

Table S1. The method, time, sample location in different rooms for the aerosol generation, monitor and acquisition in the scenario of toilet flushing and respiration simulation.

| Aerosol Generation | | | | | Monitor and Acquisition | | | | | |
|--------------------|---------------------------------------|-------------------------|---------------------------------------|-------------------------|-------------------------|---|--|---|----------------------|----------------------|
| Scenario 1 | | | | | Scenario 2 | | | Scenario 1 | Scenario 2 | |
| Room\ Time | 0h | 0.5h | 1h | 1.5h | Room\ Time | 0-4h | Method | Sample Location | Acquisition Time | Acquisition Time |
| 552 | Pouring simulants and toilet flushing | Toilet flushing | Pouring simulants and toilet flushing | Toilet flushing | 510 | Simulating respiration to generate aerosols | Concentration monitor: particle size spectrometer, PM ₁₀ measuring instrument | Bathroom | Every 10 minutes | Every 30 minutes |
| | | | | | | | | Bedroom | / | Every 10 minutes |
| | | | | | | | | Corridor | / | Every 1 hour |
| | | | | | | | | Floor drain, toilet lid and seat ring | Every 30 minutes | / |
| 652 | Flushing simultaneously | Flushing simultaneously | Flushing simultaneously | Flushing simultaneously | 511 | Simulating respiration to generate aerosols | Smear sampling | Exhaust fan | Every 30 minutes | / |
| | | | | | | | | Air supply outlets of fresh air system | Every 30 minutes | Every 1 hour |
| | | | | | | | | Air supply outlet of the air conditioning | | Every 1 hour |
| | | | | | | | | Surface of the table, door, bed | / | Every 1 hour |
| 752 | Flushing simultaneously | Flushing simultaneously | Flushing simultaneously | Flushing simultaneously | 552 | Simulating respiration to generate aerosols | Air suspension sample collection : filter membrane sampler, bioaerosol sampler | Exhaust outlet of the roof | After the experiment | After the experiment |
| | | | | | | | | Sewage pipe riser vent on the roof | After the experiment | After the experiment |
| | | | | | | | | Bathroom | 0-1.5h | / |
| | | | | | | | | Bedroom | / | 0-2h,2-4h |

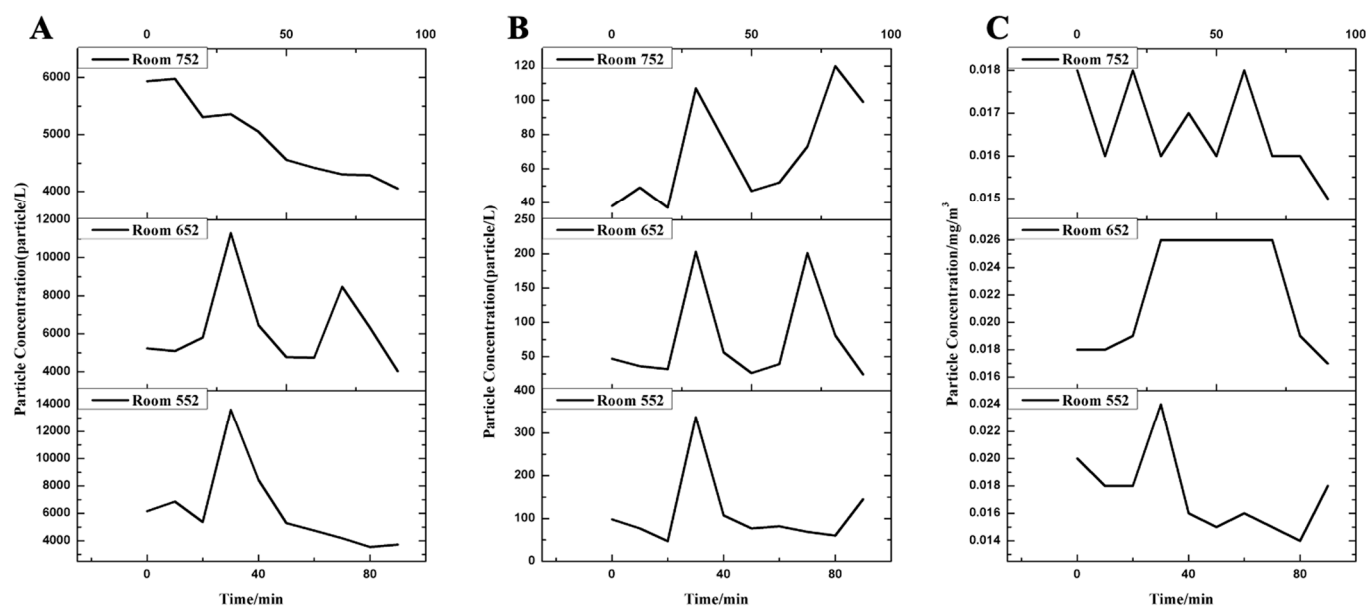


Figure S1. The changes of particle concentration over time in 3 different rooms (Room 552, 652, 752) in the scenario of toilet flushing. A.0.5μm; B.5μm; C.PM₁₀.

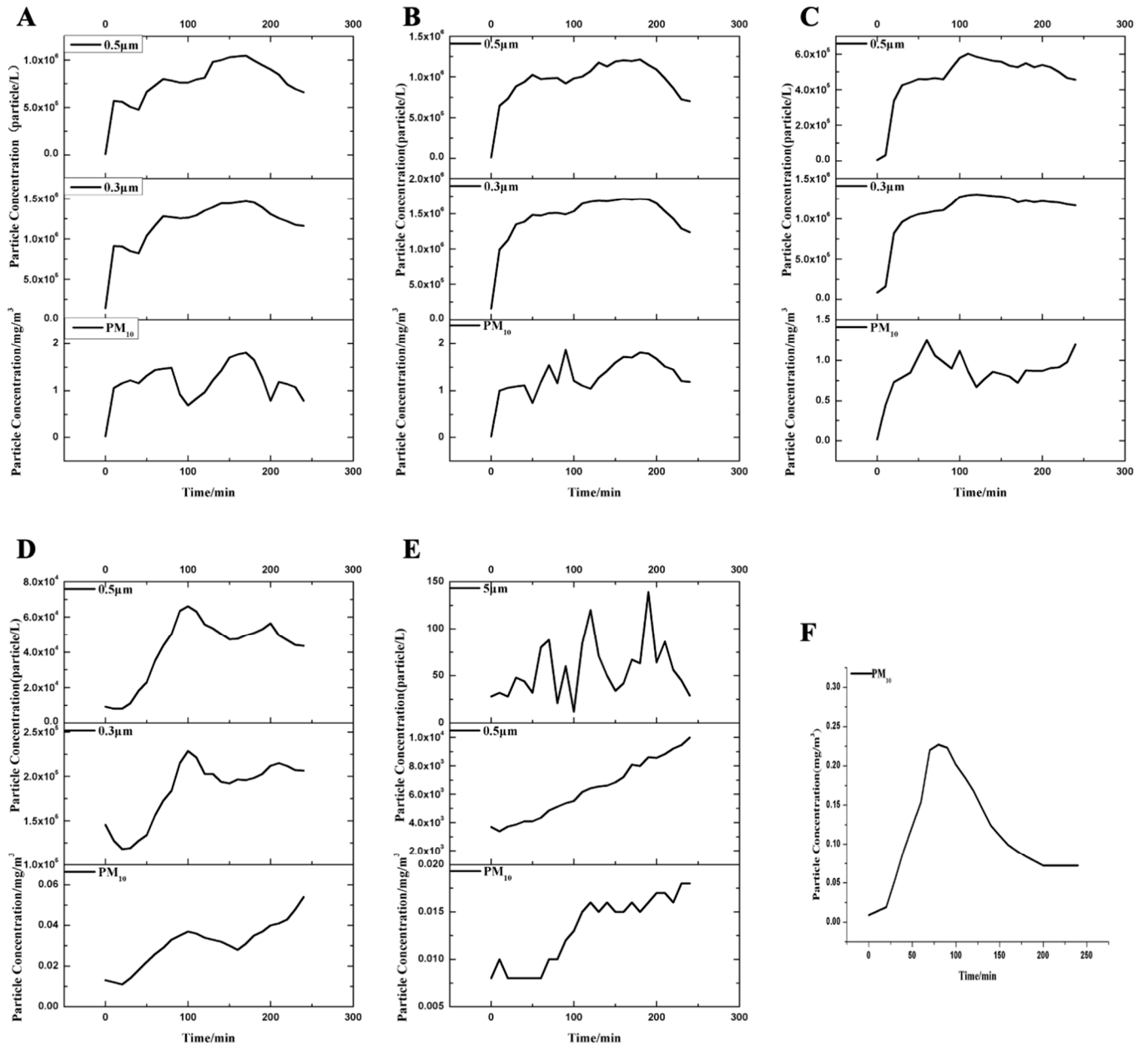


Figure S2. The changes of particle concentration over time at $0.3\mu\text{m}$, $0.5\mu\text{m}$, $5\mu\text{m}$, PM_{10} in different rooms in the scenario of respiration simulation. A.Room 510; B.Room 511; C.Room 552. D.Room 652; E.Room 705; F.Room 553.

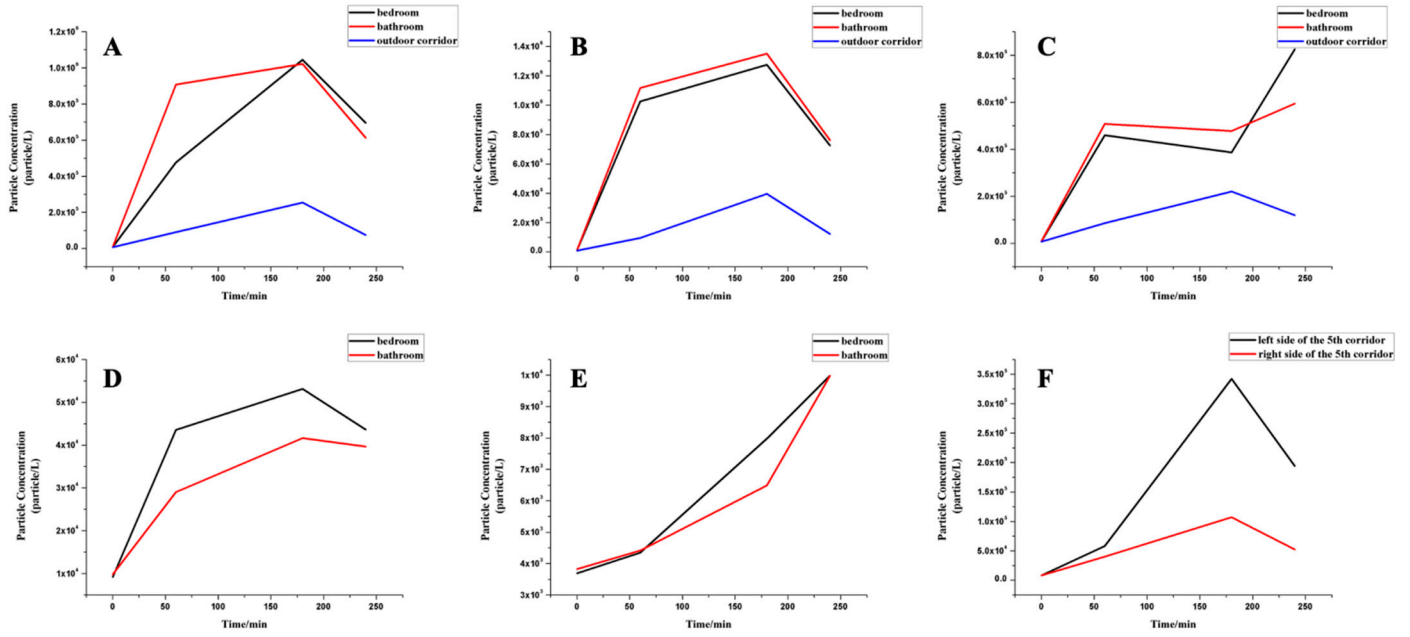


Figure S3. The changes of particle concentration at 0, 60, 180, 240 min at $0.5 \mu\text{m}$ in the bedroom, bathroom, outdoor corridor of different rooms in the scenario of respiration simulation. A.Room 510; B.Room 511; C.Room 552. D.Room 652; E.Room 705; F.The 5th corridor.

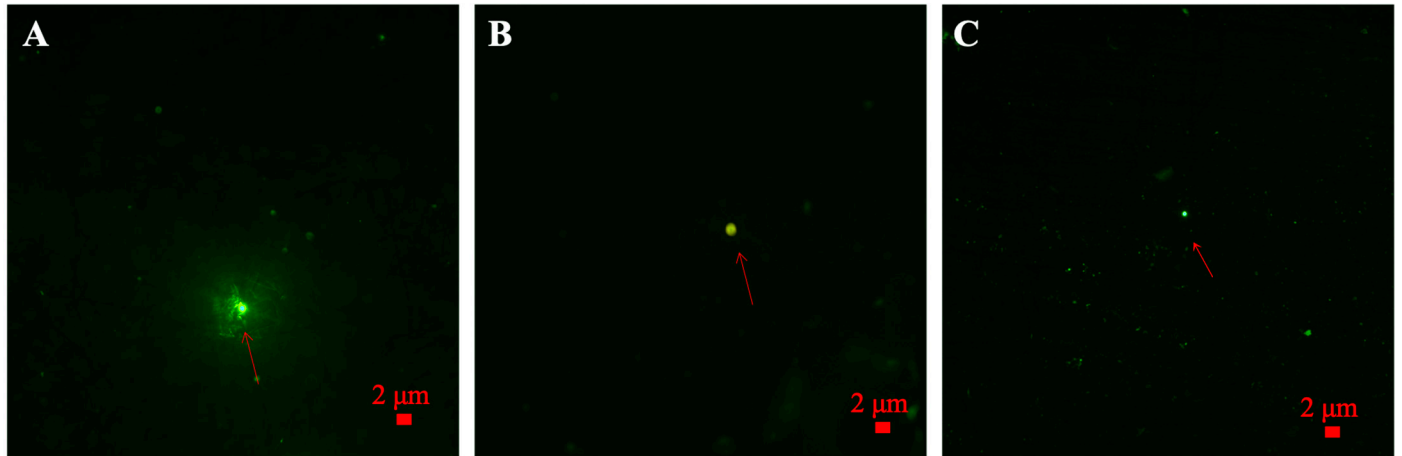


Figure S4. Representative photos of fluorescent microspheres tracked by different sampling methods in different sites. After toilet flushing and respiration simulation, fluorescent microspheres (yellow and green) were detected in (A) the aerosol filter membrane sample using PM_{10} samplers (100 L/min) under fluorescence microscopy; (B) the aerosol liquid sample using biological aerosol samplers (100 L/min) under fluorescence microscopy; and (C) an air sample using natural sedimentation on floor drain, toilet lid and seat ring; table, door, bed; exhaust fan of bathroom; air supply outlet etc., under fluorescence microscopy.