CACFP Health Impact Assessment

Methodological supplement

Contents

Overview

As part of the Healthy, Hunger-Free Kids Act of 2010, Congress directed the U.S. Department of Agriculture (USDA) to review and update the Child and Adult Care Food Program (CACFP) nutrition standards to better align with the 2010 Dietary Guidelines for Americans (DGAs).[1] In early 2015, consistent with the science-based recommendations of the National Academies of Sciences, Engineering, and Medicine (formerly the Institute of Medicine), the USDA proposed several adjustments to the CACFP nutritional standards to better meet children's nutritional needs without increasing costs. At that time, the Kids' Safe and Healthful Foods Project (KSHF), a collaboration of The Pew Charitable Trusts and the Robert Wood Johnson Foundation, initiated a health impact assessment (HIA) to analyze how the proposed regulation—the first significant update in nearly 50 years—could affect the overall health of children served by the program.[2] In April 2016, the USDA finalized this rule.

This methodological supplement complements the full HIA report and provides HIA practitioners with a detailed summary of how the research team used and aligned its work with the Minimum Elements and Practice Standards for Health Impact Assessment.[3] (See Table S.1.)

Table S.1

CACFP HIA Addressed Each of the Minimum Elements and Practice Standards Required

Comparison of the elements and approach

HIA minimum elements	How CACFP HIA addressed
1. HIA is conducted to assess the potential health consequences of a proposed program, policy, project, or plan under consideration by decision-makers and is conducted in advance of the decision in question.	The HIA team assessed the potential child nutrition-related health impacts of the proposed CACFP meal patterns rule in relation to current practices. The team conducted the HIA before the USDA finalized the rule, and KSHF shared initial findings with USDA staff before drafting the report; however, the final report and broad dissemination were completed after the final rule was released.
2. HIA involves and engages stakeholders affected by the proposal, particularly vulnerable populations.	The HIA team engaged stakeholders through an advisory committee, focus groups and interviews, and case study site visits.
3. HIA systematically considers the full range of potential impacts of the proposal on health determinants, health status, and health equity.	This HIA examined the CACFP proposed rule's potential effects on nutrition-related child health outcomes, and health risks and inequities.

4. HIA provides a profile of existing conditions for the populations affected by the proposal, including their health outcomes, health determinants, and vulnerable subgroups within the population, relevant to the health issues examined in the HIA.	Existing conditions are addressed throughout the HIA's assessment chapters.
5. HIA characterizes the proposal's impacts on health, health determinants, and health equity, while documenting data sources and analytic methods, quality of evidence used, methodological assumptions, and limitations.	This HIA characterized health factors and health impacts and their relationship to the most affected or vulnerable groups. All data sources are documented, and analytic methods are described in this supplement, including assumptions and limitations.
6. HIA provides recommendations, as needed, on feasible and effective actions to promote the positive health impacts and mitigate the negative health impacts of the decision, identifying, where appropriate, alternatives or modifications to the proposal.	Recommendations providing actions to support health and mitigate potential negative effects are in the policy recommendations chapter of the report.
7. HIA produces a publicly accessible report that includes, at minimum, documentation of the HIA's purpose, findings, and recommendations, and either documentation of the processes and methods involved or reference to an external source of documentation for these processes and methods. The report should be shared with decision-makers and other stakeholders.	This report will be shared with stakeholders and decision-makers as well as national networks of child health and nutrition experts. The report includes all the components referenced in this minimum element.
8. HIA proposes indicators, actions, and responsible parties, where indicated, for a plan to monitor the implementation of recommendations, as well as health effects and outcomes of the proposal.	See the end of this document for suggested evaluation plans that could be carried forth by the HIA team or CACFP community.

Screening

The USDA released its proposed rule for nutritional updates to CACFP in January 2015; the public comment period ended in May 2015. During that time, KSHF conducted preliminary screening and determined that an HIA would meet the criteria of feasibility, timeliness, and potential to inform future decision-making.

Feasibility, timeliness, and stakeholder interest

As part of the screening process, KSHF conducted a series of informal telephone interviews with stakeholders, including CACFP sponsors and national organizations that work with providers and on CACFP policy, to gauge their views on the proposed regulation and better understand their roles related to CACFP. These conversations demonstrated that while the proposed changes were improvements to the current nutritional standards, they could also come with challenges related to training and education, costs, and implementation. Because the HIA occurred during a rule-making time frame, staff from the USDA could not be involved as members of the Advisory Committee (AC) or guide the assessment. However, KSHF notified the USDA of its decision to conduct the HIA and invited USDA staff to participate in the stakeholder interview process—an invitation that they accepted.

Health impacts and potential to inform decision-making

Given that the CACFP nutritional standards had not been updated since their inception in 1968, stakeholders anticipated that the proposed rule could have a demonstrated impact on the health of children who participate in the program. An HIA was identified as a valuable tool to examine these impacts and provide recommendations that could potentially inform the USDA's final rule if timing allowed, but could more certainly support successful implementation.[4] Additionally, there is a potential for the benefits of the rule to also reach children who attend non-CACFP early care and education (ECE) settings, as many states require adherence to CACFP nutritional standards as part of the early care licensing process for all sites. This is an area that was further explored through the HIA and could be used to inform future policy and research efforts.

Scope

The HIA team developed the initial scope using an analysis of the proposed rule's nutritional standards compared with those required under the pre-revision guidelines. This project focused primarily on the rule changes that affect children ages 3 to 5 in CACFP, with some additional analysis on the potential impact of the rule on non-CACFP ECE settings, and did not consider the impacts on adults who are also served by the program. (For the specific changes examined, see Table 2 in the full HIA report, which can be downloaded from the report webpage.)

Vulnerable and most affected populations: Emphasis on health equity

The assessment team incorporated an equity perspective when developing the scope by including the concept in the research questions. This is based on the assertion that, while CACFP is targeted to children who are "vulnerable," some children participating in the program may also be affected by factors outside of nutrition that affect their health, such as poverty and neighborhood violence.[5] The assessment team, where possible, identified literature describing the relationship between CACFP, health inequities, children of color, and children from low-income families in order to characterize findings. The HIA team also examined existing nutrition- and diet-related health inequities by age, race, and ethnicity before characterizing impacts.

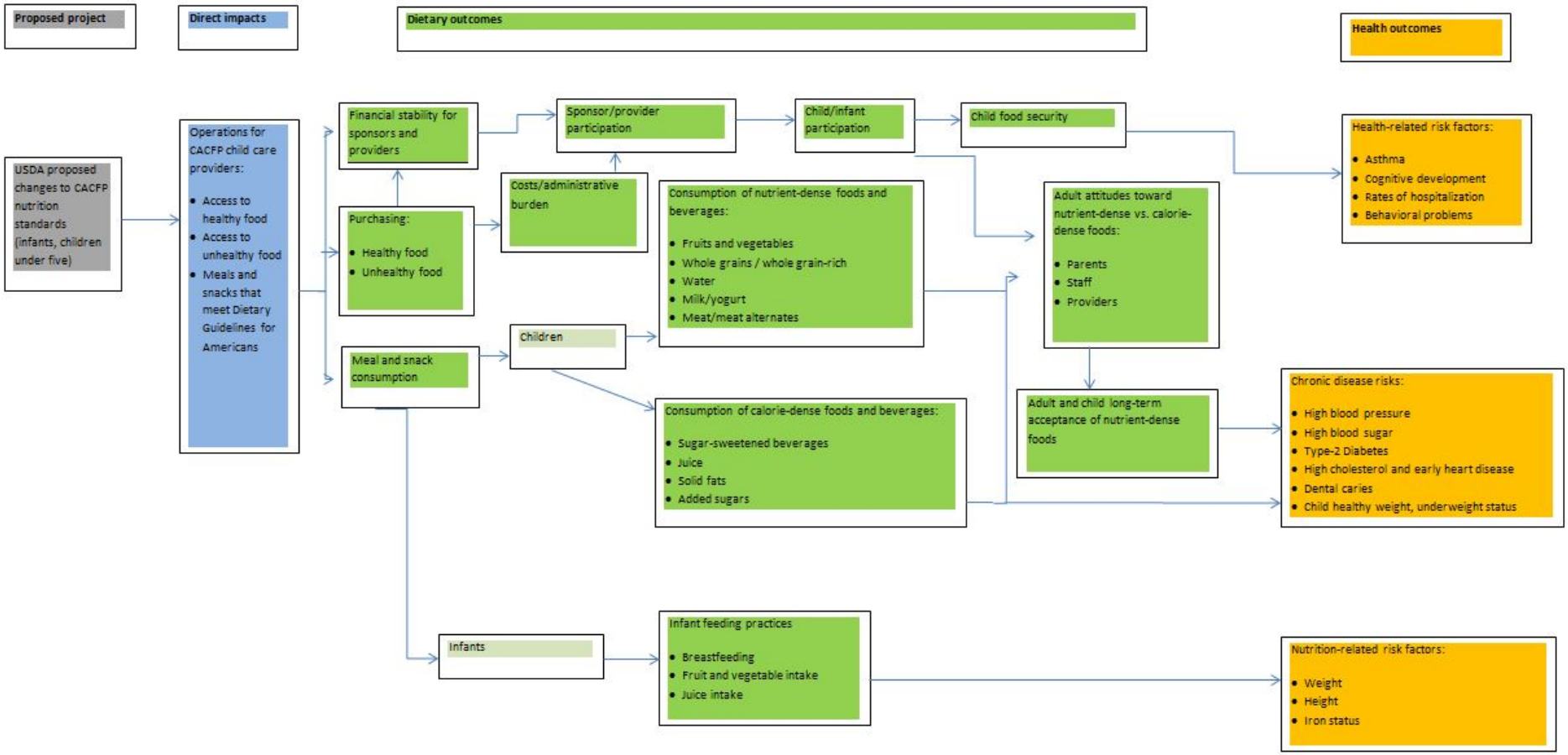
Health determinant pathway

The HIA team generated a set of hypothetical pathways through which changes to the CACFP nutritional standards could affect health determinants and health outcomes. Known as a pathway diagram, this flowchart illustrates how provisions of the proposed rule could change the child food environment (i.e., access to healthy foods), which in turn could modify the child's consumption and ultimately affect overall health and risk for chronic conditions. (See Figure S.1.)

Figure S.1

Rule-Making Can Connect to Health in Many Ways

Health pathways related to CACFP's proposed rule



Scope of assessment questions

The HIA team then used the pathway diagram to develop detailed research questions for the assessment. Table S.2 below lists the seven core research questions, their related subquestions, and the data sources the HIA team used to analyze the potential health effects of the proposed rule. Questions 1 through 4 focus on the connections between the proposed rule and food nutrient quality, including children's food consumption patterns, children's risks of health outcomes related to food and nutrient consumption, and adult and child attitudes toward new foods served. Questions 5 and 6 explore the impact of the proposed nutrient standards on CACFP provider costs, financial stability, and participation. The seventh question the HIA team considered examined how changes in costs could affect food distribution mechanisms. The team was unable to address this question based on limited data and literature related to this topic within the ECE setting.

Table S.2

How Will Changes to CACFP Meal Patterns Affect Food Nutrient Quality and Provider Costs and Financial Stability?

CACFP HIA assessment questions

Research questions	Relevant subquestions	Data sources used to answer the questions		
		Literature review	Quantitative data	Interviews and focus groups
1. How would the USDA's proposed changes affect the nutritional quality of food served in ECE settings that adhere to CACFP standards (CACFP and non-CACFP participants)?	1a. What is the impact of the change in nutritional quality of foods for providers following minimum current requirements to the proposed rule requirements?	X	X	X
	1b. What is the impact of the change in nutritional quality of foods for providers following the minimum current requirements to the proposed rule requirements and best practices?	X	X	X

	1c. What is the impact of the change in nutritional quality of food for providers following standards beyond the current CACFP minimum requirements to those in the proposed rule? (This will measure impact for those adopting current practices above minimum standards through state-by-state regulatory analysis.)	X	X	X
2. How would the changes affect dietary consumption for children in ECE settings that follow CACFP nutrition standards (CACFP and non-CACFP participants)? This includes consumption of fruits, vegetables, whole grains, grain-based desserts, milk, and meat, and consumption of commonly underconsumed nutrients, such as vitamins D and E, and commonly overconsumed macronutrients, such as saturated fat, sodium, and sugar.	2a. How will changes in nutritional quality of meal offerings affect children's food intake in ECE settings?	X		X
	2b. How will consumption of (access to) new offerings at ECE settings impact the overall nutritional quality of those children's diets?	X	X	X
3. How would changes in children's dietary consumption affect health outcomes—such as being overweight, obese, anemic, iron deficient, and food insecure—for children in settings that follow CACFP nutrition standards (CACFP and non-CACFP enrollees), particularly the most vulnerable groups of children, such as racial or ethnic minorities and those living in food deserts or in areas with limited access to quality foods)?	3a. To what extent would consumption of the new meal offerings affect children's health?	X	X	X
	3b. How will this affect the most vulnerable groups of these children? How will this affect existing health disparities rooted in demographic, social, and environmental inequities?	X	X	X

4. How would changes in dietary consumption affect the attitudes toward healthy foods of children, families, and ECE provider administrators and staff?	4a. Do changes in available foods and implementation of CACFP standards affect attitudes and beliefs about new foods served across the age spectrum (children, staff, and parents)?	X		X
	4b. How does the ECE facility's food culture influence attitudes and beliefs about healthy foods?	X		X
	4c. Is the impact on food attitudes and beliefs more positive if they are addressed before or after new regulations go into effect?	X		X
5. How would changes to the standards affect providers' costs and fiscal stability?	5a. How will changes in CACFP standards impact food, labor, and administrative costs borne by providers and, in turn, affect their fiscal stability?	X	X	X
6. How would changes to the standards affect food-related costs for CACFP settings and in turn affect participation in the meal program?	6a. To what extent has adoption of changes to CACFP meal pattern regulations resulted in changes to CACFP participation rates?	X	X	X
7. How would the changes to the nutrition standards affect food distribution costs and other food system mechanisms? *Unable to answer for the following reasons: Limited reach of CACFP to affect changes within the larger food distribution and delivery environment; limited resources to pursue additional investigation in this area.*	7a. If CACFP-participating ECE providers have to meet standards, how will it affect the food procurement system among processors, distributors, vendors, and CACFP buyers?			

HIA project team's roles and stakeholder engagement to guide the HIA

The HIA team for this project consisted of current and former KSHF staff (Sallyann Bergh and Jessica Donze Black); the Health Impact Project (Ruth Lindberg, Debarati "Mimi" Majumdar Narayan, and Keshia Pollack); Kansas Health Institute (Tatiana Lin, Shawna Chapman, Sheena Smith, Sarah Hartsig, and Cheng-Chung Huang); Upstream Public Health (Tia Henderson); and Leading Health LLC (Arianne Corbett and Kiyah Duffey). The HIA team's roles included:

- Conducting the HIA and producing final HIA products.
- Acting as a liaison between the HIA team, AC, and other stakeholders.
- Defining opportunities where the AC and other identified stakeholders could provide timely input to inform the project.
- Being accessible, inclusive, timely, open, fair, and honest. This included making every effort to provide adequate time to review information.
- Providing interested stakeholders with a way to stay involved and informed during the process.
- Providing the AC with the relevant, objective information necessary to allow its members the opportunity to provide informed advice in a timely fashion.
- Responding to AC requests for information and process support, being clear and transparent about HIA team roles and responsibilities, and carefully considering AC input.

The project team identified an AC of individuals and organizations with close working knowledge of CACFP policy and practice to provide their expertise and guidance throughout the HIA. The AC reviewed and provided feedback on the scope of work, assessment approach, draft findings, draft recommendations, and dissemination strategy before the final report's public release. The AC informed the HIA by providing subject matter expertise and a diverse range of experience and perspectives on CACFP. While the HIA team placed substantial weight on input and advice from the AC, KSHF maintained final authority and responsibility regarding what information was included in the final report.

The HIA team used the following criteria to develop an initial list of possible participants to invite to the AC:

- Type of stakeholder (state agency official, researcher, policy expert, provider, CACFP sponsor).
- USDA region (Northeast, Mid-Atlantic, Southeast, Midwest, Southwest, Northwest).
- Role related to CACFP or related subject matter.
- Years of experience with CACFP.
- Other relevant information (e.g., served on Institute of Medicine food-related CACFP committee, provided comments on the proposed rule, published research on subject matter).

The HIA team identified many potential participants who did not become AC members. The HIA team considered these individuals for stakeholder interviews. The HIA report lists each AC member and his or her affiliation.

Assessment and sources of evidence

Current conditions

The majority of the methods used to summarize current conditions included descriptive statistics about key issues surrounding CACFP participation, dietary intake, and health outcomes.

CACFP participation

A variety of institutions licensed to provide ECE services participate in CACFP, including public and private nonprofit child care centers, Head Start programs, out-of-school-time care centers, and for-profit centers that serve children from lower-income families. This HIA specifically focused on CACFP centers and family child care homes. (See "CACFP history and the proposed nutrition standards" in the full HIA report, which can be downloaded from the report webpage.)

Dietary intake

Healthy Eating Index

The HIA used the Healthy Eating Index (HEI), a scoring metric to assess diet quality and how closely eating patterns align to the DGAs, to examine the diet quality of the food environment in ECE settings.[6] HEI scores are calculated from consumption of 12 dietary components per 1,000 calories. A maximum score of 100 indicates that in a given diet, all DGAs recommendations were met or exceeded for each of the components. Nine of these components, including whole fruit, total vegetables, and whole grains, address adequacy and whether the DGAs minimum quantity recommendations were met. For these components, higher scores indicate greater intake. The remaining three assess grains, sodium, and empty calories, which should be consumed in moderation, and for these components, higher scores indicate lower intake.[7]

Dietary reference intakes

Recommendations for dietary consumption are determined in a variety of ways. According to the DGAs, a number of methods exist for determining dietary reference intakes (DRIs).[8] DRIs are a set of values that determine the amount of nutrients individuals should consume based on age and gender, and are defined in detail in the DGAs report.[9] DRIs were identified for calories, total water, macronutrients, minerals, and vitamins.[10]

To summarize current consumption of food components and nutrients among CACFP-eligible children, the HIA team used the most recent National Health and Nutrition Examination Survey (NHANES) dietary recall data available (2011 to 2012).[11] Children ages 1 to 5 who were not breastfed were included in the analysis. Family income-to-poverty ratio information is available as part of the NHANES data set, and this information was used to identify children under 185 percent of the federal poverty threshold, which was $44,863 for a family of four in 2015.[12] These children are those most likely to be eligible for CACFP at the time of the NHANES survey. The team used race and ethnicity information to identify differences in dietary consumption among racial and ethnic groups in the eligible population.

To calculate the food components and nutrients for current consumption using NHANES information, the HIA team used SAS statistical software to link the food items in the NHANES dietary recall data to

the Food Patterns Equivalent Database and the Food and Nutrient Database for Dietary Studies. Using the food components and nutrients linked to dietary recall data, the team summarized the food components, macronutrients, and micronutrients included in children's daily diets.

The age-appropriate recommendations were compared with consumption information from the NHANES data set for the following groups:

- Children ages 1 to 3.
    - Non-Hispanic white.
    - Non-Hispanic black.
    - Hispanic.
    - Other.
    - Children under 185 percent of the federal poverty threshold.
    - Children at or over 185 percent of the federal poverty threshold.
- Children ages 4 and 5.
    - Non-Hispanic white.
    - Non-Hispanic black.
    - Hispanic.
    - Other.
    - Children under 185 percent of the federal poverty threshold.
    - Children at or over 185 percent of the federal poverty threshold.

The HIA team calculated 95 percent confidence intervals for each of the nutrients, vitamins, and minerals from the NHANES data set and compared them with the recommendations. (The data are summarized by race and poverty level for each of the above age ranges in the tables in supplemental Appendix C, which can be downloaded from the report webpage.)

Children's current health conditions

Using descriptive statistics, the HIA team examined the current health status of children under age 5 across the U.S. The team identified overweight and obesity, anemia and iron deficiency, and food insecurity as health factors and outcomes for which CACFP-eligible children would be most at risk, given their socio-economic and racial profiles. Details of these statistics related to child health outcomes, risks, and inequities can be found in the "Effects on child health inequities, risks, and outcomes" section of the full HIA report.

Establishing a baseline to project impacts

The HIA explored several approaches to determine the potential magnitude of the proposed rule's impact across CACFP and non-CACFP ECE settings. The following outlines the process by which such a baseline was explored and established.

Limitations of the 'Achieving a State of Healthy Weight' report

The National Resource Center for Health and Safety in Child Care and Early Education has published its report "Achieving a State of Healthy Weight" (ASHW) every year from 2010 to 2015.[13] ASHW rates early care licensure regulations across states for their adherence to best practice standards in obesity prevention as determined by the American Academy of Pediatrics. ASHW researchers rate 47 components of early care licensure regulations regarding infant feeding, nutrition, and physical activity on a scale from 1 to 4 (1 means the regulation contradicts the standard, 2 means the regulation does not mention the content of a standard, 3 means the regulation partially meets standard, and 4 means the regulation fully meets standard). Of the 47 ASHW components, 11 relate to infant feeding and 21 to nutrition. Owing to the frequent use of CACFP standards within state early care licensure regulations, the ASHW researchers rated the CACFP meal pattern and assigned a score for each practice. When a state licensure regulation mentions the CACFP meal patterns without additional guidance or contradicting text, the state receives the assigned CACFP rating. While the HIA team had initially planned to analyze the ASHW information to describe how changes in the CACFP meal pattern guidance would affect early care settings in various states, this was not possible due to a number of limitations:

- Because the ASHW report was published before the proposed rule was released, the proposed rule's strength of impact on regulations could not be fully measured within the ASHW rating system.
- At the time the HIA was underway, the most recent edition of the ASHW report included outdated information on licensure regulations from 2014.
- The ASHW methodology may present an incorrect measure of the magnitude of impact in states where regulations differ across early care setting types—child care centers, large family child care homes, and small family child care homes. ASHW aggregated the three settings to calculate the ratings. This approach paints an artificial picture of the magnitude because some states define regulations and nutritional guidance the same way across all settings, while others set different requirements across types of sites. Furthermore, the language in states' licensing regulations may reference meal guidance in varying ways, sometimes directly pointing to CACFP as the standard and other times pointing to CACFP in a more indirect or vague way. The language can have implications when the final CACFP rule goes into effect. ASHW mentioned this issue but did not provide these details for each state in the analysis.
- The ASHW report compares state early care licensure regulations with standards outlined by the American Academy of Pediatrics (AAP). The AAP guidelines, however, do not fully align with CACFP guidance and go beyond CACFP standards in some areas. The intent of this HIA was to compare the state regulations with the CACFP meal pattern, so while the ASHW report provides a rating for CACFP, it does not allow for a thorough comparison of licensure regulations and the CACFP meal pattern.
- ASHW does not consider that some states have exemptions that are not covered by licensure. In a state where ASHW ratings may predict a high impact, there may be a large number of providers or provider types that are exempt, meaning that in practice the impact is not as large in the state.

State-by-state analysis of nutrition standards in licensure

Given the limitations of the ASHW ratings, the HIA team, in cooperation with the Public Health Law Center, analyzed nutritional standards within state early care licensing regulations for centers and homes, current as of July 2015, for all 50 states and the District of Columbia to assess the potential impact that both CACFP and non-CACFP participating sites may experience as a result of the changes in the final rule. The research demonstrated that there is diversity across CACFP and non-CACFP providers in the level at which they implement CACFP nutritional standards; a range of configurations for how state licensing laws link to CACFP standards across various early care settings; an ever-changing landscape of licensing regulations at the state level; and varying levels of monitoring for non-CACFP participating sites across states. The "Effects on state early care licensing regulations" section of the full HIA report details this analysis and proposes directions for future research and policy work.

The HIA additionally explored vulnerable populations that might be disproportionately affected by the proposed rule, such as racial or ethnic minorities and those living in food deserts or in areas with limited access to quality foods. The following seven indicators were examined to demonstrate the potential effects of the proposed rule.

Table S.3

CACFP Changes May Disproportionally Affect People in Areas With Higher Concentrations of Child Poverty or Food Insecurity

Measures and descriptions of each vulnerability indicator

Vulnerability indicator	Measure and description	Source	Data year(s)
Child poverty rate	Percentage of children under age 18 living in households with incomes below the federal poverty threshold.	USDA, Economic Research Service, "Food Environment Atlas" (2015), https://www.ers.usda.gov/data-products/food-environment-atlas	2010
Child food insecurity	Percentage of children under age 18 who are food insecure.	Feeding America, "Map the Meal Gap" (2015), http://map.feedingamerica.org	2013

Literature review

Seven members of the research team conducted systematic literature reviews with peer-reviewed and gray literature.[14] Each question has at least three people who completed the review, with four researchers for research questions 5 and 6.

Literature inclusion and exclusion criteria

Analysts conducted a search for articles from 2005 until 2015. The team first reviewed the literature in the National Academies' 2011 report "Child and Adult Care Food Program: Aligning Dietary Guidance for All" as a reference; however, a limited number of articles met the HIA research needs. Team members searched Google Scholar and PubMed from Sept. 1, 2015, through Oct. 1, 2015. Each team member was assigned a different question (with one team member assigned two questions). The team used multiple keywords connected to each research question (see Table S.4) as a basis for inclusion in the review.

Table S.4

Literature Review Search Terms by Research Question

Research question *(See questions in Table S.2)*	**Search terms**
1.	CACFP, child care, meal patterns, child nutrition program, preschool, daycare, Child and Adult Care Food Program (add variations), food, nutrition, standards, food standards, nutrition standards, fruits, vegetables, fruits and vegetables, sugar sweetened beverages, water, sugar, water availability, beverage choice, whole grains, WIC sugar, WIC, fruit juice, fried foods, breastfeeding, milk
2.	Intake, plate waste, menu changes, CACFP, child care, meal patterns, child nutrition program, preschool, daycare, Child and Adult Care Food Program, food, nutrition, standards, food standards, nutrition standards, fruits, vegetables, fruits and vegetables, sugar sweetened beverages, sugar, water, water availability, beverage choice, whole grains, WIC sugar, WIC, fruit juice, fried foods, breastfeeding, milk
3.	CACFP, child care (and similar terms), low-income children, minorities, inequities, rural, urban core, food desert, food insecurity, tier status (start with this and expand to include additional populations), meal patterns, child nutrition program, preschool, daycare, Child and Adult Care Food Program, food, nutrition, standards, food standards, nutrition standards, indicators of adiposity (i.e., obesity, overweight, BMI, BMI trajectory, skinfold thickness), nutrient levels, dental caries, cavities, oral health, behavior, behavioral outcomes, attention, long term risk for chronic illness (e.g., cardiovascular disease), bone, bone health, constipation, fruits and vegetables, sugar sweetened beverages, sugar, water availability, beverage choice, whole grains, WIC sugar, WIC, fruit juice, fried foods, breastfeeding, milk
4.	Attitudes, beliefs, perceptions, self-efficacy, staff, parents, family, exposure, acceptance, child, children, buy-in, menu changes, CACFP, child care, meal patterns, child nutrition program, preschool, daycare, Child and Adult Care Food Program, food, nutrition, standards, food standards, nutrition standards

5.	Food costs, labor costs, administrative costs, menu changes, CACFP, child care, meal patterns, child nutrition program, preschool, daycare, Child and Adult Care Food Program, food, nutrition, standards, food standards, nutrition standards, Head Start, child care provider costs
6.	Food costs, labor costs, administrative costs, providers, participation, menu changes, CACFP, child care, meal patterns, child nutrition program, preschool, daycare, Child and Adult Care Food Program, food, nutrition, standards, food standards, nutrition standards, demand for child care
7.	Network distribution (distribution networks), CACFP, child care, meal patterns, child nutrition program, preschool, daycare, Child and Adult Care Food Program, food, nutrition, standards, food standards, food costs, food prices, food expenditures, meal planning, food services

Initial searches resulted in over 5,000 hits. The team conducted a review of each title and abstract, removing duplicates and articles that did not relate to each question. In total, the team fully reviewed and included 152 articles in the analysis, including 42 articles for Question 1, 46 for Question 2, 49 for Question 3, and 42 for Question 4. Although 42 articles were reviewed for question four, an additional 68 articles were pending review when time elapsed for completion. The economic analysis team completed the review of 37 pieces of literature using the same protocol described here for questions 5 and 6. Literature was reviewed starting with the most recent publication to the oldest publications.

Article scoring for characterization of evidence

Analysts read and scored articles using criteria developed for qualitative, quantitative, and literature review studies, available on request from the authors. Each criterion, such as data set used, type of study, and findings, provided a possibility of 12 points. Articles were scored individually and then compounded to determine the quality of the total literature reviewed for each research question. They were then categorized based on each article's score; categories included low (1-4), medium (5-8), and high (9-12). Analysts developed summary scores for the literature based on the number of articles included in the findings across respective indicators (e.g., health outcomes).

The team used the following categories for coding:

- Author.
- Year.
- Population.
- Sample.
- Type of literature (e.g., peer-reviewed vs. gray).
- How the article was identified.

- Years data were collected.
- Data source (e.g., conducted or funded by nonindustry entity such as NHANES).
- Study design (e.g., strength of methodology, theoretical framework grounding, statistically significant findings at the 0.05 level or better).
- Study limitations.
- Study findings (e.g., relevant to research questions).
- Policy recommendations.

To ensure consistency in coding, the team assessed inter-rater reliability at the beginning of the coding period using three articles. The team lead identified differences in coding and scoring among the members and reconciled discrepancies with the group. Once consensus on the coding system was achieved, the team read and coded articles for each question.

Finally, each team member completed a summary score of the quality of the evidence identified through the literature review. Criteria included items such as the number of articles identified, the consistency of findings across studies, and how high the individual articles were scored for quality.

The literature review team sorted literature first by data source (so studies that used the same data would be grouped together), by study type (e.g., studies of large data sets, survey studies, etc.), and then by themes identified in findings. Midway through the assessment, the team also resorted literature based on whether the research occurred in relation to CACFP current practices, alignment with aspects of the proposed rule, or alignment with best practices. This system allows for discussion of studies that are replicated or where replication is attempted but fails to occur. Summaries captured the themes identified as well as any key findings in stand-alone studies.

CACFP menu scenario development and analysis

Menu development

To assess the effects of changes to the nutritional quality of foods served in CACFP, the HIA team requested sample menus from CACFP providers involved in the stakeholder process and used them as a template to develop a set of hypothetical weekly menus to model meals, snacks, and drinks under three scenarios:

- CACFP practices before the proposed rule (“pre-revision”).
- With the proposed requirements in place (“proposed”).
- With the proposed rule best practices included (“best practices”).

The menus were constructed to capture meal components and overall nutritional quality and to reflect potential changes caused by the CACFP rule update. Additional details about each food item were added to template menus.

To illustrate differences across scenarios, the researchers selected menu items that were allowable under each of the three examples. The foods selected highlight key differences between “pre-revision”

and "proposed" while taking into account plausible practices learned from the interviews and the AC. For example, although serving chocolate milk for all meals was allowed under the pre-revision CACFP standards, AC feedback informed the HIA team that many providers serve little to no chocolate milk. Similarly, although grain-based desserts were allowable pre-revision, there was mixed feedback on how often providers serve them. The HIA team adjusted the initial scenario menus twice—first to adapt menus from pre-revision requirements to commonly held provider practices and to remove supper, and then to shift the snack component to reflect feedback on the service of grain-based desserts. (For the hypothetical menus, see supplemental Appendix B, which can be downloaded from the report webpage.)

Menu scenario analysis

The team assessed the changes in nutritional quality of meals across menu scenarios by applying the HEI and DRI, summarized below. This method approximated the shift in nutritional quality because scores for the "proposed" and "best practice" scenarios were more closely aligned to DGAs meal component recommendations and the daily recommended nutrients for 2-to-5-year-old children.

Menu scenarios provide an example of food items served, not consumed, so results may overestimate the nutritional benefits. Moreover, because menus vary greatly across settings and surveillance data demonstrating the most common menu components are limited, the HEI scoring could not be assumed to be generalizable to the true landscape of CACFP.

Food group analysis

HEI served as a measure of diet quality to examine how nutritional quality might shift among the three menu scenarios.

To calculate the HEI for the hypothetical menus, food codes and gram equivalents for each item were identified using the USDA resource "What's in the Foods You Eat Search Tool."[15] By matching the food code and modification code between two nutrient databases—the Food and Nutrient Database for Dietary Studies and the Food Patterns Equivalents Database—the HIA team was able to calculate the amount of the 65 nutrients and 37 food components for each food. HEI-2010 component scores were calculated using the threshold amounts per 1,000 calories. Proportional scores were applied where appropriate based on the 2010 HEI update paper.[16] The overall HEI score was calculated by totaling the component scores.

An HEI score was calculated for each meal component and a total weekly average score for the components for each of the three scenarios. These scores were calculated as a ratio: the amount of any component per 1,000 calories.

To compare diet quality of the menu scenarios using the HEI, the HIA team used paired t-tests to compare the diet quality of the menu scenarios. Each of the components and the overall HEI score were analyzed, comparing the pre-revision scenario with each of the other two.

Nutrient analysis

Further, the team calculated the associated macro- and micronutrient changes across menu scenarios using 2011-12 NHANES dietary recall data. The HIA team totaled the nutrients from the DRI tables and

calculated the percentage each sample menu contributed to the daily recommendations.[17] The team then reviewed differences in the nutritional quality of the menus by using paired t-tests to compare each nutrient.

However, the HIA team chose not to include a statistical analysis of changes in nutrients between the scenarios because of a lack of representative data on pre-revision meals and inconsistencies between data sets: The scenarios reflect only partial days because CACFP limits reimbursement to a maximum number of meals during care, while the recall data covers full days. No quantitative conclusions could be drawn from the menu analysis, but providing HEI scores for the proposed changes helps to demonstrate their possible impacts.

(For the menu scenario analysis, see supplemental Appendix D, which can be downloaded from the report webpage.)

Economic analysis

Because neither the proposed nor final rules provide additional funding to support the implementation, the USDA released its regulatory impact analyses (RIAs) for each version to demonstrate how the program's nutritional changes might affect participating providers. The RIAs estimated that the changes align meals and snacks to the DGAs in a cost-neutral manner and that providers would experience "no meaningful net change in cost as a result of the rule."[18] However, during the HIA screening process, stakeholders raised concerns that improvements to the meal patterns may result in cost increases, which in turn could affect participation. The extent to which these nutritional updates influence individual providers will depend on how similar their current menus are to the proposed meal pattern requirements, the cost and ease of availability of newly required food(s), child participation rates, and the proportion of participating children who receive subsidized meals, among other factors.

The methods used in the economic analysis included a literature review and a cost simulation. The literature review followed the protocol as described above for the first four research questions.

Simulation and limitations

Analysts conducted the cost simulation to evaluate potential provider spending responses to the proposed rule. Analysts extracted baseline data for the components of meals in this simulation from a 2011 National Academies study.[19] The analysts supplemented these data with recent state-level examinations of food served in ECE settings that consider, among other issues, the prevalence of sugary snacks and the use of low-fat milk.[20] As the baseline data did not allow analysts to firmly distinguish current practice on whole versus other grains and on whether fruits, vegetables, or a combination are served at lunch meals, the HIA team identified various existing sources for food price data to be used in the simulation.

1. **Quarterly Food-at-Home Database.** Contains detailed information for specific kinds of food. The database distinguishes whole-grain products from refined grains, fruits from vegetables, and whole from low-fat milk. The database was current through 2010.[21]

2. **Fruit and vegetable prices.** Provides detailed prices by type of fruit or vegetable, with the most recent data series updated in March 2015. This data source also contains information about the costs (as of November 2012) of substituting fruits and vegetables for sugary or salty snacks.[22]
3. **Food Buying Guide for Child Nutrition Programs**. Contains information on serving sizes and provides information on servings per pound for a wide range of food types.[23]
4. **Retail Prices of Dairy Products.** Data available through 2012. Although sensitivity analysis around the baseline assumptions suggests that the estimates are robust, the work could be further refined and made more accurate with better knowledge of providers' baseline menu choices, the potential alternatives they might consider for grain-based desserts, and their actual costs incurred.[24]

Qualitative data and stakeholder engagement

Engaging stakeholders in the assessment phase is an integral part of the HIA process. The team collected qualitative data from more than 130 individuals through key informant interviews, focus groups, and case study visits with CACFP sponsors; provider staff, state agency staff, research and policy organizations, parents, and others. Gathering perspectives from those impacted by the proposed rule through qualitative research is important because these stakeholders possess expertise and community data and knowledge that can ground the HIA in the lives of affected populations.[25] Decision-makers then can consider these perspectives on how the rule may influence health. (For a visual distribution of stakeholder engagement across the country, see Figure 3 in the full HIA report, which can be downloaded from the report webpage.)

Key informant interviews: Selection criteria, selection process, and sample

The stakeholder engagement team conducted 16 semi-structured key informant interviews to gather perspectives on health impacts of proposed changes to CACFP meal patterns. Each key informant was asked a standard set of questions, depending on its applicability, as well as follow-up questions to obtain clarification, confirm understanding, and capture additional information.

To prioritize and ensure that interviewees could provide varying perspectives for all aspects of CACFP, the team utilized the same criteria used to develop the AC (see details above), as well as the following:

- Type of CACFP setting (center-based, family early learning and child care home, Head Start, at-risk after-school, tribal, or mixed).
- Size of CACFP setting (large is greater than 20 children, medium is 13 to 19 children, and small is less than 12 children).
- Location of CACFP setting (urban, suburban, or rural).

The stakeholder engagement team used various methods to develop a list of potential stakeholders for key informant interviews, including:

- Sending a survey to members of the National CACFP Sponsors Association (NCA), which provides education, support, and resources to organizations that administer CACFP and oversee provider sites. The survey was open from Sept. 1 to 29, 2016, and received 94 responses.

- Sending a survey to AC members to gather suggestions for stakeholders to interview. The survey was open from Sept. 8 to 18, 2016, and received 13 responses.
- Compiling a list of potential individuals to interview based on the HIA team's knowledge of the field, background research on key organizations related to CACFP and child nutrition, and subject matter expertise.
- Using a snowball sampling technique to obtain the names of additional people to interview from initial contacts.

The full list of possible stakeholders to interview included 49 providers, 13 sponsors, and 46 policy experts, researchers, and state and federal officials. To complete at least 15 key informant interviews, the stakeholder engagement team narrowed the full list of stakeholders using the criteria previously described. The final list of stakeholders for outreach included 11 providers, 10 sponsors, and 11 experts, researchers, and agency officials. The stakeholder engagement team completed a total of 16 key informant interviews with CACFP sponsors, providers, researchers, state and federal agency officials, and policy experts.

Interview content and structure

The team developed and tailored questionnaires for three groups of participants—providers, sponsors, and policy experts/researchers/agency officials—and tested them with three selected AC members. The stakeholder engagement team incorporated feedback as necessary to finalize the questionnaires. The stakeholder engagement team conducted most interviews by phone, lasting 60 to 90 minutes. At least two stakeholder engagement team members participated in each interview, with one leading and the other taking notes on a computer, entering responses into a pre-loaded questionnaire. The interviews covered such topics as the interviewee's role as it relates to CACFP, the nutritional environment and access to healthy foods among CACFP-participating families and providers, and perspectives on how the proposed rule might affect health, provider costs, and provider participation. Team members discussed key points and themes, reviewed notes to ensure accuracy of the conversation, finalized interview records for analysis, and uploaded the files to NVivo, a qualitative management and analysis tool.

Virtual focus groups: Selection criteria, selection process, and sample

The stakeholder engagement team completed two virtual focus groups—one with CACFP sponsors, the other with home providers—to gather additional perspectives to supplement the key informant interviews. The HIA team collaborated with the NCA and the National Association for Family Child Care to recruit participants via email for the sponsor and home provider focus groups, respectively. A member of the stakeholder engagement team moderated the virtual focus groups, and at least one additional team member was present at each session to observe, take notes, and handle logistics. The focus group questionnaires were adapted from the key informant interview questionnaires for sponsors and providers.

The virtual focus group with sponsors included 14 participants from eight states: Arizona, Georgia, Illinois, Massachusetts, Minnesota, Pennsylvania, South Dakota, and Washington. Participants held a variety of roles ranging from leaders of their sponsoring organizations to program coordinators and

subject matter experts in nutrition. The team collected demographic information about the sponsors and the providers they serve before the virtual focus groups through an online survey.

The virtual focus group with home providers included eight participants from seven states: Arkansas, California, Ohio, Utah, Vermont, Virginia, and West Virginia. Two participants serve as consultants or sponsors to programs. Participants included current and former Tier 1 and Tier 2 providers.[26]

Case studies: Selection, structure, and sample

The stakeholder engagement team selected three CACFP provider sites—suggested by experts for their success in implementing meal patterns at or above the USDA's proposed rule "best practices"—as case studies. In consultation with the AC and members of the NCA, the stakeholder engagement team initially identified six potential locations. After subsequent screening calls to understand the food program operations, the team selected three—one family home provider in Kansas, one Head Start and Early Head Start center in rural New York, and one site in Southern California that serves multiple Head Start, Early Head Start, and non-Head Start centers—to provide variation in geographic location, size, and provider type.

The stakeholder engagement team scheduled in-depth visits, lasting one to three days each, with the selected providers to understand staff and parent perspectives on the successes and challenges that come with transitioning to a healthier menu. Administrative staff at the case study sites led recruitment for the interviews and focus groups through emails, newsletters, fliers, and notifications at staff and parent meetings. Participation was limited to adults who could speak and read English.

Two members of the HIA team conducted the interviews and focus groups, which each lasted approximately 60 to 90 minutes and were recorded. For the focus groups with parents, following the consent process, participants were asked to complete a brief questionnaire that included questions about age, gender, and number of children; educational level; and household income. The questionnaire also included some questions designed to capture their thoughts regarding CACFP nutritional standard changes; responses helped identify specific areas of focus during the discussions.

Across the three visits, the HIA team conducted 13 interviews and 10 focus groups with a total of 92 individuals, including program administrators, teachers and teaching assistants, food service workers, parents, and parent advocates. As the team worked to develop agendas for these visits, site administrators indicated that parent advocates and food service workers were a critical component of their efforts in serving healthier meals and snacks, and so these stakeholder groups were later added to the initial list of stakeholder criteria. Case study interviews and focus groups were similar in structure to the key informant interviews addressed above.

Qualitative data analysis

The stakeholder engagement team captured information from the interviews, focus groups, and virtual focus groups through taking detailed notes and, in some cases, audio recordings. To prepare files for analysis, the team reviewed notes and recordings, finalized each interview or focus group record, and uploaded the records to NVivo, a qualitative data management and analysis software.

To analyze the qualitative data, the stakeholder engagement team combined interviews and focus groups from the three case study sites with data from additional virtual focus groups and key informant interviews conducted for this HIA. Data analysis consisted of stakeholder engagement team members developing a code book of "a priori," or pre-identified, codes stemming from the HIA research questions. In some cases, the team developed additional codes based on new themes that arose from the data collected. Thematic data analysis was used to identify key themes within four stakeholders groups: parents, CACFP sponsors, policy experts and researchers, and providers, including teachers, food service workers, administrators, and other staff. Interview and focus group records were coded according to common themes. Two team members discussed any disagreements in order to provide reliability to results. Results were not connected to any particular focus group participant or interviewee; rather, the data were analyzed across the focus group and interview samples and presented in aggregate. To further analyze data from the case study research, the team developed vignettes from the three case study sites to provide a snapshot of the visits and highlight prominent themes and recommendations for successful implementation of the proposed rule. Additionally, themes identified during the visits are woven throughout the qualitative findings presented in the report.

Assessment limitations and data gaps

The HIA team identified the following limitations during the assessment process:

- In the analysis of health and health equity, the HIA is limited by CACFP itself, which is structured to support the nation's most vulnerable children but may not be reaching all who could benefit from the nutritious meals and snacks served through the program. The HIA report discusses some of these limitations—such as geographic location and CACFP eligibility structure—as some factors that may prevent the program from supporting all children in need of the program's meal offerings.
- Non-CACFP providers who serve food may also be affected by the final rule, but complexities in nutritional standards outlined in licensing regulations and discrepancies between policy and practice presented limitations in assessing the proposed rule's magnitude of impact. Background on this is highlighted above, and details of these complexities are elaborated in "Effects on state early care licensing regulations" in the full HIA report.
- Some groups (for example, the American Heart Association) recommend more stringent guidelines than are presented in the 2010 DGAs. These were not included in the analysis of current child food intake. Because the proposed rule is based on the 2010 DGAs, newer research or best practices, including the updated 2015 DGAs, may point to adjustments for the appropriate thresholds for various nutrients.
- This HIA was constrained in determining a cost threshold that might result in CACFP sponsor or provider participation beyond what is described in the assessment. No one data set shows the reasons that providers have been leaving CACFP. The HIA team learned that some states do not have funds to conduct annual inspections, which may mean that some locations are not in compliance with CACFP.

- The literature base indicates that researchers have a difficult time measuring child consumption of food and fluids. This means that using food served as a proxy for consumption may underestimate or overestimate actual consumption.

Qualitative data limitations

Conducting interviews and focus groups in a select number of locations may not provide representative information or projections for impacts that may occur as a result of the proposed rule. However, collecting perspectives from individuals with diverse experiences with CACFP provided insight into the potential positive and negative health impacts of changing CACFP meal requirements and supplemented the other analyses conducted for the HIA. Additionally, the HIA did not include non-English-speaking populations in the stakeholder group, and none of the printed materials was provided in other languages.

Quantitative data limitations

A major data gap exists in defining the current meal practices. There is not one recent, nationally representative sample that provides an average of meal practices in place across all states. The HIA team examined multiple sources, including the Colorado Healthier Meals Initiative report, the Assessment of Afterschool Program Practices Tool study, the state-by-state analysis from the Maternal and Child Health programs, the ASHW ratings, and state-by-state nutritional requirements in ECE licensing regulations. For more information on these complexities for understanding current practice and the HIA's approach to establishing a baseline, see, "Effects on state early care licensing regulations" in the full HIA report.

There is no nationally representative menu or set of menus that can be developed for the purposes of the sample menu construction. The data and methods the HIA team used to generate the menus are limited. For example, the team did not have access to Minute Menu, a CACFP management software that helps providers generate and track their menus, due to its proprietary nature. The HIA team also did not collect a representative sample of menus from providers across the nation to develop these scenarios or fully account for regional differences. However, the HIA team put forth a diligent effort to estimate current practice, using specific parameters and systematic methods to conduct this scenario analysis.

Data sets related to CACFP operating budgets are limited. A single comprehensive data set is unavailable across all sites in the U.S. that provides a cost breakdown among labor, food, and related materials supporting meal provision.

Characterization of impacts

The HIA team characterized the potential impacts of changes to CACFP nutritional standards on health factors or outcomes based on findings from the literature review and data analyses. The stakeholder engagement process supported those decisions but was not used in the overall projection of direction. Such characterizations are summarized at the end of the HIA report's assessment chapters. The categories and subcategories that were reviewed are detailed in Table S.5, and the characterizations are listed in Table S.6.

Table S.5

Characterizing Impacts: Categories and Subcategories With Definitions

Category	Subcategory	
Direction: Projects the direction of change based on the proposed rule	**Increase**: Literature (data) achieves consensus that this indicator might increase **Decrease**: Literature (data) achieves consensus that this indicator might decrease **Mixed**: Literature (data) lacks consensus about this indicator's potential direction **No effect**: Literature (data) suggests that this indictor might remain unchanged **Unknown**: Literature (data) does not exist for this indicator **Uncertain**: It is not possible to predict from literature (data) what the direction of change will be **N/A**: Evidence from literature (data) is not applicable to this indicator	
Expected health impact (nature): Indicates whether the health impact is beneficial or adverse	**Beneficial**: Change may improve health **Adverse**: Change may impair health **Uncertain**: Unknown how health can be affected **Mixed**: Change may be positive as well as negative **None**: No identified effect on health	
Magnitude of impact: Indicates how widely the health effects would be spread within a population or across a geographical area	**Strength:** Describes the extent of the impact on health outcomes	• **No substantial:** When the final CACFP rule goes into effect, licensed providers (CACFP and non-CACFP) that follow state regulations will feel no meaningful effect because the meals and snacks they serve are already at least on par with the new requirements. • **Low:** When the final rule goes into effect, providers (CACFP and non-CACFP) that comply with state requirements will need to make very few improvements to ensure that the meals and

		snacks they serve meet the new standards. • **Medium:** When the final rule goes into effect, licensed providers (CACFP and non-CACFP) that follow state regulations that automatically update to match the final rule will need to make substantive changes to their meals and snacks to meet the new requirements.* • **High:** When the final rule goes into effect, licensed providers (CACFP and non-CACFP) that abide by state regulations will need to make improvements to all meal and snack components served.*
	Distribution: Describes the population most likely to be affected by changes in the health factor or outcome	**CACFP participants:** • State licensure requirements (6+ standards, regardless of whether licensure updates with CACFP final rule) > current CACFP guidance • State licensure requirements (3-5 standards, when licensure should update with CACFP final rule) > current CACFP guidance • State licensure requirements (0-2 standards, when licensure should update with CACFP final rule) > current CACFP guidance **Non-CACFP participants:** • State licensure requirements (6+ standards, regardless of whether state licensure updates with CACFP final rule) > pre-revision CACFP guidance • State licensure requirements (3-5 standards, when licensure should update with CACFP final rule) > pre-revision CACFP guidance • State licensure requirements (0-2 standards, when licensure should update with CACFP final rule) > pre-revision CACFP guidance • State licensure requirements (0 standards, when licensure may update or should not update with CACFP final rule) > pre-revision CACFP guidance • State licensure requirements (1-2 standards, when licensure may update or should not update with CACFP final rule) > pre-revision CACFP guidance • State licensure requirements (3-5 standards, when licensure may update or should not update with CACFP final rule) > pre-revision CACFP guidance.

Likelihood: How likely that a given exposure will occur	**Likely:** It is likely that impacts will occur as a result of the proposed rule change **Possible:** It is possible that impacts will occur as a result of the proposed rule change **Unlikely:** It is unlikely that impacts will occur as a result of the proposed rule change **Uncertain:** It is unclear if impacts will occur as a result of the proposed rule change	

* The impact is less clear for certain non-CACFP providers that follow state regulations, which probably will not automatically update to the final rule. Those that choose to follow the new CACFP standards may experience a medium or high impact, but they would not be required to do so based on state licensing requirements.

Note: The magnitude of impact was determined based on state early care licensing requirements for the nutritional quality of foods served at early care settings. There is a limitation in this research given the wide range of implementation practices by providers; thus, impact may vary at the individual provider level, regardless of what state early care regulation requires.

Table S.6

Characterizing Impacts: Findings From Literature Review, Data Analyses, and Stakeholder Engagement

Research question and related indicator *(health factor or outcome)*	Direction of change based on literature	Direction of change based on data	Direction of change based on stakeholder perceptions	Overall projected direction of change	Expected health impact	Magnitude of impact		Vulnerable populations	Likelihood that impacts will occur as result of proposed rule
						Distribution of impact	Strength of impact		
1. Nutritional quality of foods children are served	Increase	Increase	Increase	Increase	Beneficial	***CACFP settings***		• Underserved communities within affluent urban neighborhoods • Populations living in low supermarket access areas or food deserts • Children living in poverty • Communities of color (e.g.,	Likely
						All state licensure requirements exceed pre-revision CACFP guidance. *[all settings in 1 state]*	No substantial*		

						3-5 state licensure requirements exceed pre-revision CACFP guidance. *[centers in 1 state]*	Low[†]	African-American, Hispanic, American Indian/Alaska Native children)	
						1-2 state licensure requirements exceed pre-revision CACFP guidance. *[all in 11 states; centers in 4 states]*	Medium[‡]		

						State licensure requirements are below average and do not meet or exceed any pre-revision CACFP guidance. *[all settings in 33 states and the District of Columbia; homes in 5 states]*	High[§]		
						Non-CACFP settings		• Underserved communities within affluent urban neighborhoods • Populations living in low supermarket access areas or food deserts	Likely

						6 or more state licensure requirements exceed pre-revision CACFP guidance. *[all settings in 1 state]*	No substantial*	• Children living in poverty • Communities of color (e.g., African-American, Hispanic, American Indian/Alaska Native	
						3-5 state licensure requirements exceed pre-revision CACFP guidance. *[centers in 1 state]*	Low†		

						1-2 state licensure requirements exceed pre-revision CACFP guidance. *[all settings in 2 states; centers in 2 states; homes in 1 state]*	Medium‡		
						1-2 state licensure requirements exceed pre-revision CACFP guidance.*[all settings in 8 states; centers in 3 states; homes in 1 state]*	Medium (anticipated)‖		

						No state licensure requirements exceed pre-revision CACFP guidance. *[all settings in 5 states and the District of Columbia; centers in 5 states; homes]*	High[§]		
						No state licensure requirements exceed pre-revision CACFP guidance. *[all settings in 23 states; homes in 8 states]*	High (anticipated)[‖]		
2a. Overall consumption of food groups	Mixed	Mixed	Increase	Mixed	Beneficial	Unknown	Unknown		Likely
Fruits	No effect	No effect	N/A	No effect	None	Unknown	Unknown		Likely
Vegetables	Increase	Increase	N/A	Increase	Beneficial	Unknown	Unknown		Possible

Whole grains	Increase	Increase	N/A	Increase	Beneficial	Unknown	Unknown		Likely
Grain-based desserts	Decrease	Decrease	N/A	Decrease	Beneficial	Unknown	Unknown		Likely
Milk	No effect	No effect	N/A	No effect	None	Unknown	Unknown		Likely
Meat	No effect	No effect	N/A	No effect	None	Unknown	Unknown		Likely
2b. Consumption of nutrients commonly underconsumed (such as vitamins D and E)	Increase	Increase	N/A	Increase	Beneficial	Unknown	Unknown		Possible
2c. Overall consumption of nutrients commonly overconsumed	Decrease	Decrease	Decrease	Decrease	Beneficial	Unknown	Unknown		Possible
Saturated fat	Decrease	Decrease	N/A	Decrease	Beneficial	Unknown	Unknown		Likely
Sodium	Uncertain	Uncertain	N/A	Uncertain	Uncertain	Unknown	Unknown		Likely
Empty calories	Decrease	Decrease	Decrease	Decrease	Beneficial	Unknown	Unknown		Possible
2d. Overall nutritional quality of children's diet (all settings, including child care)	Increase	Increase	Increase	Increase	Beneficial	Unknown	Unknown		Possible
3. Risk of health outcomes									

Being overweight or obese	Decrease	Decrease	Decrease	Decrease	Beneficial	Unknown	Unknown	• Children from low-income families (those qualifying for programs such as Head Start and CACFP) • African-American, Hispanic, American Indian/Alaska Native children	Possible
Being iron deficient or anemic	Unknown	No effect	N/A	Unknown	None	N/A	Unknown	Low-income African-American children	Likely

Being food insecure[#]	Uncertain	N/A	N/A	Uncertain	Uncertain	Unknown	Unknown	• Counties with higher proportions of African-Americans, Hispanics, Native Americans, and Pacific Islanders • Low-income families	Likely
4. Positive attitudes toward nutrient-dense foods									
Providers	Increase	N/A	Increase	Increase	Uncertain	Unknown	Unknown		Possible
Children	Increase	N/A	Increase	Increase	Uncertain	Unknown	Unknown		Possible
Parents	Mixed	N/A	Mixed	Mixed	Uncertain	Unknown	Unknown		Possible
5. Provider costs	Increase	Increase	Increase	Increase	Uncertain	• Family child care homes, rural providers (impacted more)	Unknown (but very small financial impact projected)		Likely

						• Child care centers, state agencies, sponsor organizations (secondary impacts)			
6. Provider participation	Decrease	N/A	Mixed	Decrease	Uncertain	Family child care homes (impacted more) Child care centers (less impacted financially)	Unknown (but very small impact on participation projected)	Children served by CACFP providers who leave the program	Possible

* When the final rule goes into effect, licensed providers will feel no meaningful effect because the meals and snacks they serve are already at least on par with the new CACFP requirements.

† When the final rule goes into effect, providers that comply with state requirements will need to make very few improvements to ensure that the meals and snacks they serve meet CACFP standards.

‡ When the final rule goes into effect, licensed providers that follow state regulations will need to make substantive changes to some of their meals and snacks to meet CACFP requirements.

§ When the final rule goes into effect, licensed providers that follow state regulations will need to improve all of their meals and snacks to meet CACFP requirements.

|| The impact is less clear for certain non-CACFP providers that follow state regulations, which probably will not automatically update to the final rule. Those that choose to follow the new CACFP standards may experience a medium or high impact (as described above), but they would not be required to do so based on state licensing requirements.

[#] Children who participate in CACFP are less food insecure; however, in order to project how changes from the current state to the proposed rule would impact food security, the HIA would need to understand the impact of provider participation on access to CACFP.

Findings and recommendations

The HIA team developed a set of findings and another of recommendations drawing on the available scientific literature on health and nutrition, perspectives from the broader CACFP community, scenario analyses of hypothetical menus and cost components, and the knowledge and judgment of the AC. Using this evidence and the characterization of health effects, the team identified the positive health factors or health outcomes that could be supported or expanded and the potential unintended health factors or health outcome consequences that needed to be minimized. The team also considered that the HIA was conducted based on the proposed CACFP rule, before the release of the final rule.

Most of the proposed requirements were promulgated in the final rule, which was released before the HIA was published. Therefore, rather than discuss all proposed provisions, the HIA report focuses on the findings for those changes and recommended best practices that were included in the final rule and supported by the assessment. Additionally, the report included administrative and operational policy recommendations that support the implementation of the final rule. Recommendations were developed that would be applicable to the USDA, state agencies, sponsor organizations, and providers. The team reviewed the draft recommendations with the AC and asked for feedback to ensure that each recommendation was feasible, aligned with evidence identified by the HIA process, addressed vulnerable populations, and reduced existing health inequities, where possible. Based on the AC input, the HIA team revised recommendations to better address the research questions and health indicators.

Dissemination

The final report was distributed to the USDA, national networks and coalitions, and other partner organizations. Members of the HIA team participated as speakers at annual conferences, including the NCA, the Academy of Nutrition and Dietetics, the Child Care Food Program Roundtable, the Food Research and Action Center, and the National CACFP Forum to inform CACFP stakeholders and researchers within the field about the report's findings and recommendations. Moreover, collateral materials were created and distributed via social networks and the Pew website.

Evaluation plans

The evaluation component of any HIA typically has three components: process, impact, and outcome. Because an evaluation is outside the scope of this project, KSHF encourages interested stakeholders and HIA practitioners to conduct an evaluation to measure the effectiveness of the HIA and the value it brought to federal policymaking. As the updated CACFP nutritional standards are implemented, the ECE community could benefit by taking time to reflect on the challenges and successes of implementation.

Process evaluation

Process evaluation is intended to determine the effectiveness of the HIA design and how it was carried out, including planning, assessment, reporting, engagement of relevant stakeholders, and follow-up from the reporting phase. It should include an assessment of the HIA's alignment with the most recent practice standards, an opportunity for stakeholder feedback on the process that includes advisory committee members and decision-makers, and a report of the findings that can be shared broadly with other HIA practitioners.

Impact evaluation

Impact evaluation seeks to understand the impact of the HIA itself on policymakers' decisions and their decision-making process. Impact evaluation assesses the extent to which the HIA influenced various stakeholders' perspectives and its recommendations were considered and implemented.

Because the final CACFP rule was released before the HIA's publication, determining whether any of the HIA recommendations have been adopted would be beneficial to the ECE community. Examples of methods for assessing the HIA's effect on implementation include tracking state policies that incorporate recommendations of the HIA; identifying nongovernmental organizational support of the HIA's recommendations; and determining whether the USDA, CACFP sponsors, and others identified in the report adopt any of the HIA-specific implementation recommendations.

Outcome evaluation

Outcome evaluation tracks the effect of the proposed policy, project, or program on health outcomes and/or determinants of concern. Health determinants are difficult to quantify because they are affected by a variety of factors. The HIA predicted that the proposed changes could result in direct and indirect long-term and short-term impacts on health. However, these predictions should be considered in the context of other factors and policy environments. Given the complexity of health-related variables and external factors, it may be difficult to identify specific indicators to monitor or identify resources that could make this possible. However, to better inform policy moving forward, the HIA team recommends that significant surveillance be conducted. The team encourages the USDA or other organization to monitor the number of providers that participate in CACFP, the number of children they serve, and any changes directly or indirectly associated with the increased nutrition standards; the practices of CACFP providers as they relate to alignment with best practices and any changes directly or indirectly affected by the updated meal pattern; and ongoing monitoring of the number of states that require CACFP as the

required nutritional standard in state early care licensing regulations and any changes directly or indirectly related to the updated meal pattern.

Endnotes

[1] U.S. Department of Agriculture, "Hunger-Free Kids Act," accessed Jan. 27, 2017, https://www.fns.usda.gov/tags/hunger-free-kids-act.

[2] National Academies of Sciences, Engineering, and Medicine, *Child and Adult Care Food Program: Aligning Dietary Guidance for All* (Washington: The National Academies Press, 2011), http://www.nationalacademies.org/hmd/Reports/2010/Child-and-Adult-Care-Food-Program-Aligning-Dietary-Guidance-for-All.aspx.

[3] Rajiv Bhatia et al., "Minimum Elements and Practice Standards for Health Impact Assessment, Version 3" (September 2014), https://sophia.wildapricot.org/resources/Documents/HIA-Practice-Standards-September-2014.pdf; The Pew Charitable Trusts, "Healthier Nutrition Standards Benefit Kids" (July 2017), http://www.pewtrusts.org/ChildCareNutritionStandards.

[4] Although the CACFP final rule was released before the HIA's publication, KSHF met with USDA staff members before the release to brief them on the HIA's initial findings. This HIA analyzed the potential health impact of proposed changes to the program's nutritional standards before finalization of the regulation and provides recommendations for successful implementation. The new rule was effective in June 2016, and providers must be compliant by October 2017.

[5] U.S. Department of Health and Human Services, "HHS Action Plan to Reduce Racial and Ethnic Health Disparities: A Nation Free of Disparities in Health and Health Care," accessed June 1, 2016, http://minorityhealth.hhs.gov/npa/files/plans/hhs/hhs_plan_complete.pdf; Jo C. Phelan, Bruce G. Link, and Parisa Tehranifar, "Social Conditions as Fundamental Causes of Health Inequalities: Theory, Evidence, and Policy Implications," *Journal of Health and Social Behavior* 51, no. 1 (2010): S28–40, http://journals.sagepub.com/doi/pdf/10.1177/0022146510383498.

[6] U.S. Department of Agriculture, Center for Nutrition Policy and Promotion, "Healthy Eating Index," accessed May 2, 2016, http://www.cnpp.usda.gov/healthyeatingindex.

[7] Ibid.

[8] U.S. Department of Agriculture, "Dietary Guidelines for Americans 2010," http://health.gov/dietaryguidelines/dga2010/dietaryguidelines2010.pdf.

[9] Ibid.

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