



# Daffodil

## Phototherapy Neonatal Jaundice Management System

**In collaboration with Lightweight Medical and designer Roisin Monnington**

Neonatal jaundice is the most prevalent medical condition requiring treatment in newborn babies. Daffodil's unique wraparound LED form treats jaundice more effectively. Evidence-based, user-centered design processes have delivered this inclusive product.

Daffodil's efficiency, compact footprint and usability extend its market from the ward to the home care sector.

### Brief

The brief was to research and develop an effective, accessible and safe neonatal jaundice management system. Roisin Monnington was awarded financial and tutorial support by the Lightweight Medical team throughout the design and development of the project.

### Approach

Prior to design development Monnington was asked to define a clinical need for the product. This was achieved by in depth research into the subject of neonatal jaundice and associated approaches to treatment. In order to ensure that all aspects of neonatal jaundice and its management were fully understood the research was divided into three separate areas, namely clinical, user and technical research.

Clinical research involved gaining specific knowledge surrounding the condition of neonatal jaundice through examining published medical research material, including detailed information relating to the anatomy and physiology of the condition. This area of research also encompassed a review of treatment methods and investigation into the prevalence of the condition, in order to make informed decisions regarding the treatment modality and the optimum location for treatment.

User research involved clinical visits to neonatal units to develop an understanding of the mindset of those professionals providing treatment for neonates with jaundice. This research enabled three specific user groups to be defined and each of these groups' specific needs to be established. This was considered essential in order to develop a product that met real and perceived user needs, which directly influenced the approach to the design, to ensure it was acceptable in its totality to each user group.

Technical research involved examining two elements; detailed medical research reports and medical devices' product specifications. Product comparison allowed technical specifications to be defined. Peer reviewed research reports provided knowledge about the optimisation of treatment methods.

### Result

It has been proven that many current phototherapy devices do not provide sufficient irradiance to break down bilirubin efficiently. LED is recorded as the light source that allows maximum irradiance at the neonates skin, alongside other fundamental benefits.

The final design includes a curved flexible PCB controlled by appropriate drivers housed in a formed plastic case appropriately designed for standard hospital care.

Using the design specification documents a single product was developed utilising a range of techniques including brainstorming and direct clinical review at each stage of the design process.



*"Roisin has taken a complex brief in a mature healthcare product category and developed an innovative hybrid product which balances the needs of patient and clinician. The Daffodil fills a gap in the market which currently has few, if no, competing products. Her comprehensive initial research phase laid the foundations for smooth, controlled and ultimately successful conceptual and detailed design phases. Roisin has approached the project in a manner more akin to that of an industry professional than an undergraduate student. The project has been delivered to time and cost and Lightweight Medical is a happy client."*

**Neil Tierney,**  
Director of R&D  
Lightweight Medical Ltd