Pediatric Patient's Hierarchy of Developmental Needs: An Ecobiodevelopmental Protective Framework for Hospitalized Children

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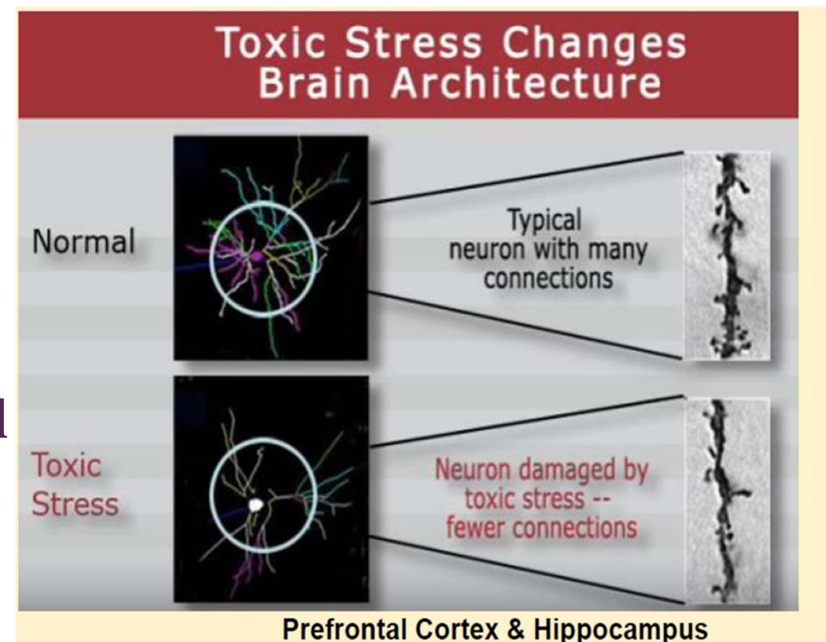
The Adverse Childhood Experience of Hospitalization

- Children who are exposed to hospitalization and chronic illness are at-risk for "developmental interruption" as a result of toxic stress and anxiety changing the architecture of the developing brain.[1]

- Teaching children coping interventions may profoundly influence a child's physical and mental health, considering the fact that synoptic connections in the brain are fewer in number when children lack the ability to effectively manage their anxiety and stress. [1]



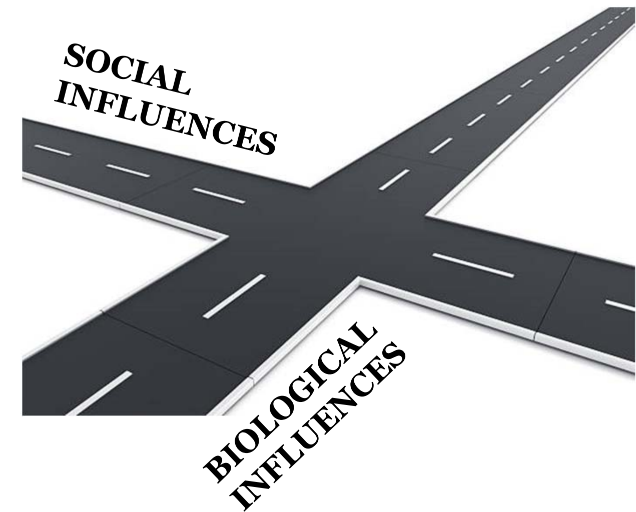
Pediatric Psychosocial Care

- Refers to the relationship between psychological and social effects and the influence they have while continuously interacting with each other.[2]
- Serves as a buffer for at-risk children.
- Effective non-pharmacologic pain intervention may elicit activation of neuropeptide systems, such as cholecystokinin.[3] Cholecystokinin is an opioid-modulating substance that promotes stressor adaptability and can achieve an analgesic effect through the potentiation of opioid activity.[4]
- Ultimately, pediatric psychosocial care uses these types of child-friendly non-pharmacologic approaches in order to teach children and families coping skills to help alleviate developmentally damaging stress and anxiety.

The Pediatric Patient Ecosystem

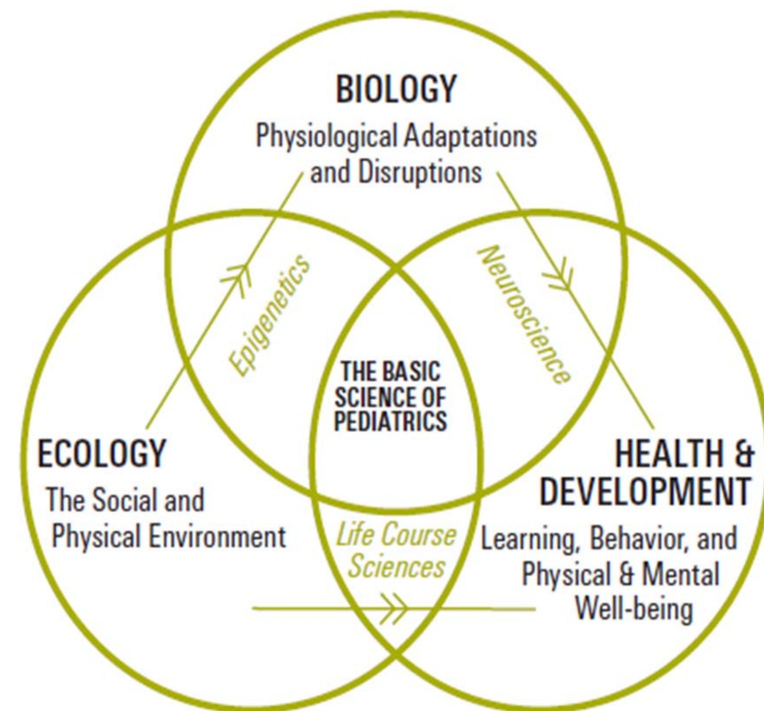
- Central to the Pediatric Patient's Hierarchy of Developmental Needs (PPHDN) framework is the concept of thinking of the child and family as an ecosystem.

- The idea is that the features effecting healthy development and functioning are best understood through examining the intersection of biological and social influences.



Ecobiodevelopmental Framework

- An emerging science for understanding the evolution of human health and disease across the lifespan.
- The framework converges and demonstrates the strong association between physiological adaptions and disruptions (biology), the social and physical environment (ecology), and learning, behavior, and physical and mental well-being (health and development) on the developmental outcomes and life course trajectories of children.



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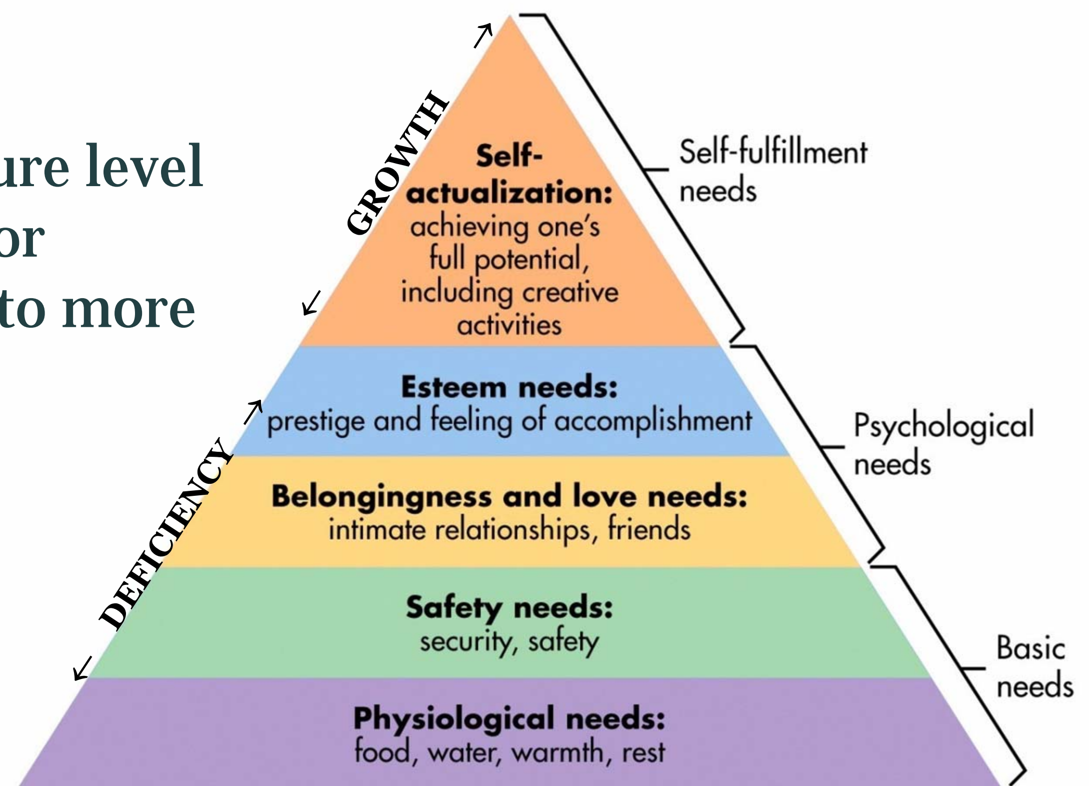
Maslow's Hierarchy of Needs

- Motivation Theory.[36]
- Deficiency vs. Growth
- One progresses from a secure level of basic need satisfaction for survival before moving on to more complex needs.[37]

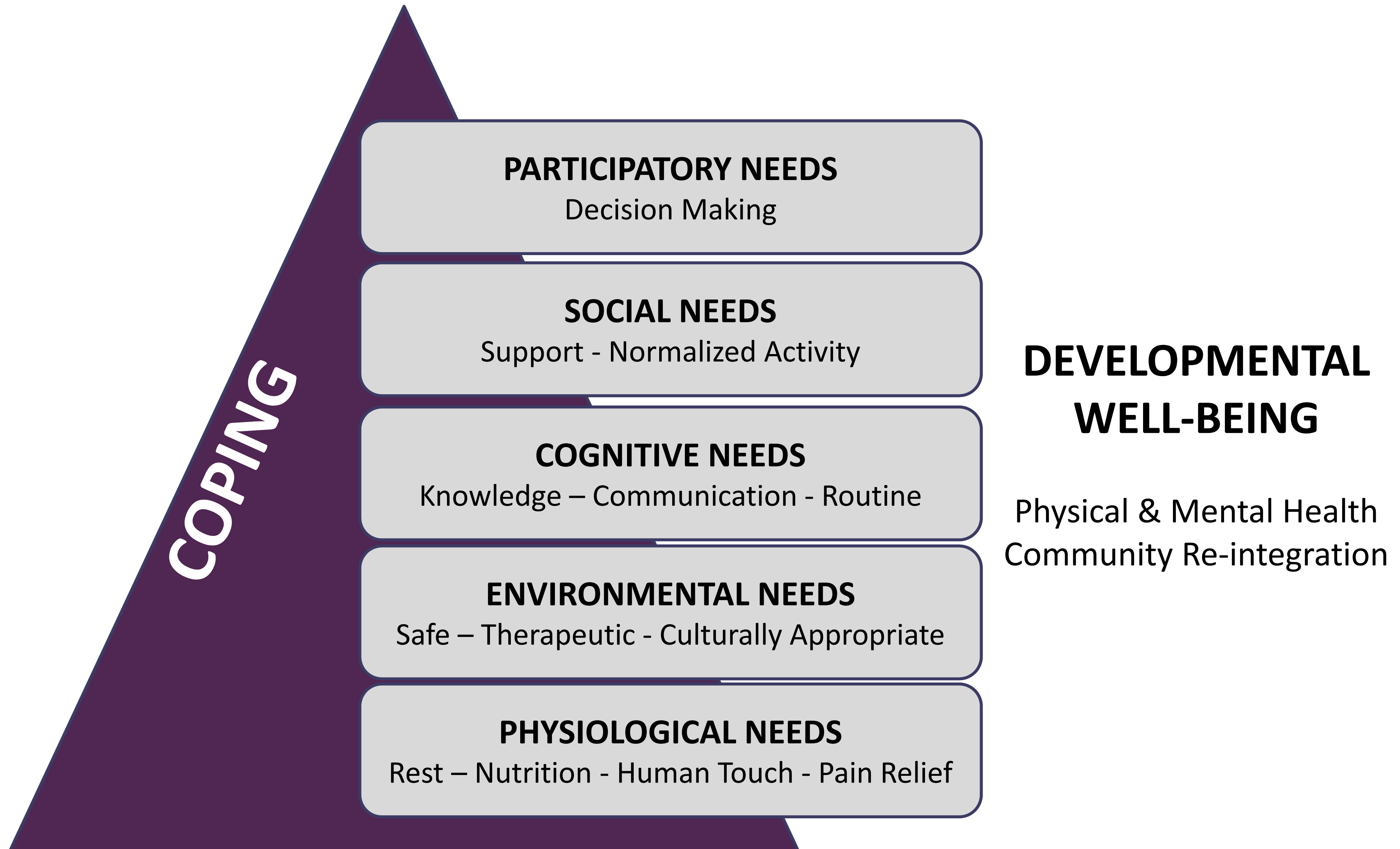


Pediatric Patient's Hierarchy of Developmental Needs

- The authors hereby propose a Pediatric Patient's Hierarchy of Developmental Needs (PPHDN) as a means for consistent global application when treating children in hospital.

- Drawing upon Maslow's Hierarchy of Needs, ecological theory, and the Ecobiodevelopmental Framework, the PPHDN adds the component of *child development* to guide best practice intervention strategies.

Pediatric Patient's Hierarchy of Developmental Needs



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Physiological Needs

Rest

- Restorative for brain metabolism and serves memory consolidation and learning.[6]
- Therefore, ensure a child receives proper rest in the hospital. Maintain consistent rest patterns for the child by working collaboratively with the family to incorporate rest into the child's daily schedule.

Nutrition

- Nutrients provide building blocks that play a critical role in cell proliferation, DNA synthesis, neurotransmitter and hormone metabolism, and are important constituents of enzyme systems in the brain impacting cognition,[7] timing of sexual development,[8] behavioral and emotional expression.[9]

Human Touch

- Infants and children in institutional care typically receive minimal touching from caregivers which is related to their later cognitive and neurodevelopmental delays.[10]
- Touch decreases blood pressure and heart rate as well as stress hormones cortisol and alpha amylase and increases oxytocin levels.[11]

Pain Relief

- Pain in children is associated with short and long-term physiological and psychological adverse effects, negatively impacting social and neurocognitive developmental outcomes.[12]
- Pain management strategies are associated with more rapid and full recoveries and decreased costs to the health care system.[13]

Environmental Needs

Safe

- Not only prudent in risk management, but may also provide a tool for demonstrating preventative basic home safety principles to parents, such as fall prevention.[14]

Therapeutic

- Research shows that a therapeutic physical healing environment can influence treatment processes and health outcomes.[15]
- Factors essential to an effective therapeutic healing environment are safety,[16] sound,[16] color,[17] artwork,[18] interactive art,[19] lighting,[20] outdoor spaces,[21] furnishing [22] and atmosphere.[23]
- Optimizes clinical care and outcomes as well as employee satisfaction and morale in addition to patient satisfaction.[24]

Culturally Appropriate

- Cultural incompetence can result in compromised quality of care, noncompliance by the patient, inability to recognize differences, fear of the new or unknown, denial, and inability to look in depth at the individual needs of the patient and her or his family.[25]

Cognitive Needs

Knowledge	Communication	Routine
• Pediatric patients facing medical events benefit from developmentally appropriate knowledge though preparation before the experience. • Content should contain information about both sensory and procedural expectations.[26]	• Should be presented step by step in simple and concrete terms according to what the child will emotionally and physically experience. • Evidence suggests that children's memory will be improved if photographs or other illustrations are used in teaching.[27]	• Provides children with a sense of security, serving as an anchor that allows them to deal with ambiguity, the unexpected, and unfamiliar.[28] • At risk of routine interruption simply by the nature of being in an unfamiliar environment with limited control of their surroundings.[29] • Schedules, such as times for medication taking, procedures, medical rounds, etc. are often determined based on the convenience of the medical team.[29]

Social Needs

Support

Interruptions or disruptions to typical play such as physical limitations from hospitalization can interfere with the acquisition of socialization and support developed through peer relations.[30]

In fact, youth asked about their perspectives on their illness and overall adjustment have reported social support was a highly valued and important component of managing their illness.[31]

Normalized Activity

Provides continuity between the hospital and the outside world and pleasant associations with unpleasant circumstances are established.[32]

Normalizes the unpleasant circumstances of tests, procedures, medical equipment, etc. and brings typical experiences the child might experience when not hospitalized, into the hospital walls.[32]

Participatory Needs

Decision Making

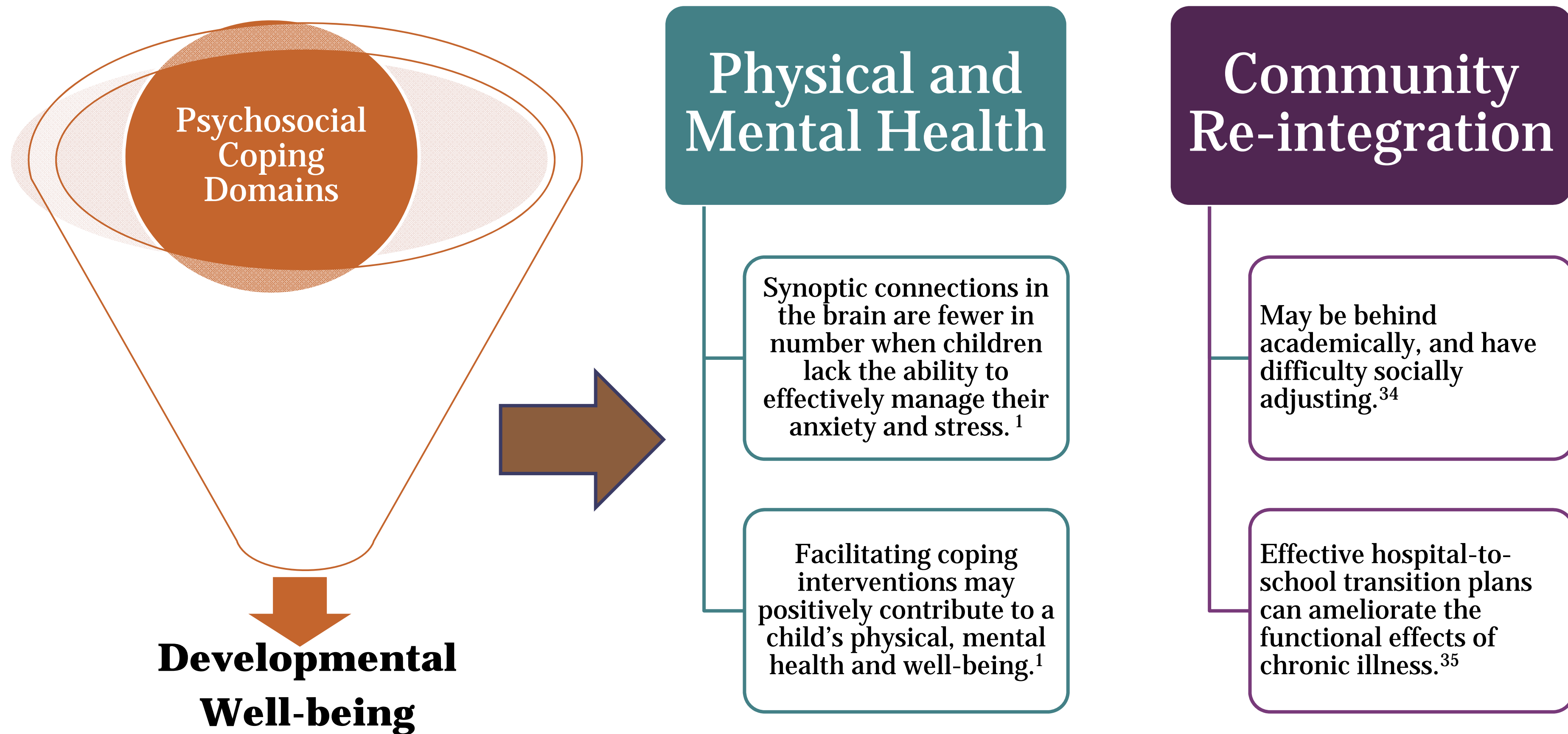
Children interpret, organize, and use information from the environment, and acquire adult skills and knowledge via the process of active decision making.[28]

Encouraging children's autonomy is an important element of fostering self-esteem in children of any age, and loss of self-determination may encourage learned helplessness, negatively influencing children's adjustment to their illness and overall welfare.[29]

Listening to children and taking their feelings and opinions seriously are now enshrined in national and international law.

The UN convention on the rights of the child, and the Children Act in Great Britain, make it imperative that the opinions of children are considered when decisions concerning them are made.[33]

Developmental Well-being



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References

- 1. Center on the Developing Child. (2011). InBrief: The impact of early adversity on children's development. *Harvard University.* Retrieved from http://developingchild.harvard.edu/resourcecategory/multimedia/
- 2. Guiding Principles. (2005). Psychosocial care and protection of tsunami affected children. *Save the Children.* Retrieved from http://resourcentre.savethechildren.se/sites/default/files/documents/2981.pdf
- 3. Cignacco, E., Hamers, J.P.H., Stoffel, L., van Lingen, R. A., Gessler, P., McDougall, J., & Nelle, M. (2007). The efficacy of non pharmacological interventions in the management of procedural pain in preterm and term neonates. A systematic literature review. *European Journal of Pain (London, England)*, *11*(2), 139–152. Retrieved from http://doi.org/10.1016/j.ejpain.2006.02.010
- 4. Hebb, A.L.O., Poulin, J.-F., Roach, S. P., Zacharko, R. M., & Drolet, G. (2005). Cholecystokinin and endogenous opioid peptides: Interactive influence on pain, cognition, and emotion. *Progress in Neuro-Psychopharmacology & Biological Psychiatry*, *29*(8), 1225–1238. Retrieved from https://doi. org/10.1016/j.pnpbp.2005.08.008.
- 5. Adverse Childhood Experiences and the Lifelong Consequences of Trauma. (2014). *American Academy of Pediatrics,* 1-5. Retrieved March 17, 2017, from https://www.aap.org/en-us/Documents/ttb_aces_consequences.pdf
- 6. Benington JH, Heller HC. Restoration of brain energy as the function of sleep. Prog Neurobiol. 1995;45:347–360.
- 7. Bhatnagar, S., and Taneja, S. (2001). Zinc and cognitive development. *Br. J. Nutr*. 85, S139–S145.
- 7. Lozoff, B., and Georgieff, M. K. (2006). Iron deficiency and brain development. *Semin. Pediatr. Neurol*. 13, 158–165.
- 7. Zeisel, S. H. (2009). Importance of methyl donors during reproduction. *Am. J. Clin. Nutr*. 89, 673S–677S.
- 7. De Souza, A. S., Fernandes, F. S., and Do Carmo, M. G. (2011). Effects of maternal malnutrition and postnatal nutritional rehabilitation on brain fatty acids, learning, and memory. *Nutr. Rev*. 69, 132–144.
- 7. Zimmermann, M. B. (2011). The role of iodine in human growth and development. *Semin. Cell Dev. Biol*. 22, 645–652.
- 8. Epstein LH, Wing RR, Valaski A. Childhood obesity. Pediatr Clin North Am 1985;32:363–79.
- 8. Forbes GB. Influence of nutrition. In: Forbes GB, ed. Human body composition: growth, aging, nutrition and activity. New York: Springer-Verlag, 1987:209-47.
- 9. Kleinman, R. E., Murphy, J. M., Little, M., Pagano, M., Wehler, C. A., Regal, K., & Jellinek, M. S. (1998). Hunger in Children in the United States: Potential Behavioral and Emotional Correlates. *Pediatrics,101*(1). doi:10.1542/peds.101.1.e3.
- 10. MacLean, K. (2003). The impact of institutionalization on child development. Development and psychopathology, 15, 853–884.
- 11. Heinrichs, M., Baumgartner, T., Kirschbaum, C., & Ehlert, U. (2003). Social support and oxytocin interact to suppress cortisol and subjective responses to psychosocial stress. Biological Psychiatry, 54, 1389–1398.
- 11. Henricson, M., Berglund, A. L., Maatta, S., Ekman, R., & Segesten, K. (2008). The outcome of tactile touch on oxytocin in intensive care patients: A randomized controlled trial. Journal of Clinical Nursing, 17, 2624–2633.
- 12. Grunau RE, Tu MT. Long-term consequences of pain in human neonates. In: Anand KJS, Stevens BJ, McGrath PJ, editors. Pain in neonates and infants. Philadelphia, PA: Elsevier; 2007. p. 45–66.

References continued

- 13. Dufault MA, Sullivan M. A collaborative research utilization approach to evaluate the effects of pain management standards on patient outcomes. J Prof Nurs 2000;16:240–50.
- 14. Levene S, Bonfield G. Accidents on hospital wards. Arch Dis Child 1991;66:1047-9.
- 14. Banco L, & Powers A. Hospitals: Unsafe environments for children. Pediatrics 1988;82:794-7.
- 14. Lyons TJ, Oates RK. Falling out of bed: A relatively benign occurrence. Pediatrics 1993;92:125-7.
- 15. M. Y. Abbas and R. Ghazali, "Healing environment: paediatric wards-status and design trend," Procedia—Social and Behavioral Sciences, vol. 49, pp. 28–38, 2012.
- 16. Biley, FC (1996). Hospitals: healing environments? Complementary Therapies in Nursing and Midwifery, vol. 2, no. 4, pp. 110–115.
- 17. Ananth, S. (2008), *The natural next step*. Explore, vol. 4, no. 4, pp. 273– 274.
- 18. Daykin, N., Byrne, E., Soteriou, T., & O'Connor, S. (2008). The impact of art, design and environment in mental healthcare: a systematic review of the literature, Journal of the Royal Society for the Promotion of Health, vol. 128, no. 2, pp. 85–94, 2008.
- 18. Whitehouse, S., Varni, JW., Seid, M., et al., "Evaluating a children's hospital garden environment: utilization and consumer satisfaction," Journal of Environmental Psychology, vol. 21, no. 3, pp. 301–314, 2001.
- 19. Stichler, JF., (2008). Healing by design. Journal of Nursing Administration, vol. 38, no. 12, pp. 505–509, 2008.
- 20. Beauchemin, KM., & Hays, P., (1996). Sunny hospital rooms expedite recovery from severe and refractory depressions. Journal of Affective Disorders, vol. 40, no. 1-2, pp. 49–51.
- 21. Ulrich, RS., (1984). View through a window may influence recovery from surgery/ Science, vol. 224, no. 4647, pp. 420–421, 1984.
- 22. Baldwin, S. Effects of furniture rearrangement on the atmosphere of wards in a maximum-security hospital. Hospital & Community Psychiatry, vol. 36, no. 5, pp. 525–528, 1985.
- 23. Moran, T., (1993). Hospital Hotel Crain's Detroit Business. Detroit, vol. 9, no. 18, p. 11.
- 24. Altimier, LB. (2004). Healing environments: for patients and providers. *Newborn and Infant Nursing Reviews*, vol. 4, no. 2, pp. 89 92.
- 25. Wells, S. A., & Black, R. (2000). Cultural competency for health professionals. Bethesda, MD: American Occupational Therapy Association.
- 26. Spafford PA, von Baeyer CL, Hicks CL. Expected and reported pain in children undergoing ear piercing: a randomized trial of preparation by parents. Behav Res Ther. 2002;40(3):253–266.
- 26. Tak JH, van Bon WH. Pain- and distress-reducing interventions for venipuncture in children. Child Care Health Dev. 2006; 32(3):257–268.
- 26. Suls J, Wan CK. Effects of sensory and procedural information on coping with stressful medical procedures and pain: a metaanalysis. J Consult Clin Psychol. 1989;57(3):372–37.

References continued

- 27. McGuigan F, Salmon K. Pre-event discussion and recall of a novel event: how are children best prepared? *J Exp Child Psychol.* 2005;91(4):342–366.
- 28. Corsaro, W. A. (1992). Interpretive Reproduction in Children's Peer Cultures. *Social Psychology Quarterly, 55*(2), 160. doi:10.2307/2786944.
- 29. Coyne, I. (2006). Children's experiences of hospitalization. *Journal of Child Health Care, 10*(4), 326-336**.**
- 30. Burdette, H.L. & Whitaker, R.C. (2005). Resurrecting free play in young children: Looking Beyond fitness and fatness to attention, affiliation, and affect. *Arch Pediatr Adolesc Med*, 159, 46-50.
- 30. Hay, D.F., Payne, A. & Chadwick, A. (2004). Peer relations in childhood. *Journal of Child Psychology*, 45(1), 84-108.
- 31. Lightfoot, J., Wright, S., & Sloper, P. (1999). Supporting pupils in mainstream school with an illness or disability: Young people's views. Child: Care, Health and Development, 25, 267 – 283.
- 32. Froehlich, M.A.R. (1984).A comparison of the effect of music therapy and medical play therapy on the verbalization behavior of pediatric patients. *Journal of MusicTherapy,*21 (l), 2-15.
- 33. Taylor, A.S. (2000). The U.N. Convention on the rights of the child: Giving children a voice. In A. Lewis & G. Lindsay (Eds.), *Researching children´s perspectives* (pp. 21-33). Buckingham, England: Open University Press.
- 34. McDougall, J., King, G., de Wit, D. J., Miller, L. T., Hong, S., Offord, D. R., et al. (2004). Chronic physical health conditions and disability among Canadian school-aged children: A national profile. Disability and Rehabilitation, 26, 35 – 45.
- 35. American Academy of Pediatrics, Committee on School Health. (1993). Children with chronic illness. In P.R. Nader (Ed.), School health: Policy and practice (pp. 188 – 195). Elk Grove, IL: Author.
- 36. Maslow, A.H. (1943). A Theory of Human Motivation. *Psychological Review,* 50(4), 370-96.
- 37. Poston, B. (2009). An exercise in personal exploration: Maslow's Hierarchy of Needs. The Surgical Technologist.(1), 347-353.