

To Predict the Prevalence of Influenza

Tatsuno High School

1. Purpose

- ▶ To find the correlation between flu cases and weather conditions.
- ▶ To make an equation which can predict the prevalence of flu.

2. Methodology

※ **NEXT**...the number of infected person **next** week **THIS**...the number of infected person **this** week
DIFFERENCE...the difference between THIS and NEXT

- ① We collected data on temperature, humidity, rainfall, wind velocity and the number of infected persons at Kobe, Himeji and Toyooka from 2010 to 2018.
- ② We investigated the correlations between **NEXT** and **THIS**, **DIFFERENCE**, temperature, humidity, rainfall, wind velocity.
- ③ We made an equation for each place using R(statistical software) and consider them.

3. Hypothesis

Reasoning

- ① Flu cases decreases as the temperature or humidity increases.
- ② Flu is an airborne transmitted epidemic.
- ③ When it rains, humidity increases.

	Tem	Hum	Rain	Wind
Kobe	—	—	—	+
Himeji	—	—	—	+
Toyooka	—	—	—	+

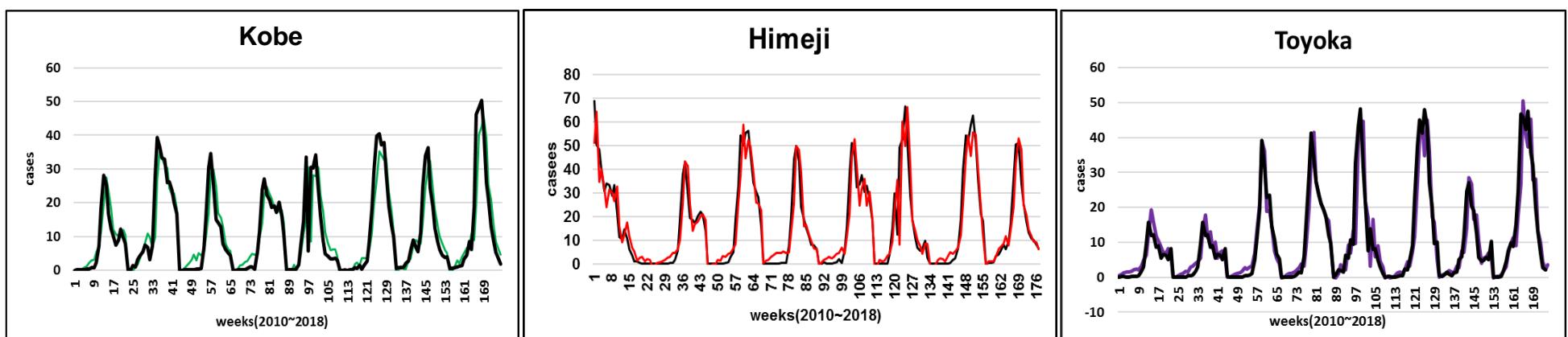
Comparison of cities

- ① Himeji and Kobe have similar results because they belong to the Setouchi climate.
- ② Toyooka has different results from the other two spots because of the lower temperature.

※ — ... Negative correlation
 ※ + ... Positive correlation

4. Result and Consideration

Black...actual data Color...predicted data



Approximate expressions

(Kobe's NEXT) = $-0.5208 \times [\text{Tem}] + 0.7814 \times [\text{THIS}] + 7.501$

(Himeji's NEXT) = $-0.4990 \times [\text{Tem}] + 0.1241 \times [\text{Hum}] + 0.3973 \times [\text{DIFFERENCE}] + 0.8455 \times [\text{THIS}] - 2.522$

(Toyooka's NEXT) = $-0.2154 \times [\text{Tem}] + 0.8422 \times [\text{THIS}] + 0.3974 \times [\text{DIFFERENCE}] + 3.634$

- ▶ It is thought that the climatically similar areas of Himeji and Kobe in the Setouchi region contributed to a similar result.
- ▶ The precipitation is relatively low throughout the year and the wind is mild because of the mountains, so precipitation and wind speed are considered to have little effect on influenza epidemics.

5. Future prospects

- ▶ We would like to investigate, in detail, the correlation between the number of patients in Toyooka, humidity and wind speed.
- ▶ We would like to research more points over Japan and determine expressions for new, and larger datasets.

6. References

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