

EPIDEMIOLOGICAL MODELLING

WITH PROFESSOR RENATA IVANEK

Talking points

KNOWLEDGE

1. Which species of *Listeria* causes listeriosis?
2. What are the inputs for the FInD Cov Control model?

COMPREHENSION

3. Why is swab sampling in a food production facility not a feasible way to catch all *Listeria* contamination?
4. What is meant by a 'digital twin' of a food production facility?

APPLICATION

5. How would Renata need to adjust her FInD Cov Control model to assess how flu would impact production at a car factory?

ANALYSIS

6. Why is low-frequency testing for COVID-19 in a workplace less cost-effective than intensive testing?

SYNTHESIS

7. Imagine you are designing a computer model showing the spread of an infectious disease at your school. What would the inputs and outputs of the model be?

EVALUATION

8. How would you assess the accuracy of the EnABLE model when setting it up for a new food production facility?
9. What impact did epidemiological modelling have on you personally during the COVID-19 pandemic?

Activity

Have a go at epidemiological modelling!

In this exercise, you can interact with a simple computer model of a disease outbreak. Go to www.learner.org/wp-content/interactive/envsci/disease/disease.html?initLesson=2 and explore the different variables you can alter as inputs for the model. What does each variable mean? How do you think each variable will influence the number of deaths and sick days in the population once the outbreak begins?

Design an experiment to test the effects of different variables on the population. For each variable under investigation, keep all other variable values fixed apart from the variable of interest. Run the model multiple times, changing the value of the variable under investigation each time. After each model run, record the number of deaths and sick days that occurred in that scenario.

For each variable you test, display your results in a graph by plotting the variable against the number of deaths and/or sick days. Which variables have the greatest impact on the population during the outbreak?

More resources

- Learn more about the research being conducted in Renata's lab: blogs.cornell.edu/ivaneklab
- Renata's research uses digital tools to address challenges in the food industry. Learn about other projects being conducted in the Cornell Institute for Digital Agriculture: digitalagriculture.cornell.edu
- The Computer Science department at Cornell University has a number of outreach programmes: www.cs.cornell.edu/phd/outreach-opportunities