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Addendums to Chronic Lung Disease: Prevention is the Cure

Rob Graham, R.R.T., N.R.C.P.

I dedicate this column to the late Dr. Andrew (Andy) Shennan, the founder of the perinatal program at Women's College Hospital (now at Sunnybrook Health Sciences Centre). To my teacher, my mentor and the man I owe my career as it is to, thank you. You have earned your place where there are no hospitals and no NICUs, where all the babies do is laugh and giggle and sleep.

I attended our NICU's annual "Premie Picnic" for the first time in July of this year. After a 2-year hiatus due to Covid-19, it was heartening for those organising the picnic to see the number of attendees there. All appreciated the food, the various activities for the children and shade for the grown-ups. The children were delighted to pet and play with my little Havanese dogs, and the dogs were equally delighted.

Some of our NICU staff responsible for organising were there but also other staff to show support and enjoy a beautiful day in Sunnybrook Park (adjacent to our hospital). Several staff were first-time attendees as well.

Being amongst NICU graduates born at various gestation ages was a powerful reminder of just how good a job we, as a team, do. Amongst the attendees were now 20-year-old former 25-week twins, who are both fine. Thank you very much! Several children born at less than 24 weeks gestation were also present and doing very well. I was glad to have the opportunity to speak with several parents, who expressed their never-ending gratitude—a heartwarming experience.

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While watching children playing, running, and bouncing in the bouncy castle, I could not help but think back to the column I wrote for NT in March of this year, "Moral Distress In the NICU—Their pain is our pain." It occurred to me that watching these children could alleviate much of the distress and misperceptions common to bedside caregivers. A large contributor to the problem of moral distress in the NICU is the disconnect between the bedside and follow-up. We are often not afforded the opportunity to see the fruits of our labour.

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Many NICUs have rightfully embraced the concept of family-centred care, but despite carrying the banner of family-centred care, the primary focus is on the baby. Once discharged, the family is "out of sight, out of mind." The next stop is the follow-up clinic, which focuses naturally on their child. The centre of the family-centred care circle is planted firmly in the NICU.

I wrote the aforementioned column on moral distress in the NICU from a caregiver's perspective. There is another perspective—the parents'.

Even an exceptionally empathic person can only feel a part of what parents feel as they watch the centre of their universe struggling to survive. Every poke, every intubation, and every procedure can add to the anxiety, fear, and even depression already raging within them. Some have a support network, but many do not. This is especially true of those delivering in a tertiary care centre far from their home and families, single parents, and new immigrants or refugees.

Even with socialised medicine, financial demands can quickly become overwhelming. Parking, alternate accommodations, food, and transportation costs all bleed budgets that may already be reeling from the lack of a paycheque and are in addition to costs

associated with their permanent residence.

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The detrimental effects of stress on mental and physical health are well known. This negative effect extends beyond parents and may lead to problems during their baby's hospital stay and after discharge. I have experienced seeing parents so traumatised by the prospect of all the things that can go wrong and the barrage of statistics that it resulted in detaching from their child. The more unfavourable a baby's prognosis, the more likely this will happen. Fearful of losing their baby, they may try to blunt that hurt by not bonding.

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Unfortunately, the benefits of kangaroo care (KC) are often lost to them because bedside caregivers consider the baby too unstable to do so. While caution is warranted and safety is paramount, every effort should be made to facilitate KC or modified KC as early as possible; and it should be discouraged only in the most severe cases. A parent should be encouraged to hold their baby whenever possible. Losing a child without ever having held them is an anguish no parent should ever suffer.

When parents do bond and make attachments with their baby, it may be dysfunctional. "Vulnerable baby syndrome" is a phenomenon seen in follow-up clinics. It manifests differently, but all represent an abnormal attachment (or lack thereof) between a parent and their child. Parents may be over-protective or over-controlling, make inordinate use of healthcare services if they believe their child is ill, or socially isolate their child for fear of exposure to germs. Parents may socially isolate themselves because they do not trust anyone else to care for the child in their absence (1). These behaviours are detrimental to the child's normal socialisation and development. There is a call to reframe how outcomes are presented to parents that are meaningful to them, not just the medical community (2).

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"Put your mask on first" is the instruction given to aircraft passengers in a loss of cabin pressure emergency. This is because a person is not able to help another if they are incapacitated. We send babies home to be cared for by their parents, but their experiences may hinder that ability in the NICU. We must ensure parents are prepared to provide the best care possible to optimise that care. We must accept that while our primary patients are babies, their well-being hinges upon our providing the support parents need to deal with the trauma of delivering prematurely and the attending course to follow. We need to do better.

Last month's column, "Chronic Lung Disease: Prevention is the cure," discussed a hybrid approach to ventilation with jet ventilation and recruitment maneuvers. Two statements in that piece could be misunderstood and require clarification.

"HFJV is less affected by airway resistance" is true but could be interpreted as jet ventilation *not* being affected by airway resistance, which is false. "Sheer thinning" is a phenomenon usually attributed to non-Newtonian liquids, but the effect is also seen in gas flow (3). Flow velocity is higher in the centre of a tube and slower along the edges due to frictional forces at the interface between the tube and that flowing within it. Because the jet breath travels down the centre of the airway, it does not contact the airway walls. It still faces resistance from the gas in its path.

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The difference between conventional and jet ventilation is that while compliant areas will accept more volume, that volume does not come from non-compliant areas in jet ventilation. When the jet breath reaches non-compliant areas, it fizzles, dissipating. It does not reverse direction and flow into compliant areas. Conversely, in conventional ventilation, the bulk flow of a breath facing high resistance and low compliance will compress momentarily and then flow into compliant areas during pendelluft. Unlike jet ventilation, excess volume to compliant areas is redirected from areas of lower compliance.

In the end, compliant areas will accept more volume; volume comes from the portion of the jet breath that reaches them.

The take-home message is that HFJV is well suited to meeting the challenges associated with chronic lung disease; prevention is still the cure.

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