



## Non-Ionizing Radiation & Children's Health

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POSTER

PLATFORM PRESENTATION

### **Newborn UVA exposure during phototherapy for Jaundice treatment**

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Neonatal jaundice is one of the most common conditions needing medical attention in newborn term (60%) and preterm (80%) babies. High concentrations of unconjugated bilirubin may occasionally cause kernicterus (permanent brain damage), moreover it can also be a sign of serious liver disease. Early recognition of jaundice is vital for treatment of any underlying condition. In most cases the exposure to suitable light (phototherapy) can safely control bilirubin concentrations.

Although it is well known that blue-green spectrum (420-470 nm), is most effective, as at these wavelengths light penetrates skin well and is absorbed maximally by bilirubin, radiation emissions from commercially available phototherapy systems vary widely, depending on the types of lamps used. Relevant UV component may also be present, with potential long-term adverse effect.

The IEC CEN International Standard 60601-2-50 prescribes that the main radiation emission of infant phototherapy equipment must be in the range between 400 nm and 550 nm. Regarding UV exposure the IEC prevents that infant is exposed to UV above the ELV - 30 J/m<sup>2</sup> to a 3-day (72-hour) exposure, and has been made assuming that the same criteria adopted by the ICNIRP, to protect adult workers can also be used for the phototherapy of babies.

Due to the lack of information provided by the manufacturers, at the present time it is very difficult to obtain adequate radiation exposure data in order to get an unambiguous result stating the hazard for newborns and for workers operating with phototherapy equipment.

The aim of this study has been to assess the levels of exposure to optical radiation to which newborns and workers are usually exposed using different type of phototherapy devices in clinical use in Italy.

The results show a great variability in the spectral emission of the investigated phototherapy equipment, which is generally centred in the visible region, particularly towards the blue end; but some equipment also emits in the "Ultraviolet A" region.

Considering the high susceptibility to UV-induced skin damage of the newborn, related to its pigmentary traits, and the fact that UV exposure during infant therapy is unnecessary, it should be reduced to reduce the risk for baby and workers.

In conclusion the definition of a "standard emission spectrum" for phototherapy equipment might be very useful to optimize effectiveness of neonatal phototherapy, to reduce unnecessary UV exposure for the newborn and to optimize risk management procedures at work.