

## Temporal Characteristics Of Aerosol Generation During A Voluntary Cough

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**RATIONALE:** Infectious diseases can be spread by the generation and airborne transmission of particles containing bacteria and viruses. The objective of this study was to explore the time course of aerosol generation during a voluntary cough. **METHODS:** A system was designed in which subjects (N=9) voluntarily coughed through a cylindrical mouthpiece into a straight tube (228.5cm x 5 cm dia.) attached to a spirometer. The tube was divided into 4 sections. The first three sections were 70 cm in length, and the fourth was 15.25 cm in length and included the spirometer. The tube and spirometer were held at 37°C to minimize condensation effects. Prior to a subject coughing into the system, the tube and spirometer were washed out with HEPA filtered air. Following a voluntary cough, valves separating each tube section were closed. The particle size distribution of the expelled aerosol was then simultaneously measured within each section using 4 light scattering particle sizers. The spirometer was used to record cough airflow and gas volume. **RESULTS:** As the volume of the cough increased, the cumulative count distributions were shifted further down the tube. Cumulative count percentages in the first section of the tube (those particles expelled last during the cough) decreased when the initial portion of the cough volume moved further from the mouth. **CONCLUSIONS:** Based on particle count and particulate mass data for each subject, the majority of the aerosol was produced during the initial expulsive portion of a cough.

**Key words:** Cough analysis, Bioaerosols, Voluntary Cough, Airborne transmission

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