increased. Nevertheless, its reliability has to be demonstrated yet before proposing to substitute microbiological sampling.

Objective: To study whether particle counting could be predictive of microbiological contamination of air in operating rooms.

Methods: From January 21 to April 21 2010, particle counting and microbiological air sampling were performed in 22 operating rooms in a 1300-bed university hospital. Microbiological air counts were measured using an air sampler which impacted on Sabouraud agar and Blood agar. Means of Particles were counted by a particle analyser for 1 min. Spearman correlation coefficient was used to analyze the association between particle counts and colony counts. Different values of CFU/m^3 were chosen as critical values to create COR curves. We tried to find the best cut-off value of particle counting to obtain the best predictive value of microbiological contamination.

Results: 32 microbiological samples and 96 particles counting were performed. Spearman correlation coefficients were: particle 0.3 μm-bacterial $r = 0.294$ $p = 0.007$, 0.5 μm-bacterial $r = 0.107$ $p = 0.333$, 5 μm-bacterial $r = 0.025$ $p = 0.823$, 0.3 μm-fungal $r = 0.389$ $p < 0.001$, 0.5 μm-fungal $r = 0.311$ $p = 0.002$, 5 μm-fungal $r = 0.055$ $p = 0.592$. COR curves for cut-off of 5, 10 and 20 bacterial CFU/m^3 were respectively 0.667 (IC 95% 0.551–0.784), 0.669 (IC 95% 0.551–0.787), 0.621 (IC 95% 0.490–0.751). No COR curve for fungal CFU/m^3 was performed because of the small amount of positive results.

Discussion: Our findings suggest that 0.3 μm particle counting is reliable to predict microbiological air contamination. We are conducting more measurements in collaboration with other hospitals to be able to determine those cut-off values for 0.3 μm particles with the negative predictive value that can make unnecessary microbiological sampling.

P11.22
Time trend of *Legionella* colonization in the waterline of a hospital of Rome, Italy

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Background: In many hospital's Legionella outbreaks, hot water systems are the most frequent source of infection.

Objectives: Considering the old age of the hospital waterline, an investigation on *Legionella* spp. water colonization was performed to evaluate the system weakness and to implement environmental preventive measures.

Methods: From 2004 to 2010, a total of 5 sampling campaigns were performed, collecting 99 water samples from 13 wards and 3 other points of the water line (boilers, point of connection with public water line, hospital waterworks). The samples were analyzed, following national *Legionella* spp. standard methods.

Results: A total of 28 samples (28.3%) were positive for *Legionella* spp. There has been an increasing time trend until 2008, from 4.5% to 75% in 2008; in the first month of 2010 only 26.3% of the samples were positive. The boiler was positive in 45.5% of samples collected since 2006. In total, surgeries were positive in 38% of cases (8/21): 100% of positive samples in 2006 and 2008, reduced at 50% in the first month of 2010. Only in these wards *Legionella* spp. were found four times to be >10,000 cfu/L. Among other wards, emergency medicine and oncology are the most contaminated (31% of positive samples). The worst year was 2008 with 75% of positive samples.

Conclusion: Hospital water system seems to be affected by *Legionella* spp. colonization most frequently from 2006 to 2010. The high percentage of positivity in 2008 was related to the presence of a building yard in the hospital. In 2010 there was an improvement, although boilers, surgery, medicine and oncology are still contaminated. It is necessary now to investigate the temperature level mantained in hot-water system and also to observe if the structural characteristics of water ducts could have influenced the colonization observed.

P11.23
Effect of forced-air warming (FAW) on operating theatre air quality: assessment using computer modeling and submicron particle release

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Background: Perioperative hypothermia (PH) causes significant morbidity and increases risk of surgical site infection (SSI). Active warming devices are used to prevent PH. Forced-air warming (FAW) warms by convection by delivering air at 42°C. Some have asked whether FAW introduces contaminants into the surgical site or alters airflow in the operating theatre (OT).

Aim(s)/Objective(s): Assess effect of FAW in the OT using two different analytical methods.

Methods: Computational fluid dynamics (CFD) modeling of airborne particles was used to assess impact of FAW in an OT. Submicron particles were released in two different OTs. The OT had a human volunteer, two FAW models, and other standard equipment. Particle counts were quantified after release. A protective effect (PE) score based on German Deutsches Institut für Normung (DIN) 1946–4:2008–12 was calculated. Smoke plume was used to visualize airflow in the OT with and without FAW.

Results: CFD analysis found no deposition of particles on the patient with or without activation of the FAW device and minimal disruption of airflow. Smoke plume divided neatly above the patient, flowed to either side and downward below the OT table. No outflow from the warming blanket rose back into the surgical field. In all cases, PE score of 3.0–5.0, i.e. particle log reduction, was observed with or without the FAW activated which was well above the 2.0 threshold value indicated as minimum value by the DIN standard.

Conclusion: CFD analysis did not find any deposition of particles onto the surgical site nor significant disruption of airflow in the OT with use of FAW. There was no compromise in the PE when FAW was activated. In fact, under conditions that reflect real operating conditions, the PE was significantly better than the minimal threshold values used to validate class Ia OT based on DIN standard. We find no objective evidence that FAW has any undesirable effect on air quality during intraoperative care.

P11.24
Review of current evidence on the reduction of infection rates in ten NHS hospitals using the Inov8 AD (air disinfection) technology

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This paper is a first in a series of articles where we present a systematic review of available quantitative evidence on the correlation between bio-burden reduction in a hospital setting and the reduction in cross infections.

We have conducted trials of Inov8 Air Disinfection Technology in various UK NHS Hospital Trusts (Hereford, Worcester and Redditch, Trafford, Huddersfield and Caulderdale, Shrewsbury, Northampton, North Staffordshire, Wolverhampton, Nottingham and the The Royal Free Hospital amongst others). These trials ran for periods of between three and seven months in duration. We have identified that the introduction of the AD technology has had a significant reduction effect on the level of bio-burden (between 40% and 90%). The hospitals' own data suggests that, for at least part of the set, there is good correlation between the bio-burden reduction and the rates of outbreaks from *Clostridium difficile*, Norovirus and MRSA.

The evidence presented in this article therefore proposes the following working hypothesis: The use of the Inov8 AD Technology in a hospital setting helps to significantly reduce the environmental