COVID-19 lockdown and fatal motor vehicle collisions due to speed-related traffic violations in Japan: a time-series study

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ABSTRACT

Between March and May 2020, Japan experienced a lockdown due to the COVID-19 crisis. Empty roads possibly triggered speed-related traffic violations that caused fatal motor vehicle collisions (MVCs). Using police data on the monthly number of fatal MVCs between January 2010 and February 2020 in which motor vehicle drivers were at fault, we forecasted the numbers of fatal MVCs due to the speed-related violations during the lockdown and compared these with those observed. We also compared the observed to forecasted using the ratio of the number of speed-related fatal MVCs to that of non-speed related fatal MVCs. The observed numbers of speed-related fatal MVCs were within the 95% CIs of the forecasted numbers. The observed ratio was higher than the forecasted ratio in April (p=0.016). In the second month of the lockdown, drivers were more likely to commit speed-related violations that caused fatal MVCs than before the lockdown.

INTRODUCTION

In the wake of the spread of COVID-19 in Japan in early 2020, the Japanese government requested that all primary and secondary schools close temporarily from early March, declared states of emergency in April and lifted them in late May. This mild lockdown decreased the traffic volume and motor vehicle collisions (MVCs) significantly. The number of MVCs in March, April and May were smaller by 17.6%, 36.2% and 40.7% than those of the same months of the previous year, respectively.[1] However, the number of road deaths was decreased only by 8.4%, 19.9% and 7.6% in these months.[1]

This gap might be partly due to the change in driver behaviour during the lockdown. According to media reports, empty roads triggered some speed-related traffic law violations among drivers, such as speeding, failing to stop at a stop sign, red-light running and failing to yield to pedestrians.[2–4] For example, in Tokyo, in March 2020, the number of tickets issued for speeding increased by 52% compared with that of March 2019,[3] and the police officially enhanced enforcement for speeding in May.[2] However, the number of tickets issued is not a direct measure of road injuries but a combined measure of the level of enforcement and road users' behaviour. So, to examine the potential change in driver behaviour and its public health consequences, we need a more direct indicator.

We consider that the number of fatal MVCs would be such an indicator, and it is unknown whether those due to the speed-related traffic violations ('*speed-related fatal MVCs*') increased during the lockdown. It is also unknown whether they increased relative to fatal MVCs due to violations that are not speed related ('*non-speed-related fatal MVCs*'). Therefore, in this study, we aimed to answer the following research questions: did the number of speed-related fatal MVCs change during the lockdown? Was the change in the number of speed-related fatal MVCs different from that in the number of non-speed related fatal MVCs? Answering these research questions would inform road users and traffic law enforcement authorities of the change in driver behaviour that caused fatal MVCs and contribute to road safety during potential future lockdowns.

METHODS

Study design

This was a time-series study. Using police-reported fatal MVCs data in Japan between January 2010 and February 2020, we forecasted the monthly number of fatal MVCs per day from March to May 2020, when Japan had the COVID-19 lockdown. We compared the forecasted number of speed-related fatal MVCs to that observed in each month. We repeated the comparison between the observed and forecasted using the ratio of the number of speed-related fatal MVCs to that of non-speed related fatal MVCs as the outcome variable. In this analysis, we assumed that the drivers who continued driving during the lockdown were at least as likely as the overall drivers before the lockdown to commit non-speed related violations that caused fatal MVCs.

Data sources and variables

We obtained the monthly number of fatal MVCs in which motor vehicle drivers were at fault between January 2010 and May 2020 from the police.[1] They are collected according to a standardised definition of measurements, and fatality is defined as a death that occurred within 24 hours of the MVC.[5] The police determined a traffic violation that mainly caused each MVC, and the data were disaggregated by those violations. Based on media reports,[2–4] we deemed the following violations in the data as speed-related ones that might have increased during the lockdown: 'speeding', 'driving at unsafe speed' for road, traffic and vehicle conditions, 'stop sign violation' and 'slowing violation' at stop and slow-down signs, respectively, 'failure to stop at railway crossing', 'disregarding traffic signal' and 'impeding

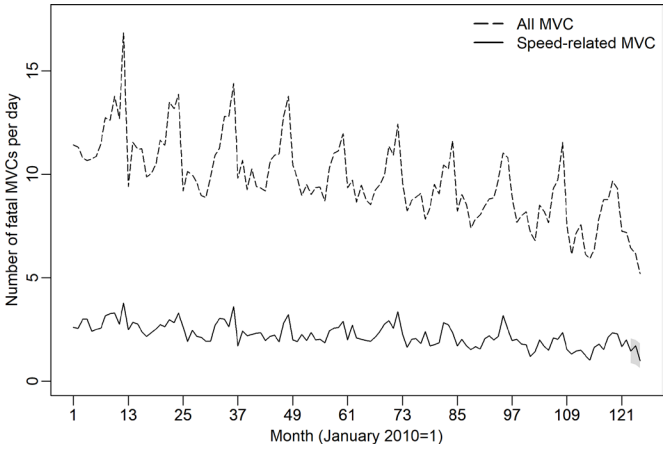

Figure 1 The time trend of the monthly average number of fatal motor vehicle collisions (MVCs) and those due to speed-related traffic violations per day in Japan between January 2010 and May 2020. *The grey area shows the 95% CIs of the forecasted numbers of speed-related fatal MVCs per day between March and May 2020 based on the time-series analysis.

pedestrians'. These violations are being called 'speed-related violations' because they occur as a result of inappropriate vehicle speed. For example, a stop sign violation means that the driver failed to control the vehicle speed to 0 at the stop sign. The non-speed-related violations included 'careless driving', 'improper steering and/or braking', 'failure to make safety check' around the vehicle, 'not keeping eyes on the road' and 'road or lane infringement', which do not involve an inappropriate vehicle speed. We excluded approximately 2% of MVCs that had a missing value ('unknown') for the violation status from the analysis. To describe characteristics of the at-fault drivers, we also obtained the fatal MVCs data disaggregated by their age or vehicle type. Unfortunately, data simultaneously disaggregated by two or more of the three variables (traffic violation, age and vehicle type) were not available. We also obtained the biannual number of police-reported traffic violations from January to June of 2015–2020.[1]

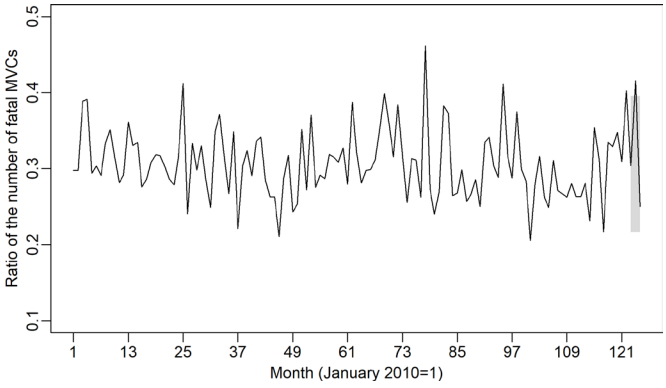

Figure 2 The time trend of the ratio of the monthly number of fatal motor vehicle collisions (MVCs) due to speed-related traffic violations to that of fatal MVCs whose cause was not a speed-related traffic violation in Japan between January 2010 and May 2020. *The grey area shows the 95% CIs of the forecasted ratio of the number of speed-related fatal MVCs to that of non-speed related fatal MVCs between March and May 2020 based on the time-series analysis.

Statistical analysis

First, we described the data and displayed the monthly average number of fatal MVCs per day and that of speed-related fatal MVCs per day, using the police data. We also displayed the monthly observed ratio of the number of speed-related fatal MVCs to that of non-speed related fatal MVCs.

To forecast the number and ratio of fatal MVCs during the lockdown, we applied seasonal autoregressive integrated moving average (ARIMA) models to the data before the lockdown, that is, from January 2010 to February 2020. ARIMA models are used to analyse time-series data, where the value of a variable at time t (x_t) is modelled by its past values (x_{t-1}, x_{t-2}, …, x_{t-p} or autoregressive terms) and its past prediction errors (w_{t-1}, w_{t-2}, …, w_{t-q} or moving average terms).[6] When the data have an upward or downward trend, differencing is used to meet the model's assumptions. When the data have seasonality, seasonal terms are used to model x_t by its past values of the previous periods (eg, x_{t-12}, x_{t-24}, …, $x_{t-12\times P}$ when the data are monthly) and corresponding prediction errors (w_{t-12}, w_{t-24}, …, $w_{t-12\times Q}$ in the example).[6] We denote seasonal ARIMA models by ARIMA(p,d,q)×(P,D,Q)$_s$, where p is the order of the autoregressive term, d is the order of differencing, q is the order of the moving average term, P, D and Q are their seasonal terms, respectively, and s is the seasonal period. We examined the need for differencing and the potential dependence orders based on the displayed data and the autocorrelation and partial autocorrelation functions of the data.[6] Then, we examined the normality of residuals and the Ljung-Box-Pierce Q-statistic of the models to examine their fit.[6] When multiple models showed a good fit, we selected the best model based on the Akaike Information Criterion.[6] Finally, we forecasted the number and ratio of MVCs from March to May 2020 using the selected models and compared them with those that were observed.

We conducted all the statistical analyses using R V.4.0.2. We used the acf2, sarima and sarima.for functions of the astsa package to build seasonal ARIMA models and to forecast the number and ratio of MVCs.[7] All p values reported are two sided.

Patient and public involvement

We did not involve the study participants or the general public of Japan in our research. We do not plan to involve them in disseminating the study results beyond usual media coverage.

RESULTS

Between January 2010 and May 2020, the police recorded 37 160 fatal MVCs, of which 8521 were speed-related and 791 had a missing value for the violation status. Of the 37 160 fatal MVCs, 4%, 70%, 13% and 12% were caused by drivers aged under 20 years, between 20 and 64 years, between 65 and 74 years and aged 75 years or over; and 57%, 29% and 13% of the at-fault drivers were in passenger vehicles, cargo vehicles and motorcycles, respectively. From 2015 to 2020, the total number of police-reported traffic violations from January to June steadily decreased from 4 728 683 to 3 512 656, but the number of some speed-related violations, such as speeding, impeding pedestrians, failure to stop at stop sign and failure to stop at railroad crossing increased between 2019 and 2020 (online supplemental table 1).

Figure 1 shows the monthly trend of the numbers of speed-related and non-speed related fatal MVCs per day, and both exhibited a decreasing trend with a seasonal pattern. Figure 2 shows the monthly trend of the ratio of the number of speed-related fatal MVCs to that of non-speed related fatal MVCs, and the ratio was around 0.3 without any apparent trends or

seasonal patterns. Online supplemental table 2 shows the data for these analyses, that is, the monthly number of fatal MVCs stratified by the traffic violation that mainly caused each MVC from January 2010 to May 2020.

The best seasonal ARIMA model for the monthly number of speed-related fatal MVCs per day had a structure of ARIMA$(0,0,0)\times(0,1,1)_{12}$. The grey area in figure 1 shows the 95% CIs of the forecasted numbers of speed-related fatal MVCs per day between March and May 2020. All of the observed numbers (solid line) were within the intervals.

The best ARIMA model for the ratio of the number of speed-related fatal MVCs to that of non-speed related fatal MVCs had a structure of ARIMA(0,0,0), that is, it was best described as white noise. The grey area in figure 2 shows the 95% CIs of the forecasted ratios between March and May 2020. The observed ratio was above the upper limit of the 95% CI of the forecasted ratio (point estimate 0.306; 95% CI 0.217 to 0.396) only in April (0.416, p=0.016).

DISCUSSION

During the COVID-19 lockdown in Japan, the observed number of speed-related fatal MVCs was well within the range forecasted from the past data. However, the observed ratio of the number of speed-related fatal MVCs to that of non-speed-related fatal MVCs was higher than the forecasted value in April 2020, the second month of the lockdown (0.416 vs 0.306, p=0.016). This result indicates that the drivers who continued driving in the middle of the lockdown were more likely to commit the speed-related violations that caused fatal MVCs than the overall drivers before the lockdown.

One of the strengths of our study is that we used the complete 10-year data on fatal MVCs of over 120 million people, and this enabled us to evaluate the change in the number of the hard health outcome, that is, fatal MVCs. In addition, our findings would be generalisable and informative to countries that share similar contexts, especially where vehicle speed, speeding violations or road deaths are reported to have increased during the lockdown.[8 9] To our knowledge, this is the first study that examined potential changes in fatal MVCs due to specific traffic violations among drivers during a COVID-19 lockdown. However, a limitation of our study is that we lack the data that would enable us to examine the reason behind the increase in the ratio only in April. A rather large decrease in the ratio between April and May 2020 might be attributable to enhanced speed enforcement by the police.[2] Additionally, we were unable to explore potential associations between driver and vehicle characteristics and fatal MVCs, since the data available were not simultaneously disaggregated by two or more variables.

In conclusion, the COVID-19 lockdown in Japan triggered the speed-related traffic violations that caused fatal MVCs during part of the lockdown. It is necessary for road users and law enforcement authorities to understand that the drivers who remain on the road during a lockdown can be at increased risk of committing such violations that result in fatal MVCs.

What is already known on the subject

- Japan had a lockdown due to COVID-19 between March and May 2020.
- The lockdown significantly reduced traffic volume and motor vehicle collisions.
- The empty roads possibly triggered speed-related violations among drivers.

What this study adds

- There is no evidence that the absolute number of fatal motor vehicle collisions due to speed-related violations increased during the lockdown.
- However, in April 2020, there was a relative increase after adjusting for the number of fatal collisions due to other violations.

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Supplementary Table 1 Trends in enforcement of violations of the Road Traffic Act in Japan between January and June from 2015 to 2020

	Year					
Type of violation	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Unlicensed	11,132	10,463	10,192	9,465	9,214	9,447
Drunk driving	12,897	12,595	13,597	13,132	12,441	11,292
Speeding	839,478	800,655	740,940	621,648	565,602	576,415
Disregarding traffic signal	376,280	371,727	366,629	342,669	323,110	306,466
Impeding pedestrians	51,245	54,765	75,525	86,727	110,252	139,578
Failure to stop at stop sign	666,641	675,072	667,304	643,635	656,137	784,011
Driving while fatigued	97	51	38	41	55	43
Driving a motor vehicle in violation of loading rules	5,974	6,451	6,602	6,533	6,325	6,453
Violation of the prohibition of passage	395,159	381,128	376,621	344,074	337,596	357,248
Improper overtaking or road or lane infringement	129,033	122,829	118,961	107,187	103,631	104,369
Failure to slow down	629	534	395	287	248	198
Driving improperly maintained vehicle	15,971	14,010	13,666	11,434	10,839	11,529
Driving vehicle without proper muffler	1,437	1,306	1,125	970	920	1,232
Failure to stop at railroad crossing	53,126	49,837	47,534	42,585	39,462	46,245
Using wireless communication equipment while driving	532,996	483,060	475,013	432,650	384,758	153,001
Violating the method of turning left/right	27,324	27,160	29,841	27,741	25,814	25,544
Suddenly starting motor vehicle or motorized bicycle, etc. in a manner that makes noise causing an extreme nuisance to others	141	135	134	127	115	156
Other dynamic violations	222,292	209,210	197,673	179,728	158,675	150,326
Stopping or parking a vehicle in a prohibited place	18,933	17,485	16,112	15,103	14,687	13,074
Parking a vehicle in a prohibited place	116,361	112,391	107,985	95,034	90,432	83,246
Violating the obligation to carry and present license cards	33,149	31,889	31,045	28,212	27,074	26,492
Driving without fastening the seat belt	568,865	480,371	432,648	360,940	314,124	255,300
Riding without a helmet for motorcyclists	7,211	6,081	5,293	4,589	4,036	4,289
Driving without restraining a toddler by a toddler restraint system	65,577	56,159	52,067	42,096	34,740	25,874
The order to pay the Abandonment Penalty	576,735	554,760	532,442	495,759	465,979	420,828
Total	**4,728,683**	**4,480,124**	**4,319,382**	**3,912,366**	**3,696,266**	**3,512,656**

Source: National Police Agency. Traffic Accident Statistics. 2020. https://www.npa.go.jp/publications/statistics/koutsuu/toukeihyo_e.html (accessed 25 Sep 2020).

Supplementary Table 2 Trends in the monthly number of fatal motor vehicle collisions in which motor vehicle drivers were at fault between January 2010 and May 2020, stratified by traffic violation that mainly caused each collision

Month	Year	Disregarding traffic signal	Road or lane infringement	Speeding	Improper crossing or turning around	Improper overtaking	Failure to stop at railway crossing	Improper right turn	Improper left turn	Roundabouts	Impeding priority traffic	Improper driving at intersection	Impeding pedestrians ,etc	Slowing violation	Stop sign violation	Improper maintenance	Drunk driving	Driving while fatigued	Improper steering and/or braking	Careless driving	Not keeping eyes on the road	Failure to confirm traffic movement	Failure to make safety check	Driving at unsafe speed	Other violations of safe driving practices	Other violations	Unknown	Total
1	2010	13	14	14	2	0	0	0	1	0	11	28	26	5	9	0	3	0	46	65	49	3	43	14	3	4	1	354
2	2010	10	7	15	0	1	2	0	0	0	8	15	21	2	9	1	1	2	35	69	55	10	30	13	3	6	3	317
3	2010	14	16	26	0	3	0	0	2	0	9	16	24	1	12	0	1	0	45	53	39	11	34	16	5	5	2	334
4	2010	15	15	32	0	5	2	1	0	0	9	19	17	1	12	0	2	1	33	50	44	12	29	11	3	7	0	320
5	2010	12	17	14	3	5	0	1	0	0	13	22	22	0	12	0	5	3	30	70	35	7	34	15	3	7	3	333
6	2010	11	23	22	1	2	0	2	1	0	14	18	14	4	16	0	4	2	36	52	33	5	42	8	4	8	4	326
7	2010	7	17	37	0	1	2	0	0	0	9	24	15	2	12	0	5	1	43	59	53	7	46	5	5	5	2	357
8	2010	12	18	25	1	2	1	2	0	0	12	20	23	6	13	0	2	5	52	57	63	7	40	18	3	10	3	395
9	2010	16	18	26	2	5	0	3	0	0	11	15	23	4	18	1	1	4	44	69	57	10	33	11	2	4	1	378
10	2010	19	13	35	4	4	1	1	3	0	12	20	21	2	16	0	5	1	44	87	58	9	48	8	6	8	2	427
11	2010	15	10	21	3	1	0	2	0	0	11	18	23	1	11	0	2	0	38	72	68	16	38	12	4	12	3	381
12	2010	11	23	27	6	4	3	2	1	0	17	29	45	4	12	0	3	1	53	92	85	15	54	15	8	8	4	522
1	2011	13	11	14	1	0	2	1	1	0	7	17	21	2	7	0	3	2	29	44	55	5	32	18	2	3	2	292
2	2011	13	11	20	5	1	0	1	1	0	7	17	24	3	9	0	6	0	36	59	55	6	35	11	0	2	1	323
3	2011	15	13	18	3	1	1	2	0	0	15	15	21	2	12	0	4	1	40	59	49	10	35	17	6	4	5	348
4	2011	15	21	22	1	4	4	1	2	0	13	21	16	2	7	1	4	0	39	48	43	9	40	6	2	12	4	337
5	2011	12	18	16	3	2	1	0	0	0	8	13	17	3	9	0	5	2	33	59	41	7	35	9	4	4	5	306
6	2011	18	22	16	3	1	1	2	1	0	9	14	11	3	11	0	2	4	37	43	40	9	31	10	3	6	4	301
7	2011	11	19	23	7	1	1	3	0	0	11	18	18	3	12	0	3	4	41	49	48	4	31	10	4	2	2	325
8	2011	17	12	25	6	5	2	0	1	0	6	25	18	1	17	1	4	4	36	65	48	16	33	5	3	3	8	361
9	2011	16	12	19	2	2	0	1	0	0	8	20	18	2	13	0	3	1	35	73	47	11	34	11	5	7	2	342
10	2011	16	25	18	2	5	0	2	0	0	9	22	29	2	13	0	2	2	38	74	67	11	55	14	2	5	5	418
11	2011	14	15	20	5	3	0	0	0	0	11	17	21	3	12	0	6	2	25	87	79	9	38	15	4	4	5	395
12	2011	15	17	17	0	4	2	1	0	0	14	21	34	7	12	0	2	2	42	80	78	10	36	15	9	6	6	430
1	2012	10	8	13	1	2	1	2	0	0	4	19	28	3	14	0	3	0	21	64	45	8	17	13	4	1	4	285
2	2012	8	13	12	2	3	0	0	0	0	12	23	19	2	5	0	1	1	26	61	45	7	27	10	8	4	5	294
3	2012	15	13	14	4	0	0	1	0	0	10	13	26	0	12	1	3	0	33	62	49	9	21	9	5	4	5	309
4	2012	9	15	17	1	5	2	0	0	0	5	9	20	1	8	0	1	1	34	56	44	7	32	8	3	5	5	288
5	2012	9	9	18	3	5	0	0	2	0	10	24	18	0	12	0	2	4	30	32	33	5	29	9	3	9	12	278
6	2012	15	11	31	3	4	0	2	0	0	15	15	15	2	12	1	4	2	37	27	32	10	28	3	5	3	5	266
7	2012	17	14	17	3	3	0	1	1	0	10	7	10	2	6	0	2	2	40	61	40	10	40	8	4	3	6	307
8	2012	9	20	25	5	0	2	3	1	0	13	15	31	1	10	0	3	9	30	58	35	8	31	6	2	8	14	339
9	2012	10	15	24	4	0	1	2	1	0	11	11	34	2	13	0	2	2	31	62	53	14	28	7	2	7	2	338
10	2012	14	16	20	0	6	2	1	1	0	10	28	32	1	15	0	1	7	27	77	63	13	39	9	2	5	8	397
11	2012	13	11	18	2	7	2	2	0	0	10	24	26	0	8	0	6	4	35	64	65	9	42	12	9	6	9	384
12	2012	16	26	24	2	0	1	1	0	0	12	23	37	3	11	0	5	3	43	73	66	4	43	20	9	11	13	446
1	2013	10	10	11	2	3	0	1	0	0	4	15	15	0	5	0	1	0	45	52	53	11	33	12	5	5	11	304
2	2013	9	24	11	1	4	1	0	1	0	6	12	30	2	3	0	6	1	30	50	37	10	30	12	4	8	7	299
3	2013	15	15	15	1	3	0	2	1	0	10	10	22	3	6	0	1	2	37	53	43	5	22	7	1	4	9	287
4	2013	8	15	20	1	2	1	2	1	0	6	15	15	3	10	0	0	2	41	57	38	7	39	11	3	5	6	308
5	2013	11	12	20	4	2	0	1	0	0	7	13	18	1	10	0	1	0	33	47	35	10	34	12	8	7	6	292
6	2013	11	14	22	0	1	2	0	0	0	8	17	15	3	8	0	2	0	45	39	32	5	29	9	5	8	5	280
7	2013	17	15	18	4	4	1	1	0	0	10	12	10	1	7	0	3	2	34	43	38	6	34	7	3	5	10	285
8	2013	7	18	26	1	5	1	0	0	0	10	22	18	0	7	0	1	3	36	64	39	13	30	8	5	8	8	330
9	2013	12	13	14	2	2	1	2	1	0	13	18	24	2	7	1	1	6	47	57	39	18	23	7	5	7	6	328
10	2013	8	20	17	0	3	0	0	0	0	15	24	15	2	10	0	1	4	33	60	57	14	44	7	2	3	2	341
11	2013	10	10	17	4	2	2	1	0	0	12	19	31	2	10	0	4	0	27	84	63	9	49	12	7	2	7	384
12	2013	11	25	25	1	2	3	1	2	0	7	19	35	3	9	1	2	0	49	73	65	9	42	14	8	10	12	427
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2	2014	8	13	14	2	3	1	1	0	0	8	16	13	3	5	0	1	0	37	55	39	8	23	10	4	3	7	274
3	2014	11	15	20	1	3	0	1	0	0	6	10	18	2	12	0	2	2	27	54	42	4	21	7	4	7	9	278
4	2014	7	11	19	3	1	1	0	0	0	7	21	16	0	12	0	4	2	38	49	37	10	24	4	6	4	9	285
5	2014	12	6	31	0	0	1	1	0	0	5	22	17	0	7	0	4	0	30	47	29	10	27	6	9	5	10	280
6	2014	10	11	17	0	1	1	1	0	0	8	23	17	1	8	1	3	0	38	49	26	8	27	6	9	13	3	281
7	2014	11	18	20	3	1	1	1	0	0	4	13	10	2	12	0	5	1	38	48	40	10	26	7	5	3	12	291
8	2014	10	11	16	1	3	2	0	0	0	13	17	18	0	10	0	2	1	31	51	26	4	29	2	6	7	10	270
9	2014	11	14	17	0	2	1	2	0	0	8	13	20	2	12	1	2	3	31	44	42	11	38	10	7	11	7	309
10	2014	14	15	17	3	1	0	1	1	0	12	20	26	1	14	0	1	1	33	57	56	11	31	7	8	4	8	342
11	2014	16	12	12	2	1	0	1	1	0	6	25	33	0	8	0	3	3	33	64	54	5	32	9	5	6	3	334
12	2014	9	8	18	3	0	0	1	0	0	8	19	38	0	15	0	1	0	50	65	61	7	39	10	5	8	6	371
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2	2015	20	11	15	0	1	1	0	0	0	2	16	25	1	8	0	1	3	38	41	27	7	40	6	3	6	0	272
3	2015	14	6	15	1	1	0	0	0	0	6	11	15	2	9	0	1	1	38	55	38	5	28	9	3	7	1	268
4	2015	9	7	25	2	3	0	3	2	0	8	18	14	1	7	0	3	0	39	53	28	6	35	5	4	6	6	284
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6	2015	12	14	19	1	5	0	1	0	0	14	14	13	1	7	0	1	2	29	42	28	7	25	6	4	7	4	256
7	2015	18	16	18	1	4	0	0	0	0	9	9	18	0	4	1	2	1	39	50	38	4	32	8	2	4	3	286
8	2015	12	18	19	1	2	1	0	0	0	14	9	22	1	11	0	0	5	41	37	38	9	27	8	5	5	9	294
9	2015	17	26	22	1	1	0	0	0	0	8	13	25	1	13	0	2	1	29	45	31	7	32	5	4	8	7	298
10	2015	11	14	25	2	4	2	1	1	0	19	15	33	1	14	0	1	1	28	54	54	6	40	5	7	5	9	352
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6	2016	14	10	18	6	4	1	0	0	0	9	10	16	2	15	0	0	3	29	39	15	4	20	6	3	4	7	235
7	2016	12	18	15	3	4	0	0	1	0	14	11	13	2	6	0	1	2	33	43	27	8	21	5	4	4	13	260
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12	2016	12	19	11	4	4	1	1	0	0	15	16	32	3	4	0	4	1	44	56	58	4	43	10	1	6	11	360
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2	2017	11	17	10	0	1	0	0	0	0	6	11	15	3	9	0	1	2	34	53	31	6	23	9	3	3	5	253
3	2017	13	12	8	2	3	1	0	0	0	9	19	20	1	6	0	1	0	37	47	27	3	38	4	4	4	5	264
4	2017	7	13	15	1	2	0	0	0	0	9	13	11	0	5	0	1	1	36	38	25	6	22	8	4	2	3	222
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6	2017	12	13	9	0	2	1	1	2	0	6	16	13	2	5	0	3	2	39	33	27	6	26	5	7	5	6	241
7	2017	10	19	16	2	2	0	1	0	0	4	15	19	2	10	0	1	0	36	44	26	2	27	7	5	7	8	263
8	2017	17	20	18	3	1	0	1	0	0	5	12	9	2	15	0	3	2	33	43	30	5	31	7	2	8	6	273
9	2017	8	14	12	1	1	1	2	0	0	12	19	23	0	11	0	1	1	38	34	27	4	33	5	3	8	9	266
10	2017	7	9	17	2	4	0	1	0	0	14	11	29	3	7	0	0	2	37	51	39	5	48	4	4	5	3	302
11	2017	16	8	18	2	0	0	2	2	0	6	18	36	1	13	0	2	3	35	52	46	5	40	11	2	8	5	331
12	2017	10	23	13	2	3	1	2	0	0	5	15	34	2	9	0	1	2	34	63	53	8	26	9	3	7	10	335
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2	2018	15	9	9	0	1	2	1	0	0	9	13	21	3	4	0	1	5	29	37	14	2	25	3	4	2	6	215
3	2018	7	15	13	0	2	1	2	0	0	3	10	26	1	3	0	2	2	36	37	35	4	31	5	5	3	5	248
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5	2018	5	12	9	1	4	1	1	1	0	10	5	7	2	7	0	0	3	27	36	36	7	30	6	4	3	6	223
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8	2018	10	14	14	0	3	0	0	1	0	12	10	15	3	7	1	0	1	49	40	27	4	27	3	3	6	4	254
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10	2018	10	18	11	2	1	0	2	1	0	6	17	26	2	11	0	0	0	24	49	37	11	32	5	1	8	15	289
11	2018	10	22	8	3	1	2	1	0	0	12	17	27	2	5	1	2	4	25	52	35	8	32	7	3	7	6	292
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2	2019	4	7	3	0	0	0	0	0	0	5	6	17	1	5	0	0	2	19	30	26	8	22	7	2	5	3	172
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6	2019	7	8	2	1	2	2	0	0	0	2	6	10	0	5	0	3	7	33	28	16	2	19	5	5	2	13	178
7	2019	10	13	14	1	3	1	0	2	0	1	8	14	0	6	0	0	1	32	29	18	2	23	6	6	5	3	198
8	2019	16	14	16	3	0	0	1	0	0	5	8	10	2	8	0	0	4	34	39	31	2	28	4	5	5	10	245
9	2019	12	17	10	3	0	1	1	0	0	9	21	12	0	6	1	0	2	27	52	35	2	26	5	7	9	5	263
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3	2020	5	7	12	1	4	1	1	1	0	3	6	10	2	6	0	1	2	29	36	21	6	23	9	3	4	7	200
4	2020	9	8	16	1	1	0	0	1	0	8	4	17	2	7	0	1	0	36	25	13	3	16	1	1	7	8	185
5	2020	5	9	9	3	2	0	0	0	1	5	11	0	3	0	1	0	31	23	14	2	22	3	3	8	6	161

Source: National Police Agency. Traffic Accident Statistics. 2020. https://www.npa.go.jp/publications/statistics/koutsuu/toukeihyo_e.html (accessed 25 Sep 2020).