School Closures During COVID-19: Opportunities for Innovation in Meal Service

In 2019, the National School Lunch Program and School Breakfast Program served approximately 15 million breakfasts and 30 million lunches daily at low or no cost to students.

Access to these meals has been disrupted as a result of long-term school closures related to the COVID-19 pandemic, potentially decreasing both student nutrient intake and household food security. By the week of March 23, 2020, all states had mandated statewide school closures as a result of the pandemic, and the number of weekly missed breakfasts and lunches served at school reached a peak of approximately 169.6 million; this weekly estimate remained steady through the final week of April.

We highlight strategies that states and school districts are using to replace these missed meals, including a case study from Maryland and the US Department of Agriculture waivers that, in many cases, have introduced flexibility to allow for innovation. Also, we explore lessons learned from the pandemic with the goal of informing and strengthening future school nutrition policies for out-of-school time, such as over the summer. (*Am J Public Health.* 2020;110:1635–1643. https://doi.org/10.2105/AJPH.2020.305875)

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As COVID-19 disrupts regular access to food assistance resources and creates growing economic uncertainty, low-income families are being disproportionally burdened. Long-term school closures mean that millions of students no longer have access to the free or reduced-price meals they rely on to meet their nutritional needs. As social distancing recommendations continue, with no clear end date in many places, children and their families must be protected from the unintended nutritional consequences of school closures.

School meals are a vital component of the US social safety net. The US Department of Agriculture (USDA) National School Lunch Program (NSLP) is the largest antihunger program in the nation other than the Supplemental Nutrition Assistance Program.[1] In 2019, the NSLP and the School Breakfast Program (SBP) served approximately 15 million breakfasts and 30 million lunches daily at low or no cost to students.[1] More than three quarters of all students participating in school meal programs qualify for free or reduced-price meals because they live in a household with an income below 185% of the federal poverty level.[2]

Loss of access to school meals puts millions of households at increased risk of food insecurity, a household-level economic and social condition wherein, at times, 1 or more household members are unable to acquire adequate food because of insufficient money or other resources.[3] In 2018, nearly 1 in 7 children (about 11 million) lived in a food-insecure household, with higher rates in Black and Hispanic households.[4] Food insecurity rates are rising as millions of people in the United States experience job losses related to COVID-19. Recent estimates show that as many as 33% of households with children, including 40% of Black and Hispanic households, were food insecure in April 2020.[5]

Federal school meal programs reduce household food insecurity.[6] Among households with at least 1 child receiving free or reduced-price meals, NSLP participation is associated with a 14% reduction in food insufficiency (an alternate measure of food hardship closest to the most severe form of food insecurity).[7] Access to the SBP reduces the risk of marginal food insecurity and the likelihood of skipping breakfast, especially among low-income children.[8] A rise in food insecurity during the summer months, particularly among NSLP participants, further suggests that school meals reduce food insecurity.[9] In addition, school meals provide critical economic support to low-income families. The NSLP lifts 1.3 million people out of poverty.[10]

School meals significantly contribute to students' daily dietary intake and are generally more nutritious than meals from other sources, including home-packed meals.[11] This is especially true for children in low-income households who rely on school meals as a substantial source of nutrition. The Healthy, Hunger-Free Kids Act, passed by Congress in 2010, increased access to nutritious meals and had a positive impact on diet quality by updating school meal nutrition standards.[12] Its effects are

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especially pronounced among low-income students who receive free and reduced-price lunches.[13]

Prior to COVID-19, concern about school meal access during school closures (e.g., hurricanes, snowstorms, civil unrest, summer break) was mounting.[14–16] In a previous policy brief, we projected the impact of school closures resulting from short-term emergencies on the number of "missed meals" (meals that would have been served if schools were open) among children in Philadelphia, Pennsylvania.[14] These estimates showed that even 3 days of school closures could result in more than 400 000 missed meals among school-aged children.

Missed meals may have a significant impact on children's health, nutrition, and food security. Such consequences are likely to be magnified among low-income, Black, and Hispanic children who are already at greater risk for poor physical and mental health and worse academic performance than their higher-income and White counterparts.[17] Black and Hispanic students are also more likely to be eligible for free or reduced-price meals and more likely to participate in school meals than their White and Asian peers.[18] However, the fact that rates of COVID-19–related morbidity and mortality are disproportionately high among Black and Hispanic populations may limit their ability to access emergency meal sites.[19]

Here we illustrate the impact of COVID-19 on students' access to food by estimating the number of missed meals, which we define as breakfasts and lunches that would have been served in school if schools were open, although many of these meals were ultimately served at community sites instead. We highlight the innovative meal replacement efforts being implemented by states and school districts, including a specific case study from Maryland. In addition, we explore lessons learned from this crisis with the goal of informing and strengthening future nutrition policies with respect to out-of-school time, including summer meals and unexpected school closures.

NATIONAL MISSED MEAL ESTIMATES

In an effort to slow the spread of COVID-19, school districts across the United States started to close in March 2020, with the earliest closures in the Seattle area the week of March 2. By March 16, at least 907 US school districts had closed and 8 states (in addition to Washington, DC) had closed statewide. Other states followed rapidly, with Texas and Idaho being among the last states to close schools (on March 23 and 24, respectively).[20]

Here we estimate the number of missed breakfasts and lunches per week from March 2 through May 1, 2020, using school closure reports from the independent news organization *Education Week* and USDA reports of state-level free and reduced-price participation in the NSLP and SBP during 2019 (detailed weekly estimates by state are provided in Table A and Figure A, available as supplements to the online version of this article at http://www.ajph.org).[2,20] This estimate of the number of students relying on school breakfasts and lunches may be an underestimate of need.

In 2019, 26% and 15% of children participating in the NSLP and SBP, respectively, did not qualify for free or reduced-price meals but rather paid full price for school meals.[2] These children may, however, come from households with incomes that are just above the eligibility cutoff or that fluctuate seasonally. Previous estimates suggest that as many as 15% of marginally food-secure students and 10% of food-insecure students do not qualify for free or reduced-price meals on the basis of household income, and thus they may rely on full-priced school meals for nutritious, low-cost meals.[21] Furthermore, with widespread unemployment resulting from COVID-19, it is likely that many more children qualify for free and reduced-price school meals now than before the start of the pandemic. With the weekly value of meals children receive at school conservatively estimated at $30 (not accounting for time spent purchasing and preparing foods), lost access to school meals could pose a significant added financial burden for families.[22]

In the early weeks of March, when closures were occurring at the district (rather than the state) level, the number of missed meals was relatively modest. By the week of March 9, as shown in Table 1, nearly 2.6 million school meals had been missed as a result of school closures, and by the following week that number had ballooned to nearly 125 million meals. By the week of March 23, with all states having mandated statewide school closures, the number of weekly missed meals reached its peak. Cumulatively, we estimate that among students who receive free and reduced-price meals, more than 1.15 billion meals were not served in school as a result of school closures during the 9-week period between March 9 and May 1.

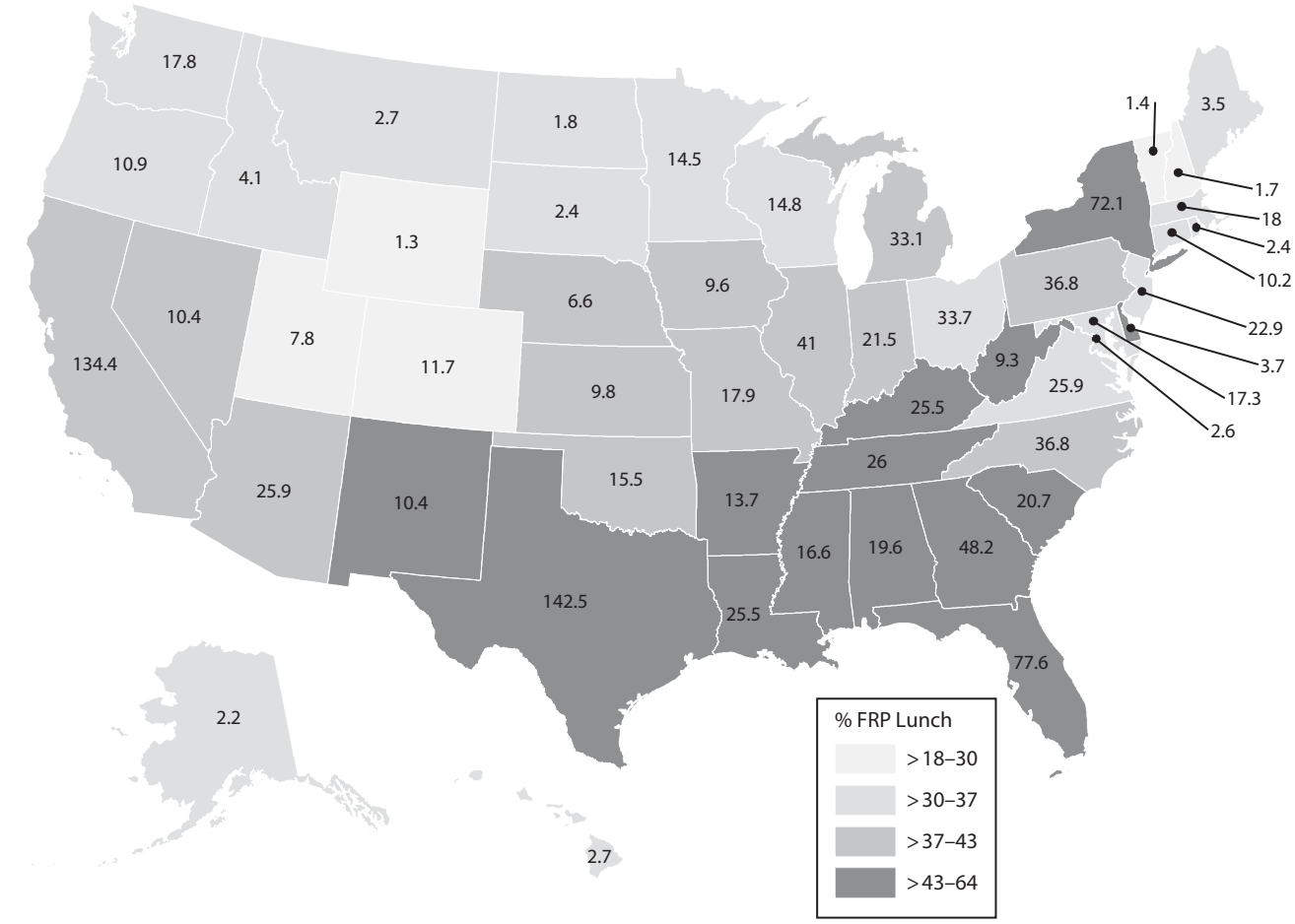
Figure 1 maps total missed meals per state and the percentage (in gray) of enrolled students per state participating in free and reduced-price meals. These estimates account only for breakfast and lunch; an estimated 1.5 million after-school snacks and 1.3 million after-school suppers are also served to children daily through federal child nutrition programs (Food Research and Action Center October 2018 estimates).

INNOVATIVE RESPONSES

Here we provide an overview of USDA school meal program waivers and state and school

TABLE 1—Weekly and Cumulative Missed Free and Reduced-Price School Meals (Breakfast and Lunch): United States, March 2–May 1, 2020

Dates	Weekly Meals	Cumulative Meals
March 2–6	36 802	36 802
March 9–13	2 598 526	2 635 328
March 16–20	124 824 223	127 459 551
March 23–27	169 479 514	296 939 064
March 30–April 3	169 619 512	466 558 576
April 6–10	169 619 512	636 178 088
April 13–17	169 619 512	805 797 601
April 20–24	169 619 512	975 417 113
April 27–May 1	169 619 512	1 145 036 625



Note. This map depicts (in gray) students participating in free and reduced-price meals as a percentage of the total state student enrollment population. The number overlaid on each state is the total number (in millions) of free and reduced-price missed school meals (breakfast and lunch) between March 2 and May 1, 2020.

FIGURE 1—Free and Reduced-Price (FRP) Participating Students as a Percentage of Total Student Enrollment and State Cumulative Missed FRP School Breakfasts and Lunches: United States, March 2–May 1, 2020

district meal service innovations implemented in an effort to replace meals that could not be served in schools as a result of the pandemic.

Waivers

The Families First Coronavirus Response Act gave the USDA authority to issue nationwide waivers to school meal regulations. The USDA granted 18 nationwide waivers (detailed in Table 2) between March 20 and May 1 to provide flexibility for states in determining where and how school meals could be served during closures. The waivers included allowing multiple meals to be served at one time, permitting a meal to be provided to a parent or guardian without a child present, and relaxing nutrition requirements for federal financial reimbursement. The intention of these waivers was to ease program operations and protect the health of students and program staff.

State agencies are eligible to use all nationwide waivers (after notifying their USDA regional office regarding which waivers they plan to use). However, they must submit a report within 1 year summarizing how each waiver was used and whether its implementation improved school meal services.

Innovations and Challenges

Taking advantage of USDA waivers, states and districts have developed innovative strategies in which they vary where, how, and to whom they provide meals to maintain access while minimizing the risk of COVID-19 exposure. As schools and districts have adapted to these new methods of serving meals, they have faced unexpected challenges with respect to health, finances, and food procurement and delivery systems. Here we outline some of the innovative approaches and discuss challenges and barriers.

Where meals are offered. Many districts have sought to maximize program reach by situating meal delivery sites in central community locations such as school parking lots, community centers, libraries, apartment complexes, and churches.[23] Other districts are delivering meals at intersections along school bus routes.[24] Outdoor meal distribution is challenging in inclement weather, however, and there have been

TABLE 2—US Nationwide COVID-19 Child Nutrition Response Waivers for National School Lunch and School Breakfast Programs Beginning March 20, 2020

Waiver	Waiver Name	Programs Covered	Release Date	What It Does
1	Nationwide Waiver to Allow Meal Service Time Flexibility in the Child Nutrition Programs	NSLP, SBP, SSO, SFSP, CACFP	March 20	Provides flexibility for serving times Allows for serving multiple meals for the same day at one time
2	Nationwide Waiver to Allow Noncongregate Feeding in the Child Nutrition Programs	NSLP, SBP, SSO, SFSP, CACFP	March 20	Allows for off-site consumption of meals and serving models such as grab-and-go, curbside pick-up, mobile/bus routes, and home delivery
4	Nationwide Waiver to Allow Meal Pattern Flexibility in the Child Nutrition Programs	NSLP, SBP, SSO, SFSP, CACFP	March 25	Allows for meal reimbursement even if meal does not meet all nutritional requirements or include all meal components
5	Nationwide Waiver to Allow Parents and Guardians to Pick Up Meals for Children	NSLP, SBP, SSO, SFSP, CACFP	March 25	Allows for distributing meals without a child present
6	Nationwide Waiver of Community Eligibility Provision Deadlines	NSLP, SBP	March 25	Extends deadlines for various tasks within the Community Eligibility Provision data release and election process
9	Nationwide Waiver of Onsite Monitoring Requirements in the School Meals Programs	NSLP, SBP	March 27	Waives the in-person component of the state agency's required monitoring activities Allows states to postpone required reviews of school food authorities that are closed and request an extension of their review cycle as needed
10	Nationwide Waiver of Onsite Monitoring Requirements for SFSP Sponsoring Organizations	SFSP	March 27	Waives the requirement for an in-person site visit during the first week of a site's operation and the review of the site's food service within the first 4 weeks of operation
11	Nationwide Waiver of Onsite Monitoring Requirements for SFSP State Agencies	SFSP	March 27	Waives the in-person component of the state agency's required monitoring activities
12	Nationwide Waiver of 60 Day Reporting Requirements for January and February 2020	NSLP, SBP, SFSP, SSO, CACFP, SMP	April 1	Extends the deadline to submit claims for reimbursement for January 2020 and February 2020 by 30 days each Allows 90 days for submission of reports rather than 60 days
13	Nationwide Waiver to Allow Meal Pattern Flexibility in the Child Nutrition Programs—EXTENSION	NSLP, SBP, SSO, SFSP, CACFP	April 21	Allows for meal reimbursement even if meal does not meet all nutritional requirements or include all meal components
14	Nationwide Waiver to Allow Area Eligibility for Closed Enrolled Sites in the SFSP and NSLP SSO	SSO, SFSP	April 21	Allows closed enrolled sites to determine site eligibility through area eligibility (instead of collecting income eligibility applications)
15	Nationwide Waiver of First Week Site Visits in the SFSP	SFSP	April 21	Waives the requirement that SFSP sponsors visit each of their sites at least once during their first week of operation
16	Nationwide Waiver to Allow Offer Versus Serve Flexibilities in the SFSP	SFSP	April 21	Waives the limitation on the use of offer versus serve
17	Nationwide Waiver of Meal Service Time Restrictions in the SFSP and SSO	SSO, SFSP	April 21	Waives the amount of time that must elapse between the beginning of one meal and the beginning of the next and the duration of a meal service
18	Nationwide Waiver of Local School Wellness Policy Triennial Assessments in the NSLP and SBP	NSLP, SBP	April 23	Extends the deadline to complete the triennial assessment of compliance with school wellness policies

Continued

TABLE 2—*Continued*

Waiver	Waiver Name	Programs Covered	Release Date	What It Does
19	Nationwide Waiver of Food Service Management Contract Duration in the NSLP and SFSP	NSLP, SBP, SSO, SFSP	April 24	Waives food service management company contract duration and extension limits
21	Nationwide Waiver to Extend Unanticipated School Closure Operations through June 30, 2020	SSO, SFSP	April 27	Waives the limit on unanticipated school closure operations to October through April, allowing operators to continue current operations through June 30, 2020 Waives the federal application deadline for SFSP and SSO operators
SP 12-2020	Fresh Fruit and Vegetable Program During COVID-19	FFVP	April 9	Clarifies that participating schools may serve fresh produce through the FFVP in a noncongregate setting Clarifies that produce may be served through the FFVP outside the typical school day, at whatever time works best, including alongside other meals being distributed Applies to produce already in stock as well as produce ordered for distribution during closures

Note. CACFP = Child and Adult Care Food Program (offers reimbursement to child and adult care institutions and family or group day-care homes for providing nutritious meals and snacks to the children and older adults or chronically impaired individuals with disabilities in their care); CEP = Community Eligibility Provision (allows the nation's highest-poverty schools and districts to serve breakfast and lunch at no cost to all enrolled students without collecting household applications); FFVP = Fresh Fruit and Vegetable Program; NSLP = National School Lunch Program (provides reimbursement to states to operate nonprofit lunch programs in schools); SBP = School Breakfast Program (provides reimbursement to states to operate nonprofit breakfast programs in schools); SFSP = Summer Food Service Program (provides free meals to children and adolescents in low-income areas when school is out); SMP = Special Milk Program (provides milk to children in schools who do not participate in other federal meal service programs); SSO = NSLP Seamless Summer Option (a federal meal program that encourages more school food authorities already participating in the NSLP and SBP to provide meals in low-income areas during the traditional summer vacation periods and during school vacation periods longer than 10 school days for year-round schools). This list does not include waivers that apply exclusively to the CACFP.

reports of canceled distributions resulting from high winds or rain.[25]

Home delivery is another common approach, especially in rural districts, although the USDA does not provide reimbursement for delivery-related expenses.[26] Several states have encouraged rural districts to participate in a program administered by the Baylor Collaborative on Hunger and Poverty, which, in partnership with the USDA and private industry, provides free weekly home delivery of parcels containing a 5-day supply of shelf-stable, individually packaged foods. Most districts with home delivery have encouraged students to sign up online; in districts such as Saint Paul, Minnesota, all students at high-poverty schools that were authorized before the pandemic to serve universal free meals through the Community Eligibility Provision were automatically registered for home delivery.[27]

National waivers have allowed states to serve school meals in noncongregate settings. However, concerns about viral exposure remain as staff, students, or families gather to prepare, distribute, or pick up meals. These concerns have caused several districts to suspend meal service, particularly after employees have tested positive for the virus.[28] Although efforts to facilitate contactless delivery support social distancing, food service staff who lack access to personal protective equipment including gloves, masks, and hand sanitizer—items in short supply across all sectors—have expressed concern about being exposed to the virus and transmitting it to others.[29]

Solutions to address staffing shortfalls, for example enlisting support from groups such as the National Guard, may unintentionally discourage participation by families who distrust authority as a result of past negative experiences (e.g., racial/ethnic minority and immigrant families).[30]

How meals are offered. As a result of increased community need, some districts have expanded meal service to 7 days per week.[31] Others now provide up to 1 week of meals at once to decrease staff exposure and improve convenience for parents and students. USDA waivers allowing provision of bulk items, such as a gallon of milk rather than single-serve milk cartons, facilitate this approach.[32] Backpack programs (which provide shelf-stable grocery items) have also been adopted or expanded in many districts.[33] In addition, in an effort to increase meal participation and decrease waste, some districts allow students to preorder meals online or by phone.[34]

These changes require schools to adjust procurement, preparation, and distribution techniques. Whereas schools could previously batch cook and serve hot meals, serving multiple meals (e.g., breakfast and lunch) or several days' worth of meals at once requires menu and procurement changes. In addition, meals must be packaged, where previously they would have been served in an on-site cafeteria. Changes to meal formats may also be complicated by nationwide supply chain issues.[35]

To whom meals are offered. In many districts, school meal access has been expanded beyond school-aged children, including to all children 0 to 18 years old

and students with disabilities 18 to 26 years old.[36] Rising rates of hunger among adults have sparked several districts to also provide meals to adults at low or no cost, with some (e.g., in New York City) offering separate times for child and adult meal pick-up.[37] Other districts have partnered with food banks or food pantries to provide additional food items for households at a single site.

Although the $2 trillion Coronavirus Aid, Relief, and Economic Security Act includes $8.8 billion for child nutrition programs, it remains unclear how and when funds will be distributed. Meanwhile, increasing food insecurity is forcing many school meal distribution sites to expand operations as household incomes are plummeting and more children and adults need food assistance.[29]

Continued meal service is complicated by financial and child-care challenges encountered by food service staff themselves. Considered essential workers, food service staff face competing demands. The mean hourly wage among these individuals is $10.29, and thus unemployment benefits may be higher than their weekly paychecks and involve less risk of COVID-19 exposure.[38]

MARYLAND MEAL REPLACEMENT ESTIMATES

Nationally, school food authorities are working at reduced capacity relative to typical in-school periods. In a survey of geographically diverse K–12 food service operators conducted at the end of March, 31% reported a full shutdown of operations, and an additional 49% reported serving less than half of their previous meal volume.[39]

Nonetheless, many school food authorities and districts have successfully reached children with replacement meals during school closures. In Maryland, statewide school closures were announced on Thursday, March 12, with replacement meals to begin on Monday, March 16, providing only 1 business day to prepare. The state department of education collaborated with Maryland's 24 school districts to develop a plan that met social distancing guidelines while also reaching children in greatest need of a school meal. Specifically, the state department of education was granted, within the first 3 weeks of COVID-19 meal service, 5 of the nationwide waivers (1, 2, and 4–6) outlined in Table 2. In addition, it received state-specific approval for meal delivery to students' homes and extended approval of area eligibility to sites serving catchment areas where 30% or more of students were eligible for free or reduced-price meals (formerly 50%).[40]

Innovations implemented by districts included new distribution sites, mobile distribution using school buses, home delivery in rural areas, shared meal preparation resources among nonpublic and private schools and districts, and coordination with community partners. Innovations were shared during weekly calls that included school food authorities and district leaders. In the following weeks, the USDA granted Maryland additional waivers (including adding the remaining waivers outlined in Table 2 and eliminating the free and reduced-price meal catchment area eligibility requirement) and innovations continued.

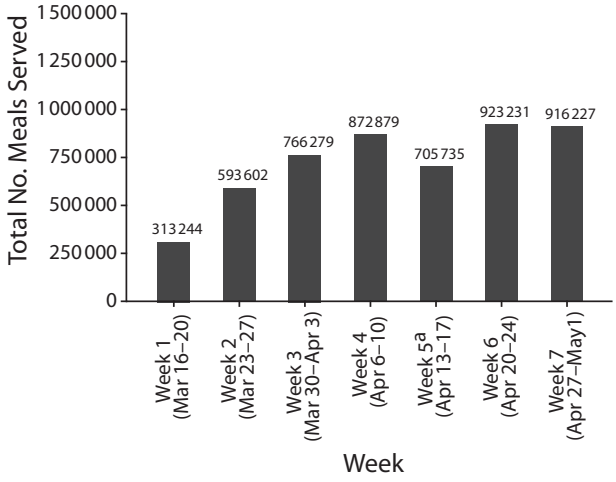
The state department of education published weekly numbers of meals served on its Web site[40]; data are shown in Figure 2 for the initial 7 weeks of school closures (the dip in meals in week 5 is a result of spring break closures in some districts, which typically suspended meals for 1–2 days). Beginning the week of March 16 (week 1 of school closures), Maryland school districts served 313 244 breakfast and lunch meals. In the following week, the number of meals served nearly doubled. By weeks 6 and 7 of school closures, districts were serving nearly 1 million breakfast and lunch meals weekly.

Using the same research methods described earlier, we estimate that each day schools are closed in Maryland, 493 917 free or reduced-price meals that would have been served are missed (equivalent to 2 469 585 meals per week). This means that, at the peak of meal delivery, there were approximately 1.5 million missed meals each week. Although Maryland has been able to shrink the missed meals gap over time with rapid innovation and implementation of USDA waivers, additional support will be needed. It should be noted that most Maryland districts are also serving supper or a snack (or both) to help meet the needs of students. Researchers are partnering with the state to evaluate meal service using an implementation science approach. Innovations will be tracked to determine later effects on both summer feeding programs and school meal programs during the 2020–2021 school year.

Although Maryland is, so far, unique in making publicly available extensive data about meals served during the pandemic, districts in other states are also working hard to reach students. On its Web site in April, the West Virginia Department of Education reported serving approximately 1.4 million meals weekly to school-aged children at 393 feeding sites. The New York City Department of Education reported providing 3 meals a day to children and adults at 435 sites across all 5 boroughs. Between March 13 and April 13, the city served more than 3 million meals to children; in comparison, it served more than 1 million breakfasts and lunches daily before the pandemic.[37]

The School District of Philadelphia, which served approximately 135 000 school meals per day prior to the pandemic (according to district estimates), reported that between March 16 and April 20 it served nearly 182 000 children at 49 pick-up sites, with a total of almost 1 million meals served. Before the pandemic, the San Francisco Unified School District in California served approximately 38 893 meals per day, totaling 194 465 meals per week. Between March 16 and May 8, it distributed almost 862 000 meals through a combination of grab-and-go meal sites, home deliveries, and partnerships with community-based organizations. Because available data for meal replacements served during the pandemic generally do not distinguish between types of meals (e.g., breakfast, lunch, snack), we cannot directly compare replacement estimates and meals served during a typical school week.

In addition to school-based responses to providing meals to children during COVID-19, Congress has authorized the USDA to approve state applications for pandemic electronic benefits transfer (P-EBT). P-EBT provides monetary benefits to households



Note. The average number of free and reduced-price breakfast and lunch meals served each week before the COVID-19 pandemic was 2 469 585.
[a]Many districts suspended meal service for 1 or 2 days during spring break.

FIGURE 2—Number of Breakfast and Lunch Meals Served per Week During COVID-19 School Closures: Maryland, March 16–May 3, 2020

with children who have temporarily lost access to free or reduced-price school meals. Households are eligible to participate in P-EBT if their child is eligible to receive free or reduced-priced meals, regardless of current participation in the Supplemental Nutrition Assistance Program. As of May 1, 2020, the USDA had approved P-EBT implementation in only 18 states, and few states had begun distributing benefits.

LESSONS LEARNED

We learned the following lessons:

- School nutrition programs are playing a vital role in responding to student and family needs.
- School nutrition operations during the pandemic have underscored the challenges of feeding children when schools are not in session and have identified possible solutions.
- The COVID-19 crisis has spurred innovation in school nutrition services.
- Children across the country are missing out on the critical school meals they relied on when schools were in session.

Responding to Student and Family Needs

The pandemic has cast a spotlight on the critical role of school food and nutrition programs with respect to the food security and well-being of students and families. As unemployment and food insecurity rise, more families will need support to ensure that children have access to the food they need to thrive. School nutrition programs will need funding, flexibility, and staff support to respond to this growing need. Recognizing the important role that school nutrition plays in supporting students, school food and nutrition service leaders must be actively involved in planning related to when and how schools reopen.

Feeding Children When Schools Are Closed

National waivers provided by the USDA have eased administrative burdens and provided the flexibility necessary to feed children during this crisis. These waivers are aimed at addressing issues unique to the pandemic. For example, the USDA intended for state agencies to approve meal pattern waivers only when they are targeted and justified on the basis of food supply disruptions. Similarly, waiving on-site monitoring visits addresses the need for social distancing.

However, many waivers also address universal challenges that child nutrition programs face in reaching children when schools are closed. Child nutrition programs are in place to feed children when schools are out of session for the summer (i.e., the Seamless Summer Option and the Summer Food Service Program), and in some districts there are provisions for school breaks or unanticipated school closures such as during snowstorms.

Yet, these programs consistently reach only a small fraction of children who rely on free or reduced-price meals during the school year.[2] Summer meal sponsors and program operators have often cited congregate meal requirements as a barrier to service. Several federal demonstration projects that allowed for noncongregate summer feeding in rural areas and during excessive heat successfully expanded program access.[15] Extending program flexibility beyond the pandemic, especially in regard to the congregate meal requirement, would enable schools and other organizations to better reach children in rural and underserved communities and to operate more effectively during out-of-school times. Required reporting by state agencies will provide further insight into how individual waivers have been used and the extent to which they have improved services for participants.

Innovation in School Nutrition Services

The pace at which schools closed and officials issued shelter-in-place orders meant that school nutrition programs had to quickly revise operations, from distribution and staffing models to meal procurement, planning, and delivery. Moreover, school nutrition staff had to respond to new guidance and changing circumstances by continually revising and improving program delivery. In many cases, this crisis has accelerated trends in child nutrition programs. Over the past decade, an increasing number of schools have provided universal free meals through the Community Eligibility Provision, offered grab-and-go breakfasts, and operated mobile summer meal programs. Future analyses will provide insight as to whether those schools were better able to pivot to emergency feeding during COVID-19.

Replacing Meals Offered in Schools

Despite the heroic efforts of school nutrition professionals, generous private-sector donations, and increased program flexibility, it is unlikely that school districts will be able to replace, through emergency meal distribution programs, all meals that were previously being provided in school. It will be important to understand the extent to which P-EBT supplements or replaces current meal distribution programs as well as the effects of

these efforts on child food security. These findings will provide important lessons to rapidly deploy alternative nutrition assistance to families during future crises.

Moreover, evaluations of P-EBT will provide insights into effective strategies to address prolonged—albeit planned—summer school closures. Although summer meal sites provide needed access for some children, the reach of summer meal programs is far short of anticipated need on the basis of school-year free and reduced-price lunch participation. A USDA demonstration program providing a summer electronic benefits transfer to school-aged children, an approach similar to the current P-EBT system, substantially decreased summer food insecurity.[16] Lessons learned from the P-EBT implementation may solidify the need for similar supplemental nutrition assistance support during the summer months.

Further examination is needed to understand the extent to which schools and other organizations were able to fill the meal gap during the COVID-19 pandemic. Future studies can provide insight into factors that enabled schools to respond more effectively and the distribution models and practices that contributed to success. It is especially critical to understand how effectively food and nutrition programs are meeting the nutritional needs of children and families disproportionately affected by both food insecurity and COVID-19, particularly families of color and children living in rural areas who may lack access to emergency feeding sites and grocery stores. State agencies and school districts can partner with researchers to consider disparities in access and draw out lessons and best practices that can guide future program delivery, investment, and policy.

CONCLUSION

Although there is still much to be learned about school nutrition during this pandemic, a few key themes have emerged. School nutrition programs play a vital role in meeting the nutritional needs of children and responding to the rapidly growing food insecurity crisis. The challenges school nutrition operators face in keeping children fed during the pandemic highlight preexisting hurdles associated with running school nutrition programs when schools are not in session, and this period can provide many useful lessons for future out-of-school meal provision.

States and school districts have responded quickly to the current crisis, developing innovative solutions for addressing rapidly changing demands, including expanding meal service to 7 days per week, offering grab-and-go meals in outdoor locations, and providing up to a week of meals at once. These nimble and innovative responses are essential for reducing child hunger during the pandemic.

Despite these extraordinary efforts by school nutrition programs, there is still a large gap between the number of meals served in a typical school week and the number of meals currently being distributed as replacements. Ultimately, school nutrition programs should not be tasked with filling this gap on their own; P-EBT is an essential policy mechanism that can also be used. The pandemic offers us a unique opportunity to determine the best way to address nutrition gaps among school-aged children during out-of-school time. AJPH

CONTRIBUTORS

E. W. Kinsey led the writing of the article. H. K. Seligman conceptualized the study. All of the authors collected data, conducted data analyses, interpreted results, and contributed to the writing of the article.

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CONFLICTS OF INTEREST

The authors have no conflicts of interest to report.

HUMAN PARTICIPANT PROTECTION

No protocol approval was needed for this research because no human participants were involved.

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