Master Class Ep. 140 II "Health Modelling Essentials – Linking Epidemiology, Economics, and Policy" II Tuesday, September 9, 2025, 03:30 PM – 04:30 PM IST
(Online)

From: IIHMRU President Office
presidentoffice@iihmr.edu.in
To: Ms. Akansha Tyagi, akansha.mph12@iihmr.in
Sent: Tuesday, September 9 at 1:30 PM

Dear Ms. Akansha Tyagi,

Greetings for the day.

Hope this email finds you in great health.

IIHMR University takes the lead to organize a series of Master Classes specially curated for the students to enlighten and share insights on issues and initiatives of current interest. The University is conducting a session on September 9, 2025– from 03:30 PM – 04:30 PM IST (Online).

The masterclass will help students to understand "Health Modelling Essentials – Linking Epidemiology, Economics, and Policy."

Title – **"**Health Modelling Essentials – Linking Epidemiology, Economics, and Policy."

Guest Speaker: Dr. Prerika Nehra, Senior Researcher, Martin Luther University, Berlin, Germany

Moderator: Dr. Seema Mehta, Professor- SDG SPH, IIHMR University, Jaipur, Rajasthan, India

Student Coordinator – Ms. Akansha Tyagi, MPH JHU Cohort 12, IIHMR University, Jaipur, Rajasthan, India.

Date: Tuesday, September 9, 2025

Time: 03:30 PM – 04:30 PM IST
Mode: Online

The Session will be of Approx 45 minutes followed by 15-minute question-answer session (1 Hour duration). The target audience will be MPH 1st Year & 2nd Year students along with Faculties and Team Members of Placements & Alumni Relations.

Thanks and Regards

President Office

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IIHMR UNIVERSITY, JAIPUR

EVENT OUTCOME REPORT

"Master Class Episode 140"

"Master Class Episode 140"
TOPIC: Health Modelling Essentials – Linking Epidemiology, Economics, and Policy
DATE: September 09, 2025, 03:30 pm – 04:30 pm IST
VENUE: IIHMR University, Jaipur (ONLINE MODE)
SPEAKER: Dr. Prerika Nehra, Senior Researcher, Martin Luther University, Berlin, Germany
NUMBER OF PARTICIPANTS: MPH students (27 Students)
INTRODUCTION: The Master Class 140 session titled *"***Health Modelling Essentials – Linking Epidemiology, Economics, and Policy***"* was held on **September 09, 2025,** at **IIHMR University** in online mode. The session was coordinated by**. Ms. Akansha Tyagi**, an MPH JHU Cohort 12 student, was moderated by **Dr. Seema Mehta**, Professor and Program Coordinator, SD Gupta School of Public Health. The guest speaker **Dr. Prerika Nehra** is a Senior Researcher, currently working with Health Economics research group at the Medical Faculty, Martin Luther University; close association with MONID (Modeling Network for Severe Infectious Diseases)
OBJECTIVE: The objective is to understand Health Modelling and link it with Epidemiology, Economics and Policy.

SALIENT NOVEL POINTS COVERED

1. Introduction to Models and Disease Modelling

The session began with an introduction to the concept of a model in public health. A model was defined as a simplified description of a system that helps in understanding and analysing complex real-world phenomena. In epidemiology, disease models serve as frameworks that describe how diseases develop, spread, and affect populations.

- Modellers use the language of figures, variables, and equations to represent population dynamics and disease transmission.
- Disease models simulate how a disease progresses from healthy to mild, moderate, severe, and critical stages, allowing researchers to predict outcomes and evaluate potential interventions.
- This understanding helps in making sense of relationships between components of a system, like population characteristics, risk factors, and disease spread.

2. Types of Models in Epidemiology and Applications

The second major focus was on the various types of models used in public health and epidemiology, along with their specific roles:

- **Compartmental Models**: Divide populations into categories (e.g., Susceptible, Infected, recovered – SIR models) and use differential equations to describe transitions. Useful for understanding disease transmission dynamics.

- **Agent-Based Models**: Simulate individual behaviors and interactions, capturing heterogeneity in populations such as movements, contact networks, and stochastic (random) events.
- **Network Models**: Focus on social or contact networks to study how disease spreads through individual-level connections (e.g., close contacts, households, workplaces).
- **Spatial Models**: Incorporate geography and spatial structure to show how location and movement influence disease spread.

Additionally, the session linked epidemiology and modelling, showing how epidemiologists observe incidence, prevalence, causes, and risks, while modellers build mathematical simulations to connect these risks to disease outcomes.

3. Economic Evaluation and Policy Relevance (ICER)

The final theme highlighted how health modelling extends beyond epidemiology to include health economics and policy decision-making.

- The Incremental Cost-Effectiveness Ratio (ICER) was introduced as a key tool for comparing healthcare interventions.
- ICER measures the extra cost required to gain one additional unit of health benefit (such as an additional Quality-Adjusted Life Year – QALY, or extra year of healthy life).
- It compares a new intervention vs. standard care, calculating both the additional cost and the extra health gain.
- By combining epidemiological insights with cost-effectiveness analysis, models provide evidence to support resource allocation, intervention prioritization, and policy decisions.

Q&A and Interactive Session: The session featured a lively Q&A where students asked which models are the most useful in public health and which software should be used to make these models.

Conclusion: The session highlighted how health modelling simplifies complex systems to understand disease dynamics, risk factors, and outcomes. By exploring different modelling approaches and economic tools like ICER, it showed how models serve as vital links between epidemiology, economics, and policy, enabling evidence-based decisions for effective public health action.

IIHMR UNIVERSITY

Master Class
Episode 140

Health Modelling Essentials- Linking Epidemiology, Economics, and Policy

Tuesday, September 9, 2025 12:00 PM – 1:00 PM CET / 3:30 PM – 4:30 PM IST

MODERATOR

Dr. Seema Mehta

Professor- SDG SPH
IIHMR University
Jaipur, Rajasthan, India

SPEAKER

Dr. Prerika Nehra

Sr. Researcher, Martin Luther University
Berlin, Germany

STUDENT CO-ORDINATOR

Ms. Akansha Tyagi

MPH JHU Cohort 12
IIHMR University
Jaipur, Rajasthan, India

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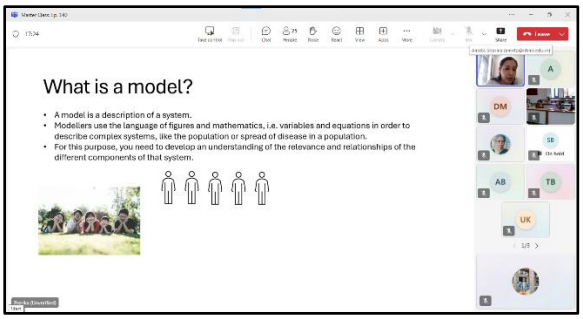
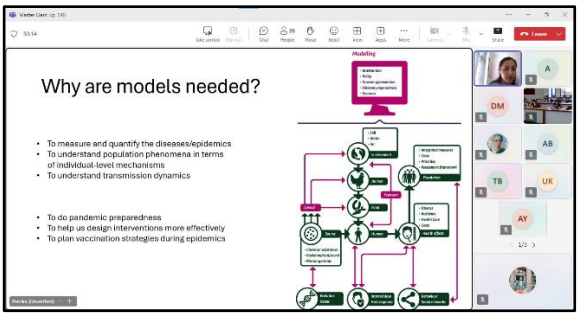
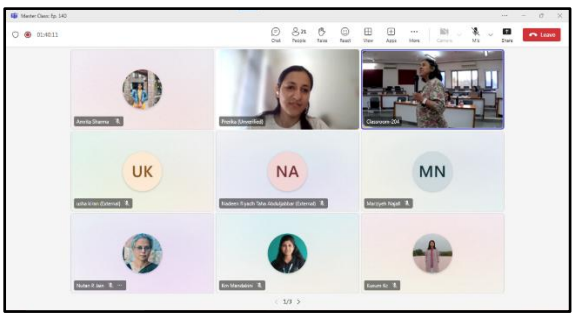
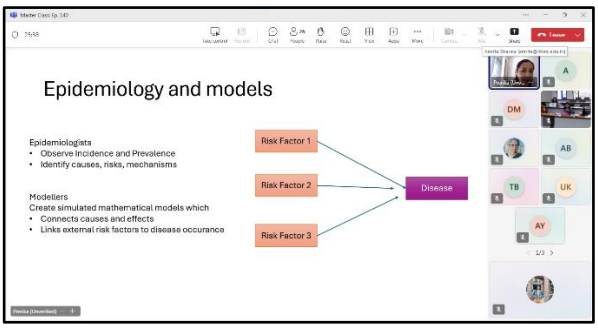
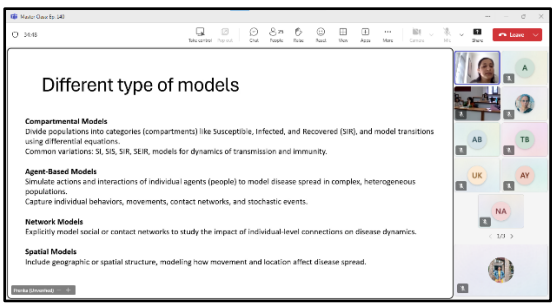
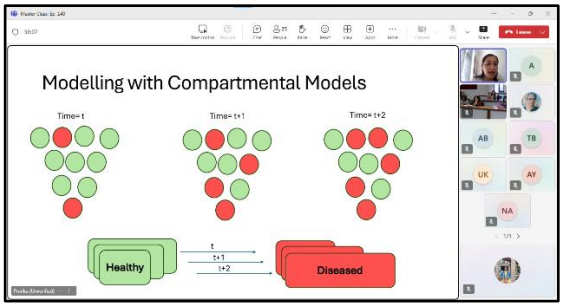


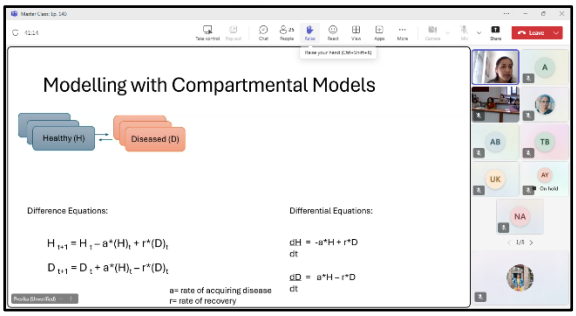


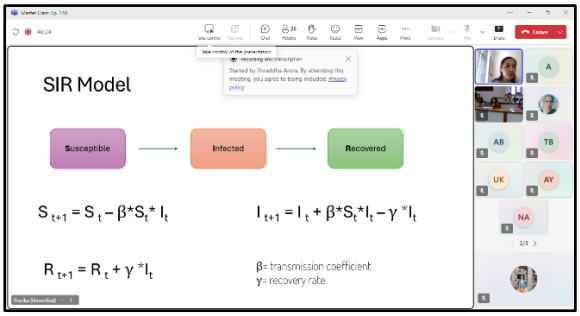


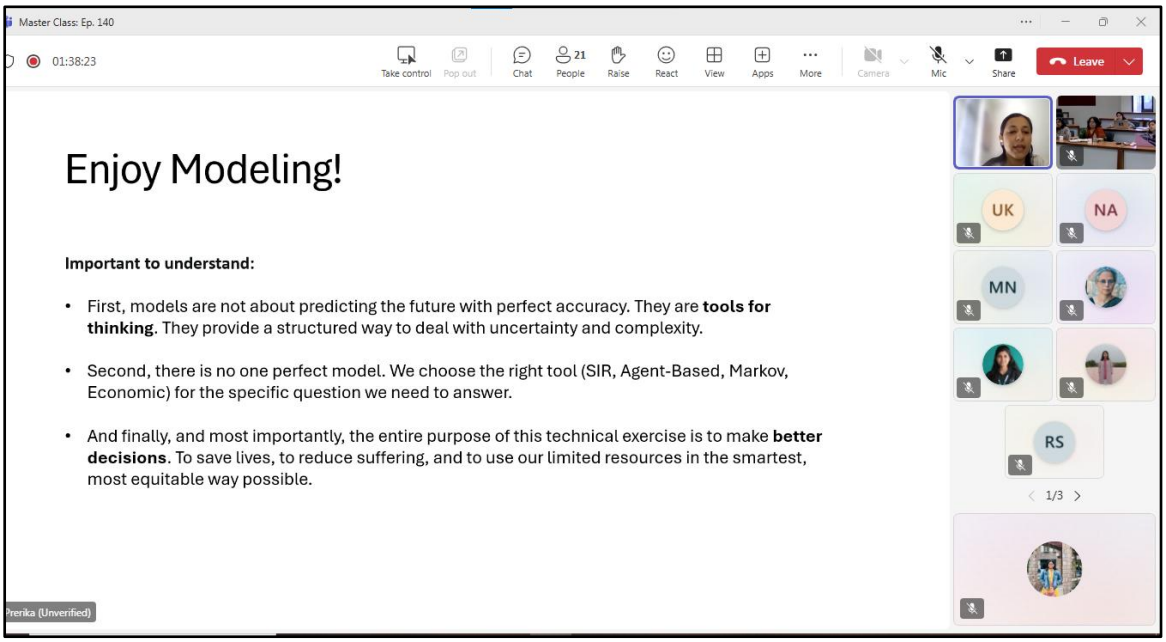



Different type of models
Compartmental Models
Divide populations into categories (compartments) like Susceptible, Infected, and Recovered (SIR), and model transitions using differential equations.
Common variations: SI, SIS, SIR, SEIR, models for dynamics of transmission and immunity.
Agent-Based Models
Simulate actions and interactions of individual agents (people) to model disease spread in complex, heterogeneous populations.
Capture individual behaviors, movements, contact networks, and stochastic events.
Network Models
Explicitly model social or contact networks to study the impact of individual-level connections on disease dynamics.
Spatial Models
Include geographic or spatial structure, modeling how movement and location affect disease spread.


Modelling with Compartmental Models
Time= t
Time= t+1
Time= t+2
Healthy
Diseased


Modelling with Compartmental Models
Healthy (H)
Diseased (D)
Difference Equations:
Differential Equations:
a= rate of acquiring disease
r= rate of recovery


SIR Model
Susceptible
Infected
Recovered
β= transmission coefficient
γ= recovery rate


Master Class: Ep. 140
01:38:23
Take control
Pop out
Chat
People
Raise
React
View
Apps
More
Camera
Mic
Share
Leave
Enjoy Modeling!
Important to understand:
First, models are not about predicting the future with perfect accuracy. They are tools for thinking. They provide a structured way to deal with uncertainty and complexity.
Second, there is no one perfect model. We choose the right tool (SIR, Agent-Based, Markov, Economic) for the specific question we need to answer.
And finally, and most importantly, the entire purpose of this technical exercise is to make better decisions. To save lives, to reduce suffering, and to use our limited resources in the smartest, most equitable way possible.
Prerika (Unverified)
1/3

Sr. No.	1. Summary		
	Meeting title	Master Class: Ep. 140	
	Attended participants	27	
	Start time	9/09/25, 3:20:59 PM	
	End time	9/09/25, 5:30:53 PM	
	2. Participants		
	Name	First Join	Role
1	Nutan P. Jain	9/09/25, 3:21:03 PM	Presenter
2	Marziyeh Najafi	9/09/25, 3:22:34 PM	Presenter
3	Amrita Sharma	9/09/25, 3:24:20 PM	Presenter
4	Aisha Abdullahi Gure	9/09/25, 3:25:08 PM	Presenter
5	Dini Mohamed	9/09/25, 3:25:19 PM	Presenter
6	Classroom-204	9/09/25, 3:27:13 PM	Presenter
7	Prerika (Unverified)	9/09/25, 3:27:37 PM	Presenter
8	Snehgdha Biswas	9/09/25, 3:27:48 PM	Presenter
9	Abdullah Mohammed Saeed Bahaisa	9/09/25, 3:28:10 PM	Presenter
10	Tripti Bisawa	9/09/25, 3:28:42 PM	Presenter
11	usha kiran	9/09/25, 3:29:40 PM	Presenter
12	Ashish Yadav	9/09/25, 3:29:41 PM	Presenter
13	Nadeen Riyadh Taha Abduljabbar	9/09/25, 3:29:42 PM	Presenter
14	read.ai meeting notes (Unverified)	9/09/25, 3:29:42 PM	Presenter
15	Tejas wd (Unverified)	9/09/25, 3:29:43 PM	Presenter
16	Abdifatah (Unverified)	9/09/25, 3:31:10 PM	Presenter
17	Km Mandakini	9/09/25, 3:31:11 PM	Presenter
18	Aziza Mohammed Derhem	9/09/25, 3:31:19 PM	Presenter
19	Kusum Kc	9/09/25, 3:31:28 PM	Presenter
20	Refka Sallam	9/09/25, 3:31:49 PM	Presenter
21	Linda (Unverified)	9/09/25, 3:32:26 PM	Presenter
22	Soni Manocha	9/09/25, 3:34:48 PM	Presenter
23	jawaahir yuusuf	9/09/25, 3:35:10 PM	Presenter
24	Akansha Tyagi	9/09/25, 3:35:18 PM	Presenter
25	kalyani kumari	9/09/25, 3:35:29 PM	Presenter
26	Ayan Mohamed Salad	9/09/25, 3:39:08 PM	Presenter
27	Shraddha Arora	9/09/25, 4:02:15 PM	Presenter