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TITLE: RN4CAST@IT-Ped: nurse staffing and children's safety

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Some authors argue that it is not longer ethically correct to expose hospitalized patients to death risks associated with understaffing (Nickitas, 2014). Also the Care Quality Commission (CQC, an independent regulator of all health and social care services in England) has included staffing levels as one of the auditing quality standards when inspecting hospitals and health centres. The Royal College of Nursing, in its document *Mandatory Nurse Staffing Levels* (RCN, 2012), clearly defined which nurse staffing levels should be adopted by policy makers to ensure the provision of safe care. However, even in the UK where such pressure exists there are no legally defined nurse staffing levels.

In paediatric care, healthcare is divided into three levels of complexity, and nurse-to-patient ratios change according to the level of complexity: intensive care 1:1; high dependency 1:2; and special care 1:4 (RCN, 2012). The minimum nurse-to-patient ratio was established to ensure positive patient outcomes (RCN, 2012). With regard to outcomes, child mortality in children under the age of 5 has passed from 12.7 million in 1990 to 5.9 million in 2015. The risk of dying is highest during the perinatal period, in fact 45% of child mortality occurs during the first year of life (WHO, 2016).

Data published in 2015 by the Centres for Disease Control & Prevention (CDC) of Atlanta, show that in the USA every 10 newborn babies, one is preterm. Of these, two-thirds survive but present higher risks of developing a severe disability at the expense of their body systems and organs. The outcomes of premature births, combined with congenital disorders, accidents and non-communicable diseases have been identified by the WHO as "healthcare priorities for the paediatric population. Approximately 1.8 million children are hospitalized each year (Owens *et al*. 2003) and due to their particular characteristics, they are more subject to medical errors and adverse outcomes, leading to increased costs to deal with the outcomes of such events.

Although some authors have examined the association between nurse staffing and adverse outcomes in children, only Cimiotti et al. in 2014, after the dissemination of the results of the international RN4CAST project in adult patients, conducted the first study that correlated adverse outcomes in children also with other factors that have an impact on staffing (Aiken *et al*. 2003). The results showed significant differences in terms of appropriateness of nursing resources, and the outcomes of paediatric patients varied according to the healthcare setting, which determined differences in the quality of care provided to patients (Cimiotti *et al*. 2014).

We found that these aspects have mostly been investigated in Neonatal Intensive Care Units (UK Neonatal Staffing Study Group, 2002; Sherenian *et al*. 2013; Gagliardi *et al*. 2016; Tubbs-Cooley & Younger, 2015; Callaghan *et al*. 2003; Rogowsky *et al*. 2013; Corchia *et al*. 2016) and confirmed how the particular characteristics of a newborn require more attention when planning staffing levels. Many authors have recommended the need to base decisions regarding the allocation of resources on evidence.

Another paediatric care setting that has been analysed, albeit less extensively, is general surgery (Hickey *et al.* 2016; Voepl-Lewis *et al.* 2012). The results showed that high levels of staff education and experience are significantly associated with minor rates of complications and mortality. In addition, staffing has a role in the association between adverse events and levels of patient surveillance: as surveillance increases, adverse events diminish, even in the case of understaffing. Due to these differences in terms of settings and study populations, it is not possible to propose a common evidence-based standard to guide the planning of the allocation of human and material resources in the field of paediatrics.

Therefore, a specific study is needed to correlate the characteristics of: a) health professionals (i.e. job satisfaction, work environment, burnout, experience, education, and staffing levels); b) the various patients that present to the paediatric services (i.e. heterogeneous diseases and complexities, age, and diverse needs); and c) patient-centred outcomes.

Consequently, in the light of the literature analyzed and the epidemiological data on the paediatric population, the University of Genoa (Italy) has decided to extend the RN4CAST@IT study (Sasso *et al*. 2015; Sasso *et al*. 2016) and conduct it also in the field of paediatrics. In collaboration with the Italian Association of Children's Hospitals (AOPI), the

University of Genoa has launched the research project "Registered Nurse Forecasting in Pediatrics" (RN4CAST@IT-Ped).

RN4CAST@IT-Ped will involve all the paediatric wards of 13 hospitals of the AOPI distributed throughout Italy. An original aspect of this study is that it considers the sampling of all patients, even those who are no longer children, but hospitalized in a pediatric ward. In fact, there are increasing numbers of young adults affected by chronic diseases which until only a few decades ago did not allow them to reach adulthood (Campbell *et al.* 2016). For instance, the life expectancy of individual affected by cystic fibrosis has significantly increased in the last few years, and currently about 56% of this population reaches adult age (in 1982 this percentage was 27%) (Cystic Fibrosis Trust, 2008).

These conditions are historically anchored to paediatric care, which still today limits the transition to services for adult care. Therefore, nurses who work in paediatric units increasingly deal with patients since these were newborns, through their adolescence, and until they become adults, and this requires that pediatric nurses have specific knowledge in fields other than paediatric care (Glasper, 2017). Therefore, ensuring optimal levels of staffing, both in terms of numbers and education, constitutes a new challenge, internationally, for health organizations.

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Conflict of Interest

The authors declare that there is no conflict of interest.

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