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Foreword

The accreditation process of Level-II care introduced by National Neonatology Forum (NNF) standardized and accelerated the growth of special care units for high risk neonates in our country. With the introduction of DM (Neonatology) training programme there has been a phenomenal growth of Neonatal Intensive Care Units (NICU) in India.

The ultimate determinant of the quality of care delivered by such units is the intact survival rates of the neonates treated by them. Survival rates alone cannot be the end point to assess NICU treatment protocols. Experiences of the western world have clearly shown the importance of simultaneously organizing early intervention programmes for high risk babies in order to reduce the potential burden of neurodevelopment disabilities. From survival to intact survival is a real challenge of modern neonatal intensive care. This book will go a long way in meeting that challenge. There has been a genuine need for an Indian book specifically focusing on the outcome of graduates of NICUs.

The major highlight of this book is the attempt to review the relationship of risk factors, the brain damage caused, and neurodevelopmental outcome and link the same to NICU management principles. This book focuses on the follow-up in the first two years of post-natal period. Details of specific neurodevelopment disabilities, available elsewhere, have been rightly omitted.

I am glad to see so many of my colleagues and former neonatology students contributing to this book. My special congratulations to Dr Naveen and Dr Srinivas for a job well done. Dr MKC Nair and Dr A Parthasarathy team has once again shown the same magic touch, as in the IAP Textbook of Pediatrics.

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Preface

In India, neonatal mortality has remained static over the last several years. Majority of mortality could be explained by infection (52%), asphyxia (20%) and low birth weight (17%), all of which are preventable. At the community level, we have made a conscious shift from “diagnosis based” approach to “illness based protocols” in the integrated management of neonatal and childhood illness (IMNCI), a concept endorsed by both National Neonatology Forum and the Indian Academy of Pediatrics. At the tertiary level health care, Neonatal Intensive Care Units (NICUs) across the country have definitely improved the survival chances of many high risk babies, who otherwise would have succumbed easily.

Now, the question asked more often is, whether we are increasing the incidence of developmental delay and disability by saving more and lower birth weight and other at-risk babies. Unfortunately we do not have hard data on this. Our understanding of risk factors for neurodevelopmental disabilities has made definite progress, yet we still cannot predict outcome in every individual case. But, we surely know that the answer probably lies in promoting “developmental friendly well baby clinic” concept and mother oriented early stimulation at home for all babies especially for preterm/ IUGR babies. Infact, it may be now considered unethical to have a level-II and level-III NICU, without having a neonatal follow-up and developmental stimulation program. The lack of a “standard-protocol” for neurodevelopmental follow-up and availability of trained personnel has been the major limiting factors. The one year Postgraduate Diploma in Developmental Neurology course for doctors and two years Master of Health Science (MHSc) in Clinical Child Development course for nurses, therapists and doctors, being conducted by Child Development Centre, in association with Institute of Distance Education, University of Kerala is a step in the right direction.

This book attempts to **organize currently available knowledge** on risk factors affecting neurodevelopment, best practices in modifying these risks and explains simple neurodevelopmental assessment techniques. It also discusses, in detail the early stimulation program that can be initiated in the neonatal period and management of developmental delay in the

first two years, with the ultimate **objective of minimizing child hood disability**. The emphasis in this book has been in organizing current evidence into **simple protocols that can be practiced at all levels of care**. We do hope that you would find this book useful and pardon us for inadequacies inevitable in the first edition of any book.

Editors

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Abbreviations

NICU	Neonatal Intensive Care Unit
CNS	Central Nervous System
NDD	Neurodevelopmental Disability
HIE	Hypoxic Ischemic Encephalopathy
IVH	Intraventricular Hemorrhage
PVL	Periventricular Leukomalacia
WMD	White Matter Disease
CP	Cerebral Palsy
MR	Mental Retardation
MSAF	Meconium Stained Amniotic Fluid
PPHN	Persistent Pulmonary Hypertension of Newborn
MAP	Mean Arterial Pressure
ELBW	Extremely Low Birth Weight
VLBW	Very Low Birth Weight
LBW	Low Birth Weight
SVC flow	Superior Vena Caval Flow
EEG	Electroencephalogram
CSF	Cerebrospinal Fluid
LP	Lumbar Puncture
CLD	Chronic Lung Disease
BPD	Bronchopulmonary Dysplasia
ROP	Retinopathy of Prematurity
NEC	Necrotizing Enterocolitis
PDA	Patent Ductus Arteriosus
ANS	Antenatal Steroids
nCPAP	Nasal Continuous Positive Airway Pressure
DDST	Denver Development Screening Test
BSID	Bayley Scale of Infant Development