other workwear. Disposable paper or fabric gowns or disposable plastic aprons also prove convenient for testing and offer a larger sample area. Target pieces have also been fixed on temporary supports positioned around or taped to high-risk equipment items, or mounted close to and within the likely fallout zone of procedures likely to generate and release droplets. For more extensive environmental sampling and dispersal studies, A4 paper sheets have been suspended vertically or laid on horizontal surfaces as required. These are retrieved for later forensic testing and have been particularly successful in identifying sources of environmental contamination and personal exposure. This approach avoids extensive spraying of the work environment, the need for low-light conditions, and the inconvenience of spraying of clothing or skin surfaces. To obtain additional information regarding the potential for splash contamination, we have evaluated also the dual use of the luminol-based product with Glo-Germ™ oil as a simulant. Visible chemiluminescence from the luminol reaction does not interfere with the distinct blue fluorescence of the Glo-Germ product under ultraviolet illumination and the two products can be used simultaneously to provide further information about both actual and potential hazards of splash contamination. In low-light conditions, photographic recording is possible using a film speed of ISO 400 with an exposure time of up to 30 s at $f/2.8$, which is suitable also for the recording of the fluorescent Glo-Germ image after introduction of black-light illumination. Used together, these products represent complementary tools for the investigation of splash contamination as well as the efficacy of environmental and other cleaning regimens.

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None declared.

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Stability of human metapneumovirus and human coronavirus NL63 on medical instruments and in the patient environment

Madam,

Since their discovery in 2001 and 2004, respectively, the human metapneumovirus (HMPV; a paramyxovirus) and the human coronavirus (HCoV)-NL63 have been found to be important respiratory pathogens.[1,2] Both viruses are responsible for respiratory infections in children and adults and their clinical spectrum ranges from mild to life-threatening clinical syndromes.[3] Both viruses have been involved in nosocomial outbreaks, for example in a long-term care facility for elderly institutionalised persons.[4–7] To our knowledge, no investigations on the survival of HMPV and HCoV-NL63 have been published. Rabenau *et al.* have already demonstrated that the long-described virus HCoV-229E is significantly less stable than severe acute respiratory syndrome (SARS) virus, although both viruses belong to the family of coronaviruses and share many biochemical and structural characteristics.[8] Consequently, we examined the stability of HMPV and HCoV-NL63, suspended in a medium or dried on surfaces derived from the inanimate hospital environment.

Viruses were grown under standard conditions essentially as previously described.[1,2] Supernatants were collected and viral RNA was extracted using the QIAamp MinElute Virus Spin Kit or RNeasy Protect Mini Kit (Qiagen, Hilden, Germany) according to the manufacturer's protocol. For real-time reverse transcriptase–polymerase chain reaction (RT–PCR) detection and quantification of HMPV, the primers sv581s (NL-N-forward) 5′-CATATAAG CATGCTATATTAAAAGAGTCTC-3′ and sv582as (NL-N-reverse) 5′-CCTATTTCTGCAGCATATTTGTAATCA G-3′ were used. For detection and quantification of HCoV-NL63 the primers repSZ-RT (as) 5′-CCACTATAAC-3′, repSZ-1 s 5′-GTGATGCATATGCTA

ATTTG-3′ and repSZ-3 as 5′-CTCTTGCAGGTATAA TCCTA-3′ were used. Real-time RT—PCRs were performed using the one-step real-time RT—PCR kit (Sybr green) from Qiagen. Detailed temperature profiles are available on request.

For stability analyses, virus-containing cell culture supernatants, with defined copy numbers, were seeded onto different surfaces, namely single-use latex gloves, clinical thermometer caps, stethoscopes, and the plastic surface of a bedside table. Furthermore, viral suspensions were transferred into phosphate-buffered saline (PBS) or cell culture media and stored for the time periods indicated below.

Depending on the surface, viruses were recovered by re-suspending them from the dried surface or by washing the surface. The first procedure was done by wiping the dried surface with PBS-soaked swabs and was used for stethoscopes and the table; the second procedure included washing of the gloves and the clinical thermometers in PBS. Washings and swabbing were performed immediately after seeding and once per hour for the first 8 h, and then daily for seven days. In addition, the virus suspensions transferred to PBS were stored at room temperature and harvested in parallel to the swabs and washings.

Harvesting of swabs, washings, and PBS stored virus suspensions was followed by extraction of nucleic acids (followed by real-time RT—PCR) and inoculation of LLC-MK2 cells. The latter were observed for five days for cytopathic effects before supernatants were harvested and screened for viral RNA by real-time RT—PCR.

For HMPV and HCoV-NL63, drying resulted in rapid loss of infectivity. Although viral RNA was detected up to day 7, isolation of infective particles from the washings failed. This finding was characterised by both a lack of cytopathic effects in the cell culture and no detection of increasing amounts of viral nucleic acids in the cell culture media from the inoculated cell culture dishes. This indicates that after drying no replication occurred. This observation was consistent on all inanimate surfaces tested in this investigation.

By contrast, virus suspensions diluted with PBS and stored for up to seven days remained infective at room temperature, indicating that under such conditions the stability of the viral particles is conserved.

The results support the hypothesis that direct person-to-person transmission is the major route of HMPV and HCoV-NL63 spread. Consequently, contact and droplet isolation of patients seems to be the most important intervention to contain the nosocomial spread of these pathogens. Both viruses are capable of surviving in aqueous solutions and most probably in respiratory secretions until drying is completed. Thus, environmental disinfection of hand contact surfaces and fomites in the close proximity of symptomatic patients seems to be a reasonable addendum to other hygienic precautions.

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Patients' attitudes to surgical dress: a descriptive study in a district general hospital

Madam,

Doctors' attire has been under much scrutiny recently. With government directives about neckties and long sleeves, and having already disposed of the white coat, we live in an era conscious of infection control. Patients are naturally concerned about hospital-acquired infections, and their anxieties are fuelled by apparent increase in fomite-borne infection and the intense media interest in this area.

Patient preference for the mode of dress adopted by their doctor has been extensively qualitatively researched, with consistent findings.[1,2]

The potential for transmission of infectious agents via fomites including the hands and clothing of medical staff has been known for a long time, with early studies identifying a substantial and transferable pathogen burden on the white coat cuffs of medical professionals.[3]

We were keen to examine the patient's views on their surgeon's attire, before and after being informed of data on clothing-related infection transmission. Doctors'attire has, like most things, undergone a process of evolution. Starched white coats, long sleeves and neck-ties are being replaced by open-neck shirts and a 'bare below the elbow' policy. There is still much uncertainty, however, among junior doctors about what is expected of them and what is appropriate, especially when dealing with more elderly patients. The aim of this study was to assess the patient's perspective on this issue. A surgical inpatient group was chosen at random as this is the group which is more likely to experience a medical team wearing a mixture of scrubs and smart clothes.

A questionnaire was distributed to 50 randomly selected surgical inpatients at a district general hospital over a one-month period. Patients were assessed for competency to partake in the survey and informed consent was obtained 24 h before the patients were presented with the survey questionnaire. Of the 50 inpatients, 31 (62%) were emergency admissions and 19 (38%) were elective admissions.

The participants were shown photographs of a male and female doctor wearing smart dress and wearing surgical scrubs. Consistency was maintained in terms of facial expressions, wearing name badges and use of jewellery as these are independent factors that could bias results.

The patients were asked their opinions on whether they felt the doctors in each set of photographs (smart dress vs scrubs) were identifiable, professional, hygienic and approachable.

A personal preference was sought before and after evidence-based information regarding potential transmission of infection from ties/cuffs had been presented and discussed, and the survey was repeated.[3–5]

Among the figures quoted to patients were the findings of one study of 42 doctors' neckties that had been sampled for micro-organisms. The results showed that 20 carried one or more micro-organisms known to cause disease, including 12 carrying *Staphylococcus aureus*. Five carried Gram-negative bacteria; one carried *Aspergillus* sp. and two ties carried multiple pathogens. It was explained that staphylococci can cause serious wound infections; and that *Aspergillus*, a mould, is an opportunistic pathogen that threatens immunocompromised patients.

In the individual categories, before the educational intervention, respondents considered that, in terms of professionalism and approachability, smart clothes were superior to scrubs. Smart clothes and scrubs scored equally in terms of identifiability. However, at the initial questionnaire, a majority of respondents considered that scrubs were more hygienic. Nevertheless, patients preferred the smartly dressed doctor (Table I). This may be due to them scoring higher on approachability and professionalism which are qualities that are consistently highly valued in medical professionals by their patients. It is not clear whether confidence instilled in patients by smart attire means more to the patients than an impression of hygiene. Given the apparent change in attitude after the intervention of providing information to the patients, it seems likely that this issue was not very important for patients.

Our data suggest that patients' first preference is for their surgical doctor to wear smart clothes