

The Incubator, Infancy and Neonatology

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Within early medical records, the word “premature” was often used to refer to all infants that were weaker, smaller and had low birth weights as compared to their “healthier” counterparts. Medical experts have varied opinions on whether their weakened state represented poor development or was a reflection of any congenital hereditary condition.

One of the primary contributions to the development of the incubator is associated with French obstetrician Stephane Étienne Tarnier who observed that infants at the Paris maternity hospital often succumbed to hypothermia. Drawing inspiration from a poultry incubator, Tarnier constructed a similar device in 1881 with a double walled wooden box that was heated with a reservoir of water in the lower compartment. The model was later condensed into a single infant structure heated by water bottles that were replaced manually. It must be noted that Tarnier’s construction of the incubator wasn’t revolutionary, for Johann Georg von Ruehl had developed an infant warming device in 1835 which he labeled the warming tube. In 1864, Carl Siegmund Franz Credé, while working in Berlin, Germany, invented a double-wall crib that maintained warmth by circulating hot water between the two walls. However, Tarnier was the first to actually provide a statistical analysis of comparative infant mortality rates before and after integrating the incubator within postnatal care, observing a 28% decrease in infant mortality across 3 years. This analysis provided a basis for medical introspection in infant health; something that was often dependent on maternal and familial care at home as well as the introduction of specialized intensive care procedures in the subsequent years, especially for those infants that were considered “pre-term”.

In 1922, Julius Hess expanded single incubators into organized incubator stations within Michael Reese Hospital along with head nurse Eveleen Lundeen under whose orders



trained nurses were appointed. One of the leading proponents of neonatal care in 1920’s America and titled the “Father of American Neonatology”, Hess integrated various proposed components of other contemporary failed incubators such as oxygen administration and developed transport systems for out-born infants. Most importantly, the three objectives of preterm care including ensuring constant body temperature, prevention of infection and nutrition optimization introduced by Hess and Lundeen reshaped the framework of preterm care as an institution. Eveleen Lundeen traveled extensively to train nurses on postnatal care and has been credited by historians in shaping the prominent role of nurses in neonatology. Hess’s research into the physical and cognitive developments of children who were born preterm dispelled medical stereotypes and definitional complications; with his advocacy resulting in his collaboration with Martin Couney at the Chicago Century of Progress Exposition in 1933. Simultaneously in 1931, Dr. A. Robert Bauer at Henry Ford Hospital in Detroit,

Michigan, successfully integrated oxygen, heat, humidity, accessibility, and nursing care within infant care procedures.

After the Second World War, Special Baby Care Units (SBCU's) were established, with the first of their kind opened at Bristol and Birmingham. The 1960's oversaw advances in respiratory support with Herbert Barrie developing an underwater safety valve in the oxygen circuit to prevent high oxygen pressures; an endotracheal tube known as the "St Thomas's Tube" and pioneered research into the resuscitation of the newborn. Neonatal care technologies are now dispersed globally with each country having its own specification into the degree of care accorded to neonates. India has a three tier system for neonatal care designated on gestational age and birth weight with infants weighing less than 1200 grams and having a gestational age lower than 30 weeks categorized under level III as the most vulnerable. Neonatal intensive care units have also started integrating parents within prenatal care across the years as Kangaroo care gains more prominence and pain management interventions are also discussed.

