2 Article Type: XX (Miscellaneous)

- Addendum guidelines for the
- 4 prevention of peanut allergy in the
- 5 United States

6

- 7 Summary of the National Institute of Allergy and
- 8 Infectious Diseases-sponsored expert panel

9

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20

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| 80 | INTRODUCTION |
| 81 | |

Food allergy is an important public health problem because it affects children and adults, it may be severe and even life-threatening, and it may be increasing in prevalence. Beginning in 2008, the National Institute of Allergy and Infectious Diseases (NIAID), working with other organizations and advocacy groups, led the development of the first clinical guidelines for the diagnosis and management of food allergy. These guidelines, which were published in 2010, did not offer strategies for the prevention of food allergy due to a lack of definitive studies at the time.

In February 2015, the *New England Journal of Medicine* published the results of the "Learning Early about Peanut Allergy" (LEAP) trial. This landmark clinical trial showed that introduction of peanut products into the diets of infants at high risk of developing peanut allergy was safe and led to an 81 percent relative reduction in the subsequent development of peanut allergy. The LEAP trial results, combined with other emerging data, strongly suggested that peanut allergy can be prevented through introduction of peanut-containing foods beginning in infancy. This growing body of evidence raised the need for clinical recommendations focusing on peanut allergy prevention.

To achieve this goal and its wide implementation, NIAID invited the members of the 2010 Guidelines Coordinating Committee and other stakeholder organizations to develop this addendum on peanut allergy prevention to the 2010 Guidelines for the Diagnosis and Management of Food Allergy in the United States.

DEVELOPMENT OF THE 2017 ADDENDUM TO THE 2010 GUIDELINES FOR THE DIAGNOSIS AND MANAGEMENT OF FOOD ALLERGY

Coordinating Committee

The NIAID established a Coordinating Committee (CC), whose members are listed in Appendix A, to oversee the development of the addendum; review drafts of the addendum for accuracy, practicality, clarity, and broad utility of the recommendations in clinical practice; review and approve the final addendum; and disseminate the addendum.

113 The CC members represented 26 professional organizations, advocacy groups, and 114 federal agencies. 115 **Expert Panel** 116 In June 2015, the CC convened an Expert Panel (EP) that was chaired by Joshua Boyce, MD. The 26 panel members, listed in Appendix B, were specialists from a variety 117 118 of relevant clinical, scientific, and public health areas. Panel members were nominated 119 by the CC organizations, and the composition of the panel received unanimous approval 120 by the CC member organizations. The charge to the EP was to use the literature review prepared by the NIAID, in 121 122 conjunction with consensus expert opinion and EP-identified supplementary documents, 123 to develop evidence-based recommendations for the early introduction of dietary peanut 124 to prevent peanut allergy. The new guidelines are intended to supplement and modify 125 Guidelines 37 to 40 in Section 5.3.4 of the 2010 Guidelines: "Prevention of Food Allergy." 126 127 Literature review 128 NIAID staff conducted a literature search of PubMed, limited to the years 2010 129 (January) to 2016 (June). Sixty four publications (original research articles, 130 editorials/letters, and systematic reviews) were deemed relevant and placed into 2 tiers: 131 tier 1 contained 18 items, considered highly relevant to the early introduction of peanut or 132 other allergenic foods; and tier 2 contained 46 items on related topics such as food allergy 133 or eczema prevention. 134 Assessing the quality of the body of evidence 135 For the tier 1 references, the EP assessed the quality using the Grading of 136 Recommendations Assessment, Development and Evaluation (GRADE) approach. 137 Preparation of the addendum 138 Draft versions of the addendum were reviewed by the CC members, open to 139 public comment, revised accordingly, and approved by the EP and the CC.

| | 1 Oglas et al |
|-----|---|
| 140 | |
| 141 | DEFINING THE STRENGTH OF EACH CLINICAL GUIDELINE |
| 142 | The EP has used the verb "recommends" or "suggests" for each clinical |
| 143 | recommendation. These words convey the strength of the recommendation, defined as |
| 144 | follows: |
| 145 | • Recommend is used when the EP strongly recommended for or against a particular |
| 146 | course of action. |
| 147 | Suggest is used when the EP weakly recommended for or against a particular |
| 148 | course of action. |
| 149 | |
| 150 | ADDENDUM GUIDELINES |
| 151 | The EP came to consensus on the following 3 definitions used throughout the addendum |
| 152 | guidelines. |
| 153 | • Severe eczema is defined as persistent or frequently recurring eczema with typical |
| 154 | morphology and distribution assessed as severe by a health care provider and |
| 155 | requiring frequent need for prescription-strength topical corticosteroids, |
| 156 | calcineurin inhibitors, or other anti-inflammatory agents despite appropriate use |
| 157 | of emollients. |
| 158 | • Egg allergy is defined as a history of an allergic reaction to egg and a skin prick |
| 159 | test (SPT) wheal diameter of 3 mm or greater with egg white extract, or a positive |
| 160 | oral egg food challenge result. |
| 161 | • A <i>specialist</i> is defined as a health care provider with the training and experience |
| 162 | to (1) perform and interpret SPTs and oral food challenges (OFC) and (2) know |
| 163 | and manage their risks. Such persons must have appropriate medications and |
| 164 | equipment on site. |
| 165 | |
| 166 | |
| 167 | |
| 168 | |
| 169 | |

TABLE I: Summary of addendum guidelines 1, 2, and 3

170

| Ado | dendum | Infant criteria | Recommendations | Earliest age of |
|-----------|--------|------------------|-----------------------------------|--------------------|
| guideline | | | | peanut |
| | | | | introduction |
| 1 | F | Severe | Strongly consider evaluation by | 4 to 6 months |
| | | eczema, egg | sIgE and/or SPT and, if | |
| | | allergy, or both | necessary, an oral food | |
| | | | challenge. Based on test results, | |
| | | | introduce peanut-containing | |
| | | | foods | |
| | | | | |
| 2 | | Mild-to- | Introduce peanut-containing | Around 6 months |
| | | moderate | foods | |
| | | eczema | | |
| 3 | | No eczema or | Introduce peanut-containing | Age appropriate |
| | | any food | foods | and in accordance |
| | | allergy | | with family |
| | | • | | preferences and |
| | 2 | | | cultural practices |

Addendum guideline 1

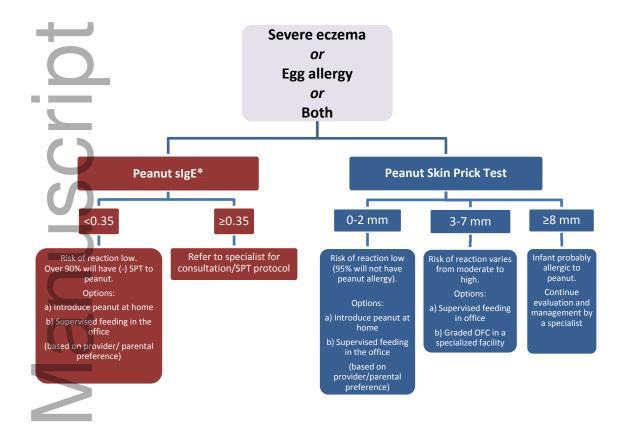
The EP recommends that infants with severe eczema, egg allergy, or both have introduction of age-appropriate peanut-containing food as early as 4 to 6 months of age to reduce the risk of peanut allergy. Other solid foods should be introduced before peanut-containing foods to show that the infant is developmentally ready. The EP recommends that evaluation with peanut-specific IgE (peanut sIgE) measurement, SPTs, or both be strongly considered before introduction of peanut to determine if peanut should be introduced and, if so, the preferred method of introduction. To minimize a delay in peanut introduction for children who may test negative, testing for peanut sIgE may be the preferred initial approach in certain health care settings, such as family medicine, pediatrics, or dermatology practices, in which skin prick testing is not routine.

Alternatively, referral for assessment by a specialist may be an option if desired by the health care provider and when available in a timely manner.

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184



*To minimize a delay in peanut introduction for children who may test negative, testing for peanut-

specific IgE may be the preferred initial approach in certain health care settings. Food allergen panel

testing or the addition of sIgE testing for foods other than peanut is not recommended due to poor

186187

188

189

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193

195

191 **FIG**

192 **1**:

Recommended approaches for evaluation of children with severe eczema and/or egg

allergy before peanut introduction

positive predictive value.

Important considerations for skin prick testing SPT reagents, testing devices, and methodology can differ significantly among health care providers in the United States or elsewhere. The EP recommends that specialists should adjust their SPT categorization criteria according to their own training and experience. Health care providers conducting oral food challenges in infants with 3 mm or greater SPT responses should be aware that the probability of a positive challenge increases T with wheal size. f the

decision is made to introduce dietary peanut based on the recommendations of addendum guideline 1, the total amount of peanut protein to be regularly consumed per week should be approximately 6 to 7 grams over 3 or more feedings.

Quality of evidence. Moderate.

The designation of the quality of evidence as "moderate" (as opposed to "high") is based on the fact that this recommendation derives primarily from a single randomized, open-label study: the LEAP trial. However, it should be noted that the assessment of the LEAP trial's primary outcome was based on a double-blind, placebo-controlled OFC. Furthermore, confidence in this recommendation is bolstered by the large effect size demonstrated in the LEAP trial and prior epidemiological data that peanut allergy is relatively infrequent in Israel, where early childhood consumption of peanut is common.

Contribution of expert opinion. Significant.

Additional comments.

- 1) Breast-feeding recommendations: The EP recognizes that early introduction of peanut may seem to depart from recommendations for exclusive breast-feeding through 6 months of age. However, it should be noted that data from the nutrition analysis of the LEAP cohort indicate that introduction of peanut did not affect the duration or frequency of breast-feeding, and did not influence growth or nutrition.
- 2) Age of peanut introduction: For children with severe eczema, egg allergy, or both, the EP recommends that introduction of solid foods begins at 4 to 6 months of age,

starting with solid food other than peanut. However, it is important to note that the infants in the LEAP trial were enrolled between 4 and 11 months of age and benefitted from peanut consumption regardless of age at entry. Therefore, if the 4- to 6-month time window is missed for any reason, including developmental delay, infants may still benefit from early peanut introduction.

- 3) Considerations for family members with established peanut allergy: The EP
- recognizes that many infants eligible for early peanut introduction under this guideline will have older siblings or caregivers with established peanut allergy. The EP recommends that in this situation caregivers discuss with their health care providers the overall benefit (reduced risk of peanut allergy in the infant) versus risks (potential for further sensitization and accidental exposure of the family member to peanut) of adding peanut to the infant's diet.
- 4) Children identified as allergic to peanut: For children who have been identified as allergic to peanut, the EP recommends strict peanut avoidance. This may include those children who fail the supervised peanut feeding or the OFC, or those children who, upon further evaluation by a specialist, are confirmed as being allergic to peanut. These children should be under long-term management by a specialist.

Addendum guideline 2

The EP suggests that infants with mild-to-moderate eczema should have introduction of age-appropriate peanut-containing food around 6 months of age, in accordance with family preferences and cultural practices, to reduce the risk of peanut allergy. Other solid foods should be introduced before peanut-containing foods to show that the infant is developmentally ready. The EP recommends that infants in this category may have dietary peanut introduced at home without an in-office evaluation. However, the EP recognizes that some caregivers and health care providers may desire an in-office supervised feeding, evaluation, or both.

Quality of evidence. Low.

The quality of evidence is low because this recommendation is based on extrapolation of data from a single study.

| 258 | Contribution of expert opinion. Significant. |
|-----|---|
| 259 | |
| 260 | Addendum guideline 3 |
| 261 | The EP suggests that infants without eczema or any food allergy have age-appropriate |
| 262 | peanut-containing foods freely introduced in the diet together with other solid foods and |
| 263 | in accordance with family preferences and cultural practices. |
| 264 | Quality of evidence. Low. |
| 265 | Contribution of expert opinion. Significant. |
| 266 | |
| 267 | Reference |
| 268 | 1. Boyce JA, Assa'ad A, Burks AW, Jones SM, Sampson HA, Wood RA, et al. |
| 269 | Guidelines for the diagnosis and management of food allergy in the United States: |
| 270 | report of the NIAID-sponsored expert panel. J Allergy Clin Immunol |
| 271 | 2010;126(suppl):S1-58. |
| 272 | APPENDIX A. COORDINATING COMMITTEE MEMBER |
| 273 | ORGANIZATIONS AND REPRESENTATIVES |
| 274 | |
| 275 | Academy of Nutrition and Dietetics |
| 276 | http://www.eatright.org/ |
| 277 | Alison Steiber PhD, RD |
| 278 | |
| 279 | Allergy & Asthma Network Mothers of Asthmatics (AANMA) |
| 280 | http://www.allergyasthmanetwork.org/main/ |
| 281 | Tonya A. Winders, MBA |
| 282 | |
| 283 | American Academy of Allergy, Asthma & Immunology (AAAAI) |
| 284 | https://www.aaaai.org/home.aspx |
| 285 | Hugh A. Sampson, MD |
| 286 | David Fleischer, MD |
| 227 | |

| 288 | American Academy of Family Physicians (AAFP) |
|-----|--|
| 289 | http://www.aafp.org/home.html |
| 290 | Jason Matuszak, MD |
| 291 | |
| 292 | American Academy of Dermatology (AAD) |
| 293 | https://www.aad.org/ |
| 294 | Lawrence F. Eichenfield, MD, FAAD |
| 295 | Jon Hanifin, MD |
| 296 | |
| 297 | American Academy of Emergency Medicine (AAEM) |
| 298 | http://www.aaem.org/ |
| 299 | Joseph P. Wood, MD, JD |
| 300 | |
| 301 | American Academy of Pediatrics (AAP) |
| 302 | https://www.aap.org |
| 303 | Scott H. Sicherer, MD, FAAP |
| 304 | |
| 305 | American Academy of Physician Assistants (AAPA) |
| 306 | https://www.aapa.org/ |
| 307 | Gabriel Ortiz, MPAS, PA-C, DFAAPA |
| 308 | |
| 309 | American College of Allergy, Asthma and Immunology (ACAAI) |
| 310 | http://acaai.org/ |
| 311 | Amal Assa'ad, MD |
| 312 | |
| 313 | American College of Gastroenterology (ACG) |
| 314 | http://gi.org/ |
| 315 | Steven J. Czinn, MD, FACG |
| 316 | |
| 317 | American Partnership for Eosinophilic Disorders (APFED) |
| 318 | httn://anfed.org/ |

| 319 | Wendy Book, MD |
|-----|--|
| 320 | |
| 321 | American Society for Nutrition (ASN) |
| 322 | http://www.nutrition.org/ |
| 323 | George J. Fuchs, III, MD |
| 324 | |
| 325 | Asthma and Allergy Foundation of America (AAFA) |
| 326 | http://www.aafa.org/ |
| 327 | Meryl Bloomrosen, MBA, MBI |
| 328 | David R. Stukus, MD |
| 329 | |
| 330 | Canadian Society of Allergy and Clinical Immunology (CSACI) |
| 331 | http://www.csaci.ca/ |
| 332 | Edmond Chan, MD, FRCPC |
| 333 | |
| 334 | Eunice Kennedy Shriver National Institute of Child Health & Human Development |
| 335 | (NICHD) |
| 336 | https://www.nichd.nih.gov |
| 337 | Gilman Grave, MD |
| 338 | |
| 339 | European Academy of Allergy and Clinical Immunology (EAACI) |
| 340 | http://www.eaaci.org/ |
| 341 | Antonella Muraro, MD, PhD |
| 342 | |
| 343 | Food Allergy Research & Education (FARE) |
| 344 | https://www.foodallergy.org/ |
| 345 | James R. Baker, MD |
| 346 | Mary Jane Marchisotto |
| 347 | |
| 348 | National Eczema Association (NEA) |
| 349 | http://nationaleczema.org/ |

| 350 | Julie Block |
|-----|---|
| 351 | |
| 352 | National Heart, Lung, and Blood Institute (NHLBI) |
| 353 | http://www.nhlbi.nih.gov/ |
| 354 | Janet M. de Jesus, MS, RD |
| 355 | |
| 356 | National Institute of Allergy and Infectious Diseases (NIAID) |
| 357 | http://www.niaid.nih.gov/ |
| 358 | Daniel Rotrosen, MD |
| 359 | Alkis Togias, MD |
| 360 | Marshall Plaut, MD |
| 361 | |
| 362 | National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS) |
| 363 | http://www.niams.nih.gov/ |
| 364 | Ricardo Cibotti, PhD |
| 365 | |
| 366 | National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) |
| 367 | www.niddk.nih.gov |
| 368 | Frank Hamilton, MD, MPH |
| 369 | Margaret A. McDowell, PhD, MPH, RD (retired) |
| 370 | Rachel Fisher, MS, MPH, RD |
| 371 | |
| 372 | North American Society for Pediatric Gastroenterology, Hepatology and Nutrition |
| 373 | (NASPGHAN) |
| 374 | http://www.naspghan.org/ |
| 375 | Glenn Furuta, MD |
| 376 | |
| 377 | Society of Pediatric Nurses (SPN) |
| 378 | http://www.pedsnurses.org/ |
| 379 | Michele Habich, DNP, APN/CNS, CPN |
| 380 | |

| 381 | United States Department of Agriculture (USDA) |
|------------|---|
| 382 | http://www.usda.gov/ |
| 383 | Soheila J. Maleki, PhD |
| 384 | |
| 385 | World Allergy Organization (WAO) |
| 386 | http://www.worldallergy.org/ |
| 387 | Lanny J. Rosenwasser, MD |
| 388 | APPENDIX B: EXPERT PANEL, JUNE 2015 |
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| 392 | Professor of Medicine and Pediatrics |
| 393 | Harvard Medical School |
| 394 | Director, Inflammation and Allergic Disease Research Section |
| 395 | Director, Jeff and Penny Vinik Center for Allergic Disease Research |
| 396 | Specialty: Allergy/pediatric pulmonology |
| 397 | |
| 398 | Panelists |
| 399 | Maria Acebal, JD |
| 100 | Board of Directors, Food Allergy Research & Education |
| 101 | Member of NIAID Advisory Council |
| 102 | Former CEO of Food Allergy and Anaphylaxis Network |
| 103 | Specialty: Advocacy |
| 104 | + |
| 105 | Amal Assa'ad, MD |
| 106 | Professor, University of Cincinnati Department of Pediatrics |
| 107 | Director, FARE Center of Excellence in Food Allergy |
| 108 | Director of Clinical Services, Division of Allergy and Immunology |
| 109 | Associate Director, Division of Allergy and Immunology |
| 110 | Cincinnati Children's Hospital Medical Center |
| 111 | Specialty: Allergy/pediatrics |

| 112 | |
|-----------------|---|
| 113 | James R. Baker Jr, MD |
| 114 | CEO and Chief Medical Officer |
| 1 15 | Food Allergy Research & Education, McLean VA |
| 116 | Founding Director, Mary H. Weiser Food Allergy Center, University of Michigan |
| 117 | Professor of Internal Medicine, Division of Allergy and Clinical Immunology |
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| 119 | Specialty: Allergy/advocacy/education |
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| 121 | Lisa A. Beck, MD |
| 122 | Professor, Department of Dermatology |
| 123 | University of Rochester Medical Center |
| 124 | School of Medicine and Dentistry |
| 125 | Specialty: Dermatology |
| 126 | |
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| 128 | President and CEO |
| 129 | National Eczema Association |
| 130 | Specialty: Advocacy/education |
| 131 | |
| 132 | Carol Byrd-Bredbenner, PhD, RD, FAND |
| 133 | Professor of Nutrition/Extension Specialist |
| 134 | Rutgers University, School of Environmental and Biological Sciences |
| 135 | Specialty: Nutrition/health communication/behavioral science |
| 136 | |
| 137 | Edmond S. Chan, MD, FRCPC |
| 138 | Clinical Associate Professor |
| 139 | Head, Division of Allergy and Immunology |
| 140 | Department of Pediatrics |
| 141 | BC Children's Hospital |
| 142 | University of British Columbia |

| 443 | Specialty: Allergy/pediatrics |
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| 445 | Lawrence F. Eichenfield, MD |
| 446 | Professor of Pediatrics and Dermatology |
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| 449 | University of California, San Diego School of Medicine |
| 450 | Specialty: Dermatology/pediatrics |
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| 453 | Associate Professor of Pediatrics |
| 454 | University of Colorado School of Medicine |
| 455 | Children's Hospital Colorado, Aurora, CO |
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| 462 | Kentucky Children's Hospital |
| 463 | Specialty: Gastroenterology/pediatrics |
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| 466 | Professor of Pediatrics |
| 467 | Director, Gastrointestinal Eosinophilic Diseases Program |
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| 472 | Matthew J. Greenhawt, MD MBA, MSc |
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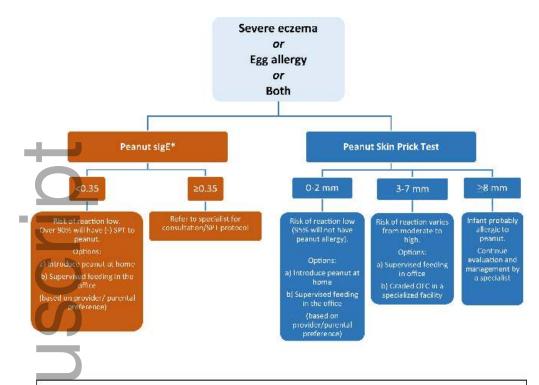
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| 1 75 | University of Colorado School of Medicine |
| 1 76 | Children's Hospital Colorado, Aurora, CO |
| 177 | Specialty: Allergy/pediatrics |
| 178 | |
| 179 | Ruchi Gupta, MD, MPH |
| 180 | Associate Professor of Pediatrics and Medicine |
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| 182 | Ann and Robert H. Lurie Children's Hospital of Chicago |
| 183 | Northwestern Medicine, Northwestern University |
| 184 | Specialty: Pediatrics |
| 185 | |
| 186 | Michele Habich, DNP, APN/CNS, CPN |
| 187 | Advanced Practice Nurse |
| 188 | Northwestern Medicine, Central DuPage Hospital |
| 189 | Specialty: Nursing/pediatrics/education |
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| 191 | Stacie M. Jones, MD |
| 192 | Professor of Pediatrics |
| 193 | University of Arkansas for Medical Sciences |
| 194 | Chief, Allergy and Immunology |
| 195 | Arkansas Children's Hospital |
| 196 | Specialty: Allergy/pediatrics |
| 197 | |
| 198 | Kari Keaton |
| 199 | Facilitator, Metro DC Food Allergy Support Group |
| 500 | Specialty: Advocacy/education |
| 501 | |
| 502 | Antonella Muraro, MD, PhD |
| 503 | President of European Academy of Allergy and Clinical Immunology (EAACI) |
| 504 | Professor of Allergy and Pediatric Allergy |

| 505 | Head of the Veneto Region Food Allergy Centre of Excellence for Research and |
|-----|--|
| 506 | Treatment |
| 507 | University Hospital of Padua, Italy |
| 508 | Specialty: Allergy/pediatrics |
| 509 | |
| 510 | Lanny J. Rosenwasser, MD |
| 511 | Immediate Past President, World Allergy Organization |
| 512 | Professor of Medicine |
| 513 | University of Missouri-Kansas City-School of Medicine |
| 514 | Specialty: Allergy/pediatrics |
| 515 | |
| 516 | Hugh A. Sampson, MD |
| 517 | Professor of Pediatrics, Allergy and Immunology |
| 518 | Icahn School of Medicine at Mount Sinai |
| 519 | Director, Jaffe Food Allergy Institute |
| 520 | Specialty: Allergy/pediatrics |
| 521 | |
| 522 | Lynda C. Schneider, MD |
| 523 | Professor of Pediatrics |
| 524 | Harvard Medical School |
| 525 | Director, Allergy Program |
| 526 | Boston Children's Hospital |
| 527 | Specialty: Allergy/pediatrics |
| 528 | |
| 529 | Scott H. Sicherer, MD |
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| 531 | Icahn School of Medicine at Mount Sinai |
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| 538 | Chief, Division of Dermatology |
| 539 | Seattle Children's Hospital |
| 540 | University of Washington School of Medicine |
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| 543 | Jonathan Spergel, MD, PhD |
| 544 | Stuart Starr Professor of Pediatrics |
| 545 | Chief, Allergy Section |
| 546 | Director, Center for Pediatric Eosinophilic Disorders |
| 547 | The Children's Hospital of Philadelphia |
| 548 | Perelman School of Medicine, University of Pennsylvania |
| 549 | Specialty: Allergy/pediatrics |
| 550 | |
| 551 | David R. Stukus, MD |
| 552 | Assistant Professor of Pediatrics |
| 553 | Section of Allergy/Immunology |
| 554 | Nationwide Children's Hospital |
| 555 | Columbus, OH |
| 556 | Specialty: Allergy/pediatrics |
| 557 | |
| 558 | Carina Venter, PhD, RD |
| 559 | Allergy Specialist, Dietitian |
| 560 | Cincinnati Children's Hospital Medical Center |
| 561 | University of Cincinnati College of Medicine |
| 562 | Specialty: Allergy/dietitian/pediatrics |
| 563 | Abbreviations used |
| 564 | CC: Coordinating Committee |
| 565 | EP: Expert Panel |
| 566 | CPADE: Crading of Pacammendations Assessment Development and Evaluation |

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- 567 LEAP: Learning Early about Peanut Allergy
- NIAID: National Institute of Allergy and Infectious Diseases
- 569 OFC: Oral food challenge
- 570 sIgE: Specific Immunoglobulin E
- 571 SPT: Skin prick test



* To minimize a delay in peanut introduction for children who may test negative, testing for peanut-specific IgE may be the preferred initial approach in certain health care settings. Food allergen panel testing or the addition of sIgE testing for foods other than peanut is not recommended due to poor positive predictive value.

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