

# Reconsidering the effects of blue-light installation for prevention of railway suicides

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**Title**

Reconsidering the effects of blue-light installation for prevention of railway suicides

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## **Abstract**

### **Background**

A recent preliminary communication suggested that the calming effect of blue lights installed at the ends of railway platforms in Japan reduced suicides by 84%. This estimate is potentially misleading from an epidemiological point of view and is reconsidered in the present study.

### **Methods**

Governmental data listing all railway suicide attempts in Japan from April 2002 to March 2012 were used to investigate the proportion of suicide attempts within station premises, where blue lights are potentially installed, and at night, when they would be lit. For those suicide attempts within station premises, we also estimated the proportion that occurred at the ends of the platforms at night.

### **Results**

Of 5841 total reported suicide attempts, 43% occurred within the station premises, 43% occurred at night (from 18:00 to 05:59), and 14% occurred both within the station premises and at night. Of the 2535 attempts within station premises, 32% occurred at night and 28% at most were at the end of a platform at night.

### **Limitations**

The exact proportion of nighttime suicide attempts at the ends of railway platforms was not calculable. Nonetheless, the proportion of suicide attempts that is potentially preventable by blue lights should be less than our conservative estimate.

### **Conclusions**

The installation of blue lights on platforms, even were they to have some effect in preventing railway suicides at night, would have a much smaller impact than previously estimated.

Keywords: Suicide prevention; Blue lights; Railway suicide

## **Introduction**

Matsubayashi et al. (2013), in a recent preliminary communication, evaluated the calming effect of blue lights installed at the ends of station platforms by a Japanese railway company as a measure to prevent people from jumping into the path of an oncoming train. They suggested that the installation of blue lights reduced suicides by 84% and issued a press release, reporting only the point estimate (84%) without its confidence interval (95% CI: 14%–97%), which was covered by Japan's major news media.

To interpret this finding and translate it into practice, it is important to take a descriptive epidemiological viewpoint, accounting for time, place, and person. Blue lights, if effective in suicide prevention, would work only when illuminated at night. Moreover, the lights, as potentially installed at the ends of railway platforms, would work only in their immediate vicinity—i.e., they would not discourage jumping onto the track from the middle of the platform. Therefore, the finding mentioned above could be misleading unless the times and places of the suicides are taken into account. The aim of this rapid communication is to examine railway suicide attempts in terms of time and place to further evaluate the use of blue lights on platforms for suicide prevention.

## **Methods**

We used data on railway suicide attempts for fiscal years 2002–2011 (from April 2002 to March 2012) compiled by the Japanese Ministry of Land, Infrastructure, Transport and Tourism (MLIT), which were made public pursuant to the Information Disclosure Act. Railway companies are obligated by the Railway Business Act to report all accidents to the MLIT, including suicide attempts, using a uniform format.

We extracted all cases categorized as “suicide attempt” from the data sets. The entries include the date and time of each attempt, but characteristics of the victim such as age and sex are not necessarily included. The location of a suicide attempt is recorded under two broad classifications: “station premises” and “between stations.” Platforms and adjacent areas are classified as being within the station premises. The circumstances of the attempt are described in free-form text. The text is not structured, and thus determining the exact location where the victim jumped onto or otherwise entered the track is often difficult.

Because blue lights are typically installed at the ends of platforms and would have an effect only when lit, we first calculated the proportion of suicide attempts stratified by time (06:00–11:59, 12:00–17:59, 18:00–23:59, or 00:00–05:59) and place (“station premises” or “between stations”) to ascertain what proportion of suicide attempts occurred within station premises at night (18:00–23:59 and

0:00–05:59).

In addition, we attempted to identify, from the descriptions of the events, whether each one occurred at the end of the platform, where blue lights would potentially be installed. This region was defined as being within 20 meters of either end of the platform, because we assumed that the illumination from the blue lights would reach that distance at most, which is about the length of a car.

For this purpose, one of the authors (MK) and a research assistant independently coded the locations of suicide attempts within station premises into either end or middle sections of the platform. When it was difficult to classify an attempt, it was entered as “unidentified.” For attempts whose coding was at odds between the two coders, the disagreement was resolved by the other two authors (MI and HI). Agreement between the two coders appeared to be fair, with a kappa coefficient of 0.4.

We calculated the proportion of suicide attempts by time and platform section to determine how many occurred at the ends of platforms at night. For the most conservative estimate, we further assumed that all the “unidentified” attempts occurred at end sections, but these data are shown separately from the suicide attempts that were positively identified as having occurred at an end section. This was calculated for each fiscal year of the study period to investigate whether the proportion of nighttime suicide attempts at the platform ends decreased from 2008 onward, when the installation of blue lights started (Watanabe, 2011). Suicide attempts within the train or by jumping out of the train were excluded from the analysis.

## **Results**

Table 1 shows the 5841 reported suicide attempts from April 2002 to March 2012 by time and location. Of these, 43% occurred within station premises, 43% were at night, and 14% fell into both categories. The proportion of nighttime suicide attempts between stations (52%) was greater than that within station premises (32%).

Table 2 shows the 2535 suicide attempts that occurred within station premises. Conservatively assuming that the “unidentified” attempts all occurred at platform ends, a maximum of 82% is obtained for the end sections, with 28% at night. The latter figure does not decline after 2008, the period during which the blue lights were being deployed on platforms (Table 3).

## **Discussion**

We found that more than half of railway suicide attempts occurred during the day, with many occurring away from station premises. Nighttime suicide attempts within station premises account for only 14% of all railway suicide attempts. Those who entered the track from the platform did not

necessarily do so from one of the ends, where the blue lights would potentially have been installed. According to our most conservative estimate, only 28% of suicide attempts within station premises occurred at the end of a platform at night. Therefore, the installation of blue lights on platforms, to the extent they have some effect in preventing nighttime suicides, would have a small effect on the overall prevention of railway suicides.

One might suppose that the blue lights themselves spurred people who intended to commit suicide from the end of a platform at night to choose another place or a different time, thus artificially causing the number of such nighttime attempts to appear to be small. However, the proportion of suicide attempts from the ends of platforms at night has not declined since the installation began, so this assumption is not supported. Moreover, we believe that the number of station platforms equipped with blue lights is still too small to generate any such effect.

While acknowledging the importance of railway suicide prevention, one should place the figures in context. Unintentional events are responsible for about half of all railway deaths and injuries. Of the 4013 railway deaths and injuries from 2002 to 2009, 55% were suicide attempts, whereas 21% were cases of accidentally being hit by a train at the edge of a platform and another 10% were falls onto the track (Sato, 2011). Moreover, it should be kept in mind that persons with visual impairment are at a greater risk of falling. A recent questionnaire-based survey conducted by the Japan Federation of the Blind (2001) reported that 37% of 252 respondents with visual impairment had fallen onto a train track at one time or another. While the installation of blue lights might represent an inexpensive method of railway suicide prevention, it would have no effect on other types of railway death and injury.

Our study is limited by the fact that the exact proportion of railway suicide attempts that occurred at the ends of platforms was not calculable because of the sometimes incomplete descriptions of location in the free-form portion of the event data. We therefore instead calculated the maximum number of suicide attempts that could have occurred at the end sections of platforms, using a predetermined classification of place. This is a conservative estimate, and the proportion of suicide attempts that are potentially preventable by the blue lights should be less than that we obtained.

In conclusion, the installation of blue lights as a method of railway suicide prevention is likely to have a much smaller effect than previously estimated.

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**Table 1** Railway suicide attempts by time and location

Time	All locations		Between stations		Station premises			
	N	%	n	%	% Tot. <sup>a</sup>	n	%	% Tot. <sup>a</sup>
06:00–11:59	1487	25	732	22	13	755	30	13
12:00–17:59	1820	31	863	26	15	957	38	16
18:00–23:59	1984	34	1311	40	22	673	27	12
00:00–05:59	550	9	400	12	7	150	6	3
Total	5841	100	3306	100	57	2535	100	43

*Note:* From data compiled by the Japanese Ministry of Land, Infrastructure, Transport and Tourism, April 2002–March 2012.

<sup>a</sup> Denominator is the total number of suicide attempts.



**Table 2** Railway suicide attempts within station premises by time and location

Time	All locations		Platform section				Unidentified <sup>a</sup>	
	N	% <sup>b</sup>	Middle		End		n	% <sup>b</sup>
			n	% <sup>b</sup>	n	% <sup>b</sup>		
06:00–11:59	755	30	158	6	96	4	501	20
12:00–17:59	957	38	182	7	151	6	624	25
18:00–23:59	673	27	103	4	107	4	463	18
00:00–05:59	150	6	22	1	25	1	103	4
Total	2535	100	465	18	379	15	1691	67

<sup>a</sup> Attempts within station premises that were not identifiable as having occurred at the end or middle of a platform.

<sup>b</sup> Denominator is the total number of suicide attempts within station premises.

**Table 3** Railway suicide attempts within station premises at night (n = 823) by year and location

Fiscal year	Total <sup>a</sup>	Platform section				Unidentified <sup>b</sup>		End section + unidentified <sup>b</sup>	
		Middle		End		n	% <sup>c</sup>	n	% <sup>c</sup>
		n	% <sup>c</sup>	n	% <sup>c</sup>				
2002	181	4	2	8	4	61	34	69	38
2003	246	5	2	8	3	83	34	91	37
2004	204	4	2	5	2	55	27	60	29
2005	247	15	6	9	4	57	23	66	27
2006	226	9	4	12	5	45	20	57	25
2007	293	13	4	18	6	47	16	65	22
2008	310	14	5	19	6	63	20	82	26
2009	284	22	8	17	6	54	19	71	25
2010	250	16	6	19	8	50	20	69	28
2011	294	23	8	17	6	51	17	68	23
Total	2535	125	5	132	5	566	22	698	28

*Note:* Night is defined as 18:00–05:59.

<sup>a</sup> Total number of attempts within station premises.

<sup>b</sup> Attempts within station premises that were not identifiable as having occurred at the end or middle of a platform.

<sup>c</sup> Denominator is the total number of attempts within station premises in each fiscal year.