

THE NUTRITIONAL HEALTH OF YOUNG REFUGEE CHILDREN RESETTLING IN WASHINGTON STATE



*ELIZABETH DAWSON-HAHN,
SUZINNE PAK-GORSTEIN, ANDREA J. HOOPES,
AND JASMINE MATHESON*



The Nutritional Health of Young Refugee Children Resettling in Washington State

By Elizabeth Dawson-Hahn, Suzinne Pak-Gorstein,
Andrea J. Hoopes, and Jasmine Matheson

November 2016

Acknowledgments

The authors are grateful for the thoughtful feedback and editing support of Randy Capps, Kate Hooper, and their colleagues at the Migration Policy Institute (MPI). They appreciate the advice and insights of colleagues who attended the symposium cohosted by MPI and the Foundation for Child Development (FCD). Additionally, they appreciate the feedback and discussion points provided by Michelle Weinberg and Tarissa Mitchell at the Centers for Disease Control and Prevention, Alex Klosovsky at the International Organization for Migration, Barbara Day and Margaret Burkhardt at the U.S. State Department, and Wayne Turnberg at the Washington State Department of Health. This work draws from an existing article by the same authors, published in *PLoS One*.

This report was prepared for a research symposium on young children in refugee families, held at MPI on February 25, 2015 with support from FCD. This series explores the well-being and development of children from birth to age 10 in refugee families, across a range of disciplines, including child development, psychology, sociology, health, education, and public policy.

© 2016 Migration Policy Institute.
All Rights Reserved.

Cover Design and Layout: Liz Heimann, MPI
Cover Photo: Rilee Yandt/World Relief Spokane

No part of this publication may be reproduced or transmitted in any form by any means, electronic or mechanical, including photocopy, or any information storage and retrieval system, without permission from the Migration Policy Institute. A full-text PDF of this document is available for free download from www.migrationpolicy.org.

Information for reproducing excerpts from this report can be found at www.migrationpolicy.org/about/copyright-policy. Inquiries can also be directed to communications@migrationpolicy.org.

Suggested citation: Dawson-Hahn, Elizabeth, Suzinne Pak-Gorstein, Andrea J. Hoopes, and Jasmine Matheson. 2016. *The Nutritional Health of Young Refugee Children Resettling in Washington State*. Washington, DC: Migration Policy Institute.



Table of Contents

Executive Summary	1
I. Introduction	1
II. Background: Poor Nutritional Status and Its Consequences	2
A. Undernutrition	3
B. Overnutrition	4
III. Assessing the Nutritional Status of Refugee Children	5
IV. Data and Methods	6
V. Prevalence of Malnutrition among Young Refugee Children in Washington State	6
A. Children under Age 5	8
B. Children Ages 5 to 10	9
VI. Conclusion and Policy Recommendations	10
A. Preresettlement Recommendations	11
B. Postresettlement Recommendations	11
C. Future Research Directions	12
Appendix. Anthropometric Definitions of Nutritional Status	13
Works Cited	14
About the Authors	17



Executive Summary

Refugee children arrive in the United States with diverse health and nutritional needs. Whether the needs of these children are met—or not—can have long-term consequences for their development and well-being. Although children comprise one-third of refugees resettled in the United States, the data describing their nutritional and health status are limited. Relevant studies of refugee children overseas have often focused on undernutrition (i.e., wasting or stunting) among very young children (from birth to age 5). Less is known about the undernutrition of children older than 5. Meanwhile, some refugee children may in fact be at risk of overnutrition (i.e., overweight or obesity), which has its own set of health risks.

Nearly half (45 percent) of the children in the sample suffered from malnutrition.

This report describes the prevalence of both undernutrition and overnutrition among children (from birth to age 10) resettled in Washington State between July 2012 and June 2014, using weight- and height-for-length data from a medical screening examination conducted prior to their resettlement in the United States. The sample includes 982 children, of whom 65 percent originated from Iraq, Somalia, or Burma.

Nearly half (45 percent) of the children in the sample suffered from malnutrition—either under- or over-nutrition. The type and extent of malnutrition varied by origin: Somali and Iraqi children had the highest rates of wasting, Burmese and Somali children had high rates of stunting, and Iraqi children were most likely to be overweight.

To put these nutritional risks into a larger context, the authors compared the portion of the sample under age 5 to low-income children of the same age in Washington State, as identified by the 2011 Pediatric Nutrition Surveillance System (PedNSS) of the Centers for Disease Control and Prevention (CDC). Compared with the low-income sample, a greater proportion of the refugee children suffered from wasting or stunting, while a smaller share were overweight or obese at the time of resettlement in Washington State.

These findings emphasize the importance of addressing the entire spectrum of malnutrition when designing nutrition programs for refugee children both before and after their resettlement in the United States. Where possible, health screenings and interventions overseas should be expanded to include older children and to address overnutrition as well as undernutrition. Postresettlement interventions should include: providing nutrition counseling and support to help refugee children reach and maintain a healthy weight; linking children with a primary-care provider who can follow their nutritional status over time; referring pregnant women and children under age 5 to public nutrition programs such as Women, Infants, and Children (WIC); and offering nutritional support through resettlement agencies and community organizations.

I. Introduction

Refugee children are vulnerable to health and nutrition risks that can have long-term consequences for their development and well-being. Although children represented roughly one-third of the 128,000 refugees resettled in the United States in 2012 and 2013,¹ there are limited data describing their nutritional

1 United Nations High Commissioner for Refugees (UNHCR), *UNHCR Global Trends: Forced Displacement in 2014* (Geneva: UNHCR, 2015), www.unhcr.org/556725e69.pdf; Daniel C. Martin and James E. Yankay, *Refugees and Asylees: 2012* (Washington, DC: U.S. Department of Homeland Security, 2013), www.dhs.gov/sites/default/files/publications/ois_rfa_fr_2012.pdf; Daniel C. Martin and James E. Yankay, *Refugees and Asylees: 2013* (Washington, DC: U.S. Department of Homeland Security, 2014), www.dhs.gov/sites/default/files/publications/ois_rfa_fr_2013.pdf.



and health status. The lack of data is compounded by the fact that relevant medical studies often focus on undernutrition among very young children (from birth to age 5), leaving a dearth of information on older children and other types of malnutrition.

This report examines the prevalence of malnutrition, both undernutrition (i.e., wasting and stunting) and overnutrition (i.e., overweight and obesity), among refugee children from birth to age 10 using data from an overseas medical screening exam of children resettled in Washington State between July 1, 2012, and June 30, 2014.² In 2012, Washington State became home to 2,164 newly arrived refugees, the tenth-largest number resettled in a state that year. Most of these refugees (65 percent) came from Iraq, Somalia, or Burma.³

If untreated, malnutrition in the form of under- or overnutrition can have significant long-term health consequences. Children who suffer from undernutrition have a higher risk of morbidity and mortality, and poor cognitive and development outcomes, while childhood overnutrition can lead to adult obesity and associated long-term health issues such as hypertension, diabetes, liver and gallbladder disease, cancer, and depression.⁴ Treating malnutrition requires monitoring and support to help children reach and maintain a healthy weight, and to prevent the risk of associated chronic disease. An improved understanding of the nutritional status of refugee children—in comparison with that of their low income peers—would allow dietitians, medical providers, community organizations, and resettlement agencies to better target nutritional support and health care to the specific needs of these children.

II. Background: Poor Nutritional Status and Its Consequences

Globally, there is a rise in two forms of childhood malnutrition—undernutrition and overnutrition—a “double burden” with long-term adverse health effects. While most studies focus on the prevalence of undernutrition among refugee children, few reports mention overnutrition.⁵ Research on certain populations after resettlement notes the existence of both undernutrition and overnutrition.⁶ Health and nutrition from the time of conception through a child’s first few years lay the foundation for lifetime health.⁷ Thus it is imperative to understand the nutritional status of young refugee children, and the potential effects of malnutrition on their long-term health and well-being.

2 This report includes information and figures from Elizabeth E. Dawson-Hahn, Suzinne Pak-Gorstein, Andrea J. Hoopes, and Jasmine Matheson, “Comparison of the Nutritional Status of Overseas Refugee Children with Low Income Children in Washington State,” *PLoS ONE* 11, no. 1 (2016): e0147854, doi:10.1371/journal.pone.0147854.

3 U.S. Department of Health and Human Services, Office of Refugee Resettlement (ORR), “Fiscal Year 2012 Refugee Arrivals,” updated January 24, 2013, www.acf.hhs.gov/programs/orr/resource/fiscal-year-2012-refugee-arrivals.

4 Robert E. Black et al., “Maternal and Child Undernutrition and Overweight in Low-Income and Middle-Income Countries,” *Lancet* 382, no. 9890 (2013): 427–51; World Health Organization (WHO), *Population-Based Approaches to Childhood Obesity Prevention* (Geneva: WHO, 2012), www.who.int/dietphysicalactivity/childhood/WHO_new_childhoodobesity_PREVENTION_27nov_HR_PRINT_OK.pdf.

5 Oleg O. Bilukha et al., “Nutritional Status of Women and Child Refugees from Syria–Jordan, April–May 2014,” *Centers for Disease Control Morbidity and Mortality Weekly Report* 63, no. 29 (2014): 638–39, www.cdc.gov/mmwr/preview/mmwrhtml/mm6329a6.htm; International Organization for Migration (IOM), *Nutrition Surveillance Reports: Health Assessment Programme: January–December 2013* (Manila: IOM, 2013), publications.iom.int/system/files/pdf/nutrition_surveillance_report_jan-dec2013.pdf.

6 Emad A. Yanni et al., “The Health Profile and Chronic Diseases Comorbidities of US-Bound Iraqi Refugees Screened by the International Organization for Migration in Jordan: 2007–2009,” *Journal for Immigrant and Minority Health* 15, no. 1 (2013): 1–9; Paul L. Geltman et al., “Growth Status and Related Medical Conditions among Refugee Children in Massachusetts, 1995–1998,” *American Journal of Public Health* 91, no. 11 (2001): 1800–05.

7 Black et al., “Maternal and Child Undernutrition and Overweight.”



A. *Undernutrition*

Young children are particularly vulnerable to three forms of undernutrition: (1) acute undernutrition, or wasting (i.e., low weight-for-height); (2) chronic undernutrition, or stunting (i.e., low height-for-age); and (3) micronutrient deficiencies.⁸ Refugee children are at particularly high risk; many are from countries with high levels of acute and chronic undernutrition,⁹ and many have suffered adverse circumstances while in transit. For example, since early 2015, funding shortages have forced the World Food Program to decrease food rations for refugees in both Syria and Uganda, placing families at increased risk of poor nutritional and health outcomes.¹⁰

Undernutrition is widely considered to be a leading cause of death for children under the age of 5, accounting for about 45 percent of all deaths in that age group worldwide. Acute or chronic undernutrition impairs the immune system, placing children at greater risk of infection and, consequently, death. Taken together, all forms of undernutrition caused more than 3 million maternal and child deaths in 2011.¹¹ The World Health Organization (WHO) estimates that mortality rates are twice as high for children suffering from wasting than stunting, and higher still for children with both conditions.¹² In addition to child mortality, undernutrition is associated with poor cognitive development as affected children may spend less time exploring their environment.¹³

Undernutrition is widely considered to be a leading cause of death for children under the age of 5.

Though less of an immediate health threat than wasting, stunting may inhibit cognitive development throughout early childhood—a critical time period for learning. Poorer cognitive development can have long-term consequences over a lifetime, limiting educational attainment and, ultimately, employment opportunities.¹⁴ Studies of adults who were stunted as children have found they completed nearly one year less of schooling and earned 20 percent less compared with nonstunted adults.¹⁵ Stunted children become adults with lower lean body mass, who in turn are at higher risk for metabolic disorders.¹⁶ Further, stunting is known to affect both childhood and adult height and, among women, can lead to poorer pregnancy outcomes, propagating a cycle of poor health.

I. *Wasting*

Acute undernutrition, also known as wasting, is calculated by comparing a child's weight-for-height to average growth standards at a particular age. Wasting is classified as moderate acute malnutrition (MAM) or severe acute malnutrition (SAM). Under either definition, acute undernutrition is a leading contributor to child mortality worldwide, particularly for children under age 5.¹⁷

8 WHO, "Moderate Malnutrition," accessed February 11, 2015, www.who.int/nutrition/topics/moderate_malnutrition/en/.

9 Martin and Yankay, *Refugees and Asylees: 2013*.

10 World Food Program (WFP), "WFP Forced to Make Deeper Cuts in Food Assistance for Syrian Refugees Due to a Lack of Funding" (news release, July 10, 2015), www.wfp.org/news/news-release/wfp-forced-make-deeper-cuts-food-assistance-syrian-refugees-due-lack-funding; WFP, "World Food Programme Forced to Cut Rations to some 150,000 Refugees In Uganda" (news release, January 27, 2015), www.wfp.org/news/news-release/world-food-programme-forced-cut-rations-some-150000-refugees-uganda.

11 Black et al., "Maternal and Child Undernutrition and Overweight."

12 WHO, *WHA Global Nutrition Targets 2025: Wasting Policy Brief* (Geneva: WHO, 2014), 3, www.who.int/nutrition/topics/globaltargets_wasting_policybrief.pdf.

13 Ibid.

14 Kathryn G. Dewey and Khadija Begum, "Long-Term Consequences of Stunting in Early Life," *Maternal & Child Nutrition* 7, Supplement 3 (2011): 5–18.

15 WHO, *WHA Global Nutrition Targets 2025: Stunting Policy Brief* (Geneva: WHO, 2014), 2–3, www.who.int/nutrition/topics/globaltargets_stunting_policybrief.pdf.

16 Mark D. DeBoer et al., "Early Childhood Growth Failure and the Developmental Origins of Adult Disease: Do Enteric Infections and Malnutrition Increase Risk for the Metabolic Syndrome?" *Nutrition Reviews* 70, no. 11 (2012): 642–53.

17 Steve Collins, "Treating Severe Acute Malnutrition Seriously," *Archives of Disease in Childhood* 92, no. 5 (2007): 453–61.



Children in refugee camps or host communities in countries of first asylum are treated for SAM using ready-to-use therapeutic food (RUTF), which is a peanut-based paste. RUTF has revolutionized the treatment of SAM, making it feasible to treat wasting in a community setting rather than requiring hospital care. All of a child's caloric needs are provided by RUTF. Children with MAM, meanwhile, are often given both supplementary calories and micronutrient supplementation rather than RUTF for all of their calories. Globally, the treatment of MAM and SAM is primarily focused on children under age 5. This reflects the critical role that early nutrition plays in development, and the high morbidity and mortality associated with malnutrition in this age group.

2. Stunting

Chronic undernutrition, also called stunting, is calculated by comparing a child's height-for-age against growth standards. Stunting tends to occur before the age of 2, often beginning during pregnancy and continuing during early childhood, and is difficult to reverse.¹⁸ The causes of stunting are not fully understood and may vary around the world. Documented factors include diarrheal disease, small size for gestational age, poor maternal nutritional status, insufficient diet and feeding frequency, lack of dietary diversity, hookworm infection, preterm birth, zinc deficiency, and human immunodeficiency virus (HIV). Studies are ongoing to determine the best treatment for stunting, which likely includes preventing infection, improving dietary diversity and micronutrient intake, and improving both prenatal care and health care for adolescent girls and women in general to ensure healthy pregnancies down the road.

B. Overnutrition

The incidence of overweight and obesity among young children is rising in low-, middle-, and high-income countries, and studies have found certain populations are more likely to be overweight than to suffer from undernutrition.¹⁹ According to a report on the nutritional status of Syrian refugee women and children published by the Centers for Disease Control and Prevention (CDC), Syrian refugee children are more likely to be overweight than wasted.²⁰ The *2013 Nutrition Surveillance Report* from the International Organization for Migration (IOM) noted the same for young refugee children living in Ethiopia, Jordan, and South Africa.²¹ A few small studies of refugee children postresettlement (in DeKalb County, Georgia; Rochester, Minnesota; Providence, Rhode Island; and Victoria, Australia) suggest the need to better understand the effects of resettlement on nutritional outcomes in children, including those who are overweight upon arrival or at risk of becoming so following resettlement.²²

The negative outcomes associated with overweight and obesity are different from those of undernutrition and include a risk of long-term obesity and associated chronic diseases, as well as psychosocial consequences. Overweight children may experience societal bias and mental health consequences, such as depression, which can continue into adulthood. Further, overweight children can have elevated lipid (fat) levels, glucose intolerance, hepatic steatosis (a "fatty liver," with negative effects over time), and advanced bone age. Overweight and obesity often persists into adulthood, and obese individuals are more likely than others to have hypertension and other forms of cardiovascular disease, Type 2 diabetes, and many types of cancer.²³

18 WHO, *WHA Global Nutrition Targets 2025: Wasting Policy Brief*.

19 Black et al., "Maternal and Child Undernutrition and Overweight."

20 Bilukha et al., "Nutritional Status of Women and Child Refugees."

21 IOM, *Nutrition Surveillance Reports*.

22 Ankoor Y. Shah et al., "Nutritional Status of Refugee Children Entering DeKalb County, Georgia," *Journal of Immigrant and Minority Health* 16, no. 5 (2014): 959–67; André M. Renzaho et al., "Obesity and Undernutrition in Sub-Saharan African Immigrant and Refugee Children in Victoria, Australia," *Asia Pacific Journal of Clinical Nutrition* 15, no. 4 (2006): 482–90; Katrina Hervey et al., "Overweight among Refugee Children after Arrival in the United States," *Journal of Health Care for the Poor and Underserved* 20, no. 1 (2009): 246–56; Jessica H. Heney, Camia C. Dimock, Jennifer F. Friedman, and Carol Lewis, "Pediatric Refugees in Rhode Island: Increases in BMI Percentile, Overweight, and Obesity Following Resettlement," *Rhode Island Medical Journal* 98, no. 1 (2013): 43–47.

23 Muskaan Gurnani, Catherine Birken, and Jill Hamilton, "Childhood Obesity: Causes, Consequences, and Management," *Pediatric Clinics of North America* 62, no. 4 (2015): 821–40.



While prevention is preferable, several interventions are available for overweight children. Younger overweight children can be counseled on healthy eating habits and physical activity and thus encouraged to “grow out of” obesity. Older children can be supported by their primary care provider or enrolled in a multidisciplinary weight treatment program to promote healthy weight loss through behavior change (improving diet, limiting sedentary activity, and promoting physical activity and sleep).²⁴ Community-based programs provide important resources for families that may include physical activity options.

III. Assessing the Nutritional Status of Refugee Children

Before refugees depart for the United States, they undergo an overseas medical examination (OME), conducted by a physician contracted by the U.S. Department of State, to screen for health conditions that would prevent travel to the United States or require follow-up treatment there.²⁵ The IOM conducts many such examinations.²⁶ The OME includes anthropometric measurements (such as weight and height/length) that can indicate whether a child is suffering from undernutrition or overnutrition. IOM publishes an annual *Nutrition Surveillance Report* that is based on the OME and includes information on wasting and stunting—and limited data on overnutrition—among refugee children.²⁷ If the OME indicates MAM, children are referred to targeted supplementary feeding programs; those with SAM are referred to therapeutic feeding programs that use RUTF in refugee camps or communities in first-asylum countries, based on availability.²⁸

A survey of U.S. refugee health coordinators found wide variation in the support and care of refugee children’s nutritional issues postresettlement.

Once a refugee arrives in the United States, the CDC shares the details of this examination with public health authorities in the receiving U.S. state through its Electronic Disease Notification (EDN) system. Within 30–90 days after resettlement, refugee children undergo a domestic medical screening examination (DME) at a local public health department or with a primary-care provider.²⁹ The DME is the first opportunity in the United States to assess the nutritional needs of refugee children through weight and height measurements; any concerning results can then be referred to a primary-care provider. A survey of U.S. refugee health coordinators found wide variation in the support and care of refugee children’s nutritional issues postresettlement.³⁰ Low-income refugee children under age 5 may be enrolled in the federal Women, Infants, and Children (WIC) nutrition program, through which they (and their mothers)

24 Pilar De-Miguel Etayo, Gloria Bueno, Jesús M. Garagorri, and Luis A. Moreno, “Interventions for Treating Obesity in Children,” *World Review of Nutrition and Dietetics* 108 (2013): 98–106.

25 Inadmissible health conditions (or “Class A” conditions) include serious infectious diseases such as tuberculosis, syphilis, and leprosy; drug addiction; and physical or mental disorders that include harmful behaviors. “Class B” conditions are physical or mental disorders that do not bar someone from entering the United States, but are serious enough to require treatment soon after arriving in the United States. See Refugee Health Technical Assistance Center, “Overseas Medical Exam,” accessed March 14, 2016, <http://refugeehealthta.org/physical-mental-health/health-assessments/overseas-medical-exam/>; Deborah Lee et al., “Disease Surveillance among Newly Arriving Refugees and Immigrants—Electronic Disease Notification System, United States, 2009,” *CDC Mortality and Morbidity Weekly Report* 62, no. SS07 (2013), www.cdc.gov/mmwr/preview/mmwrhtml/ss6207a1.htm.

26 Refugee Health Technical Assistance Center, “Overseas Medical Exam.”

27 IOM, *Nutrition Surveillance Reports*.

28 IOM, *Nutrition Surveillance Reports*; Helen Young, Annalies Borrel, Diane Holland, and Peter Salama, “Public Nutrition in Complex Emergencies,” *Lancet* 365, no. 9448 (2004): 1899–909.

29 The location of their first visit depends on the jurisdiction in which they are resettled.

30 Caitlyn Lutfy, Susan Cookson, Leisel Talley, and Roger Rochat, “Malnourished Children in Refugee Camps and Lack of Connection with Services after US Resettlement,” *Journal of Immigrant and Minority Health* 16, no. 5 (2013): 1–7.



can access nutrition education and food assistance. Refugee children are also eligible for the Early Head Start (birth to 3 years) and Head Start (3 to 5 years) early childhood education programs that include a nutrition education component. Many municipalities are working to address the importance of cultural competence in childhood education programs; providing culturally competent care is an important component of working with refugee families and clients.

IV. Data and Methods

This study uses OME data to assess the prevalence of malnutrition among children from birth to age 10 resettled in Washington State between July 1, 2012, and June 30, 2014.³¹ The sample includes 982 refugee children from 35 different countries. Slightly more than half of the sample was male (53 percent), and 51 percent was 5 years old or younger, with ages ranging from 2 months to 10 years. Iraq (27 percent), Somalia (22 percent), and Burma (16 percent) were the top three countries of origin, representing 65 percent of all children in the sample. The comparative study focuses on the nutritional status of refugee children from these three countries.

To assess the nutritional status of refugee children relative to other vulnerable children in the United States, the authors compared refugee children from Iraq, Somalia, and Burma who were under the age of 5 to low-income children in Washington State under age 5 using data from the 2011 CDC Pediatric Nutrition Surveillance System (PedNSS).³² These data include participants in WIC and two other major federally funded programs: Early and Periodic Screening, Diagnosis, and Treatment (EPSDT) and Title V Maternal and Child Health (MCH).³³

The PedNSS data measure the prevalence of wasting, stunting, and obesity among children under age 5, and the incidence of both overweight and obesity among children ages 2 to 5 and older. The Washington State PedNSS data include 222,048 low-income children under age 5, and 106,647 children ages 2 to 5. The comparisons between the refugee children and the low-income children were made statistically using chi square tests.³⁴

Almost half (45 percent) of the refugee children ... resettled in Washington State during the study period suffered from at least one form of malnutrition.

31 Deidentified weight and height/length measurements were obtained from the overseas screening records available via the Centers for Disease Control and Prevention (CDC) Electronic Disease Notification system.

32 PedNSS is a program-based surveillance system with data on the nutritional status of low-income children across the United States.

33 CDC, "What is PedNSS," updated December 17, 2014, www.cdc.gov/pednss/what_is/pednss/.

34 This study was approved by the Seattle Children's Institutional Review Board (IRB) and the Washington State IRB. All data were deidentified prior to analysis. The anthropometric measurements were calculated using the zanthro program in Stata 13.0 (College Station, TX: StataCorp LP). The anthropometric definitions used in this study can be found in the Appendix.



V. Prevalence of Malnutrition among Young Refugee Children in Washington State

Almost half (45 percent) of the refugee children (0 to 10 years old; n=982) resettled in Washington State during the study period suffered from at least one form of malnutrition: wasting, stunting, overweight, or obesity (see Table 1).

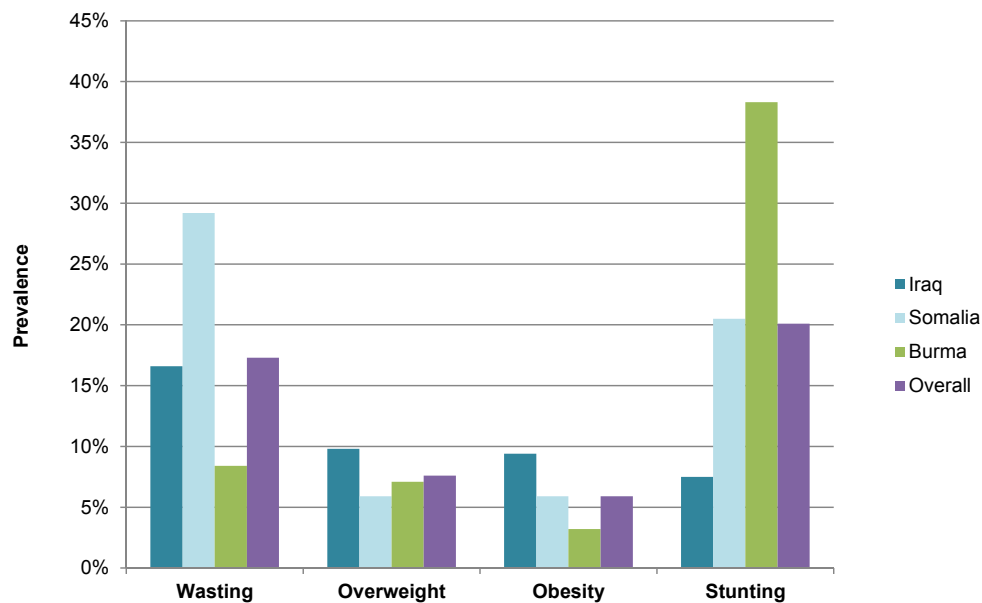
Table 1. Nutritional Status of Refugee Children (0 to 10 years old) Resettled in Washington State during 2012–14

	% (n=982)
Children with at least 1 form of malnutrition	44.9
Wasting	17.3
Stunting	20.1
Overweight	7.6
Obesity	5.9

Source: Authors' analysis of data from the Electronic Disease Notification (EDN) system of the U.S. Centers for Disease Control (CDC), provided through the Washington State Department of Health.

The data on refugee children resettled in Washington State also showed significant variation by national origin (see Figure 1). Wasting was the most prevalent among Somali children (29 percent; n=219), who also suffered a significant stunting (21 percent) at a rate second only to Burmese children (38 percent; n=154). Meanwhile, nearly 20 percent (n=265) of Iraqi children were overweight or obese.

Figure 1. Nutritional Status of Refugee Children Resettled in Washington State during 2012–14 (n=982)

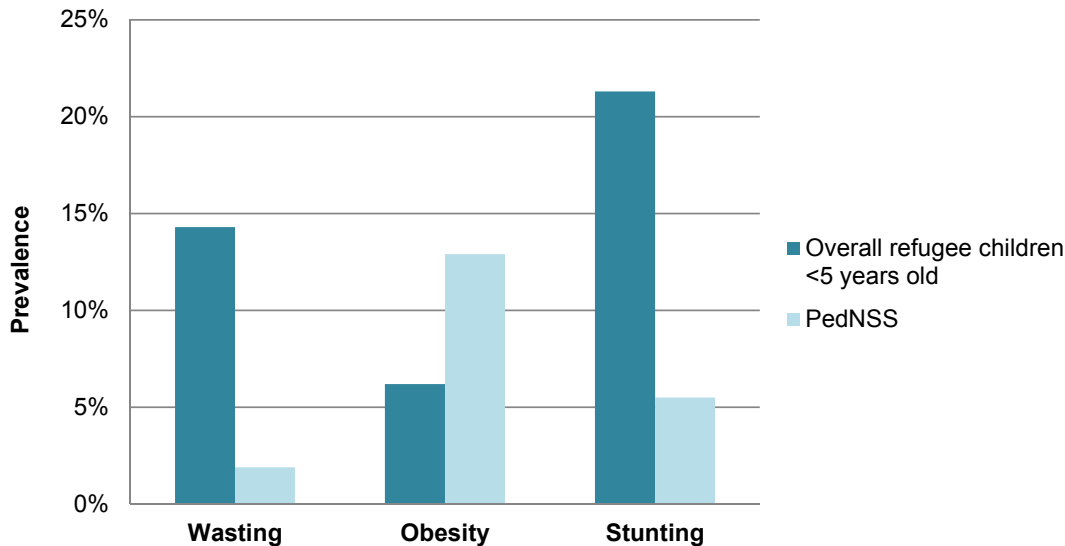


Source: Authors' analysis of data from the CDC EDN, provided through the Washington State Department of Health.

A. Children under Age 5

A comparison of refugee children under age 5 (n=502) with the PedNSS sample of low-income children in Washington State revealed stark differences in the prevalence of wasting: 14 percent of refugees (n=502) versus 2 percent of low-income children (see Figure 2). Similarly, a significantly larger share of refugee children showed signs of stunting: 21 percent versus 5 percent ($p<0.001$).

Figure 2. Nutritional Status of Refugee Children under Age 5 Resettled in Washington State during 2012–14 (n=982), Compared to Low-Income Children in the State (n=222,048)



PedNSS= Pediatric Nutrition Surveillance System.

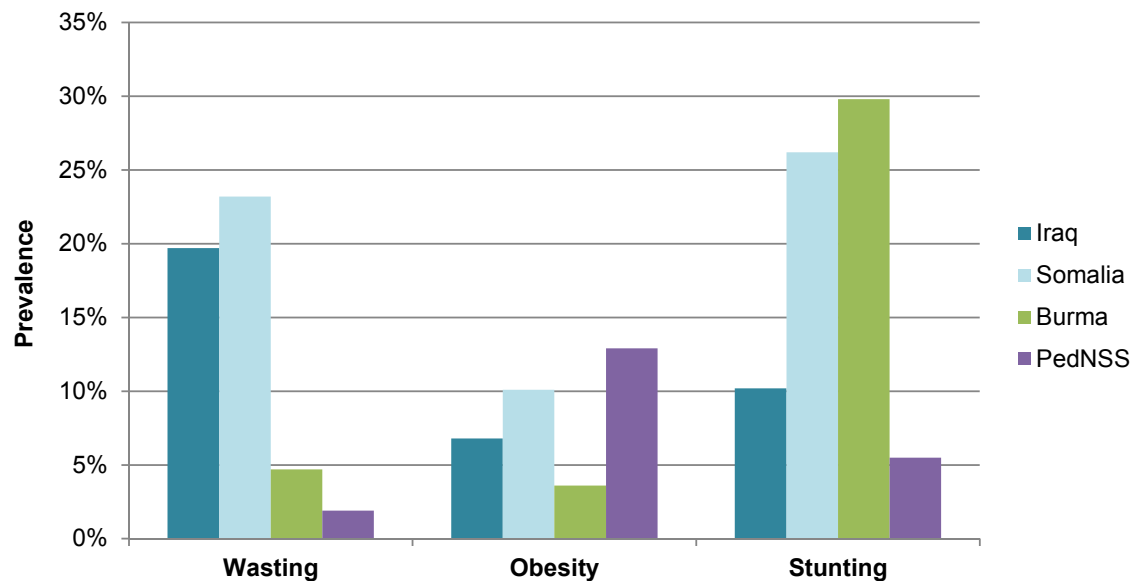
Note: Only obesity and not overweight data were included in this comparison because the PedNSS did not include overweight data for children 0 to 1.99 years old.

Source: Authors' analysis of CDC EDN data for Washington State. This figure also appeared in Elizabeth E. Dawson-Hahn, Suzinne Pak-Gorstein, Andrea J. Hoopes, and Jasmine Matheson, "Comparison of the Nutritional Status of Overseas Refugee Children with Low Income Children in Washington State," *PLoS ONE* 11, no. 1 (2016): e0147854, doi:10.1371/journal.pone.0147854.

Wasting was most prevalent among young Somali (23 percent; n=99) and Iraqi (20 percent; n=147) children ($p<0.001$). Stunting was much more prevalent among Burmese children (30 percent; n=84) and Somali children (26 percent; n=99) than among low-income children from Washington State (6 percent; n=222,048) ($p<0.001$). Obesity was less common in all three groups of refugee children than among low-income children from Washington State, but the share of obese Somali refugee children was not significantly different from that of the low-income reference group (see Figure 3) (Somali: $p=0.25$; Iraqi: $p=0.01$; Burmese $p=0.004$).



Figure 3. Nutritional Status of Refugee Children under Age 5 Resettled in Washington State by Top Three Resettlement Group during 2012–14 (n=330), Compared to Low-Income Children in the State (n=222,048)



PedNSS= Pediatric Nutrition Surveillance System.

Notes: Only obesity and not overweight data were included in this comparison because the PedNSS did not include overweight data for children 0 to 1.99 years old. The prevalence of wasting was statistically significantly higher for Iraqi children ($p < 0.001$) and Somali children ($p < 0.001$) compared to the PedNSS sample. The prevalence of obesity was statistically significantly lower among children from Iraq ($p = 0.01$) and Burma ($p = 0.004$). The prevalence of stunting was statistically significantly higher among children from Iraq ($p = 0.02$), Somalia ($p < 0.001$), and Burma ($p < 0.001$).

Source: Authors' analysis of CDC EDN data for Washington State. This figure also appears in Dawson-Hahn, Pak-Gorstein, Hoopes, and Matheson, "Comparison of the Nutritional Status of Overseas Refugee Children with Low Income Children in Washington State."

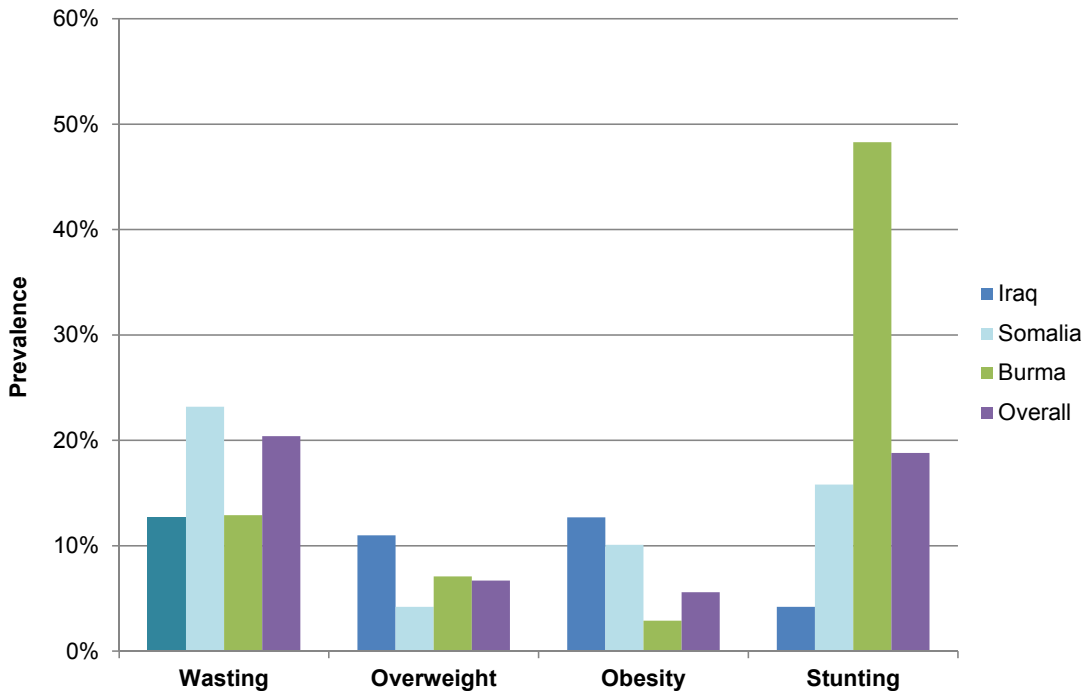
Given the high rates of wasting affecting refugees worldwide, the authors anticipated that refugee children arriving in Washington State would be more likely to suffer from wasting than overnutrition (overweight or obesity). This pattern held for the majority of the sample, but the analysis revealed some important exceptions. Rates of wasting and overnutrition were similar among Iraqi children. Nearly one in three Burmese children suffered from stunting, but their levels of wasting and overweight were similar. These findings suggest that while undernutrition remains the primary concern, refugee children may be subject to some of the same factors that have led to a rise in childhood obesity globally.

B. Children Ages 5 to 10

While many studies of refugee children have focused on young children (birth to age 5), older children (ages 5 to 10) also had elevated levels of undernutrition. Overall, wasting was more prevalent among refugee children ages 5 to 10 (20 percent; $n = 480$) than among children under age 5 (see Figures 2 and 4).

When children ages 5 to 10 were evaluated by their country of origin (see Figure 4), wasting was seen to be most common among young Somali children (24 percent; $n = 120$), and stunting among Burmese children (48 percent; $n = 70$). Children from Iraq were the most likely to be overweight (11 percent; $n = 118$) or obese (13 percent; $n = 118$).

Figure 4. Nutritional Status of Refugee Children Ages 5 to 10 from Iraq, Somalia, and Burma Resettled in Washington State in 2012–14



Source: Authors' analysis of CDC EDN data for Washington State.

Notably, stunting was more prevalent among Burmese children ages 5 to 10 than among those under age 5, and wasting was more prevalent among Somali and Burmese children ages 5 to 10 years than among those under age 5 (see Figures 3 and 4). This may be because older children have spent more time in transit (and in settings such as camps) or because overseas nutritional programs (for all children, not only refugees) focus on younger children. Obesity was more common among Iraqi children ages 5 to 10 than among their conationals under 5, but there was no statistically significant difference in obesity between younger and older children from Somalia and Burma (see Figures 3 and 4). These findings indicate a need to address the nutritional status of older children (ages 5 to 10), who may require different interventions, both overseas and postresettlement, from those targeted at younger children.

VI. Conclusion and Policy Recommendations

The prevalence of both undernutrition and overnutrition among refugee children, as observed during the OME, is a “double burden” that needs to be addressed. Differences observed across countries of origin imply that the nutritional needs of refugee children vary. It is important to address the entire spectrum of malnutrition when designing child nutrition programs before and after resettlement. Close attention to refugees’ country of origin and their preresettlement experiences are key to providing children with effective and culturally appropriate support.

While acute undernutrition (wasting) is of primary concern in a crisis setting due to its association with mortality, addressing chronic undernutrition (stunting) and overnutrition is also important given their long-term health and developmental consequences and the length of time that some refugees spend in camps and other humanitarian relief settings (often many years, even decades). Postresettlement interventions should address undernutrition and overnutrition in those who arrive with these conditions, and work to prevent children from becoming overweight or obese. The high prevalence of undernutrition



among refugee children ages 5 to 10 highlights the importance of providing nutritional support to all children, not just the very young.

These findings underline the importance of incorporating the nutritional status of refugee children into comprehensive profiles of health risk factors that include infectious diseases, environmental toxins, mental health concerns, and developmental risks.³⁵

The high prevalence of undernutrition among refugee children ages 5 to 10 highlights the importance of providing nutritional support to all children, not just the very young.

IOM plans to increase the reporting of overnutrition prior to resettlement in its Nutrition Surveillance Reports,³⁶ which could help U.S. resettlement agencies, health providers, and others providing nutritional and health assistance to refugee populations after resettlement. Additionally, pre- and postresettlement organizations that support refugee children offer several important types of health evaluation and treatment services that can address the needs of this vulnerable group.

Additional pre- and postresettlement strategies may include the following:

A. Preresettlement Recommendations

- Raise awareness of the nutritional risks faced by refugees by publishing IOM nutritional surveillance reports on refugees resettling in the United States that include children of all ages, as well as adults, and address both under- and overnutrition.
- Nutrition surveillance reports from organizations that work with refugees (in addition to those from IOM) should be accessed to better understand the nutritional status of refugees in both refugee camps and urban settings, and from various countries of origin.
- Children ages 5 to 10 should be evaluated and included in undernutrition treatment programs.
- Obesity prevention programming for refugee children in protracted situations could be developed—particularly for those living in refugee camps or urban settings for multiple years.

B. Postresettlement Recommendations

- Based on their OME results, children with acute undernutrition or obesity should be flagged for a primary-care visit within 4 weeks of arrival in the United States.
- A primary-care medical home visit should be arranged to follow up on the nutritional status of refugee children, and ensure attainment and maintenance of a healthy weight.

35 Katherine Yun et al., “Health Profiles of Newly Arrived Refugee Children in the United States, 2006–2012,” *American Journal of Public Health* 106, no. 1 (2016): 128–35; Tarissa Mitchell et al. “Lead Poisoning in United States-Bound Refugee Children: Thailand-Burma Border, 2009,” *Pediatrics* 129, no. 2 (2012): e392–99; Mina Fazel, Ruth V. Reed, Catherine Panter-Brick, and Alan Stein, “Mental Health of Displaced and Refugee Children Resettled in High-Income Countries: Risk and Protective Factors,” *Lancet* 379, no. 9812 (2012): 266–82; Susanne Martin-Herz, Talya Kemper, Megumu Brownstein, and John F. McLaughlin, “Developmental Screening with Recent Immigrant and Refugee Children: A Preliminary Report,” *EthnoMed*, November 28, 2012, <https://ethnomed.org/clinical/pediatrics/developmental-screening-with-recent-immigrant-and-refugee-children>.

36 IOM, *Nutrition Surveillance Reports*.



- Primary-care clinics in the United States should evaluate the nutritional status of all refugee children, based on the CDC guidelines.³⁷
- Providers should analyze a child’s nutritional history and address nutritional deficiencies when developing a care plan for weight management and maintenance in the primary-care setting.
- As part of refugee orientation, nutrition counseling should be conducted during the DME or in partnership with a community organization.
 - For example, the U.S. Committee for Refugees and Immigrants offers a Healthy Living Toolkit for refugee families and the agencies that serve them in 17 languages.³⁸
- Refugees’ diets and nutritional needs may change over the months and years after resettlement, hence nutritional counseling should be provided on an ongoing, longitudinal basis.
- Additional nutritional support could be provided through agricultural and other programs run by resettlement agencies and other community service providers.
 - Refugee agriculture projects funded by the Office of Refugee Resettlement (ORR) can increase access to healthy foods and generate income opportunities by helping refugees grow produce in community or school gardens or on small farms. These projects may also include health and nutrition classes.³⁹ Examples of such projects include the International Rescue Committee (IRC) New Roots program in San Diego, CA, and Phoenix, AZ; and RefugeeOne’s Refugee Agricultural Program for refugee women in Chicago, IL.⁴⁰
- Refugees should be linked to WIC and other mainstream U.S. nutritional programs that serve low-income or vulnerable groups, including Early Head Start and Head Start programs.

C. Future Research Directions

This review observed a paucity of research identifying the specific nutritional needs of refugee groups by country of origin, or tracking the nutritional and health outcomes of refugee children and adults following resettlement. Resettlement agencies and health-care providers can benefit from timely data on refugees’ preresettlement environment, nutritional needs, and challenges. Studies that track the nutritional status of refugee children over time are also warranted. An improved understanding of risk factors among refugee children for both undernutrition and overnutrition would help researchers and policymakers develop interventions to better support the long-term health of this vulnerable population.

This review observed a paucity of research identifying the specific nutritional needs of refugee groups by country of origin.

37 These guidelines can be found online at CDC, “Guidelines for Evaluation of the Nutritional Status and Growth in Refugee Children During the Domestic Medical Screening Examination,” updated April 16, 2012, www.cdc.gov/immigrantrefugeehealth/guidelines/domestic/nutrition-growth.html.

38 U.S. Committee for Refugees and Immigrants (USCRI), “Research + Reports: Health and Nutrition,” accessed March 14, 2016, <http://refugees.org/research-reports/>.

39 ORR, “Refugee Agriculture Partnership Program,” updated September 27, 2012, www.acf.hhs.gov/programs/orr/resource/refugee-agricultural-partnership-program.

40 International Rescue Committee (IRC), “The IRC in San Diego, CA,” accessed March 14, 2016, www.rescue.org/us-program/us-san-diego-ca/fsch; IRC, “The IRC in Phoenix, AZ,” accessed March 14, 2016, www.rescue.org/us-program/us-phoenix-az/new-roots; RefugeeOne, “RefugeeOne Services,” accessed March 14, 2016, www.refugeeone.org/how-we-help.html; ORR, “IRC’s New Roots: A Growing Partnership with RAPP,” updated September 17, 2012, www.acf.hhs.gov/programs/orr/resource/ircs-new-roots-a-growing-partnership-with-rapp.



Appendix. Anthropometric Definitions of Nutritional Status

The anthropometric definitions in the study were based on the 2006 World Health Organization (WHO) multicenter growth reference study for children ages 0 to 2 and the 2000 Centers for Disease Control and Prevention (CDC) guidelines for children over age 2.⁴¹ Length is used as the stature measurement for children under 24 months, and height is used as the stature measurement for children age 24 months or older. The following are the specific anthropomorphic-based definitions of nutritional status used in this study:

- **Wasting.** Acute malnutrition, also known as wasting, is based on a comparison of the child's weight-for-height⁴² with the number of standard deviations (z-scores) from the median for a child of the same age and gender in a reference population.
- **Stunting.** Chronic malnutrition is assessed by comparing the child's height-for-age with the number of standard deviations (z-scores) from the median for a child of the same age and gender in a reference population. Chronic malnutrition is defined as height-for-age z-score ≤ -2 .⁴³
- **Overweight and obesity.** Overweight and obesity status is assessed by calculating a ratio of the child's weight-for-height and comparing the ratio to the number of standard deviations (z-scores) from the median for a child of the same age and gender in a reference population.

Table A-1. Nutritional Status Categories: Anthropometric Definitions

Nutritional Status Category	Age 0 to 1.99 years [*]	2 to 10 years ^{**}
Chronic undernutrition^{***}	Length-for-age \leq 2.3 rd percentile	Height-for-age $<$ 5 th percentile
Acute undernutrition	Weight-for-length \leq 2.3 rd percentile	BMI $<$ 5 th percentile
Healthy weight	Weight-for-length $>$ 2.3 rd percentile and $<$ 97.7 th percentile	BMI \geq 5 th percentile and \leq 85 th percentile
Overweight	Not included ^{****}	BMI $>$ 85 th percentile and $<$ 95 th percentile
Obesity	Weight-for-length \geq 97.7 th percentile	BMI \geq 95 th percentile

Notes: The 2.3rd percentile is equal to a z-score of -2.00, 5th percentile is equal to a z-score of -1.64, 85th percentile is equal to a z-score of 1.04, 95th percentile is equal to a z-score of 1.64, and 97.7th percentile is equal to a z-score of 2.00.

* Based on WHO 2006 definitions

** Based on CDC 2000 definitions

*** Children classified in one of the four weight-for-height categories could also be classified in the height-/length-for-age category of chronic undernutrition.

**** An overweight category is not included in the PedNSS data for this age group.

41 WHO, *WHO Child Growth Standards: Length/Height-For-Age, Weight-For-Age, Weight-For-Length, Weight-For-Height and Body Mass Index-For-Age: Methods and Development* (Geneva: WHO, 2006), www.who.int/childgrowth/standards/technical_report/en/; Robert J. Kuczmarski et al., "CDC Growth Charts: United States," *Advance Data* 314 (2000): 1–27.

42 For the sake of simplicity, "height" is used in this report to refer to both height and length.

43 CDC, "Guidelines for Evaluation of the Nutritional Status and Growth in Refugee Children During the Domestic Medical Screening Examination."



Works Cited

- Bilukha, Oleg O., Douglas Jayasekaran, Ann Burton, Gabriele Faender, James King'ori, Mohammad Amiri, Dorte Jessen, and Eva Leidman. 2014. Nutritional Status of Women and Child Refugees from Syria-Jordan, April-May 2014. *Centers for Disease Control Morbidity and Mortality Weekly Report* 63 (29): 638–39. www.cdc.gov/mmwr/preview/mmwrhtml/mm6329a6.htm.
- Black, Robert E., Cesar G. Victora, Susan P. Walker, Zulfiqar A. Bhutta, Parul Christian, Mercedes de Onis, Majid Ezzati, Sally Grantham-McGregor, Joanne Katz, Reynaldo Martorell, and Ricardo Uauy. 2013. Maternal and Child Undernutrition and Overweight in Low-Income and Middle-Income Countries. *Lancet* 382 (9890): 427–51.
- Centers for Disease Control and Prevention (CDC). 2012. Guidelines for Evaluation of the Nutritional Status and Growth in Refugee Children During the Domestic Medical Screening Examination. Updated April 16, 2012. www.cdc.gov/immigrantrefugeehealth/guidelines/domestic/nutrition-growth.html.
- . 2014. What is PedNSS. Updated December 17, 2014. www.cdc.gov/pednss/what_is/pednss/.
- Collins, Steve. 2007. Treating Severe Acute Malnutrition Seriously. *Archives of Disease in Children* 92 (5): 453–61.
- Dawson-Hahn, Elizabeth E., Suzinne Pak-Gorstein, Andrea J. Hoopes, and Jasmine Matheson. 2016. Comparison of the Nutritional Status of Overseas Refugee Children with Low Income Children in Washington State. *PLoS ONE* 11 (1): e0147854. doi:10.1371/journal.pone.0147854.
- DeBoer, Mark D., Aldo A. M. Lima, Reinaldo B. Oria, Rebecca J. Scharf, Sean R. Moore, Max A. Luna, and Richard Guerrant. 2012. Early Childhood Growth Failure and the Developmental Origins of Adult Disease: Do Enteric Infections and Malnutrition Increase Risk for the Metabolic Syndrome? *Nutrition Reviews* 70 (11): 642–53.
- De-Miguel Etayo, Pilar, Gloria Bueno, Jesús M. Garagorri, and Luis A. Moreno. 2013. Interventions for Treating Obesity in Children. *World Review of Nutrition and Dietetics* 108: 98–106.
- Dewey, Kathryn G. and Khadija Begum. 2011. Long-Term Consequences of Stunting in Early Life. *Maternal & Child Nutrition* 7 (Supplement 3): 5–18.
- Fazel, Mina, Ruth V. Reed, Catherine Panter-Brick, and Alan Stein. 2012. Mental Health of Displaced and Refugee Children Resettled in High-Income Countries: Risk and Protective Factors. *Lancet* 379 (9812): 266–82.
- Geltman, Paul L., Marjorie Radin, Zi Zhang, Jennifer Cochran, and Alan F. Meyers. 2001. Growth Status and Related Medical Conditions among Refugee Children in Massachusetts, 1995-1998. *American Journal of Public Health* 91 (11): 1800–05.
- Gurnani, Muskaan, Catherine Birken, and Jill Hamilton. 2015. Childhood Obesity: Causes, Consequences, and Management. *Pediatric Clinics of North America* 62 (4): 821–40.
- Heney, Jessica H., Camia C. Dimock, Jennifer F. Friedman, and Carol Lewis. 2013. Pediatric Refugees in Rhode Island: Increases in BMI Percentile, Overweight, and Obesity Following Resettlement. *Rhode Island Medical Journal* 98 (1): 43–47.
- Hervey, Katrina, Delfino Vargas-Chanes, Lisa Klesges, Philip R. Fischer, Sally Trippel, and Young J. Juhn. 2009. Overweight among Refugee Children after Arrival in the United States. *Journal of Health Care for the Poor and Underserved* 20 (1): 246–56.
- International Organization for Migration (IOM). 2013. *Nutrition Surveillance Reports: Health Assessment Programme: January–December 2013*. Manila: IOM. http://publications.iom.int/system/files/pdf/nutrition_surveillance_report_jan-dec2013.pdf.



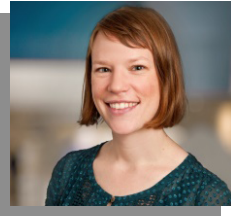
- International Rescue Committee (IRC). N.d. The IRC in San Diego, CA. Accessed March 14, 2016. www.rescue.org/us-program/us-san-diego-ca/fsch.
- . N.d. The IRC in Phoenix, AZ. Accessed March 14, 2016. www.rescue.org/us-program/us-phoenix-az/new-roots.
- Kuczmariski, Robert J., Cynthia L. Ogden, Lawrence M. Grummer-Strawn, Katherine M. Flegal, Shumei S. Guo, Rong Wei, Zugu Mei, Lester R. Curtin, Alex F. Roche, and Clifford L. Johnson. 2000. CDC Growth Charts: United States. *Advance Data* 314: 1–27.
- Lee, Deborah, Rossanne Philen, Zanju Wang, Pamela McSpadden, Drew L. Posey, Luis S. Ortega, Michelle S. Weinberg, Clive Brown, Weigong Zhou, and John A. Painter. 2013. Disease Surveillance among Newly Arriving Refugees and Immigrants—Electronic Disease Notification System, United States, 2009. *CDC Mortality and Morbidity Weekly Report* 62 (SS07): 1–20. www.cdc.gov/mmwr/preview/mmwrhtml/ss6207a1.htm.
- Lutfy, Caitlyn, Susan Cookson, Leisel Talley, and Roger Rochat. 2013. Malnourished Children in Refugee Camps and Lack of Connection with Services after US Resettlement. *Journal of Immigrant and Minority Health* 16 (5): 1–7.
- Martin, Daniel C. and James E. Yankay. 2013. *Refugees and Asylees: 2012*. Washington, DC: U.S. Department of Homeland Security. www.dhs.gov/sites/default/files/publications/ois_rfa_fr_2012.pdf.
- . 2014. *Refugees and Asylees: 2013*. Washington, DC: U.S. Department of Homeland Security. www.dhs.gov/sites/default/files/publications/ois_rfa_fr_2013.pdf.
- Martin-Herz, Susanne, Tayla Kemper, Megumu Brownstein, and John F. McLaughlin. 2012. Developmental Screening with Recent Immigrant and Refugee Children: A Preliminary Report. *EthnoMed*, November 28, 2012. <https://ethnomed.org/clinical/pediatrics/developmental-screening-with-recent-immigrant-and-refugee-children>.
- Mitchell, Tarissa, Emily Jentes, Luis Ortega, Marissa Scalia Sucusky, Taran Jefferies, Predrag Bajcevic, Valentina Parr, Warren Jones, Mary Jean Brown, and John Painter. 2012. Lead Poisoning in United States-Bound Refugee Children: Thailand-Burma Border, 2009. *Pediatrics* 129 (2): e392–99.
- Refugee Health Technical Assistance Center. N.d. Overseas Medical Exam. Accessed March 14, 2016. <http://refugeehealthta.org/physical-mental-health/health-assessments/overseas-medical-exam/>.
- RefugeeOne. 2016. RefugeeOne Services. Accessed March 14, 2016. www.refugeeone.org/how-we-help.html.
- Renzaho, André M., Carl Gibbons, Boyd Swinburn, Damien Jolley, and Cate Burns. 2006. Obesity and Undernutrition in Sub-Saharan African Immigrant and Refugee Children in Victoria, Australia. *Asia Pacific Journal of Clinical Nutrition* 15 (4): 482–90.
- Shah, Ankoor Y., Parminder S. Suchdev, Tarissa Mitchell, Sharmila Shetty, Catherine Warner, Alawode Oladele, and Susan Reines. 2014. Nutritional Status of Refugee Children Entering DeKalb County, Georgia. *Journal of Immigrant and Minority Health* 16 (5): 959–67.
- U.S. Committee for Refugees and Immigrants (USCRI). N.d. Research + Reports: Health and Nutrition. Accessed March 14, 2016. <http://refugees.org/research-reports/>.
- U.S. Department of Health and Human Services, Office of Refugee Resettlement (ORR). 2012. IRC's New Roots: A Growing Partnership with RAPP. Updated September 17, 2012. www.acf.hhs.gov/programs/orr/resource/ircs-new-roots-a-growing-partnership-with-rapp.
- . 2012. Refugee Agricultural Partnership Program. Updated September 27, 2012. www.acf.hhs.gov/programs/orr/resource/refugee-agricultural-partnership-program.



- . 2013. Fiscal Year 2012 Refugee Arrivals. Updated January 24, 2013. www.acf.hhs.gov/programs/orr/resource/fiscal-year-2012-refugee-arrivals.
- United Nations High Commissioner for Refugees (UNHCR). 2015. *UNHCR Global Trends: Forced Displacement in 2014*. Geneva: UNHCR. www.unhcr.org/556725e69.pdf.
- World Food Program (WFP). 2015. WFP Forced to Make Deeper Cuts in Food Assistance for Syrian Refugees Due to a Lack of Funding. News release, July 10, 2015. www.wfp.org/news/news-release/wfp-forced-make-deeper-cuts-food-assistance-syrian-refugees-due-lack-funding.
- . 2015. World Food Programme Forced to Cut Rations to Some 150,000 Refugees in Uganda. News release, January 27, 2015. www.wfp.org/news/news-release/world-food-programme-forced-cut-rations-some-150000-refugees-uganda.
- World Health Organization (WHO). 2006. *WHO Child Growth Standards: Length/Height-For-Age, Weight-For-Age, Weight-For-Length, Weight-For-Height and Body Mass Index-For-Age: Methods and Development*. Geneva: WHO. www.who.int/childgrowth/standards/technical_report/en/.
- . 2012. *Population-Based Approaches to Childhood Obesity Prevention*. Geneva: WHO. www.who.int/dietphysicalactivity/childhood/WHO_new_childhoodobesity_PREVENTION_27nov_HR_PRINT_OK.pdf.
- . 2014. *WHA Global Nutrition Targets 2025: Stunting Policy Brief*. Geneva: WHO. www.who.int/nutrition/topics/globaltargets_stunting_policybrief.pdf.
- . 2014. *WHA Global Nutrition Targets 2025: Wasting Policy Brief*. Geneva: WHO. www.who.int/nutrition/topics/globaltargets_wasting_policybrief.pdf.
- . N.d. Moderate Malnutrition. Accessed February 11, 2015. www.who.int/nutrition/topics/moderate_malnutrition/en/.
- Yanni, Emad A., Marwan Naoum, Nedal Odeh, Pauline Han, Margaret Coleman, and Heather Burke. 2013. The Health Profile and Chronic Diseases Comorbidities of US-Bound Iraqi Refugees Screened by the International Organization for Migration in Jordan: 2007-2009. *Journal for Immigrant and Minority Health* 15 (1): 1–9.
- Young, Helen, Annalies Borrel, Diane Holland, and Peter Salama. 2004. Public Nutrition in Complex Emergencies. *Lancet* 364 (9448): 1899–909.
- Yun, Katherine, Jasmine Matheson, Colleen Payton, Kevin C. Scott, Barbara L. Stone, Lihai Song, William M. Stauffer, Kailey Urban, Janine Young, and Blain Mamo. 2016. Health Profiles of Newly Arrived Refugee Children in the United States, 2006–2012. *American Journal of Public Health* 106 (1): 128–35.



About the Authors



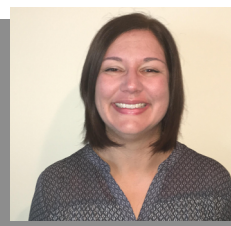
Elizabeth Dawson-Hahn is Assistant Professor of Pediatrics at the University of Washington (UW) and the Seattle Children's Research Institute. She completed her medical degree at SUNY Upstate Medical University, her pediatric residency and chief residency at the Warren Alpert Medical School of Brown University at Hasbro Children's Hospital, and her general academic pediatrics research fellowship and her master of public health degree (MPH) in epidemiology at UW. Dr. Dawson-Hahn has provided clinical care, conducted research, and led outreach to refugee and immigrant children in Upstate New York; Rhode Island; King County, Washington State; Haiti; and Tanzania. She has developed research collaborations and led studies with academic and federally qualified health centers, the Washington State Department of Health, and in partnership with institutions in other states. Her primary interest is in promoting the health, nutrition, and development of refugee and immigrant children and families.



Suzinne Pak-Gorstein is Associate Professor of Pediatrics and adjunct Associate Professor of Global Health at UW. She is Medical Director of the Harborview Pediatric clinics that serve refugee immigrant children and other vulnerable families. She is the lead author of the Centers for Disease Control and Prevention (CDC) national guidelines for nutrition and growth screening of refugee children in the United States. She has also worked with international nutrition programs, including the United Nations Children's Emergency Fund (UNICEF) collaborations supporting government monitoring and evaluation of young child and infant feeding services in Bangladesh, Indonesia, Laos, Nepal, and the Philippines. Dr. Pak-Gorstein codirects the Global Health Pathways Program at Seattle Children's Hospital, partnering with the University of Nairobi to train Seattle and Kenyan pediatric residents on community child health priorities. As the Chair of the Academic Pediatric Associations Global Health special interest group, she also leads educational programs for U.S. pediatricians on global health.



Andrea J. Hoopes is Assistant Professor of Pediatrics in the Adolescent Medicine Section at the University of Colorado Denver School of Medicine in Aurora, Colorado. She is Medical Director of the Young Mother's Clinic at Children's Hospital of Colorado, where she provides multidisciplinary care to adolescent mothers and their children. She completed her residency in pediatrics as a member of the Global Health Pathway at UW, where she also completed a fellowship in adolescent medicine and MPH in health services. Her research interests include improving adolescent sexual and reproductive health services in resource-limited settings, adolescent-centered health policies, and interdisciplinary public health prevention efforts.



Jasmine Matheson is Program Manager of the Washington State Department of Health, Refugee Health Program and serves as the State Refugee Health Coordinator. She works with local, state, and federal partners to improve health outcomes of resettled refugees. Prior to joining the Washington State Department of Health, Ms. Matheson worked in communicable disease epidemiology and food safety in Virginia and New Zealand. She obtained her MPH from University of California, Berkeley and bachelor's degree in biology from Mount Saint Mary's College.



The Migration Policy Institute is a nonprofit, nonpartisan think tank dedicated to the study of the movement of people worldwide. MPI provides analysis, development, and evaluation of migration and refugee policies at the local, national, and international levels. It aims to meet the rising demand for pragmatic and thoughtful responses to the challenges and opportunities that large-scale migration, whether voluntary or forced, presents to communities and institutions in an increasingly integrated world.

www.migrationpolicy.org

1400 16th Street NW
Suite 300
Washington, DC 20036

Tel: 001 202-266-1940
Fax: 001 202-266-1900

