

1 MCN Commentary

2 Dietary Guidelines for Children Under Two Years of Age in the Context of 3 Nurturing Care

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9 Abstract

10 Dietary guidelines provide nutritional advice to different subsets of the population, but often do
11 not take into account ‘how’ to eat. Responsive feeding is a key dimension of responsive
12 parenting involving reciprocity between the child and caregiver during the feeding process and is
13 characterized by caregiver guidance and recognition of the child’s cues of hunger and satiety.
14 There is increasing evidence to indicate that providing responsive feeding guidance to mothers
15 on how to recognize and respond appropriately to children’s hunger and satiety cues can lead to
16 improved feeding practices and weight status and developmental outcomes among infants and
17 young children. In addition, early and nurturing exposures to foods with different tastes and
18 textures and positive role modeling helps children to learn to eat healthy foods in a nurturing
19 way. The importance of improving caregiver’s responsive feeding behaviors to ensure the
20 adequate introduction of complementary foods is becoming increasingly recognized, but
21 responsive feeding principles are not used in a comprehensive way in the development of dietary
22 guidelines. The incorporation of responsive feeding principles into dietary guidelines has a
23 strong potential to enhance the impact on early childhood development outcomes for infants and

24 young children, but will require adaptation to the different contexts across countries to ensure
25 that they are culturally sensitive and grounded in a deep understanding of the types of foods
26 available to diverse communities.

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29 Early childhood development research has unequivocally shown that essential motor, language,
30 cognitive, social, emotional and behavioral skills are acquired during the first years of life, thus,
31 adequate nutrition is essential for optimal growth and development of children. The nurturing
32 care framework recognizes that children need to be surrounded by safe, stimulating
33 environments that promote healthy growth and development. Providing nurturing care to
34 children has been identified as a global priority (Black, Perez-Escamilla, & Rao, 2015; Black et
35 al., 2017) although the feeding dimension remains untapped, in part, as a result of a lack of clear
36 responsive feeding guidelines during the first 1000 days of life.

37 Dietary guidelines (DGs) have typically focused on the ‘what’ different subgroups in the
38 population should be advised to eat and ‘why’ (Herforth et al., 2019). However, little attention
39 has been paid to the ‘how’ to eat or, in the case of infants and young toddlers, how to feed them.
40 This commentary focuses on the need of more relevant dietary guidelines targeting the first 1000
41 days of life given that it represents a highly sensitive period of time for the future growth, health
42 and development of human (Black et al., 2017). During this period of time, especially infancy
43 and early toddlerhood, the how to feed is a crucial component of responsive parenting and
44 feeding which in turn are central elements of nurturing care (Black et al., 2017). Responsive
45 feeding (RF) is a key dimension of responsive parenting involving reciprocity between the child
46 and caregiver during the feeding process. It is grounded upon the following three steps: (1) the

47 child signals hunger and satiety through motor actions, facial expressions, or vocalizations; (2)
48 the caregiver recognizes the cues and responds promptly in a manner that is emotionally
49 supportive, contingent on the signal, and developmentally appropriate; and (3) the child
50 experiences a predictable response to signals (Bentley, Wasser, & Creed-Kanashiro, 2011;
51 Black & Aboud, 2011; Pérez-Escamilla, Segura-Pérez, & Lott, 2017). Ultimately the key
52 outcome sought through RF is for the young child to learn to self-regulate their food intake in
53 response to hunger. RF has been found to have strong potential to help prevent both
54 undernutrition and overnutrition making it highly relevant for dietary guidance in the context of
55 the double burden of malnutrition global epidemic (Pérez-Escamilla & Segura-Pérez, 2019).
56 In our experience there are five RF aspects that caregivers and health care providers of young
57 children could greatly benefit from if they are incorporated into DGs for infant and young
58 children. First, what the mother eats and drinks during pregnancy and lactation is likely to
59 important for the future development of food preferences in the child (Spahn et al., 2019).
60 Indeed, consistent evidence indicates that flavors such as alcohol, anise, carrot, and garlic;
61 originating from the maternal diet during pregnancy and lactation, can transfer to and flavor
62 amniotic fluid. Furthermore, fetal flavor exposure increases acceptance of similarly flavored
63 foods when re-exposed during infancy and childhood (Spahn et al., 2019). Second, it is important
64 to interpret correctly hunger and satiety cues and how they evolve as the child develops.
65 Consistent evidence from randomized controlled trials indicates that providing RF guidance to
66 mothers on how to recognize and respond appropriately to children's hunger and satiety cues can
67 lead to improved weight status among infants and young toddlers (Spill et al., 2019a), and may
68 improve developmental outcomes (Vasir et al., 2012). Third, beginning at around 6 months of age
69 when complementary foods are introduced for the first time, children benefit from repeated

70 exposure to a variety of foods and also a variety of textures that are appropriate for their
71 developmental stage (Spill et al., 2019b). Fourth, focusing on establishing pleasant and
72 stimulating eating time experiences, including not pressuring the child to eat and positive role
73 modeling of healthy dietary behaviors by caregivers, and avoiding screen distraction; helps the
74 child learn to eat healthy foods in a nurturing way (Birch & Doub, 2014; Pérez-Escamilla et al.,
75 2017; Spill et al., 2019a).

76 At the global level, most research assessing comprehensive RF interventions conducted in high
77 income countries has been done in families with high socio-economic status (Hurley, Cross, &
78 Hughes, 2011; Pérez-Escamilla et al., 2017; Redsell et al., 2016; Savage, Birch, Marini,
79 Anzman-Frasca, & Paul, 2016). There is a strong need to understand how low-income families in
80 countries with different levels of economic development can implement RF practices in their
81 households given the lack of access they often have to healthy foods, health care access,
82 resources and the overall stability needed for it to work (Abebe, Haki, & Baye, 2017; Naila et al.,
83 2018; Pérez-Escamilla et al., 2017; Silva Garcia et al., 2018).

84 In 2003, the Global Strategy for Infants and Young Child Feeding (WHO & UNICEF, 2003)
85 recognized the importance of improving caregiver's RF behaviors to ensure the adequate
86 introduction of complementary foods. Later, the Pan American Health Organization (PAHO)
87 and WHO released the Guiding Principles for Complementary Feeding of the Breastfed Child
88 with RF being one of them (PAHO & OMS, 2004). However, it has not been until more recently
89 that some RF principles have been incorporated into DG's among diverse countries including
90 Canada (Health Canada, Canadian Paediatric Society, Dietitians of Canada, & Breastfeeding
91 Committee for Canada, 2012), Mexico (Bonvecchio et al., 2015), Brazil (Ministério da Saúde,
92 2018; UNICEF-Brazil, 2018), and Europe (Fewtrell et al., 2017). However, the use of a

93 comprehensive responsive feeding framework for the development of infant feeding
94 recommendations remains largely unexplored. An exception are the U.S. HER-RWJF RF
95 Guidelines for Infants and Young Toddlers (Pérez-Escamilla et al., 2017) that have now been
96 adopted for use in Mexico's government sponsored child health and education centers as part of
97 the birth to five initial education nurturing care initiatives from the Ministry of Education (Pérez-
98 Escamilla, Segura-Pérez, & García-Martínez, 2018).
99 Incorporating RF as part of DGs that address early childhood, especially the first 1000 days of
100 life, will require adaptation to the different contexts across countries to ensure that they are
101 culturally sensitive and grounded in a deep understanding of the types of foods available to
102 diverse communities (Gladstone et al., 2018). The design and assessment of UNICEF's C-IYCF
103 Counseling Package in Nigeria is an example as to how this process of adaptation can
104 successfully occur using sound mixed methods implementation science approaches (Lamstein et
105 al., 2018). Lastly, incorporating RF guidelines into the protocols for Early Childhood
106 Development nurturing care home visits such as Care for Child Development (WHO, 2012), and
107 Reach Up (Smith et al., 2018) has a strong potential to enhance even more the impact of these
108 nurturing care interventions on ECD outcomes(Britto et al., 2017; Richter et al., 2017) .

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References

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- 111
- 112 Abebe, Z., Haki, G. D., & Baye, K. (2017). Child feeding style is associated with food intake and
113 linear growth in rural Ethiopia. *Appetite*, 116, 132-138. doi:10.1016/j.appet.2017.04.033
114 Bentley, M. E., Wasser, H. M., & Creed-Kanashiro, H. M. (2011). Responsive feeding and child
115 undernutrition in low- and middle-income countries. *J Nutr*, 141(3), 502-507.
116 doi:10.3945/jn.110.130005
117 Birch, L. L., & Doub, A. E. (2014). Learning to eat: birth to age 2 y. *Am J Clin Nutr*, 99(3),
118 723s-728s. doi:10.3945/ajcn.113.069047
119 Black, M. M., & Aboud, F. E. (2011). Responsive feeding is embedded in a theoretical
120 framework of responsive parenting. *J Nutr*, 141(3), 490-494. doi:10.3945/jn.110.129973

- 121 Black, M. M., Perez-Escamilla, R., & Rao, S. F. (2015). Integrating nutrition and child
122 development interventions: scientific basis, evidence of impact, and implementation
123 considerations. *Adv Nutr*, 6(6), 852-859. doi:10.3945/an.115.010348
- 124 Black, M. M., Walker, S. P., Fernald, L. C. H., Andersen, C. T., DiGirolamo, A. M., Lu, C., . . .
125 Grantham-McGregor, S. (2017). Early childhood development coming of age: science
126 through the life course. *Lancet*, 389(10064), 77-90. doi:10.1016/s0140-6736(16)31389-7
- 127 Bonvecchio, A. A., Fernández-Gaxiola, A. C., Plazas, B. M., Kaufer-Horwitz, M., Pérez-Lizaur,
128 A. B., & Rivera-Dommarco, J. A. (2015). *Guías alimentarias y de actividad física*.
129 Retrieved from
130 https://www.anmm.org.mx/publicaciones/CAnivANM150/L29_ANM_Guias_alimentarias.pdf
- 131 Britto, P. R., Lye, S. J., Proulx, K., Yousafzai, A. K., Matthews, S. G., Vaivada, T., . . . Bhutta,
132 Z. A. (2017). Nurturing care: promoting early childhood development. *Lancet*,
133 389(10064), 91-102. doi:10.1016/s0140-6736(16)31390-3
- 134 Fewtrell, M., Bronsky, J., Campoy, C., Domellof, M., Embleton, N., Fidler Mis, N., . . .
135 Molgaard, C. (2017). Complementary Feeding: A Position Paper by the European Society
136 for Paediatric Gastroenterology, Hepatology, and Nutrition (ESPGHAN) Committee on
137 Nutrition. *J Pediatr Gastroenterol Nutr*, 64(1), 119-132.
138 doi:10.1097/mpg.0000000000001454
- 139 Gladstone, M., Phuka, J., Mirdamadi, S., Chidzalo, K., Chitimbe, F., Koenraads, M., & Maleta,
140 K. (2018). The care, stimulation and nutrition of children from 0-2 in Malawi-
141 Perspectives from caregivers; "Who's holding the baby?". *PLoS One*, 13(6), e0199757.
142 doi:10.1371/journal.pone.0199757
- 143 Health Canada, Canadian Paediatric Society, Dietitians of Canada, & Breastfeeding Committee
144 for Canada. (2012). Nutrition for healthy term infants: recommendations from birth to six
145 months. *Can J Diet Pract Res*, 73(4), 204. doi:10.3148/73.4.2012.204
- 146 Herforth, A., Arimond, M., Alvarez-Sanchez, C., Coates, J., Christianson, K., & Muehlhoff, E.
147 (2019). A Global Review of Food-Based Dietary Guidelines. *Adv Nutr*.
148 doi:10.1093/advances/nmy130
- 149 Hurley, K. M., Cross, M. B., & Hughes, S. O. (2011). A systematic review of responsive feeding
150 and child obesity in high-income countries. *J Nutr*, 141(3), 495-501.
151 doi:10.3945/jn.110.130047
- 152 Lamstein, S., Perez-Escamilla, R., Koniz-Booher, P., Begin, F., Adeyemi, S., Kaligirwa, C., . . .
153 Adebisi, B. (2018). *The Community Infant and Young Child Feeding Counselling
154 Package in Kaduna State, Nigeria. A Mixed Methods Evaluation*. Retrieved from
155 https://www.springer-nutrition.org/sites/default/files/publications/reports/nigeria_ciycf_eval_rep_15-2-18.pdf
- 156 Ministério da Saúde. (2018). Guia alimentar para crianças menores de 2 anos. In M. d. Saúde
157 (Ed.), *Ministério da Saúde*. Brasília,
158 Naila, N., Nahar, B., Lazarus, M., Ritter, G., Hossain, M., Mahfuz, M., . . . Ickes, S. (2018).
159 "Those who care much, understand much." Maternal perceptions of children's appetite:
160 Perspectives from urban and rural caregivers of diverse parenting experience in
161 Bangladesh. *Matern Child Nutr*, 14(1). doi:10.1111/mcn.12473
- 162 PAHO, & OMS. (2004). *Guiding Principles for Complementary Feeding of The Breastfed Child*.
163 Retrieved from
- 164
- 165

- 166 https://www.who.int/nutrition/publications/guiding_principles_comfeeding_breastfed.pdf
- 167 Pérez-Escamilla, R., & Segura-Pérez, S. (2019). La alimentación perceptiva en el contexto del
168 marco mundial del cuidado cariñoso y sensible durante la primera infancia. In '*Infancia,
169 adolescencia y juventud: oportunidades claves para el desarrollo*' (pp. 35-56).
170 Montevideo, Uruguay: UNICEF.
- 171 Pérez-Escamilla, R., Segura-Pérez, S., & García-Martínez , A. (2018). Alimentación perceptiva
172 para niñas y niños de 0 a 5 años: Recetario. Aprendizajes Clave para la Educación
173 Integral. (Educación Inicial, Secretaría de Educación Pública, México, 2018.).
- 174 Pérez-Escamilla, R., Segura-Pérez, S., & Lott, M. (2017). *On behalf of the RWJF HER Expert
175 Panel on Best Practices for Promoting Healthy Nutrition, Feeding Patterns, and Weight
176 Status for Infants and Toddlers from Birth to 24 Months. Feeding Guidelines for Infants
177 and Young Toddlers*. Retrieved from [https://healthyeatingresearch.org/wp-
178 content/uploads/2017/02/her_feeding_guidelines_report_021416-1.pdf](https://healthyeatingresearch.org/wp-content/uploads/2017/02/her_feeding_guidelines_report_021416-1.pdf)
- 179 Redsell, S. A., Edmonds, B., Swift, J. A., Siriwardena, A. N., Weng, S., Nathan, D., &
180 Glazebrook, C. (2016). Systematic review of randomised controlled trials of interventions
181 that aim to reduce the risk, either directly or indirectly, of overweight and obesity in
182 infancy and early childhood. *Matern Child Nutr*, 12(1), 24-38. doi:10.1111/mcn.12184
- 183 Richter, L. M., Daelmans, B., Lombardi, J., Heymann, J., Boo, F. L., Behrman, J. R., . . .
184 Darmstadt, G. L. (2017). Investing in the foundation of sustainable development:
185 pathways to scale up for early childhood development. *Lancet*, 389(10064), 103-118.
186 doi:10.1016/s0140-6736(16)31698-1
- 187 Savage, J. S., Birch, L. L., Marini, M., Anzman-Frasca, S., & Paul, I. M. (2016). Effect of the
188 INSIGHT Responsive Parenting Intervention on Rapid Infant Weight Gain and
189 Overweight Status at Age 1 Year: A Randomized Clinical Trial. *JAMA Pediatr*, 170(8),
190 742-749. doi:10.1001/jamapediatrics.2016.0445
- 191 Silva Garcia, K., Power, T. G., Beck, A. D., Fisher, J. O., Goodell, L. S., Johnson, S. L., . . .
192 Hughes, S. O. (2018). Stability in the feeding practices and styles of low-income
193 mothers: questionnaire and observational analyses. *Int J Behav Nutr Phys Act*, 15(1), 28.
194 doi:10.1186/s12966-018-0656-6
- 195 Smith, J.A., Baker-Henningham, H., Brentani, A., Mugweni, R. and Walker, S.P., 2018.
196 Implementation of Reach Up early childhood parenting program: acceptability,
197 appropriateness, and feasibility in Brazil and Zimbabwe. Annals of the New York
198 Academy of Sciences, 1419(1), 120-140.
- 199 Spahn, J. M., Callahan, E. H., Spill, M. K., Wong, Y. P., Benjamin-Neelon, S. E., Birch, L., . . .
200 Casavale, K. O. (2019). Influence of maternal diet on flavor transfer to amniotic fluid and
201 breast milk and children's responses: a systematic review. *Am J Clin Nutr*,
202 109(Supplement_7), 1003s-1026s. doi:10.1093/ajcn/nqy240
- 203 Spill, M. K., Callahan, E. H., Shapiro, M. J., Spahn, J. M., Wong, Y. P., Benjamin-Neelon, S. E.,
204 . . . Casavale, K. O. (2019a). Caregiver feeding practices and child weight outcomes: a
205 systematic review. *Am J Clin Nutr*, 109(Supplement_7), 990s-1002s.
206 doi:10.1093/ajcn/nqy276
- 207 Spill, M. K., Johns, K., Callahan, E. H., Shapiro, M. J., Wong, Y. P., Benjamin-Neelon, S. E., . . .
208 Casavale, K. O. (2019b). Repeated exposure to food and food acceptability in infants

- 210 and toddlers: a systematic review. *Am J Clin Nutr*, 109(Supplement_7), 978s-989s.
211 doi:10.1093/ajcn/nqy308
- 212 UNICEF-Brazil. (2018). Os 10 passos para alimentação e hábitos saudáveis.pdf.
- 213 Vazir, S., Engle, P., Balakrishna, N., Griffiths, P.L., Johnson, S.L., Creed-Kanashiro, H.,
214 Fernandez Rao, S., Shroff, M.R. and Bentley, M.E., 2013. Cluster-randomized trial on
215 complementary and responsive feeding education to caregivers found improved dietary
216 intake, growth and development among rural Indian toddlers. *Maternal & child nutrition*,
217 9(1), pp.99-117.
- 218 WHO. (2012). *Care for Child Development: Improving the care of young children*.
- 219 WHO, & UNICEF. (2003). *Global Strategy for Infant and Young Child Feeding*. Geneva: World
220 Health Organization.

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