

# The impact of the COVID-19 pandemic on food price indexes and data collection

*This article describes the impact the COVID-19 pandemic has had on price changes for food categories within the U.S. Bureau of Labor Statistics import/export price indexes, producer price indexes, and consumer price indexes. In addition, the article assesses the pandemic's impact on price data collection efforts. Safety precautions established during the pandemic created data collection challenges for some price indexes more than others.*

In March 2020, the spread of coronavirus disease 2019 (COVID-19) and the actions taken in response to it drastically shifted food consumption from restaurants to homes as stay-at-home orders went into effect. At the same time, collecting price data became more difficult; first, stores and businesses closed, and second, Bureau of Labor Statistics data (BLS) collectors stopped in-person data collection. Despite the reduction in collected price quotes, BLS successfully maintained the quality of the broad price indexes while excluding very few detailed price indexes from publication. BLS price surveys were able to retain sufficient price quotes by shifting data collection techniques. This change in collection particularly affected the Consumer Price Index (CPI).

This article describes both the price changes during the pandemic and the challenges and adjustments to data collection that the pandemic required. We first take a look at the global market with import and export prices. Next, we move to the prices seen by producers and then to prices as consumers experienced them. Finally, we take a look at the collection and response rates for the three surveys.

## Price changes since the pandemic



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Demand shocks and problems with supply chains contributed to increased volatility in import, export, producer, and consumer prices in the months following the onset of the COVID-19 pandemic in the United States. Meat, fish, dairy, and eggs were especially affected by the shifting economy brought on by the pandemic.

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## Import/Export Price Index

While the United States declared a national emergency on March 13, the beginning of the pandemic dates back to the first reported case in China on November 17, 2019, which led to household lockdowns beginning there in mid-January 2020.<sup>1</sup> The downward impact on food demand and export prices began in January and accelerated, as countries closed businesses and kept people home. Demand for some key exports such as soybeans and other grains remained steady because these products are used for animal feed rather than household consumption; however, there was a reduction in demand for other food products, especially meat.

Import meat prices declined 2.3 percent in January 2020, after seeing pork-driven increases of 2.6 percent and 3.1 percent in the previous 2 months. Chinese pork producers lost substantial production in the latter part of 2019 because an outbreak of African swine fever wiped out much of their pigs.<sup>2</sup> In January 2020, China largely pulled out of the market for Australian beef because of the COVID-19 pandemic, putting more supply on the world market for that product.<sup>3</sup> Prices for import meat continued to decline overall because of weak Asian demand, falling 8.9 percent from January to April 2020, the largest 3-month drop in import prices since the final quarter of 2015.

The reduction in world meat demand, especially from Asia, resulted in declining U.S. export meat prices. The dollar value of U.S. exports of meat products and meat packaging products fell 22.5 percent from March to May 2020.<sup>4</sup> Export meat prices decreased 1.8 percent in February 2020, then edged up 0.3 percent in March and then declined 4.0 percent in April 2020.

From mid-April 2020 onward, the effects of the pandemic began to accelerate in the United States. Outbreaks in a number of U.S. meat processing facilities led to a domestic meat shortage, causing a subsequent increase in demand for imports.<sup>5</sup> In turn, import meat prices rose 16.0 percent in May 2020, the largest 1-month jump since the index was first published monthly in December 1993. Export meat prices also rose, advancing 5.0 percent in May 2020 as less meat was available for export. Despite most U.S. meat processing facilities coming back online, import meat prices continued to rise in June 2020, advancing a further 8.1 percent as demand from Asia slowly increased with countries reopening. In contrast, export meat prices fell 0.4 percent.

Both export and import fish and shellfish prices experienced shocks from the demand reductions and supply chain disruptions caused by the pandemic. In particular, lobster prices decreased because of the reduction in demand from restaurants and the cruise industry, which was effectively shut down.<sup>6</sup> Overall, export fish and shellfish prices fell 17.1 percent from January to June 2020 and import fish and shellfish prices declined 8.4 percent over the same period.

A few other export areas experienced demand reduction from the pandemic. Export prices for dairy products and eggs fell 5.3 percent from January to April 2020 before declining 11.9 percent in May 2020. An oversupply for both milk and cheese as the food service industry largely shut down led to the declines. In June 2020, dairy prices rebounded sharply, increasing 24.5 percent. Higher input costs, coupled with low inventories and cold storage

stocks, pushed cheese prices dramatically higher.<sup>7</sup> Demand appeared to recover as more states opened up and food service slowly resumed. Milk also contributed to higher prices because of large government purchases as part of the U.S. Department of Agriculture Farmers to Families Food Box program.<sup>8</sup> Export nut prices decreased 20.5 percent from December 2019 to June 2020. Some of the decline resulted from a loss in demand from Asia due to restaurant closures and decreasing purchases of some nuts (perceived luxury foods), but a record almond crop in California also supported the drop in prices.<sup>9</sup>

Corn was another food export that recorded lower prices in response to the pandemic, but this price decline stems from corn’s role as an energy rather than food product.<sup>10</sup> In 2019, 39.4 percent of all corn harvested in the United States was used for the production of ethanol.<sup>11</sup> After the onset of the pandemic, the initial reduction in energy demand from Asia coincided with an oil price war between Russia and Saudi Arabia, leading to a plunge in oil prices. Low oil prices put downward pressure on prices for related energy products such as ethanol, a situation only exacerbated by lower fuel demand in the United States once the pandemic began to spread. Export corn prices fell 16.0 percent from February to May 2020. By June 2020, agreements within the Organization of the Petroleum Exporting Countries (OPEC) to cut oil production, some renewed demand for energy prices as economies began to reopen, and lower corn acreage than originally forecast led to a 3.8-percent increase in export corn prices.<sup>12</sup>

Tables 1 and 2 show changes in the overall export and import price indexes for foods, feeds, and beverages, as well as for food products affected by the pandemic. Note that there was price movement for other food areas such as fruits and vegetables, although these changes were more attributable to factors such as weather that also impacted the overall price indexes.

**Table 1. Export price indexes for select food categories, monthly percent changes, January–June 2020**

Category	January 2020	February 2020	March 2020	April 2020	May 2020	June 2020	3-month change (March 20–June 20)
Foods, feeds, and beverages	2.3	-3.0	-1.5	-3.1	-0.5	1.1	-2.5
Meat, poultry, and other animal products	0.1	-1.8	0.3	-4.0	5.0	-0.4	0.4
Fish and shellfish	2.9	-0.6	-5.0	1.3	-2.0	-11.5	-12.2
Dairy products and eggs	1.1	-1.1	-2.7	-1.5	-11.9	24.5	8.1
Nuts and preparations	-3.0	-3.1	-3.9	-5.2	-1.5	-5.7	-12.0
Corn	2.2	0.1	-0.8	-10.2	-5.8	3.8	-12.2

Source: U.S. Bureau of Labor Statistics.

**Table 2. Import price indexes for select food categories, monthly percent changes, January–June 2020**

Category	January 2020	February 2020	March 2020	April 2020	May 2020	June 2020	3-month change (March 20–June 20)
Foods, feeds, and beverages	0.5	1.2	-1.0	-1.6	2.3	-0.1	0.6
Meat, poultry, and other animal products	-2.3	-1.0	-4.0	-4.1	16.0	8.1	20.3
Fish and shellfish	1.9	-1.0	-1.4	-1.8	-2.9	-1.7	-6.3

See footnotes at end of table.

Source: U.S. Bureau of Labor Statistics.

## Producer Price Index

The COVID-19 pandemic led to fluctuations in domestic producer prices, particularly in the food sector, as many places instituted stay-at-home orders in an effort to limit the spread of the disease. These restrictions reduced demand from restaurants, which were effectively turned into takeout establishments, while demand from grocery stores rose as consumers, unaware of how long they would be quarantined at home, increased purchases of food. Suppliers had a difficult time meeting this increased consumer-driven demand as some businesses had to shut down or limit production capacity when COVID-19 outbreaks occurred at their plants.<sup>13</sup> In addition, producers were trying to reorient their processing and supply channels from restaurants and institutional customers to supermarkets, which have different product sizes and packaging requirements.<sup>14</sup> This reduction in demand by processors forced farmers to either accept lower prices for their product or destroy perishable products because of the lack of an available market.<sup>15</sup>

Overall, the Producer Price Index (PPI) for final-demand foods decreased only 0.1 percent between March and June 2020, but the minimal cumulative movement masked an underlying monthly volatility within the index.<sup>16</sup> With no change in March 2020, prices for final-demand foods fell 0.5 percent in April 2020, as the index for corn dropped 19.1 percent and prices for dairy products declined 4.4 percent. In May 2020, the index for final-demand foods jumped by a record 6.0 percent, as meat prices surged 40.4 percent. In June 2020, the index for final-demand foods reversed course again, falling 5.2 percent, as prices for meats dropped 27.7 percent and the index for eggs fell 12.7 percent. (See table 3.)

The price patterns seen in international trade are also reflected in the domestic prices for meat, dairy, eggs, and corn. The PPIs that reflect the supply chain of meat consumption saw many significant price changes. Slaughter livestock and meats both experienced large price changes since March 2020. After declining early in 2020 as a result of lower domestic seasonal demand following the holidays, the PPI for meats jumped nearly 50 percent between March and May 2020, mainly because of the combination of lower supplies from processors and higher consumer demand. A bottleneck at processing plants (caused by retooling packaging lines) and COVID-19 shutdowns reduced demand for slaughter livestock, whose prices fell over 8 percent in March 2020, forcing ranchers to either accept lower prices or withhold their livestock from sale.<sup>17</sup> In June 2020, as stay-at-home orders were lifted throughout the country, restaurant demand increased, and supply chains started to revert to normal, as measured by the PPI for meats, which dropped over 25 percent, returning to near its pre-COVID-19 levels.

Dairy products were also heavily influenced by the pandemic. The PPI for dairy products fell 2.7 percent between February and June 2020, as school closures and stay-at-home orders substantially reduced dairy demand from restaurants and school lunch programs. Like meat processors, dairy producers were unable to quickly reorient their production facilities from institutional-sized to consumer-sized product packaging. Because demand for raw milk by dairy product manufacturers was very low, some dairy farmers could not find a market for their product, seeing no other option but to dump their perishable inventory rather than ship it for further processing.<sup>18</sup> Overall, the PPI for raw milk fell about 40 percent between February and June 2020.

Prices for eggs as measured by the PPI initially increased over 50 percent between February and April 2020. This initial increase was due to higher demand for eggs in preparation for the upcoming Easter holiday. Eggs were used for cooking and decorative purposes, and demand for them was driven by consumer panic buying resulting from

the stay-at-home orders implemented in response to the COVID-19 pandemic.<sup>19</sup> In May 2020, eggs once destined for newly closed restaurants and food service buyers were redirected into supermarket supply channels. These increased supplies, coupled with lower demand after the Easter holiday, resulted in a price drop of over 40 percent in May 2020. To bring supplies and demand back into balance, some egg producers culled their flocks or donated their eggs to foodbanks.<sup>20</sup>

World economic contraction due to the COVID-19 pandemic and a crude petroleum price war between OPEC and Russia led to historically low prices for crude petroleum.<sup>21</sup> Corn’s relationship with the energy sector is demonstrated by movements in the PPI for corn. Domestic corn prices trended with export prices, falling from February to May 2020 and rising in June 2020. The earlier downward trend was due to the role of corn in the production of ethanol, which is blended with crude petroleum to produce gasoline. Although planting and growth progress were close to historical averages, ensuring stable supply, the demand for corn to produce ethanol dropped precipitously as gasoline demand plummeted in late March and early April 2020. Corn prices fell with rising inventory levels of refined petroleum products, as consumers and industry depressed demand after the implementation of stay-at-home orders. Market conditions in the petroleum sector severely reduced the production of ethanol and led to the closure of some ethanol producing facilities.<sup>22</sup> In addition, a number of state governments campaigned to support the domestic oil and gas industries by waiving ethanol blending requirements from the Renewable Fuel Standard during the COVID-19 crisis; this prospect of a further reduction in demand put additional pressure on the price of corn.<sup>23</sup> Overall, the PPI for corn prices fell more than 20 percent between February and May 2020. In June 2020, the price for corn rose about 6 percent as ethanol production increased with state economies slowly beginning to reopen and consumers becoming more comfortable leaving the house and traveling, causing demand for gasoline to rise.

**Table 3. Producer price indexes for select food categories, monthly percent changes, seasonally adjusted, January–June 2020**

Category	January 2020	February 2020	March 2020	April 2020	May 2020	June 2020	3-month change (March 20–June 20)
Final demand foods	0.2	-1.8	0.0	-0.5	6.0	-5.2	-0.1
Slaughter livestock	0.3	-4.4	-8.1	-3.1	10.3	-10.5	-4.4
Meats	-2.1	-2.4	-1.8	4.2	40.4	-27.7	5.7
Raw milk	-3.8	-1.8	-6.6	-3.8	-22.4	-13.0	-35.1
Dairy products	-0.4	-0.6	-0.4	-4.4	-4.0	6.6	-2.2
Eggs for fresh use (NSA)	-35.2	33.4	26.4	31.8	-44.6	-12.7	-36.2
Corn	4.0	-6.5	-0.2	-19.1	-5.0	6.3	-18.3

Note: NSA = not seasonally adjusted.

Source: U.S. Bureau of Labor Statistics.

## Consumer Price Index

Unsurprisingly, consumer prices for food were also affected by COVID-19, with food at home indexes generally rising and food away from home indexes becoming more volatile.<sup>24</sup>

### Food at home price movements

Since March 2020, consumer price indexes for food at home posted some of the largest monthly increases of recent years. The global and domestic price trends highlighted by import/export and producer price indexes also show up in the price changes seen in local grocery stores. The food at home price index increased 4.3 percent (seasonally adjusted) from March to June 2020 after rising 1.1 percent over the previous 12 months. This trend was partly driven by the previously noted supply issues in the beef industry; beef prices for consumers rose more than 20 percent from March to June 2020. This increase contributed to the 10-percent increase in the CPI for meats, poultry, fish, and eggs over the same period. However, while prices for meats, poultry, fish, and eggs increased the most among major grocery store food groups, all other food at home CPIs increased broadly from March to June 2020. (See table 4.)

**Table 4. Consumer price indexes for select food at home categories, 12-month and 3-month percent change**

Category	12-month percent change, March 2019–March 2020	3-month percent change (SA), March–June 2020
Food at home	1.1	4.3
Cereals and bakery products	0.1	3.1
Meats, poultry, fish, and eggs	2.3	10.3
Beef and veal	3.8	20.4
Dairy and related products	3.7	2.1
Fruits and vegetables	-1.9	2.5
Nonalcoholic beverages	1.4	3.6
Other food at home	1.4	2.1

Note: SA = seasonally adjusted.  
Source: U.S. Bureau of Labor Statistics.

## Food away from home price movements

The main price indexes within food away from home—full-service and limited-service meals and snacks—typically show very little volatility. With fewer prices in the index and changes in the market, the price indexes for the two major product groups have fluctuated more in recent months. Prices rose more than usual among products in the limited-service meals and snack category, which has shown higher-than-usual price growth since March 2020. Prices for full-service meals and snacks declined in April 2020, but increased sharply in June 2020. Recent increases reflect, in part, higher input costs seen in food at home indexes. (See table 5.)

**Table 5. Consumer price indexes for select food away from home categories, monthly percent changes, seasonally adjusted, January–June 2020**

Category	January 2020	February 2020	March 2020	April 2020	May 2020	June 2020	3-month change (March 20–June 20)
Food away from home	0.4	0.2	0.2	0.1	0.4	0.5	1.0
Full-service meals and snacks	0.4	0.2	0.0	-0.3	0.2	0.9	0.7
Limited-service meals and snacks	0.4	0.3	0.4	0.7	0.6	0.5	1.8

See footnotes at end of table.

Source: U.S. Bureau of Labor Statistics.

## Changes to data collection in the face of the pandemic

Safety precautions established during the current pandemic created data collection challenges for some price indexes more than others. While the surveys for import, export, and producer prices were able to continue normal data collection during the pandemic, the survey for consumer prices saw significant data collection challenges, as its data are typically collected by in-person visits that were completely halted across the country in mid-March 2020.

### Import/Export Price Index

Price collection for U.S. Import and Export Index for foods, feeds, and beverages dropped after the COVID-19 pandemic started in March 2020. For imports, survey response rates for foods, feeds, and beverages were 4.8 percentage points lower in April 2020 than in April 2019. Response rates were 5.9 percentage points lower in May 2020 than in May 2019, and 5.1 percentage points lower in June 2020 than a year earlier. Although response rates for export foods, feeds, and beverages were higher than those for imports in all 3 months, they were lower than they were in 2019—by 9.0 percentage points in April 2020, 6.8 percentage points in May 2020, and 9.3 percentage points in June 2020. Import and export prices are revised in the 3 months after initial publication. While response rates improved after these revisions, they remained below their year-ago levels. There were no changes in data collection and estimation procedures.

### Producer Price Index

In the first few months of the COVID-19 pandemic, PPI response rates remained consistent with historical averages for almost all sectors. Although no concrete evidence exists that could explain why PPI response rates were nominally affected, two factors were working in favor of the PPI. First, monthly pricing data used to calculate the PPI are primarily collected online through the BLS Internet Data Collection Facility. Second, and anecdotally, when BLS staff attempted to follow up with survey respondents about extreme price movements, they found them to be more accessible during the COVID-19 pandemic as many businesses had directed their administrative staff to work from home. Since PPI response rates were largely unaffected, there were no changes in data collection and estimation procedures.

### Consumer Price Index

The CPI for commodities and services is calculated from price data that BLS collects in retail stores and restaurants. In-person data collection focuses on specific items in specific stores and locations, and these items are considered to be representative of the consumer market basket. Safety precautions necessitated by the COVID-19 pandemic had a large and immediate impact on the data collection process for the CPI program.

Food price data, both in grocery stores and in restaurants, are typically collected almost entirely by personal visit to the location. This in-person data collection was completely halted across the country on March 16, 2020. Since measuring food price change is essential to the CPI, BLS had to introduce new procedures that would allow for the collection of data in amounts sufficient for the publication of accurate food indexes. These methods included replacing in-person data collection with online data collection. However, the reduction in the number of prices

collected and the transition to the new methods created issues that users should be aware of when interpreting the indexes. In the following sections, we describe the impacts for both food at home and food away from home data collection.

### Food at home data collection

To measure price change for food at home, BLS collects data from thousands of grocery stores and other establishments that sell grocery food items. Prices are collected and indexes are published for dozens of specific food categories, which are classified into six broad groups. As is the case for many CPI categories, these prices have traditionally been collected in person by hundreds of trained BLS data collectors in the field. Each month, these collectors observe and record thousands of prices, making sure that the prices collected are for the exact items in the sample.

In 2019, about 99 percent of food at home prices were collected via personal visit. In June 2020, typical of recent months, about 96 percent of the prices were collected online, with the remaining 4 percent collected via telephone.

While BLS adapted collection procedures for the CPI by shifting to online price collection, some complications were encountered. Some grocery stores had prices available online, others had prices available only through a third party, and some had no online prices available. For some stores, there was even a queue for accessing their website. The availability of many items also decreased as demand surged.

These logistical and market impacts resulted in a decrease in the total amount of prices collected. Table 6 shows the percentage of prices in the sample collected both before and after the pandemic forced the change in collection methods.

**Table 6. Response rates for Consumer Price Index for select food at home categories, June 2019 and June 2020**

Category	Response rate	
	June 2019	June 2020
Food at home	90	66
Cereals and bakery products	93	66
Meats, poultry, fish, and eggs	91	61
Beef and veal	93	61
Dairy and related products	93	74
Fruits and vegetables	84	66
Nonalcoholic beverages	94	72
Other food at home	93	68

Source: U.S. Bureau of Labor Statistics.

Response rates for most food at home categories fell from about 90 percent to 61 percent–74 percent, with rates for meat categories seeing the largest declines. Despite these declines and challenging conditions, the new data collection methods still allowed BLS to collect more than 60 percent of the prices for all the major food categories.



A reduced number of prices collected is not the only issue that complicates price-change measurement for food at home during the pandemic. For some stores in the sample, an item’s online price may be different from, and often higher than, the in-store price for the same day and time. This difference was one of the factors that led to an increase in the food at home index from March to April 2020, because in some cases, online prices were compared with prices previously collected in store.

### Food away from home data collection

BLS collects data from thousands of restaurants and other establishments selling nongrocery food items. Restaurants are classified as either full-service or limited-service, with a price index published for each type. In addition, data are collected for employee sites, schools, vending machines, and mobile vendors such as food trucks.

Like food at home price data, most food away from home price data have historically been collected in person. When the pandemic-related restrictions began, new methods had to be developed and implemented to collect these data. Before in-person data collection was ceased, about 80 percent of food away from home price data were collected in person. In June 2020, about three-quarters of the data were collected online, with the remainder collected by telephone.

At the onset of the pandemic-related restrictions, many restaurants and other sampled establishments were closed, and many others had limited online menus, restricting the pricing availability of some specific items in the sample. In addition, data collection was extremely limited for vending machines, employee sites, and schools. This limitation resulted in declines in response rates and in fewer prices collected for food away from home indexes. (See table 7.)

**Table 7. Response rates for Consumer Price Index for select food away from home categories, June 2019 and June 2020**

Category	Response rates	
	June 2019	June 2020
Food away from home	87	60
Full-service meals and snacks	91	59
Limited-service meals and snacks	93	75
Food at employee sites and schools	50	19
Food from vending machines and mobile vendors	80	26

Source: U.S. Bureau of Labor Statistics.

Response rates declined across all categories, with rates for full-service restaurants declining more than those for limited-service restaurants, reflecting more widespread closures. The more minor categories declined sharply, reflecting closures of sites and the infeasibility of online price collection.

### Conclusion

In recent months, the pandemic resulted in upward movements for many BLS food price indexes. Large price increases for meat products occurred across the board, and price declines for corn were largely energy driven and did not affect the food purchases of U.S. consumers. Prices for perishable foods with a short shelf life was strongly affected, and disruptions in dairy and egg production and distribution caused the greatest price volatility in all BLS price indexes. The shift away from institutional and restaurant food consumption toward food at home consumption created short-term disruptions and shocks in the economy, particularly for perishable foods. These shocks rippled through the economy and affected the prices consumers pay in the grocery store.

The COVID-19 pandemic also affected BLS price data collection, with collection efforts for consumer price indexes for food being affected more than those for the other BLS price indexes. However, price data continue to be collected, contributing to the production of high-quality price indexes that inform the public.<sup>25</sup>

#### SUGGESTED CITATION

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#### NOTES

<sup>1</sup> For more information, see "Timeline: how the coronavirus spread," *Al Jazeera*, updated daily, <https://www.aljazeera.com/news/2020/01/timeline-china-coronavirus-spread-200126061554884.html>.

<sup>2</sup> Mildred Haley and Fred Gale, "African swine fever shrinks pork production in China, swells demand for imported pork," *Amber Waves*, (U.S. Department of Agriculture Economic Research Service), February 3, 2020, <https://www.ers.usda.gov/amber-waves/2020/february/african-swine-fever-shrinks-pork-production-in-china-swells-demand-for-imported-pork/>.

<sup>3</sup> Jon Condon and James Nason, "China's coronavirus outbreak will impact beef and cattle trade," *Beef Central*, January 29, 2020, <https://www.beefcentral.com/news/chinas-coronavirus-outbreak-will-impact-beef-and-cattle-trade/>.

<sup>4</sup> For more information on U.S. exports of meat products and meat packaging products, see the U.S. Census Bureau Office of Foreign Trade Statistics web page at <https://usatrade.census.gov/>. Note that a free account is needed to view this data.

<sup>5</sup> Dee-Ann Durbin, "Where's the beef? Production shutdown leads to shortages" *The Associated Press*, May 7, 2020, <https://apnews.com/1ace47a100d73ce690990d73e597db22>.

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<sup>8</sup> For more information on the U.S. Department of Agriculture Farmers to Families Food Box program, see "USDA farmers to families food box" (U.S. Department of Agriculture, Agricultural Marketing Service), updated daily, <https://www.ams.usda.gov/selling-food-to-usda/farmers-to-families-food-box>.

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- <sup>11</sup> For more information on corn production and fuel use, see figure “Corn production and portion used for fuel” (U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, May 2020), <https://afdc.energy.gov/data/10339>.
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- <sup>25</sup> Additional information is available in each program’s COVID-19 notices: [CPI notice](#), [MXPI notice](#), [PPI notice](#).

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