

Early Phototherapy Exposure and the Development of Atopic Dermatitis in Children

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Atopic dermatitis (AD) is a chronic inflammatory skin disorder that affects up to 20% of children [1]. While phototherapy has been studied as an effective treatment option for those with an inadequate response to conventional management, this study investigates the association between phototherapy exposure during the newborn period and the subsequent development of AD.

This data was extracted from the TriNetX Network. Newborns with jaundice were divided into those who received phototherapy and those who did not. Propensity matching was performed for demographics, family history of skin disorders, bilirubin levels, and neonatal intensive care services (Figure 1).

A total of 14,770 neonates with jaundice were identified, of whom 2,172 received phototherapy and 12,598 did not. After matching, phototherapy was associated with lower one-year incidence of any dermatitis (RR 0.56; $p < 0.0001$), atopic dermatitis (RR 0.35; $p < 0.0001$), non-atopic dermatitis (RR 0.60; $p < 0.0001$), allergic rhinitis (RR 0.53; $p < 0.0001$), and asthma (RR 0.64; $p = 0.0005$). These effects attenuated over time, with no significant differences beyond two years. For treatment severity, mild therapy utilization was similar between groups, whereas moderate therapy was less frequent among the phototherapy group in the first year (RR 0.39; $p = 0.0004$) (Figure 2).

Overall, neonatal phototherapy was associated with early reductions in dermatitis and atopic outcomes, though these associations were not sustained over longer-term follow-up. A number of plausible biological mechanisms may explain the observed association. The wavelength used for jaundice treatment (460-490 nm, 478 nm optimal) has been shown to increase IL-2 and IL-10 while reducing IL-1 β [2,3]. IL-10 is a key anti-inflammatory cytokine that promotes regulatory T-cell function and suppresses Th2-mediated allergic responses, the dominant pathway in atopic dermatitis pathogenesis [4,5]. Our findings suggest early phototherapy exposure in neonates and infants may be associated with a transient reduction in early childhood dermatitis and atopic dermatitis. Further prospective studies are needed to clarify underlying mechanisms and the clinical relevance of early immunomodulatory effects.

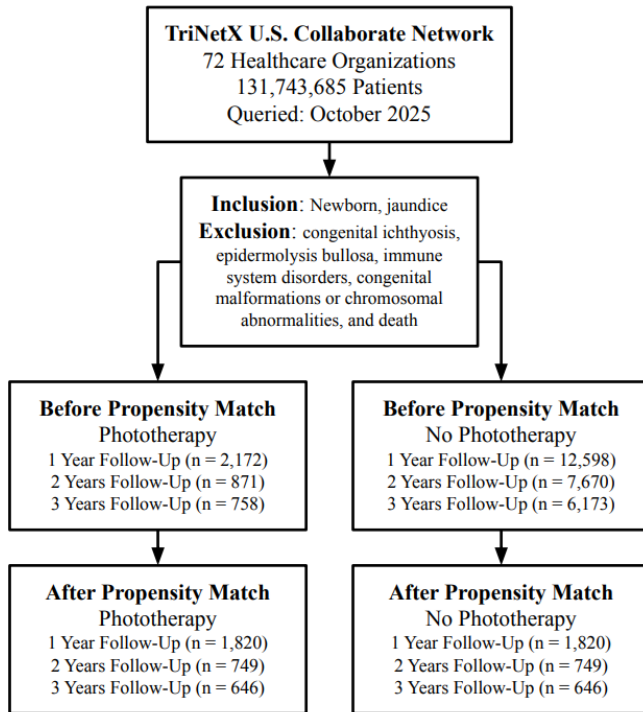


Figure 1. Flow Diagram of Cohort Construction of Newborns with Jaundice Managed With and Without Phototherapy.

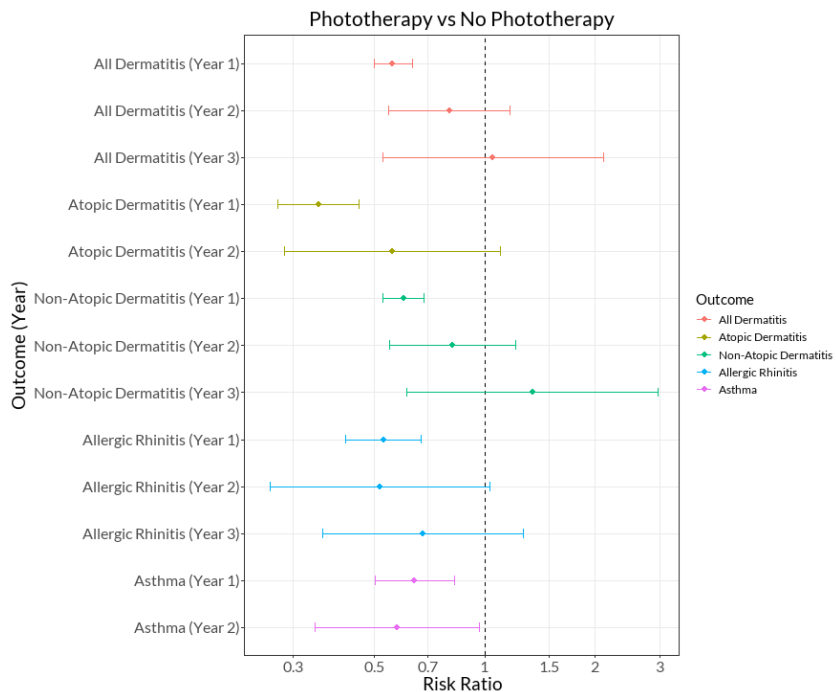


Figure 2. Forest plot comparing risk ratios for dermatologic and atopic outcomes among children exposed to phototherapy versus no phototherapy over 1–3 years of follow-up.

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