0	0	141
	Male	23	30	620	393	191	86	23	1	1	0	0	1368
	Total	30	39	666	442	204	95	27	2	2	0	0	1509
Sudurpaschim	Female	59	89	218	195	75	35	18	10	0	0	1	680
	Male	85	107	913	698	328	133	56	12	2	0	6	2340
	Total	144	176	1131	893	403	168	74	22	2	0	7	3020
National	Female	120	185	530	583	256	113	55	25	8	0	6	1881
	Male	183	414	5234	3642	2041	806	225	47	15	2	27	12636
	Total	303	599	5764	4225	2297	919	280	72	23	2	33	14517

• All data are provisional
• Data updated till 03 Jul 2020 Time 07:00:00

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Table 3: Age-sex distribution of confirmed COVID-19 cases by province

Travel history status

- We tried to obtain history of international travel (India or other countries) in 4-6 weeks prior to confirmation from 12,089 cases and could obtain it from the records and direct inquiry from 9,186 (75%) of cases.
- From those in whom such history or information could be obtained, 97% (8931/9186) had history of international travel which is equivalent to 74% of cases having a history of international travel.
- However, this varied between provinces with a high of 95% in Sudur Paschim and a low of 62% in Bagmati and province-2.

Province	Total records / persons verified	With international travel history	Without international travel history	Travel history unknown / unrecorded	Percent with known international travel history	Percent with travel history unknown / unrecorded
Prv-1	545	488	-	57	90%	10%
Prv-2	3,588	2,225	103	1,260	62%	35%
Bagmati	386	241	5	140	62%	36%
Gandaki	876	824	50	2	94%	0%
Prv-5	3,453	2,418	58	977	70%	28%
Karnali	1,442	1,025	10	407	71%	28%
Sudur Pacschim	1,799	1,710	29	60	95%	3%
Nepal	12,089	8,931	255	2,903	74%	24%

Table 4: History of international travel among confirmed cases

Laboratory results (based on data available at EDCD)

We analysed laboratory data shared by EDCD for 13,133 [Table 5]. The data set was incomplete with key information missing from Bagmati province. Nevertheless, some key data points are worth noting.

- Excluding Bagmati province, 7% of specimens are pending testing at the laboratories with as many as 20% pending in Sudur Paschim province and 7% and 9% in Province-2 and Province-5.
- Excluding Bagmati, the proportion of positives is 7% nationally with a high of 10% and 11% in Prv-5 and Prv-2. Data from NPHL is shown separately.
- We also looked at population based cumulative swabbing rates for PCR based on this data. [Table 6]
 - Nationally it is more than 6500 per million persons, with a high of 16182 in Karnali and a low of 2524 in Bagmati.
- A couple of concerning issues emerge from this analysis.
 - The laboratory data systems remain extremely fragmented and may well misinform decision making. This should be addressed at MOHP or HEOC level urgently and data systems streamlined.
 - The labs should be supported to immediately test the pending specimens and monitored on an ongoing basis to ensure a lab turnaround time of 24-48 hours. A high proportion of samples pending lab testing may mislead program managers in identifying patterns of transmission in real time.

Province	PCR Swabs Collected	PCR tests Positive	PCR tests Negative	Result pending at Lab	Percent Pending	Per cent Positive
	A	B	C	D=A-(B+C)	E=D/A%	F=B/(B+C)%
Prv-1	25,340	615	23,970	755	2.98%	2.50%
Prv-2	43,717	3,492	36,953	3,272	7.48%	8.63%
Bagmati	16,123	423	No data	No data	No data	No data
Gandaki	16,761	949	15,446	366	2.18%	5.79%
Prv-5	42,798	3,765	35,123	3,910	9.14%	9.68%
Karnali	29,077	1,617	27,047	413	1.42%	5.64%
Sudurpashchim	22,019	2,272	15,238	4,509	20.48%	12.98%
Total*	195,835	13,133	153,777	13,225	6.75%	7.87%

* We have excluded Bagmati province for the indicators per cent positive and per cent pending, because of incomplete data.

Table 5: Laboratory results, percent positivity and percent pending by province (data made available by EDCD)

Province	PCR Swabs Collected	PCR tests Positive	PCR tests Negative	Result pending at Lab	Percent Pending	Per cent Positive
	A	B	C	D=A-(B+C)	E=D/A%	F=B/(B+C)%

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Bagmati (NPHL)	16734	174	16226	334	2%	1.06%
<i>*Note: these numbers exclude the testing performed at other designated COVID-19 testing labs (i.e. TUTH, VBDRTC, Bir Hospital, PAHS, Dhulikhel Hospital, etc.) of Bagmati Province.</i>						

Province / Country	PCR Swabs Collected	Population	Cumulative PCR swabbing per million persons
(1) Province 1	25,340	4,921,498	5,149
(2) Province 2	43,717	6,209,507	7,040
(3) Bagmati	16,123	6,387,632	2,524
(4) Gandaki	16,761	2,511,136	6,675
(5) Province 5	42,798	5,066,640	8,447
(6) Karnali	29,077	1,796,822	16,182
(7) Sudur Paschim	22,019	2,910,497	7,565
(8) Nepal	195,835	29,803,732	6,571

Table 6: Cumulative PCR swabbing rate per million persons

Recovery and death

- 2936 persons have “recovered” / discharged. [Figure 9]
- Thirty persons (five female) who tested positive for COVID-19 have died. Of these, 15 persons had one or more co-morbid conditions and five persons were above 65 years of age while two were under 15 years of age. [Figure 10]

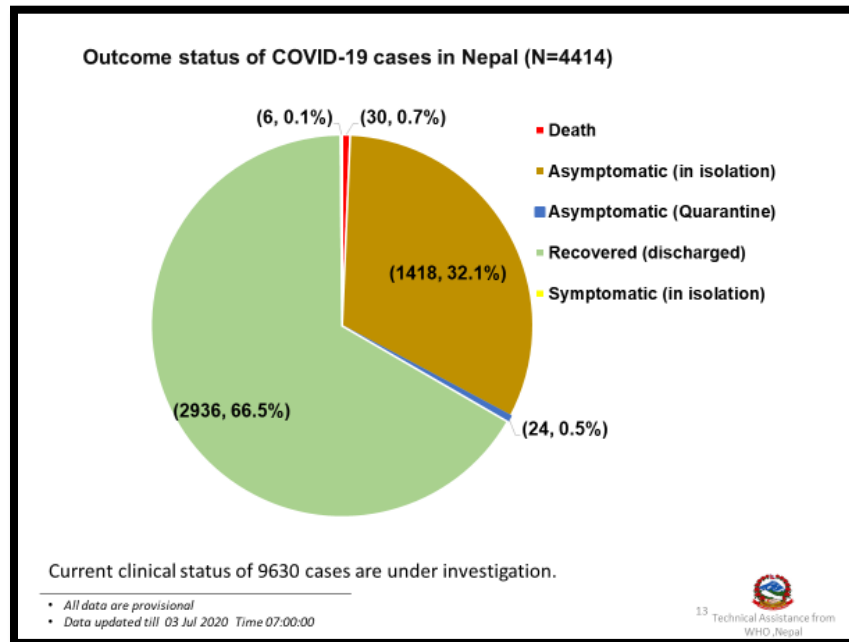


Figure 9: outcome status of confirmed COVID-19 cases

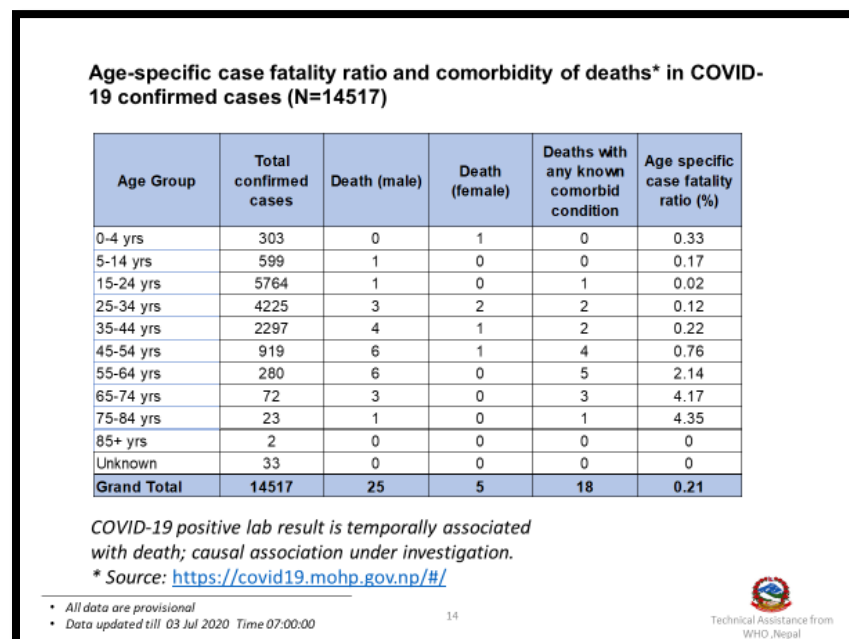


Figure 10: Age-specific case fatality ratios in lab confirmed COVID-19 cases

Quarantine centre occupancy

- Data available from Ministry of Home Affairs (<https://covid19.ndrrma.gov.np/timeline/>) shows there was a sharp increase in number of persons in quarantine from 21 May onwards and has started declining form 9 June, 2020.

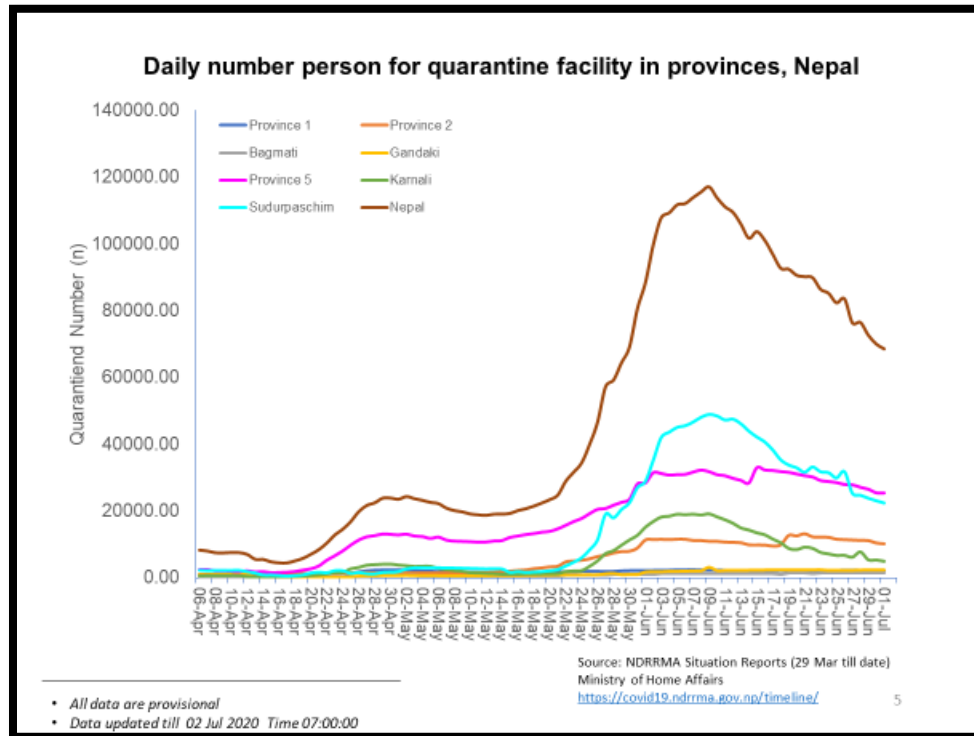


Figure 11: Persons in quarantine facilities