Infectious disease professionals need better **training in modeling**.

Here is a review of some helpful **resources.**

A REVIEW OF RESOURCES RELEVANT TO THE PEDAGOGY OF INFECTIOUS DISEASE MODELING

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MODELING HAS BECOME IMPORTANT LATELY

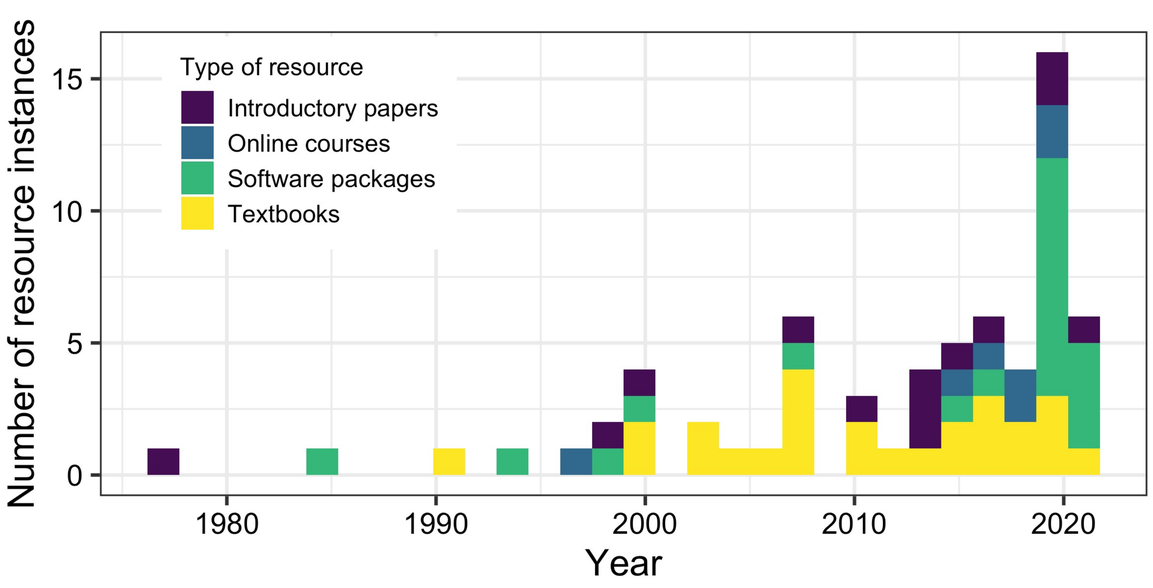
- **Models are important** in public health because they are often the best way to **synthesize what is known** and **make future predictions** accordingly, especially when there is **uncertainty** (e.g., COVID-19).
- So, they help officials make **more informed policy decisions.**
- However, many researchers have noted recently that individuals training to work with infectious disease **might not be getting adequate training** in modeling.
- There are several resources that could help, but they are scattered and aimed at various audiences.
- Here, we offer a **review** of resources that could be used to help teach modeling.

OBJECTIVE

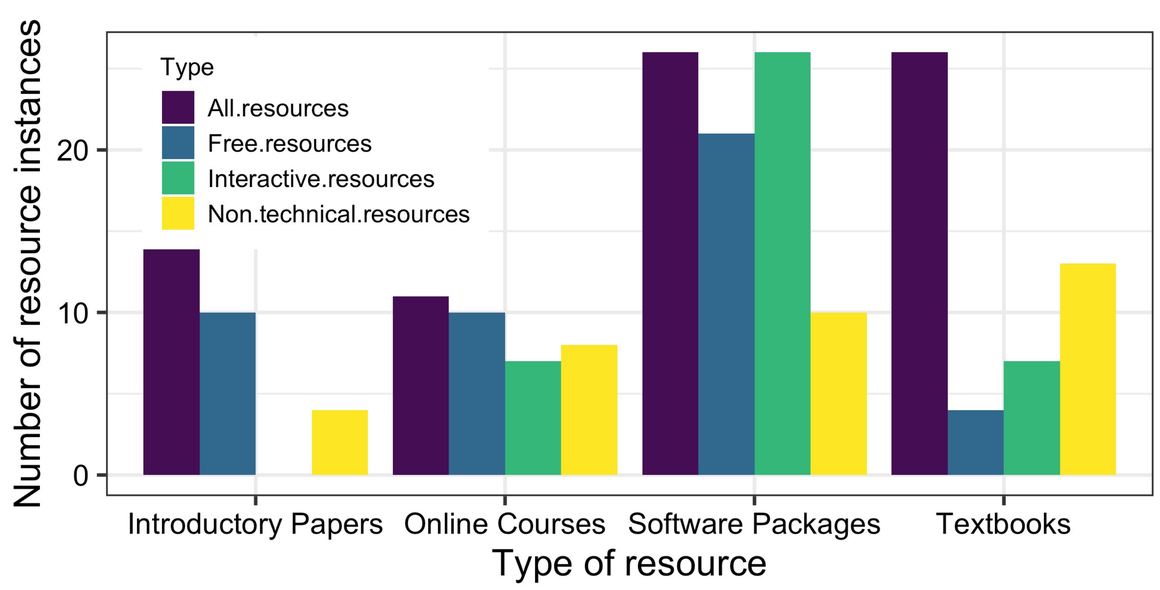
- Provide a summary of **relevant resources** for those wanting to learn infectious disease modeling from any kind of background.

APPROACH

- We searched Google, Google Scholar, and PubMed. A resource was included if it focused on infectious disease (ID) epidemiology, modeling, or both. We tabulated all relevant sources and reviewed the **most relevant** (i.e., both ID epidemiology *and* modeling) ones in the main text. We found:
  - *26 textbooks* (5 most relevant)
    - 4 on ID epidemiology, 17 on ID modeling, 4 on biological modeling, 1 on pedagogy in epidemiology
  - *11 online courses* (4 most relevant)
    - 1 on health-related modeling, 2 on ID epidemiology, 8 on ID modeling
  - *14 introductory papers* (5 most relevant)
    - All on ID modeling
  - *26 software packages* (8 most relevant)
    - 11 on ID modeling, 15 on general modeling



Modeling resources have become more prevalent in recent years



Software is generally free, interactive and accessible.

Examples of how we reviewed resources

Name	Author	Year	URL	Description/purpose	Main emphasis	Limitations	Comments	Free?
DSAIDE	Andreas Handel	2021	https://ahgroup.github.io/DSAIDE/	Contains a set of simulation models that teach infectious disease modeling from a dynamical systems modeling perspective. Allows 3 levels of interaction based on user background (web-based GUI, some coding, or advanced coding).	Focus is on allowing people to explore and study concepts by using a dynamical systems model framework without needing to read or write code. The web-based app has 21 different models where the user can input varying parameters and visualize the result. With the option to code, the user can modify existing models (ex. add a new parameter to the model) and then visualize the output.	Not meant for research; doesn't have spatial-based models; doesn't have individual level models; have to code in order to look at a parameter space	Good for gaining and intuition for modeling for any level of technical background.	Free

Name	Author	Year	URL	Description/Purpose	Main emphasis	Limitations	Comments	Free?
System Dynamics for the Health Sciences	edX; University of the Witwatersrand		https://www.edx.org/course/system-dynamics-for-health-sciences	Introductory course to teach the fundamental principles of systems dynamics to better understand complex medical issues and interventions. Aims to equip the participant use systems dynamics to explore problems relevant to their field of health. Uses system dynamics software (Vensim) to work through problems.	Learn basics of systems and their behaviors, structure of simple systems, zero and first-order systems, apply systems dynamics methodology to a range of medical problems, use system dynamics software to rapidly develop models and run simulations of problems	Not focused on infectious diseases specifically.	Good course for a general intro to modeling in the health sciences. Not good for specifically focusing on infectious disease modeling. Note on pricing: free to audit, pay for certificate.	Free

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