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The Covid-19 Shopper: Food Preparation Changes

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Introduction

Shopping for groceries and preparing food are experiences common to most Americans. During the current Covid-19 pandemic, we hypothesize that those activities have changed. The current situation that has resulted from the Covid-19 is unprecedented. People have lived under stay-at-home orders, several places where consumers obtain foods, such as restaurants and schools, closed, food supply chains have been disrupted, processing plants and farms have been disrupted due to Covid-19 outbreaks among workers. And nowhere, at the time of the study, was the pandemic in greater effect than the Northeast states of New York, New Jersey, Connecticut, Massachusetts, and Pennsylvania.

Learning how these experiences have affected consumers in terms of their food shopping and food preparation habits will help guide actions by food industries, policy makers, and institutions immediately to support the welfare of consumers. In addition, this knowledge will add to the existing knowledge of how consumers respond to extreme disruptions and will help guide the industry during future events.

Our research questions are: 1) have shopping and food preparation habits changed since the advent of the Covid-19 lock down? 2) how have shopping and food preparation habits changed since the advent of the Covid-19 lock down? 3) how has the shopping experience changed since the advent of the Covid-19 lock down? and 4) how likely are consumers to resume pre-Covid-19 habits once the pandemic subsides?

This extension bulletin is one in a series of three that examine the results of one survey conducted May 21-26, 2020. Themes of these three bulletins are 1) online grocery shopping, 2) grocery shopping habits, and 3) food preparation habits.

Review of the Online Food Environment:

The 5-state study region started implementing statewide shutdowns starting with New York State on March 21 with the other states soon following suit. When the survey launched May 21, consumers had been under stay-at-home orders for approximately 2 months (Table 1).

Table 1. Statewide Lockdown Orders

State	Order dates	Link to order	Official name of order
Connecticut	March 23 - May 20	Link	Stay Safe, Stay Home
Massachusetts	March 24 - May 18	Link	Stay-at-home
New Jersey	March 21 - June 9	Link	Stay-at-home
New York	March 20 - June 27	Link	New York State on PAUSE
Pennsylvania	April 1 - June 4	Link	Stay-at-home

Source: [https://ballotpedia.org/States_that_issued_lockdown_and_stay-at-home_orders_in_response_to_the_coronavirus_\(COVID-19\)_pandemic,_2020](https://ballotpedia.org/States_that_issued_lockdown_and_stay-at-home_orders_in_response_to_the_coronavirus_(COVID-19)_pandemic,_2020)

Before the pandemic, online grocery sales were quickly increasing. Nielsen's Brandbank reported average 2019 online sales as being 4% of total grocery sales (Dunning 2020). Online sales increased throughout the year, and in December of 2019, Brick Meets Click, a consultant group that studies digital effects on the grocery sector, reported that online grocery sales accounted for 6.3% of the total amount spent on groceries in the U.S. (Melton 2019). They predicted online sales to increase to approximately 7.0% of the market in 2020.

In March 2020 society changed. Stay-at-home orders were issued by several states, and although grocery stores remained open as essential businesses, the emergence of the pandemic and consequent stay-at-home orders caused online grocery sales to accelerate sharply. Many consumers expressed their concerns for safety and shopped in the safety of their homes while retailers fast-tracked emerging online shopping operations to meet the demand (Redman, 2020).

The increase in online shopping outpaced retailers' and manufacturers' expectations. As they made decisions about managing the growth in online sales for their products, they were interested in learning more about the online shopping behavior. Who is currently using online grocery shopping, and who are potential users? Will current online shoppers maintain their online shopping spend post-Covid-19; will they demand the same products online; will their expectations for promotions and services change?

Methodology

We surveyed shoppers in Connecticut, Massachusetts, New Jersey, New York, and Pennsylvania, a region in the U.S. that was one of the most heavily affected at that time by the Covid-19 disease. A survey panel was recruited by Qualtrics, and survey data were collected May 21-26, 2020.

Respondents self-described the type of area in which they lived as being rural, urban, or suburban, with 26.7% indicating that they lived in a rural area, 37.2% from a suburban area, and 36.2% from an urban area (Table 1). The Census Bureau has definitions for urban and rural areas. Using these definitions, 87.3% of the population in the five state region surveyed lives in urban areas and 12.7% in rural areas. Therefore, our survey over represents the rural population in the region.

Table 1. Respondents Living in Urban versus Rural Areas

	% Urban or Suburban	% Rural
Respondents	73.4	26.7
5-state weighted average ¹	88.3	12.7

¹ Iowa Community Indicators Program

Demographics

Responses to the demographic questions in the survey are presented in Table 2. One psychographic question was included to try to provide additional strength to the analyses. This question asked respondents about how much information or news they follow about covid-19. The purpose of the question was to describe to what degree respondents were worried about the

disease and, therefore, how they might be changing their normal shopping and food preparation habits.

Table 2. Respondent Demographics

Variable	Description	% of respondents
Primary shopper	I am solely or primarily responsible for grocery shopping	69.2
	I typically do at least one-half of the grocery shopping	26.0
	I typically do some, but less than one-half of the grocery shopping	4.2
	I typically do not do any grocery shopping	0.3
	Don't know or am not sure	0.3
Current Employment	I am still employed at the rate of employment prior to the Covid-19 crisis	37.2
	I am still working but not as much as prior to the Covid-19 crisis	13.9
	I am currently furloughed	7.8
	I became unemployed after the Covid-19 crisis hit and am not receiving unemployment	4.7
	I am currently on unemployment due to the Covid-19 crisis	7.2
	I am currently retired	18.5
News regarding Covid-19	Other, please describe	10.7
	I follow as much information about Covid-19 as I can	29.4
	I follow information about Covid-19 every day	44.2
	I follow information about Covid-19 on occasion	23.3
	None, I do not follow information about Covid-19	2.8
Marital status	Single	38.9
	Married	55.1
	Other	6.0
Household	Household size (number)	2.6
Children	Number of children under 18 (number)	0.55
Education	Less than High School	1.0
	High School/GED	20.4
	Some College	16.7
	2-Year College Degree	9.5
	4-Year College Degree	30.1
	Graduate/Professional degree	22.3
Ethnicity	Asian	5.3
	Black/African	6.5
	Caucasian	81.2
	Hispanic/Latinx	5.0
	Indigenous American	0.4
	Pacific Islander	0.3
	Prefer not to answer	0.4

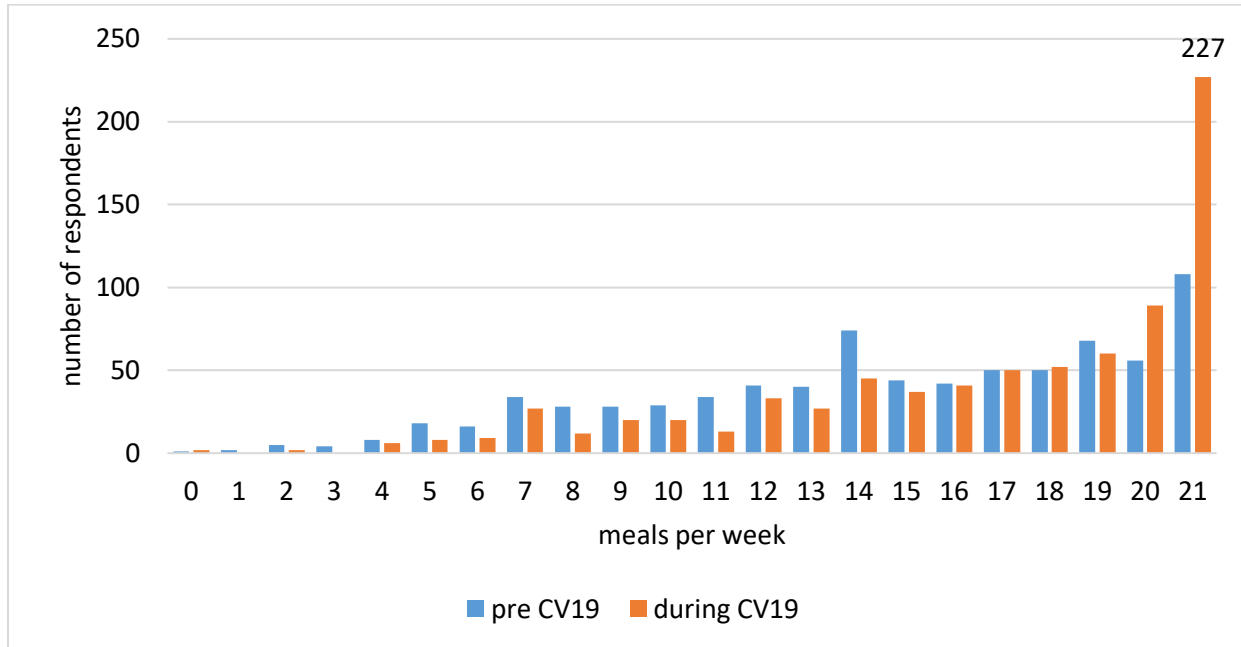
Variable	Description	% of respondents
	Please let us know your preference (describe)	1.0
Household income in 2019 before taxes	I prefer not to say	3.6
	Less than \$20,000	10.6
	\$20,000 - \$39,999	15.4
	\$40,000 - \$59,999	15.1
	\$60,000 - \$79,999	17.2
	\$80,000 - \$99,999	10.8
	\$100,000 - \$119,999	6.3
	\$120,000 - \$139,999	5.1
	\$140,000 - \$159,999	5.1
	\$160,000 - \$179,999	2.3
	\$180,000 - \$199,999	2.9
	\$200,000 or greater	5.5

RESULTS: Changes in Food Preparation

Almost all sources of food away from home, restaurants, accommodations, schools, entertainment venues, etc. were closed or severely curtailed in March due to the pandemic. When this happened, it left households to prepare more meals at home. Respondents were asked to indicate about how many times a week they prepared their breakfast, lunch, and dinners at home and how many times they purchased or got their meal away from home, pre Covid-19 and during Covid-19.

The average respondent prepared 14.6 meals at home per week out of a maximum of 21 before Covid-19. The remaining meals were purchased away from home or skipped. Figure 1 displays the number of respondents that prepared their meals at home per week. The minimum number of meals is 0 while the maximum possible is 21. We saw the number of respondents who prepared all of their meals at home (21 meals) double during Covid-19 compared to pre Covid-19. During Covid-19, 227 respondents, or 29.1% of respondents, said they were preparing all their meals at home.

Figure 1. Number of Meals Prepared at Home per Week, by number of respondents



Respondents prepared an average of two additional meals at home per week in their households during Covid-19 compared to before Covid-19 (Table 3). In a paired sample t-test of the means the p-value is <0.001, and we can conclude that the mean number of meals prepared at home during Covid-19 is significantly different than pre-Covid-19.

Table 3. Average Number of Meals per Week from Various Sources, by different meal occasion

	Prepared at home		Purchased or acquired away from home		Skipped meal	
	<i>pre Covid-19</i>	<i>during Covid-19</i>	<i>pre Covid-19</i>	<i>during Covid-19</i>	<i>pre Covid-19</i>	<i>during Covid-19</i>
Breakfast	4.9	5.4	0.9	0.5	1.2	1.1
Lunch	4.5	5.4	1.7	0.8	0.8	0.8
Dinner	5.2	5.8	1.5	1.0	0.0	0.2
Weekly meals (total)	14.6	16.6	4.1	2.3	2.0	2.1

Retailers as well as manufacturers are interested in knowing who prepared more meals at home. A number of demographic variables can be associated with increased meal preparation at home; this study tracked the variables that might best describe shoppers who prepared more meals at home during Covid-19.

An ordinary least squares (OLS) regression was used to describe shoppers who tend to prepare a greater number of meals at home during Covid-19. During Covid-19, the significant demographics of the respondents who prepared more meals than others were (Table 4):

- higher educated,
- female, and
- 65 and older

It is interesting that the shopper demographics of children under 18, higher income, and retired have a negative regression estimate, indicating that these groups would be preparing fewer number of meals at home relative to their base cohorts. The results make more sense when we look at the regression base cohorts for these variables. The base that "retired" is measured against is "homemakers, students, and those on disability". So it is reasonable that retired shoppers prepare fewer meals at home than "homemakers, students, and those on disability". The negative regression estimate for income indicates that as income rises, fewer meals are prepared at home.

Table 4. Regression Estimates for the Number of Meals Prepared at Home during Covid-19

Variable	Estimate	Std. Error	t-ratio
Intercept	16.055***	0.748	21.455
Higher-educated	1.404***	0.385	3.648
Income	-0.648	0.383	-1.689
Rural	0.044	0.439	0.100
Urban	-0.397	0.402	-0.987
Female	1.364***	0.351	3.886
18 - 34 years old	-0.539	0.437	-1.234
65 years old or older	1.314**	0.562	2.337
Employed	-0.847	0.588	-1.440
Unemployed	-0.792	0.649	-1.220
Retired	-1.274	0.759	-1.679
COVID-19 Information	0.639	0.388	1.647
Child(ren)	-0.700	0.401	-1.743
Married	0.366	0.396	0.923
R-squared	0.073		

Single, double, and triple asterisks (*, **, ***) indicate significance at a 10%, 5%, and 1% level.

We were also interested in describing which respondents *changed* their meal preparation habits the most. We feel these respondents might be those who revert to their former food preparation habits once the pandemic subsides. We looked at the difference in the number of meals prepared (during Covid-19 minus pre-Covid-19) and described those shoppers who changed their meal preparation habits more than others using a Logit regression.

Respondents that increased their meal preparation at home the most were more likely to be (Table 5):

- higher-educated,
- higher income,
- younger than 65,

- unemployed (versus homemaker, student, or on disability), and
- consuming daily information about the virus

Regardless of how many meals these people prepared at home before Covid-19, these would be people associated with a greater increase in meal preparation.

Table 5. Regression Estimates for Increased Meal Preparation at Home from pre Covid-19 to during Covid-19

Variable	Estimate	Std. Error	t-ratio
Intercept	-1.057***	0.341	-3.104
Higher-educated	0.399**	0.173	2.311
Income	0.527***	0.179	2.953
Rural	0.193	0.198	0.971
Urban	-0.016	0.183	-0.090
Female	0.129	0.159	0.814
18 - 34 years old	0.235	0.200	1.180
65 years old or older	-0.525**	0.252	-2.089
Employed	0.294	0.264	1.114
Unemployed	0.688**	0.293	2.345
Retired	0.453	0.340	1.330
COVID-19 Information	0.398**	0.175	2.279
Child(ren)	-0.025	0.182	-0.137
Married	-0.129	0.179	-0.720
Log-likelihood value	-493.732		

Single, double, and triple asterisks (*, **, ***) indicate significance at a 10%, 5%, and 1% level.

Changes in food purchases

Generally speaking, at least half of respondents reported that they purchased the same amount of food from several different food categories (Table 6). But, while 69% of respondents indicated that they purchased the same amount of dairy products, the remaining respondents (12.1%), equal to the difference between those purchasing more and those purchasing less, were enough to lay waste to a number of dairy products, resulting in many empty dairy slots on the supermarket shelf.

Respondents tilted toward purchasing more in dairy, frozen entrees, fresh meat and fish, frozen ingredients, fresh fruits and vegetables, and shelf stable foods such as pasta and beans. They also indicated the greatest increase in purchasing shelf stable foods. Forty-six percent of respondents said they were purchasing more shelf stable foods and only 4.2% said they were purchasing fewer. Although the shelf stable foods had more inventory in the supply chain at the beginning of the stay-at-home orders than many perishable items, inventories for many popular items, pastas and canned beans, were quickly depleted starting in March.

On average, respondents purchased less in the heat and serve foods and prepared, ready-to-eat foods categories.

As consumers' home situations continue to change, as people either return to work or remain jobless, as children return to school or not, purchasing patterns will likely continue to change. Perhaps the most important factor for stores will be the return to eating away from home. While restaurants continue to open, they do so slowly and with a fraction of the trade they used to command. These changes will all contribute to changing store purchase patterns and changes in the supply chains.

Table 6. Changes in Food Purchases by Store Category

	Buying the		
	same amount	Buying less	Buying more
	% of respondents		
Dairy products	69.9	9.0	21.1
Heat and serve foods (such as microwaveable mac'n'cheese, etc)	60.0	23.3	16.7
Frozen entrees (such as pizza, dinners, bowls, lasagna)	55.0	19.4	25.6
Fresh meat and fish	54.5	19.1	26.4
Frozen ingredients (such as frozen vegetables, frozen bread dough)	54.0	9.5	36.5
Fresh fruits and vegetables	53.2	11.5	35.3
Shelf stable foods (such as pasta, beans, canned foods)	49.5	4.2	46.3
Prepared, ready-to-eat foods (such as premade sandwiches, pizza, ready-to-eat salads)	48.1	34.1	17.8

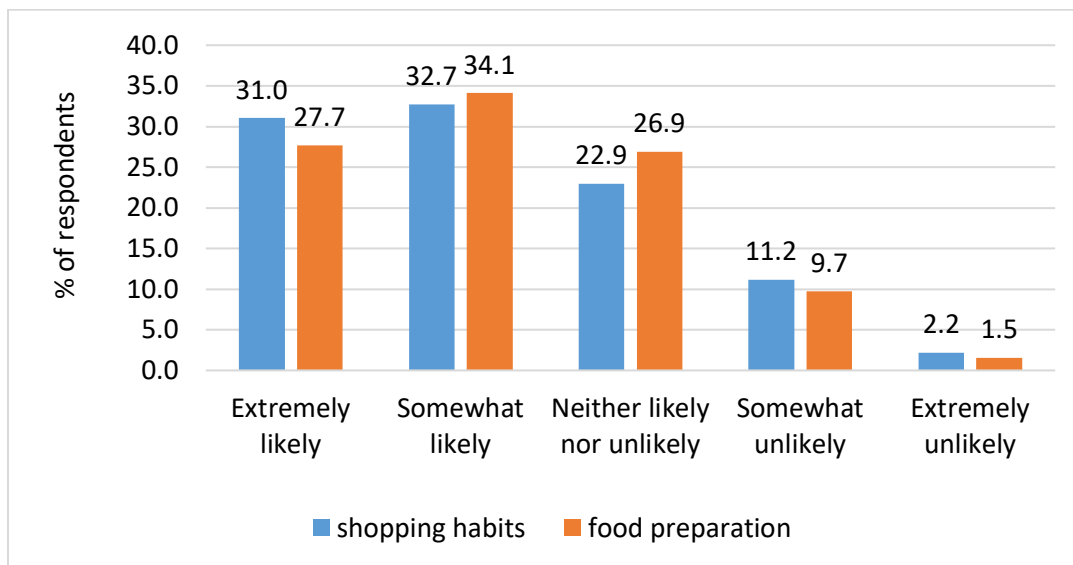
Returning to former habits

Early in the pandemic, companies were wondering when, or if, consumer habits would return to normal. When asked how likely they were to go back to their former, pre-Covid 19 shopping habits once the outbreak subsides, respondents reported they were very likely to return to their former habits. Although 63.7% of respondents said they were extremely or very likely to return to their former shopping habits, nonetheless, 36.7% were either not willing to commit or said they were extremely or very unlikely to return to former shopping habits.

As the pandemic continues and with shopping "habits" still unsettled, the likelihood of fully returning to former habits seems less likely. Retail shopping models are continuing to evolve. Online shopping has become universally accessible with almost all major retailers providing curbside pickup and many providing delivery.

As with shopping habits, people anticipate returning to their old food prep habits post Covid-19 (Figure 2). Food preparation at home, as well as shopping habits will be influenced by the economy, inflation, and food prices as well as the business and institution shut-downs that occurred this spring. These economic factors are still evolving.

Figure 2. Likelihood of Returning to Former Food Shopping and Preparation Habits



IMPLICATIONS

This study increases our knowledge about shoppers' food at home meal preparations after living for 2 months with business and school shutdowns due to the Covid-19 virus. Increasing our knowledge base is important as the food system in the U.S. continues to see disruptions due to the virus in all stages of the food system.

We hope that this study will help the food industries restructure some of its practices to help avoid or mitigate similar disruptions in the future.

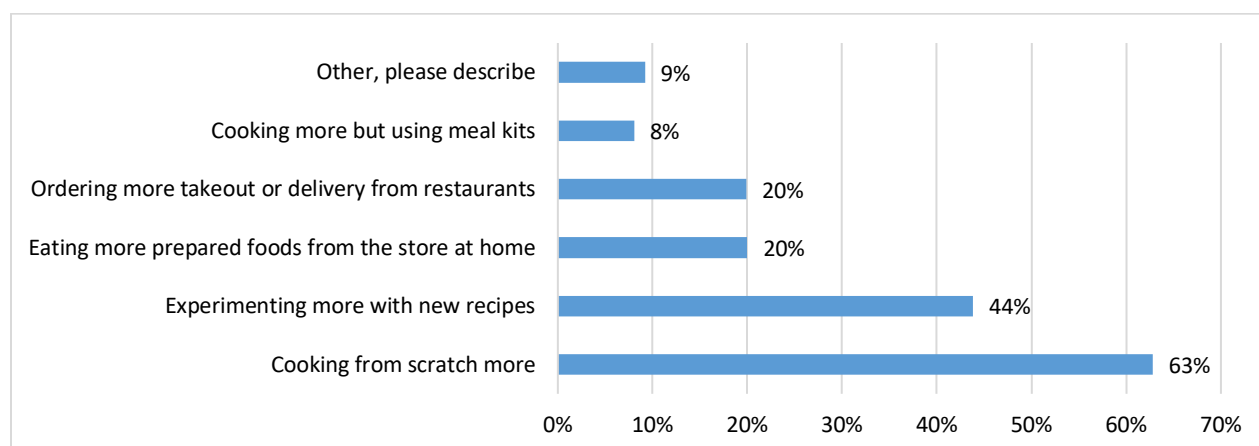
This study showed that a shift in preparing an additional 2 meals at home per week during the crisis occurred. Shopping for two more meals per week, in addition to stocking up and hoarding activities, caused many out-of-stocks in different categories of the retail store.

In addition to cooking more at home, there is evidence from industry research that some consumers are changing how they cook. These changes will, and have, also impact store stocking levels and the store's supply chains. The products purchased to cook more from scratch will differ from those more processed ingredients. For instance, empty flour and yeast shelves indicated a surge in baking using scratch ingredients.

In our survey of shoppers, we asked shoppers to indicate which of a variety of food preparation habits have changed. We did not ask if people were doing less of these food preparation habits, so cannot be sure about the direction of change for every activity, but 64% report cooking from scratch more and 44% are experimenting with new recipes. We surmise that these two food preparation activities most probably increased (Figure 3).

We cannot be sure that the other activities increased, and most probably did not. Many of the remainder may even have declined.

Figure 3. How have your food preparation habits changed due to the covid-19 crisis?



This study looked at the impact of purchasing in some of the popular retail food categories:

- Dairy products
- Heat and serve foods (such as microwaveable mac'n'cheese, etc)
- Frozen entrees (such as pizza, dinners, bowls, lasagna)
- Fresh meat and fish
- Frozen ingredients (such as frozen vegetables, frozen bread dough)
- Fresh fruits and vegetables
- Shelf stable foods (such as pasta, beans, canned foods)
- Prepared, ready-to-eat foods (such as premade sandwiches, pizza, ready-to-eat salads)

Of these categories, on average, respondents said they purchased less in only 2 categories, heat and serve foods, and prepared, ready to eat foods.

While respondents appeared very optimistic in the spring about returning to normalcy and former food preparation habits, continuing Covid-19 cases throughout the U.S. and the reemergence of high cases in Europe and parts of Asia, we feel a return to former habits will likely be tempered for many months.

The Covid-19 impact on the economy is being felt as high unemployment, modest inflation, permanent business closures, and possible recession. The impact on the food industries is being felt at production with high case loads among farm workers, at processing with high case loads among plant workers. Wholesale and distribution centers have remodeled truck delivery schedules and product flow in order to move items in high demand by shoppers.

References

Ballotpedia. 2020. "States That Issued Lockdown and Stay-at-Home Orders in Response to the Coronavirus (COVID-19) Pandemic, 2020" June 17, 2020

Crowe, Emily. 2020. "How consumer behavior is forever changing the grocery, CPG industry." *SmartBrief*. April 29, 2020.

Dunning, Amy. 2020. "Capitalizing On The Outbreak Of Online Grocery Sales" Nielsen Brandbank, April 22, 2020.

Etumnu, C.E., and N.O. Widmar. 2020. "Grocery Shopping in the Digital Era" Choices. Quarter 2. Available online:

The Hartman Group. 2018. "U.S. Grocery Shopper Trends." Food Marketing Institute.

Iowa Community Indicators Program. "Urban Percentage of the Population for States, Historical".

U.S. Census Bureau.

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