

## Comparison of maternal and child health status between Niigata Prefecture, Japan and Khabarovsk Territory, Russia – Neonatal and infant mortality rates and levels of early-pregnancy notification –

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### Abstract

This report compares the change in infant and neonatal mortality rates and levels of early pregnancy reporting rates in Japan (focusing on Niigata Prefecture) and Russia (focusing on Khabarovsk Territory).

This report was endorsed by a memorandum of understanding (MOU) between Niigata University of Health and Welfare and Far Eastern State of Medical University. The indicators of infant and child health status have been improving year on year in Russia.

It is considered that the enhancement of the quality and quantity of the perinatal medical care system, especially the introduction of general perinatal centers across Russia, is the main factor in these improvements.

### Introduction

Niigata University of Health and Welfare and the Far Eastern State Medical University (FESMU) developed a memorandum of understanding (MOU) in 2006. As a part of this exchange, our faculty members and students visited FESMU on August 21<sup>st</sup>, 2017 and July 24<sup>th</sup>, 2018. There, we learned about the current situation of child health-care measures in Khabarovsk, Russia. There has been a remarkable improvement in neonatal and infant mortality rates in Russia, as well as in levels of early pregnancy notification or registration. Therefore, we discussed how, bearing in mind Japan's falling birthrate, we can continue to improve maternal and child healthcare. To do this, we have developed a comparison between maternal and child health indicators in Japan and Russia (hereafter the two countries), with a specific focus on Niigata Prefecture and Khabarovsk Territory.

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## Materials and Methods

### 1. Target

Three datasets were used in this research:

- 1) A dataset on the changes in infant mortality rates over time in the two countries during the 12 years from 2003 to 2015.
- 2) A dataset on the contrasting neonatal mortality rates in the two countries.
- 3) A dataset on early pregnancy notification rates in the two countries

Regarding the early pregnancy notification rates, it is considered that “an early-stage pregnancy” occurs within the eleventh week of pregnancy in Japan, and within the twelfth week in Khabarovsk Territory. There is a one-week difference. However, more accurate data focusing on the contrasting neonatal mortality rate and early pregnancy notification status were not obtained this time.

### 2. Investigation

The data from Japan and Niigata Prefecture were obtained from the demographic statistics published by the Ministry of Health, Labor and Welfare in Japan, and the data from Russia and Khabarovsk Territory were acquired from the meeting with FESMU.

In comparing the maternal and child health status of these regions, it was considered very important to explore background factors, such as health as well as the medical and welfare environment. Therefore, the vital statistics (demographic statistics), including the population density of both countries, were compared in 2017.

## Results

### 1. Infant mortality rate

Figure 1 shows the annual transition of infant mortality rates from 2003 to 2015 in both countries. The infant mortality rate in 2003 was 3.0 per 1000 births in Japan as a whole and 2.8 in Niigata Prefecture. In Russia, the rate was 12.4 per 1000 births, with a rate of 15.6 in Khabarovsk Territory. By

2015, the rates in both countries changed, reaching 1.9 and 2.0 in Japan and Niigata, and 6.5 and 6.4 in Russia and Khabarovsk. Although the infant mortality rates in Japan and Niigata Prefecture were similar after twelve years, those in Russia and Khabarovsk Territory they had decreased significantly.

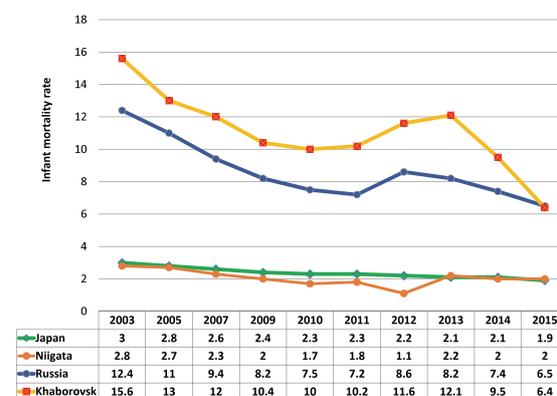


Figure 1. Transition of infant mortality rates in Japan and Niigata, and Russia and Khabarovsk.

### 2. Neonatal mortality rate

Figure 2 shows the annual changes in neonatal mortality rates from 2013 to 2016 in Japan as a whole, Niigata Prefecture, and Khabarovsk Territory. In 2013, the neonatal mortality rate was 1.0 babies per 1000 births in both Japan as a whole and Niigata Prefecture. By 2016, neonatal mortality decreased to around 0.9 babies per 1000 births in Japan and 0.6 babies in Niigata Prefecture. In Khabarovsk Territory, the rate significantly decreased from 6.0 in 2013 to 2.7 in 2016.

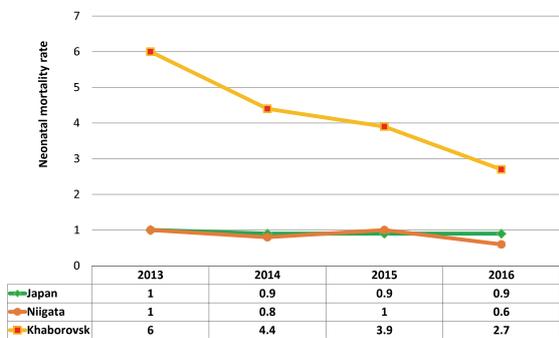


Figure 2. Transition of neonatal mortality rate in Japan, Niigata, and Khabarovsk.

### 3. Early-pregnancy notification status

Table 1 shows the changes in early-pregnancy notification rates in 2014 and 2015. As mentioned earlier, in Japan and Niigata Prefecture, early pregnancy is defined as under eleven weeks' gestation, whereas in Russia and Khabarovsk Territory, it is defined as under twelve weeks' gestation. In Japan as a whole, the early-pregnancy notification rates increased from 91.9% to 92.2%. In Niigata, they increased from 93.7% to 94.7% in Niigata. On the other hand, in Khabarovsk Territory, although it notification rates increased from 80.3% to 81.4%, the rate was still lower than in Japan and Niigata Prefecture.

Table 1. Comparison of \*Early pregnancy notification rate between Japan, Niigata, and Khabarovsk.

	2014	2015
Japan	91.9%	92.2%
Niigata	93.7%	94.7%
Khabarovsk	80.3%	81.4%

\* Early pregnancy is defined as a under 11-week pregnancy in Japan, while in Russia, under 12-week pregnancy.

### 4. Population density

Table 2 shows the population density of each country. The population density in Russia is less than one fortieth of that in Japan. There were 143,375,006 people in Russia, making it 1.13 times

as large as Japan's population of 126,755,000 people, but the Russian land area is 45 times as large as the Japanese land area. Thus, the population density was 335.33 people per squared kilometer in Japan, but only 8.4 people per squared kilometer in Russia: this is only 2.5% of the Japanese population density. In Khabarovsk Territory, the population density in Khabarovsk Territory was only 1.69 people per squared kilometer, equivalent to 0.5% of that in Japan. This extreme difference in population density must be seen as a social determinant for emergency medical care and other medical and welfare conveniences for residents.

Table 2. The population density in Japan, Niigata, Russia, and Khabarovsk in 2017.

	Population	Area(km <sup>2</sup> )	Population density (persons/km <sup>2</sup> )
Japan	126,755,000	378,000	335.33
Niigata	2,227,264	12,580	180.47
Russia	143,375,006	17,075,200	8.40
Khabarovsk	1,333,294	787,633	1.69

### 5. Perinatal care and pediatric medical system

The perinatal care facility in Russia has a three-layer system organized for each area. The first layer is comprised of small hospitals with less than 500 annual births. Second, there are obstetrics departments in independent maternity hospitals or general hospitals, with annual birth numbers of 500 to 1500; both of these have maternal fetal intensive care units. The third layer is comprised of general perinatal maternal and child medical centers, where maternal fetal intensive care units are maintained in large state, republic, or federal hospitals. There are now eighty-two such units across Russia. There is one such unit in Khabarovsk Territory (Khabarovsk General Perinatal Medical Center), in the city of Komsomolsk-on-Amur . In this territory, the survival rate of very low birth weight infants (between 500g and 999g) increased from 47.8% to 91.4% between 2005 to 2015.

In the pediatric medical care system, children



Lecture at FESMU on 21<sup>st</sup> August 2017



Khabarovsk General Perinatal Medical Center

aged zero to seventeen years old will, in principle, receive treatment from one pediatrician; pediatricians are assigned 800 children and each work in one area.

### Discussion

Significant improvements in infant mortality rates and neonatal mortality rates have been observed in Khabarovsk Territory, which has a land area twice as large as that of Japan as a whole and an extremely low population density. Improvements in neonatal mortality rates in particular have contributed to lower infant mortality rates. Medical facilities are organized into three layers and the perinatal care seems effective. The perinatal medical system in Russia is similar to that of Japan, but in the case of Japan the population density is high and patients are able to freely access any medical institution beyond their own medical area. We also noted that local maternal and child health measures such as perinatal care by local governments have been enhanced, as can be seen even in the increasing early-pregnancy reporting rate in Khabarovsk, which has a much bigger land area than Japan and a lower population density.

### Conclusion

In Khabarovsk Territory, the infant mortality rate and neonatal mortality rate are higher than those in Japan and Niigata Prefecture, but have been decreasing year by year. Since Khabarovsk Territory has a larger land area than Japan, and a very low population density, it may be difficult to understand why these dramatic improvements in maternal and child health have occurred there. For this, we require more accurate information on background factors influencing current maternal and child health conditions in Russia and Khabarovsk Territory.

It was most impressive that the infant mortality rates and newborn mortality rates have been decreasing in Russia so quickly, even though it is forty times wider than Japan. We expect that we

will be able to use evidence from this to contribute to improving Japan's neonatal and infant policy through future exchanges.

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### Conflicts of interest

No potential conflicts of interest are disclosed.

### References

1. Niigata Prefecture Perinatal Medical Facilities Equipment Plan (Outline). Available from: <http://www.pref.niigata.lg.jp/kenko/1356805237940.html> (accessed June 4, 2018) (in Japanese)
2. Current status of maternal and child health, Niigata prefecture welfare and health department. Available from: [http://www.pref.niigata.lg.jp/HTML\\_Article/114/467/02.pdf](http://www.pref.niigata.lg.jp/HTML_Article/114/467/02.pdf) (accessed May 8, 2018) (in Japanese)
3. Senkevich Ol'ga. Presented by Lecture materials at FESMU (August 21, 2017) "Actual problem of pediatrics and neonatology in the healthcare system of the Khabarovsk Territory"
4. Marina Rziankina. Presented by Lecture materials at FESMU (July 24, 2018) "The present child is the future of Russia"