

Title: Persistence of human coronaviruses on textiles during laundering

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Aims

The aim of this investigation was to determine the persistence of human coronaviruses on a range of textiles both in the environment and during laundering.

Methods and Results

The stability of human coronaviruses HCoV-OC43 and HCoV-229E on cotton, polycotton and polyester textiles was determined up to 72 hours. The transfer of HCoV-OC43 from textiles to plastic or another textile was quantified. Persistence of HCoV-OC43 on cotton during domestic and industrial laundering was also investigated in the presence and absence of detergents and temperature (40-75°C). Infectious virus was quantified by titration on mammalian cells.

Infectious HCoV-OC43 was detectable for 6 hours on polycotton, 24 hours on cotton and ≥ 72 hours on polyester. HCoV-229E was less stable, where it was detectable for 2 hours on polycotton, 6 hours on cotton and 24 hours on polyester. HCoV-OC43 transferred from polyester to PVC and polyester up to 72 hours post-inoculation, whereas no transfer was detected from cotton or polycotton.

Domestic and industrial laundering without temperature and detergent completely removed HCoV-OC43 from cotton ($\geq 4.58 \log_{10}$ reduction) under clean conditions. Under dirty conditions, HCoV-OC43 was detected on cotton ($\leq 1.78 \log_{10}$) after domestic laundering without temperature and detergent. However, HCoV-OC43 was removed by domestic laundering with temperature (40°C) and detergent, or industrial laundering without temperature and detergent.

Conclusions

Human coronaviruses can persist on textiles for up to 3 days and readily transfer from polyester to other surfaces. HCoV-OC43 were removed from cotton during both domestic and industrial laundering.

Significance of Study

Polyester could potentially act as fomites for the transmission of coronaviruses, demonstrating the importance of infection control procedures for handling of contaminated textiles. Human coronaviruses are removed from textiles during common domestic and industrial wash programmes, indicating that typical healthcare washing procedures are likely to be suitable for decontaminating textiles.