

MITOCW | MITRES_10_S95F20_0500_300k

PROFESSOR: So in the last part of the course, we'll discuss the fluid mechanics of indoor spaces, in particular, going beyond the approximation of a well-mixed room when considering airborne disease transmission.

So for example, we will consider the occupants of a room and their respiratory activity.

So when they breathe, especially if they're not wearing a mask, or if they cough, they're going to have turbulent plumes emitting from their mouth, which will then be convected throughout the room and will influence other people.

Also, the heat of the body relative to the room can lead to warmer air, which is rising, so that essentially sort of a chimney of a thermal plume rising from an individual.

Those heterogeneities in the flow and in the concentration of aerosol particles may not always be well-mixed.

We'll talk about different types of ventilation, how, for example, cold air will sink from the place where it's inserted and warm air will rise.

And that may or may not lead to sufficient mixing to remain well-mixed.

And we'll talk about how to modify our criterion for airborne disease transmission in a well-mixed room to account for some of these changes, in particular the heightened risk of short-range transmission from being directly in the path of respiratory puffs and plumes emanating from an infected person.