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## Environmental dissemination and persistence of methicillin-resistant *Staphylococcus capitis* in a neonatal intensive care unit

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**Background:** The clone *Staphylococcus capitis* NRCS-A is involved in neonatal late-onset sepsis throughout the world. Once present in a neonatal intensive care unit (NICU), this clone is able to persist and spread, suggesting the presence of reservoirs and vectors of contamination. Objectives of the study: i) to identify the distribution and environmental persistence of this clone in a NICU, ii) to evaluate the effectiveness of incubators disinfection procedures, iii) to screen an eventual *S. capitis* carriage among caregivers.

**Material/methods:** To determine the dissemination of *S. capitis* around patients infected with *S. capitis*, several standardized samples (n=33 per patients) were collected in the close environment of 3 patients infected with *S. capitis* NRCS-A (cases) and 3 uninfected (controls). The persistence of the clone within the NICU was evaluated by 23 weekly samples (in care areas, relaxation and offices) for 6 weeks. The clone was also sought on the incubators (7 sites /incubator) before and after disinfection procedure (using antiseptic immersion bath as recommended by the manufacturer). Finally, the *S. capitis* carriage was screened by performing nasal and hand samples in voluntary caregivers, before and after an absence from the NICU during at least 5 days (wash-out period). For each sample of this study, isolation of *S. capitis* NRCS-A included a 5-day incubation on MRSA Brilliance Agar (Oxoid®) followed by species identification using MALDI-TOF of the colonies.

**Results:** The *S. capitis* clone was isolated in the environmental samples of the 3 cases (57% positive samples) as well as of the 3 controls (33% positive samples), with a more frequent contamination

around cases (OR = 2.59,  $p < 0.01$ ). The 6 weeks longitudinal study showed a persistence of the clone into the NICU, particularly in the care area (31% positive samples). The incubator contamination study showed that all the incubators (16/16) were colonized by the clone (i.e., at least one positive sample) before disinfection, and 10/16 remained colonized after the disinfection procedure. Finally the carriage study showed that 3 of 21 caregivers were colonized by the clone in the NICU (in hand samples) but none remain colonized after the 5 days wash-out period.

**Conclusions:** The clone *S. capitis* NRCS-A is widely present in the environment of the NICU and is able to persist in NICU over time. The inter-patient transmission of *S. capitis* may be favored by the partial ineffectiveness of incubators disinfection procedures and by a passive colonization of caregivers when they are present in the NICU. However there is no persistent carriage of the clone. Optimization of disinfection procedures seems urgent to reduce the endemic within the NICU and to limit the spread of the clone.