COVID-19 EPIDEMIOLOGICAL ANALYSIS

A SNAPSHOT

Abstract

This snapshot analysis was prepared to describe and understand the epidemiological situation of COVID-19 in Imperial County. It is described as a snapshot analysis to summarize the data contained in Imperial County's master database in early July 2020 (containing data on cases beginning March 8, 2020), as the pandemic is ongoing.

Contents

Executive Summary 3
Statistical and Analytical Methods 4
Data Completeness 5
Imperial County Cases 6
Out-of-Country Cases 13
Cases with History of Travel to/from Mexico 15
Imperial County – Cases by ZIP Code 17
ZIP Code 92227 17
ZIP Code 92231 19
ZIP Code 92243 21
ZIP Code 92249 23
ZIP Code 92250 25
ZIP Code 92251 27

Executive Summary

This snapshot analysis was prepared to describe and understand the epidemiological situation of COVID-19 in Imperial County. It is described as a snapshot analysis to summarize the data contained in Imperial County's master database in early July 2020 (containing data on cases beginning March 8, 2020), as the pandemic is ongoing. As investigation of some cases may be delayed, entry of investigated cases into the database may be backlogged, and not all data fields were collected or recorded in a standardized way, this snapshot will necessarily be an incomplete picture of the pandemic at the time of data extraction and analysis. Nevertheless, it may serve as a useful tool to summarize the available information.

This descriptive analysis is intended to be used as a reference document. The results presented are not intended to be in-depth explorations of the data or robust hypothesis testing but should be viewed as non-exhaustive summaries. Results are subject to several limitations in the methods of analysis (described in **Statistical and Analytical Methods**) and in the quality of available data (described in **Data Completeness**). Future improvements in data entry and data cleaning may produce more robust results. In light of the various limitations, these results can be viewed used as a tool to generate hypotheses, monitor implementation of mitigation strategies, and highlight areas where further information is needed.

Results presented here focus on nine key variables of interest: age, sex, race, ethnicity, ZIP code, reported occupation, history of travel to/from Mexico, date of specimen collection, and date of death. A summary of information known on all cases in the Imperial County database are presented in the section entitled **Imperial County Cases** (including cases declared as out-of-country cases or as having a history of travel to/from Mexico). At the time of analysis, there were 8,436 identified COVID-19 cases and 151 deaths. Cases have been predominantly young (50% of cases under 40 years). The age distribution of cases has shifted to younger ages throughout the pandemic, with individuals under 30 comprising 26% of cases during the week of May 3, increasing to 37% of cases during the week of July 5. The pandemic reached its point of highest incidence to date during the week of May 31. Most cases have been reported from the areas of Calexico and El Centro, corresponding to areas of higher population. Textual keyword searches were used to categorize occupation descriptions; this method was successful in categorizing 51% of cases into at least one occupational setting category. A plurality of these cases (19%) were categorized as having no workplace (most associated with unemployment) and a smaller fraction (17%) were categorized into settings of caregiving/childcare/support services. The proportion of cases categorized as having no workplace (primarily associated with unemployment) has increased gradually but steadily over time, from 11% of cases with categorized occupation during the week of April 19 to 23% of such cases during the week of July 5. Simultaneously, the proportions of cases associated with administrative/service settings or agriculture have declined over this period.

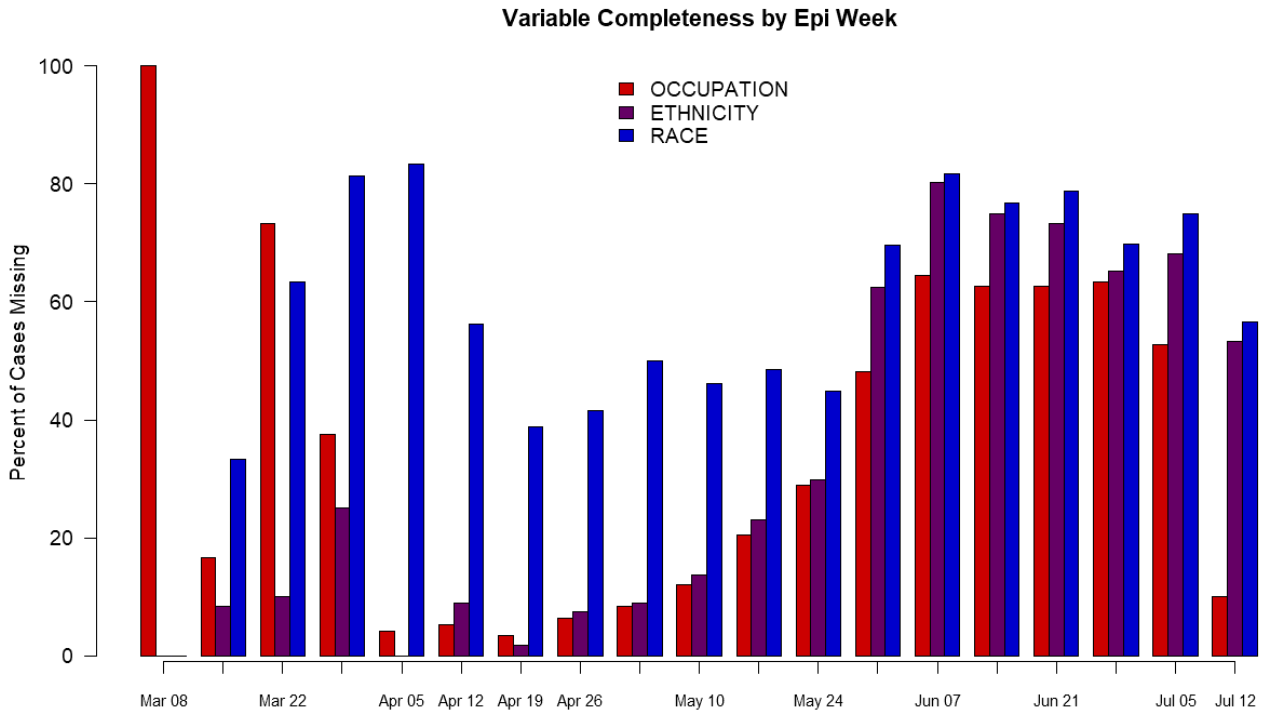
As the pandemic in Imperial County progresses, these findings are likely to become out-of-date and replaced by more recent and more complete information. In the immediate future, this analysis may serve as a useful tool for investigators, policymakers, and stakeholders in responding to the COVID-19 pandemic in Imperial County.

Statistical and Analytical Methods

A full de-identified line listing of Imperial County cases and Out-of-Country cases was extracted from the Imperial County Master Database on July 16, 2020. A comparable line listing of Imperial County cases was retrieved from CalREDIE on July 9 and occupation fields were merged with those of the Imperial County Master Database using the CalREDIE ID as the unique identifier. Out-of-Country cases (generally, cases tested in Imperial County but who reside in Mexico) included all cases listed on the "Out-Of-Country" worksheet in the Imperial County Master Database workbook. Cases with a history of travel to/from Mexico included all Out-of-Country cases; also included were any Imperial County cases with a 14-day travel history description including any of the terms: "Mexico," "Mexicali," "Tijuana," or "Baja California."

Data Completeness

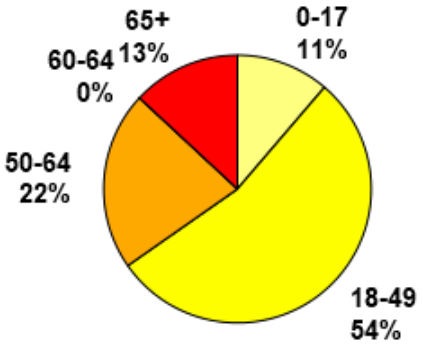
Key indicators of data completeness and quality of case investigations include case sex, age, race, ethnicity, occupation, location (assessed by ZIP code), and hospitalization status (at the time of reporting). Imperial County's database maintains high levels of completeness in collection of sex, age, ZIP code, and hospitalization status with fewer than 1% of these values missing. Completeness of data on ethnicity began high, with fewer than 10% of values missing in early March; however, the proportion of missing ethnicity values has steadily increased over time, reaching 80% in early June. Completeness of data on race and occupation has varied somewhat over time, but completeness of these variables were generally lowest in mid-April (when occupation was missing for 4% of cases and race was missing for 39% of cases) and have increased to high levels in early June (when occupation was missing for 64% of cases and race was missing for 82% of cases).



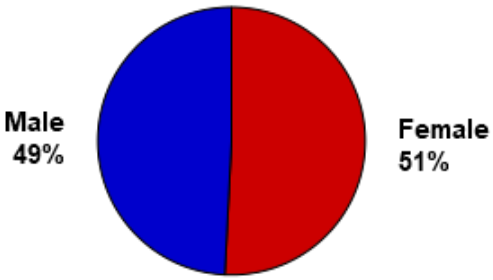
Imperial County Cases

At the time of this analysis, the Imperial County database contained 8,436 unique COVID-19 cases, including out-of-country cases reported in Imperial County. A majority of cases were female (51%), white (77%), and Hispanic (96%).

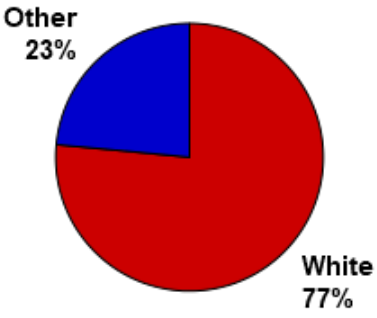
Age Distribution



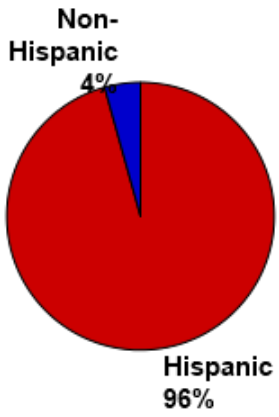
Sex Distribution



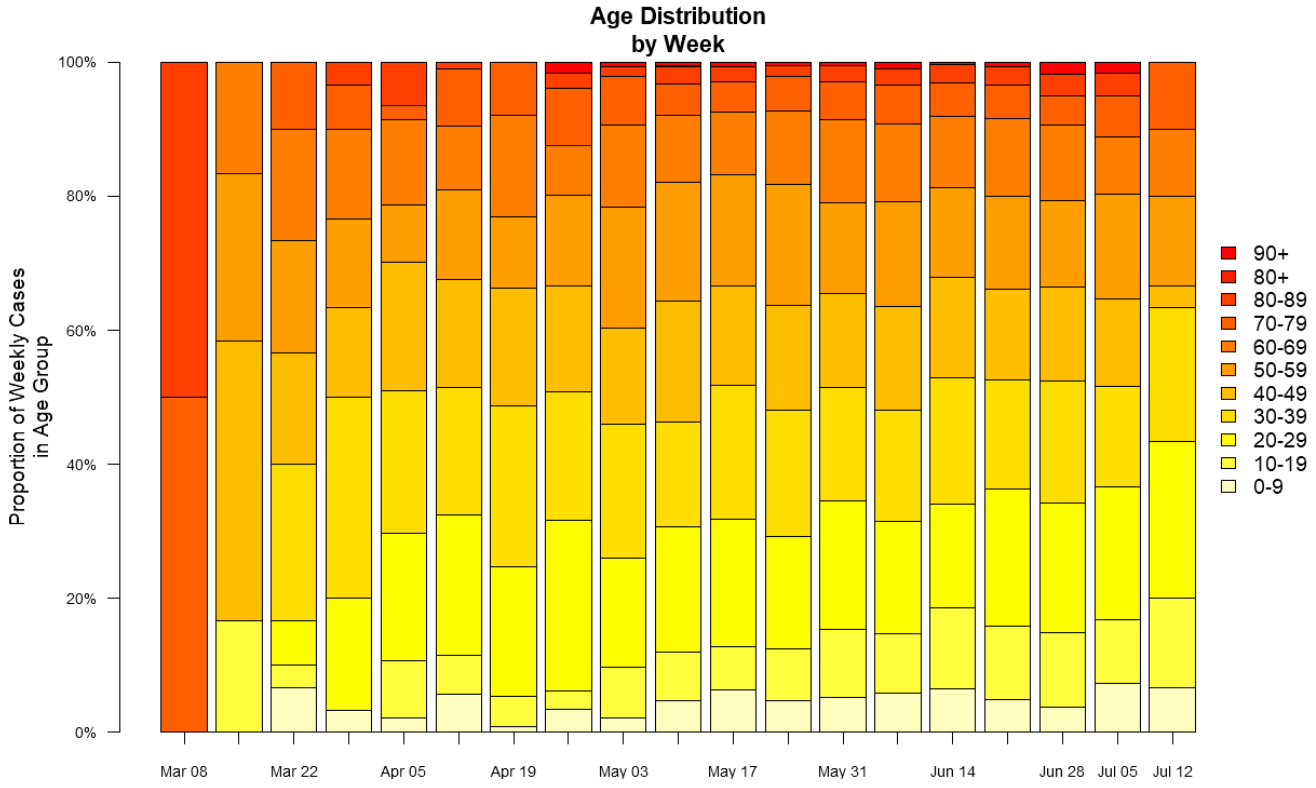
Race Distribution



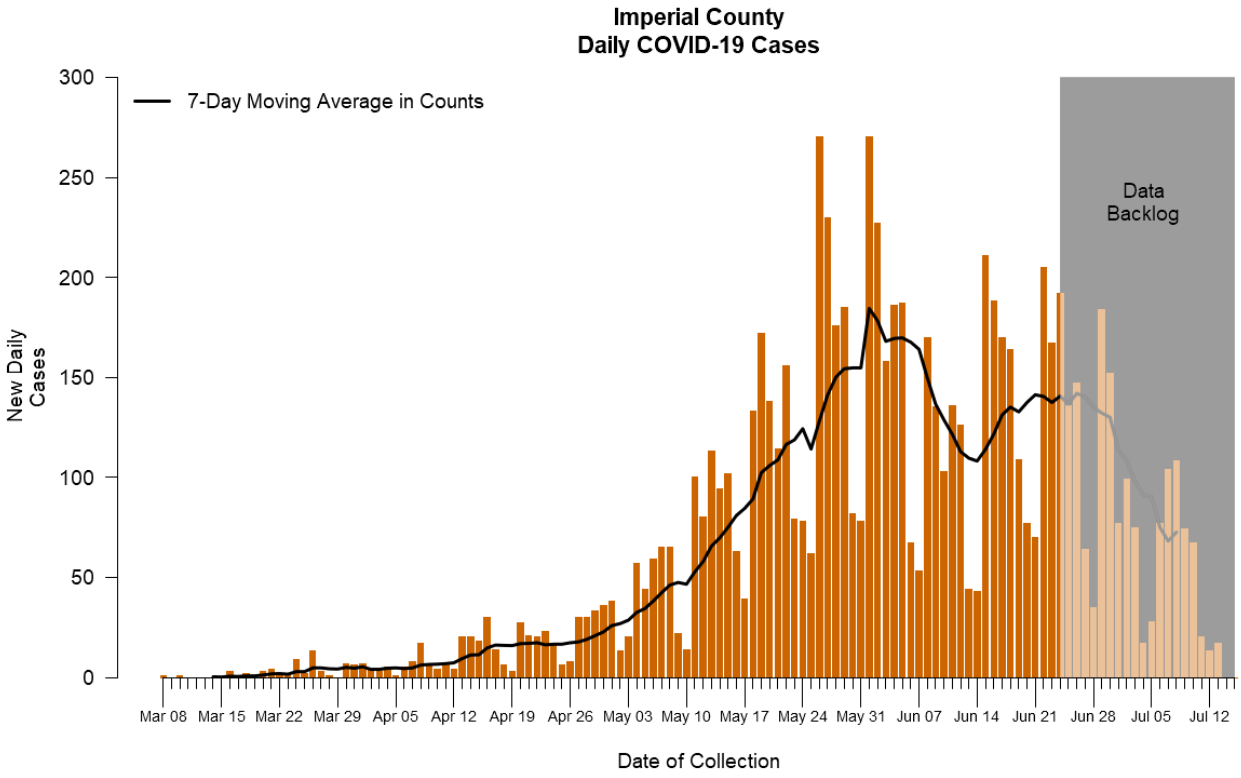
Ethnicity Distribution

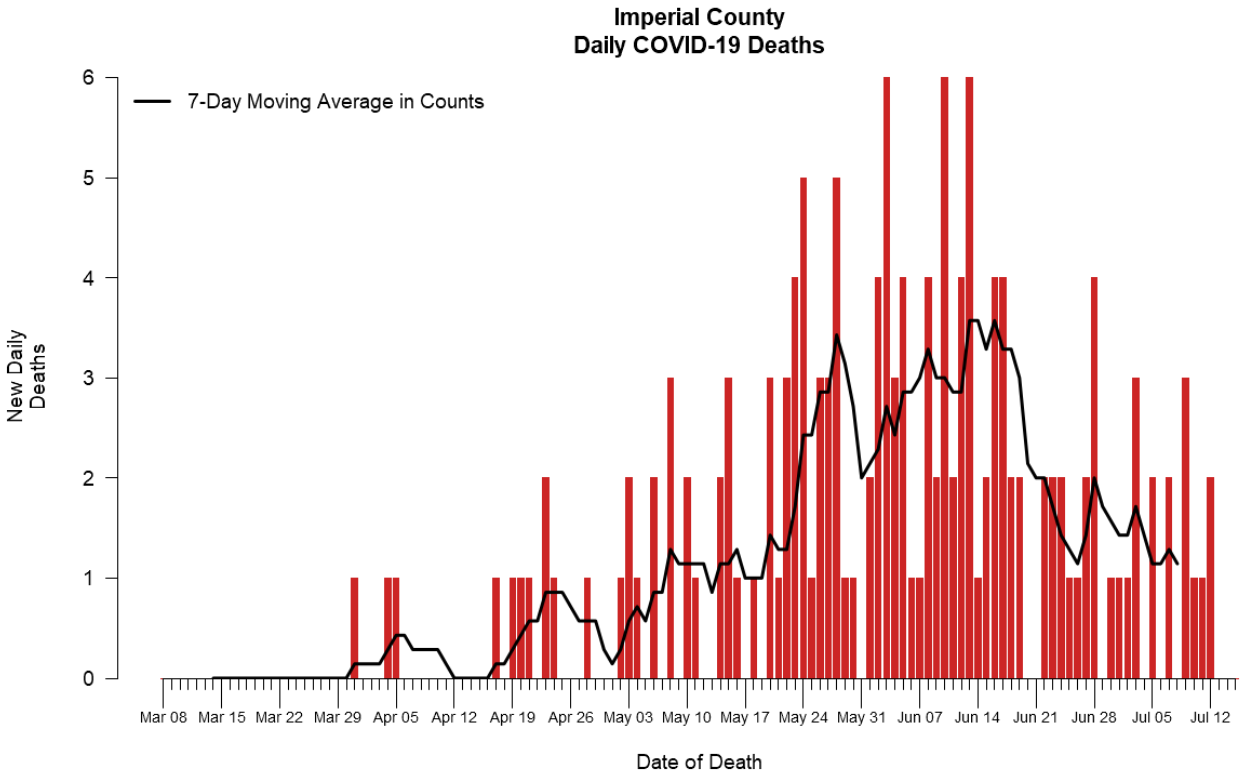


A plurality of cases was reported in ages 20-29 (18%), while 11% of cases were aged 60-69 years and 9% of cases were aged 70 years or older. The distribution of ages has gradually shifted from older adults to younger adults throughout the course of the pandemic. During the week of May 3, individuals under 30 years of age accounted for 26% of cases and individuals aged 30-59 accounted for 53% of cases. By comparison, during the week of July 5, individuals under 30 years of age accounted for 37% of cases (an increase of 11%) and individuals aged 30-59 accounted for 44% of cases (a decrease of 7%). The proportion of cases aged 60 years and older remained relatively stable, accounting for 17-22% of cases throughout this period.



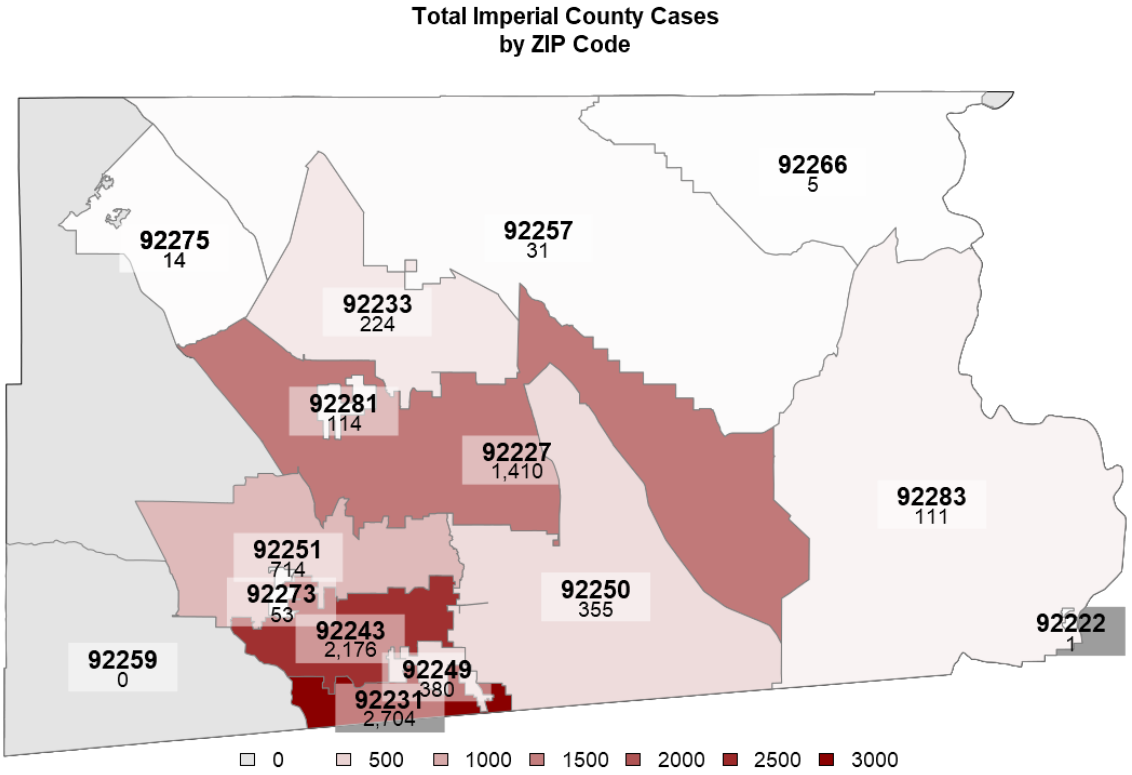
The earliest COVID-19 case in the database (by date of specimen collection) is recorded as March 8. The seven-day rolling average number of daily cases remained below 10 until April 13. Average daily incidence began to rapidly increase from 17 daily cases on April 26 to 47 daily cases two weeks later on May 10; to 124 daily cases on May 24; eventually to a high of 184 daily cases on June 1. The highest single-day incidence was 270 case, reached both on May 26 and June 1. Data on case incidence in recent weeks may be time-lagged due to delays in reporting, data entry, etc. Reported COVID-19 deaths followed similar temporal trends to case incidence. The earliest recorded death occurred on March 31, and reported daily deaths were highest at six deaths, reported each on June 3, June 10, and June 13.



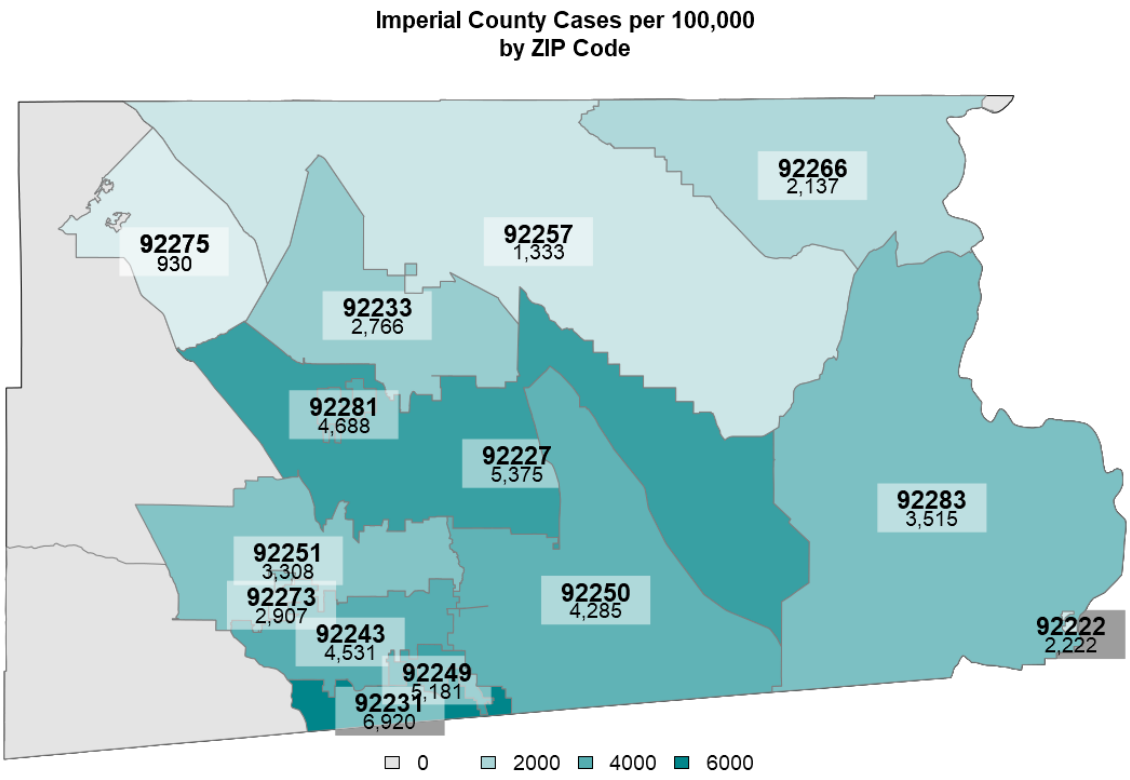


Roughly one third of cases were reported from ZIP code 92231 (2704 cases, 32%) encompassing the city of Calexico; and quarter of cases were reported from ZIP code 92243 (2176 cases, 26%) encompassing the city of

El Centro, while 400 cases or fewer were reported in all Imperial County ZIP codes but four (92231, 92243, 92227 – Brawley, and 92251 - Imperial).

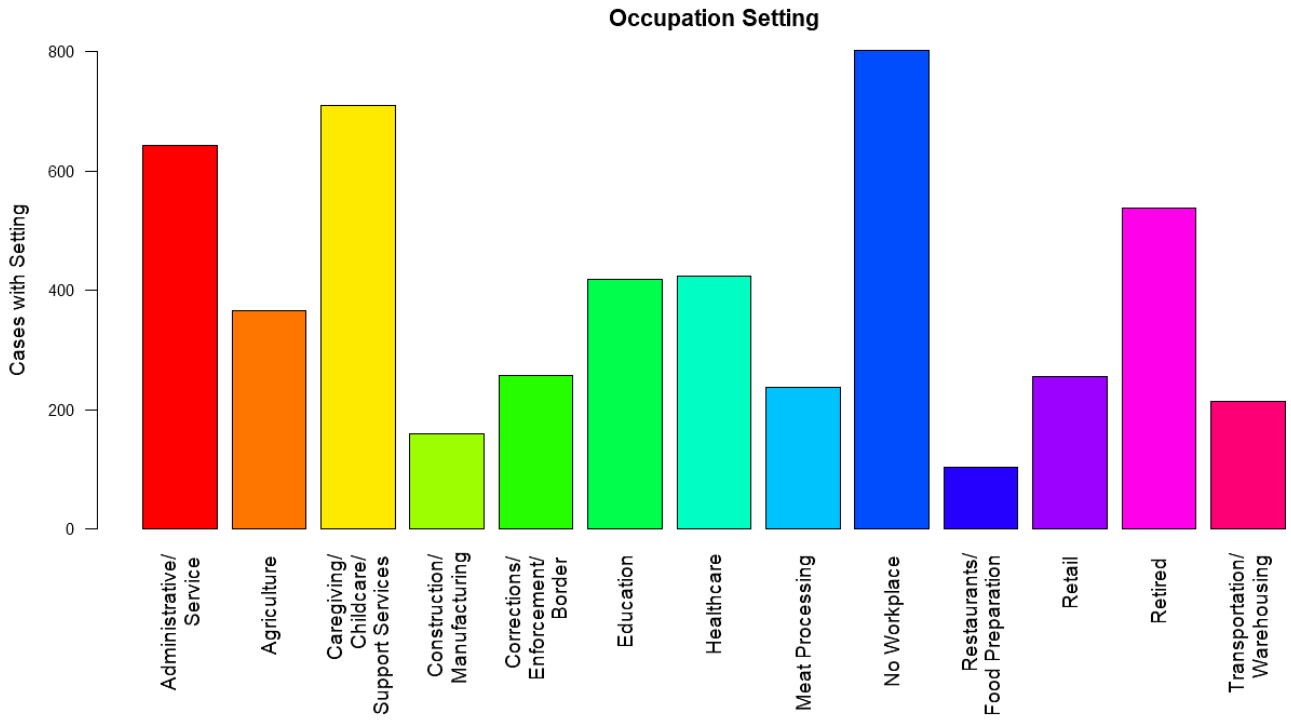


While most cases in Imperial County were reported from a small number of ZIP codes, this is likely a factor of ZIP codes with greater populations. When cumulative case counts are standardized per 100,000 residents (using 2010 US Census estimates), case incidence is more evenly distributed throughout Imperial County ZIP codes. Similar to crude incidence, population standardized incidence was highest in ZIP code 92231 (Calexico) at 6,920 cases per 100,000. However, standardized incidence in ZIP codes 92227 (Brawley), 92281 (Westmorland), and 92249 (Heber) were higher than in 92243 (El Centro). Standardized cumulative incidence exceeded 2,000 cases per 100,000 in all ZIP codes but two (92257 and 92275), compared with a national average cumulative incidence of 1,060 cases per 100,000.

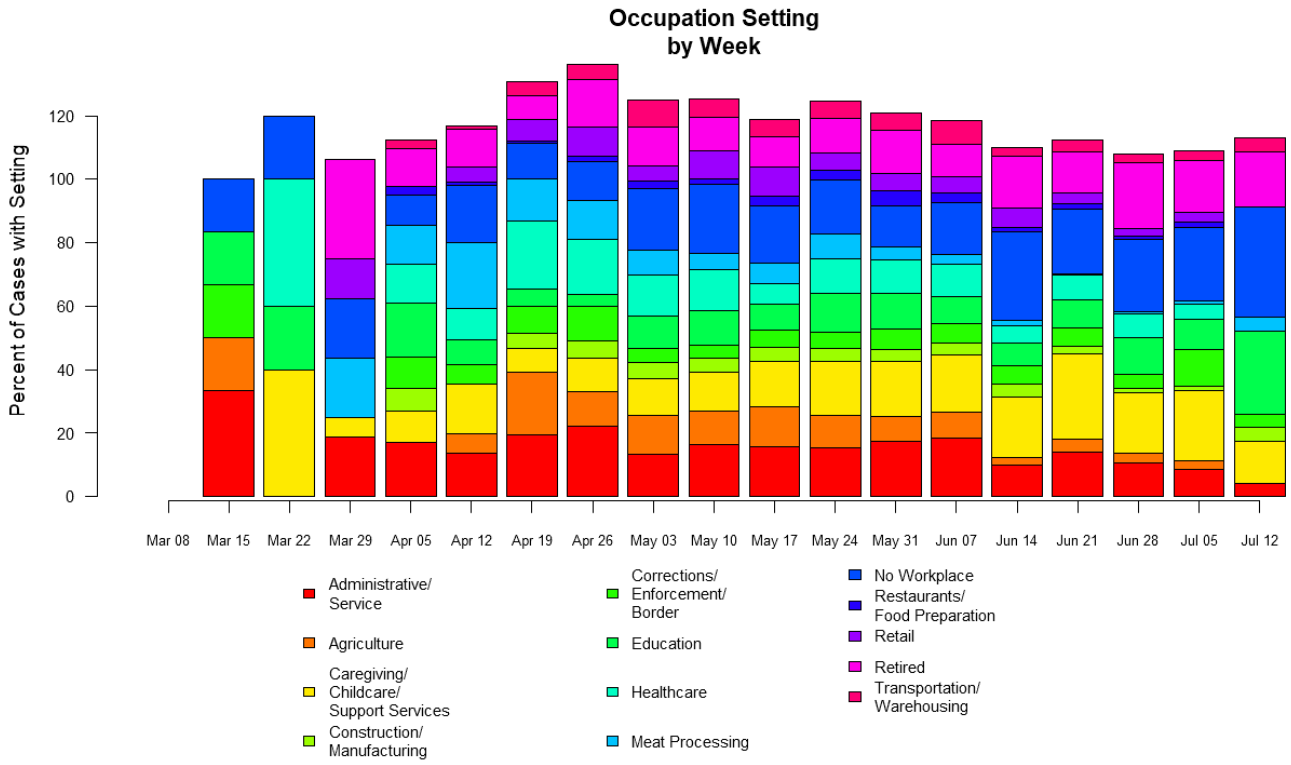


Of the 8,436 COVID-19 cases in the Imperial County database, occupational setting categories could be assigned to 4,286 cases (51%). Note: occupational setting categories were not mutually exclusive (see **Statistical and Analytical Methods** for further details). More than 60% of cases in June contained missing occupation values, while less than 10% of cases in April had missing occupation values (see **Data Completeness** for further details).

Among cases for which a category could be assigned based on occupation variable fields, a plurality (802 cases, 19%) were categorized as having No Workplace identified (739 cases identified with the term “Unemployed”). This was followed by 709 cases (17%) categorized as Caregiving/Childcare/Support Services (commonly appearing terms occupation field terms included “Disabled” – 208 cases and “Child” – 207 cases). A total of 642 cases (15%) were categorized as Administrative/Service (including 75 cases identified with the term “Assistant” and 67 cases identified with the term “Manager”). A total of 538 cases (13%) were categorized as Retired.

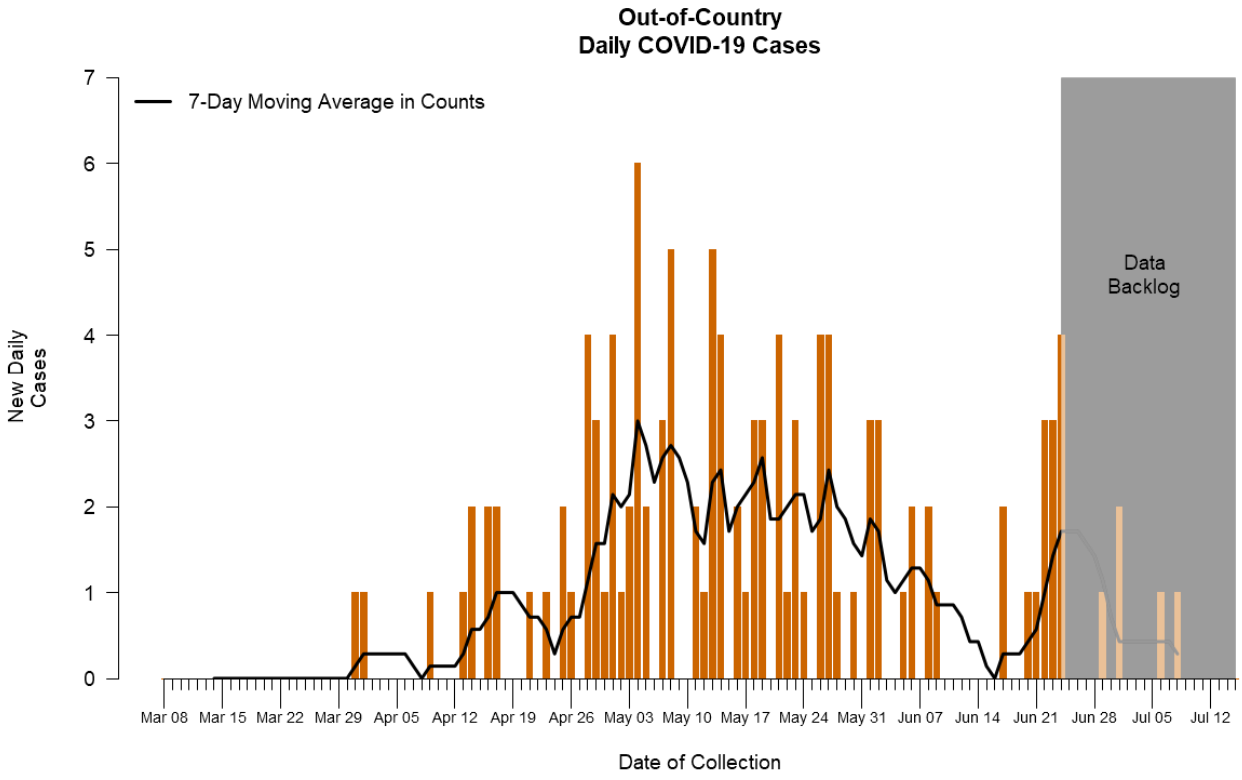


The proportion of weekly cases associated with each category was variable over time. (As these categories were not mutually exclusive, categories may sum to greater than 100% as cases occurring each week may be included in more than one category.) The proportion of incident cases associated with agriculture declined from 20% of cases with categorized occupational setting during the week of April 19 to 3% of cases during the week of July 5. By contrast, the proportion of incident cases associated with Caregiving/Childcare/Support Services increased from 7% of cases during the week of April 19 to 26% of cases during the week of June 21; this was paralleled by increases in the proportion of Retired cases from 7% to 13% during the same time period. The proportion of cases identified as having No Workplace also increased gradually over time, rising from 11% of cases with categorized occupational setting during the week of April 19 to 23% during the week of July 5.

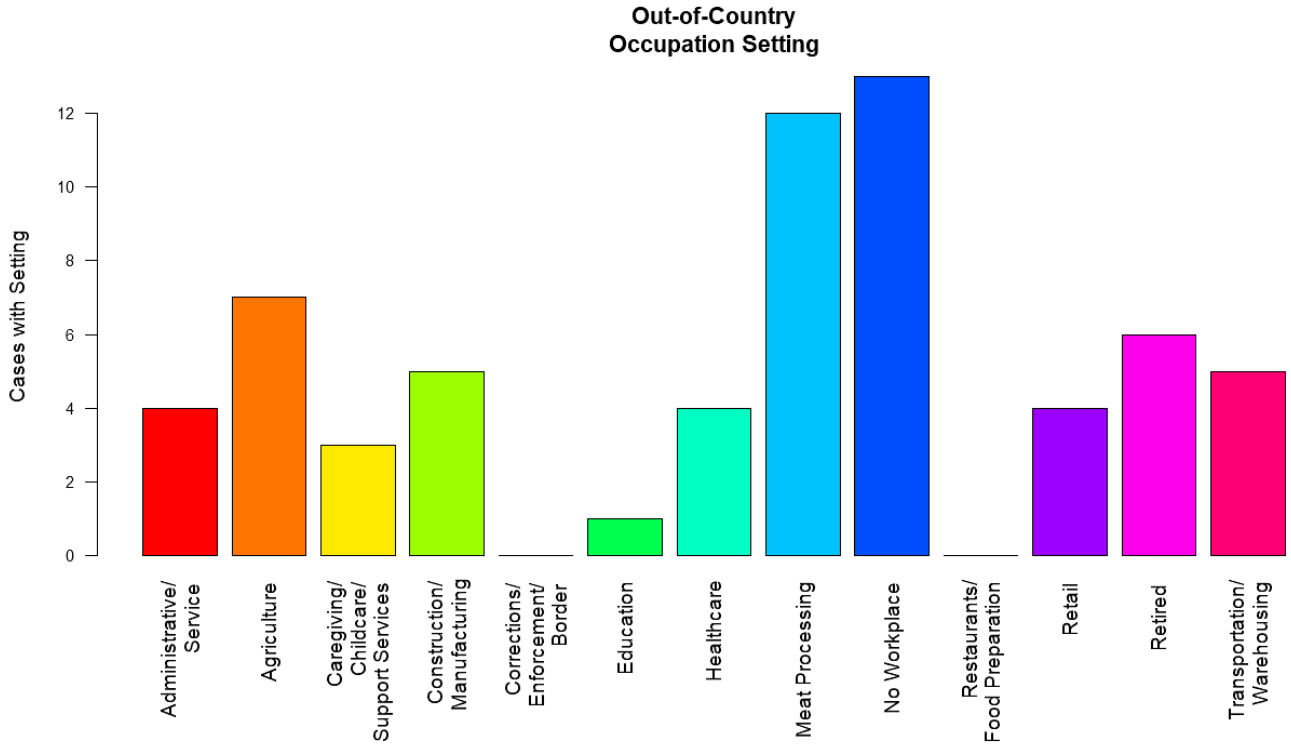

Occupation Setting
by Week
Percent of Cases with Setting
0
20
40
60
80
100
120
Mar 08
Mar 15
Mar 22
Mar 29
Apr 05
Apr 12
Apr 19
Apr 26
May 03
May 10
May 17
May 24
May 31
Jun 07
Jun 14
Jun 21
Jun 28
Jul 05
Jul 12
Administrative/ Service
Agriculture
Caregiving/ Childcare/ Support Services
Construction/ Manufacturing
Corrections/ Enforcement/ Border
Education
Healthcare
Meat Processing
No Workplace
Restaurants/ Food Preparation
Retail
Retired
Transportation/ Warehousing

Out-of-Country Cases

At the time of this analysis, the Imperial County database had identified 126 out-of-country COVID-19 cases. (See **Statistical and Analytical Methods** for details on out-of-country and travel-associated cases.) Trends in out-of-country cases appeared to precede Imperial County cases, with the greatest number of daily cases (six cases) occurring on May 4 (compared with June 1 for Imperial County cases overall). However, these trends may also reflect a declining capacity of investigators to identify out-of-country cases as Imperial County cases increased rapidly throughout May. Notably, 12 cases identified as out-of-country cases, accounting for 10% of identified out-of-country cases, were reported over a five-day period from June 20 to June 24. As data entry and investigation may be backlogged several weeks, it is unclear if this was an isolated series of cases, or if there were subsequent increases in out-of-country cases which have not yet been detected. Only three deaths were reported among out-of-country cases during the weeks of May 10, May 17, and June 28.

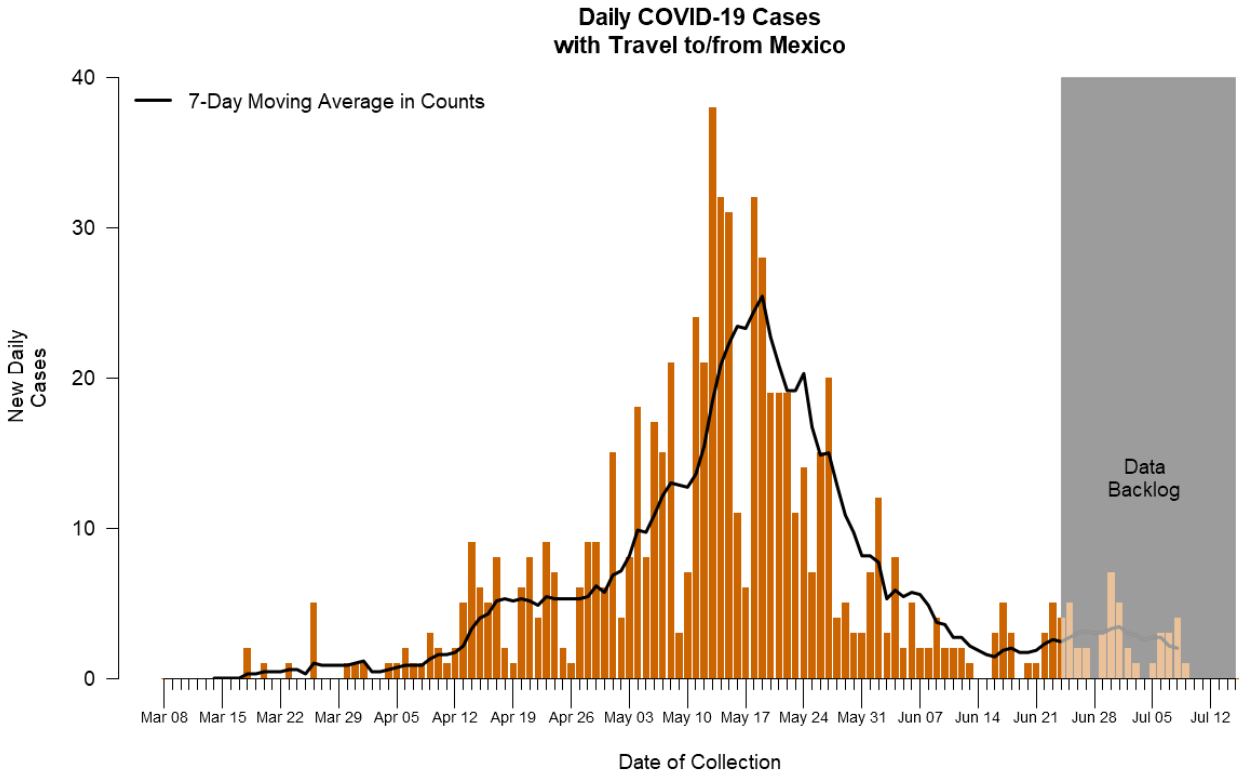


Among identified out-of-country cases, 55 cases (44%) could be categorized by occupational setting. A plurality of these, 13 cases (22%) were identified as having No Workplace; nearly as many cases, 12, were categorized in the Meat Processing occupational setting.



Cases with History of Travel to/from Mexico

In addition to the 102 identified out-of-country cases, the Imperial County database has identified 610 COVID-19 cases who reported history of travel to Mexico within 14 days of symptom onset. Combining these cases with out-of-country cases identifies 736 unique cases with travel to or from Mexico, accounting for 9% of cases in the Imperial County database. Average daily incidence of cases with a travel history to/from Mexico increased between April 28 and May 19 (from 5 daily cases to 25 daily cases, respectively), before declining rapidly (returning to 8 daily cases by June 1). This trend mirrors that of out-of-country cases. As with out-of-country cases, the rapid decline may reflect a declining capacity of investigators to ascertain travel history of cases in May and June as Imperial County cases increased.

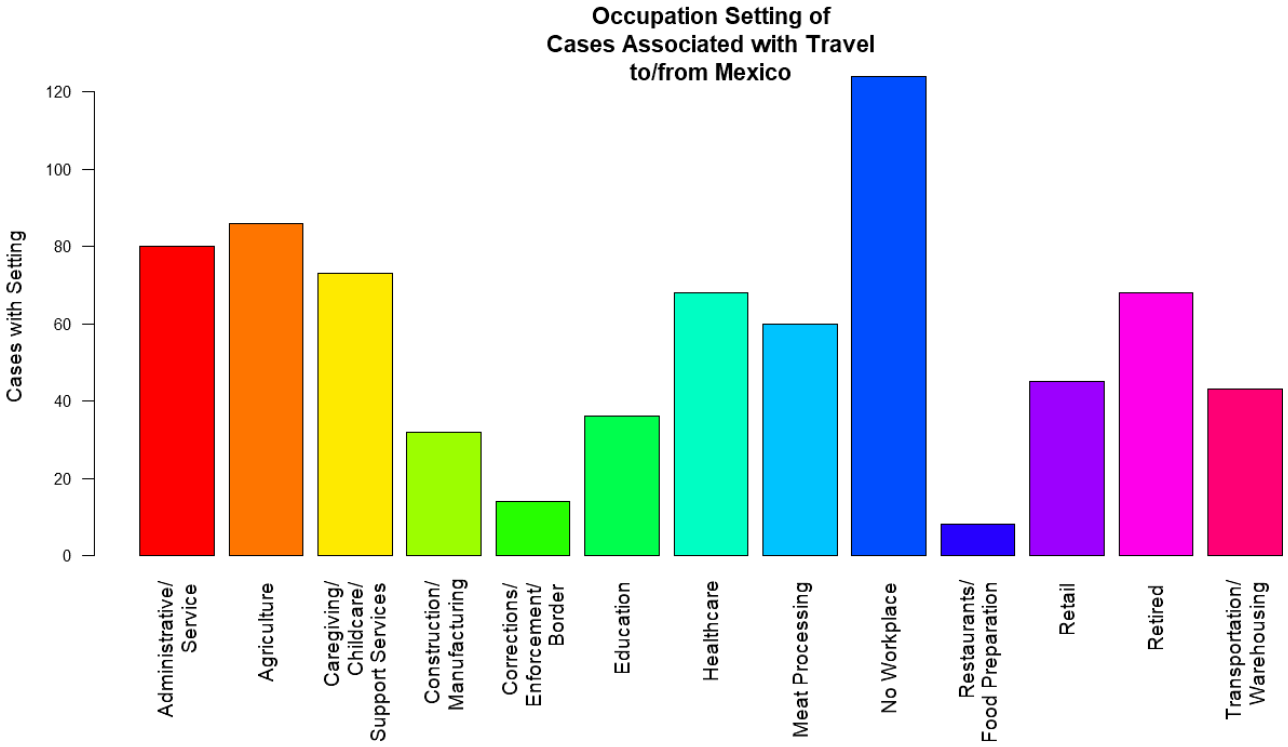


A comparison between Imperial County cases associated with travel to/from Mexico and cases reported in Mexicali reveal notable characteristics. Mexicali cases appeared to be increasing steadily from early April, while Imperial County travel cases remained at low levels. Imperial County travel case trends began increasing in mid-April, lagged several weeks behind increases in Mexicali but ahead of similar increases among Imperial County non-travel cases. Mexicali cases reached their highest daily incidence on May 21, two days after Imperial County travel cases reached their highest seven-day average daily incidence. However, Imperial County travel cases declined rapidly shortly thereafter, and by June 1 daily cases had declined 79% from the highest point. By contrast, daily cases in Mexicali remained elevated throughout May and June, with daily cases on June 30 having declined 44% from the highest point. As stated above, low numbers of Imperial County cases identified as associated with travel to/from Mexico in June may reflect either substantial reductions in incidence or a reduction in the capacity for investigators to identify or evaluate cases' travel histories.

A total of 27 deaths were among cases with travel to/from Mexico and occurred between April 20 and July 5. A plurality of cases with a travel history to/from Mexico were reported from ZIP code 92231 (Calexico, 329 cases, 45%) followed by ZIP code 92243 (El Centro, 170 cases, 24%). When standardized for population,

cumulative cases per 100,000 population was still notably higher in this ZIP code (842 cases per 100,000) than elsewhere in Imperial County.

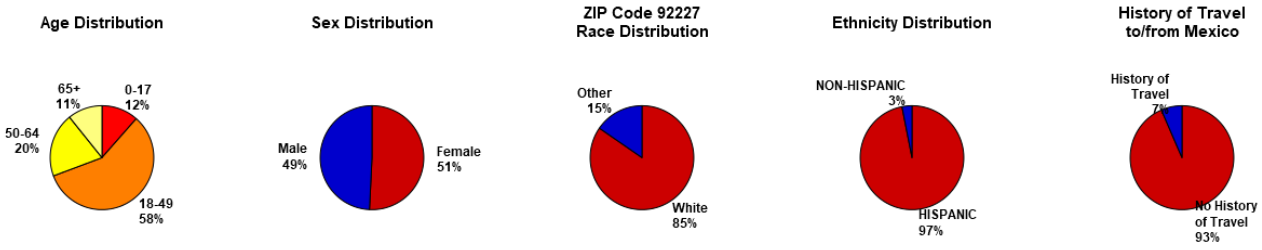
Among cases with a travel history to/from Mexico, most (594 cases, 81%) could be categorized by occupational setting; this is notably higher than the proportion of all Imperial County cases that could be categorized (51%; see **Imperial County Cases** for more details). Among those that could be categorized, a plurality (124 cases, 21%) were categorized as having No Workplace. This was followed by the number of cases associated with Agriculture (86 cases, 14%).



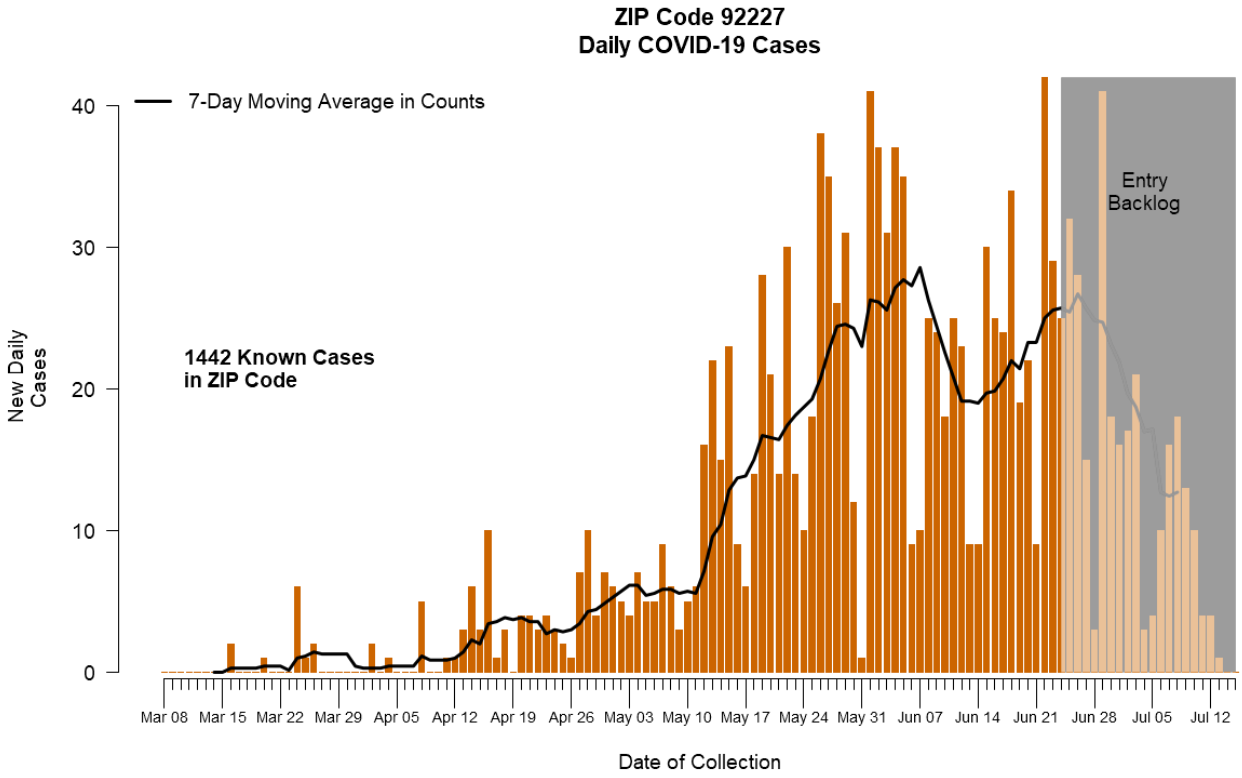
Imperial County – Cases by ZIP Code

The following sections provide summaries of cases reported from different ZIP codes within Imperial County. Each section presents demographic, temporal, and occupational setting information of cases reported from the ZIP code. Upon review, it was determined that a majority of ZIP codes contain relatively few cases, limiting inference about cases within the ZIP code. The sections below highlight any ZIP code from which 300 cases or more have been reported.

ZIP Code 92227



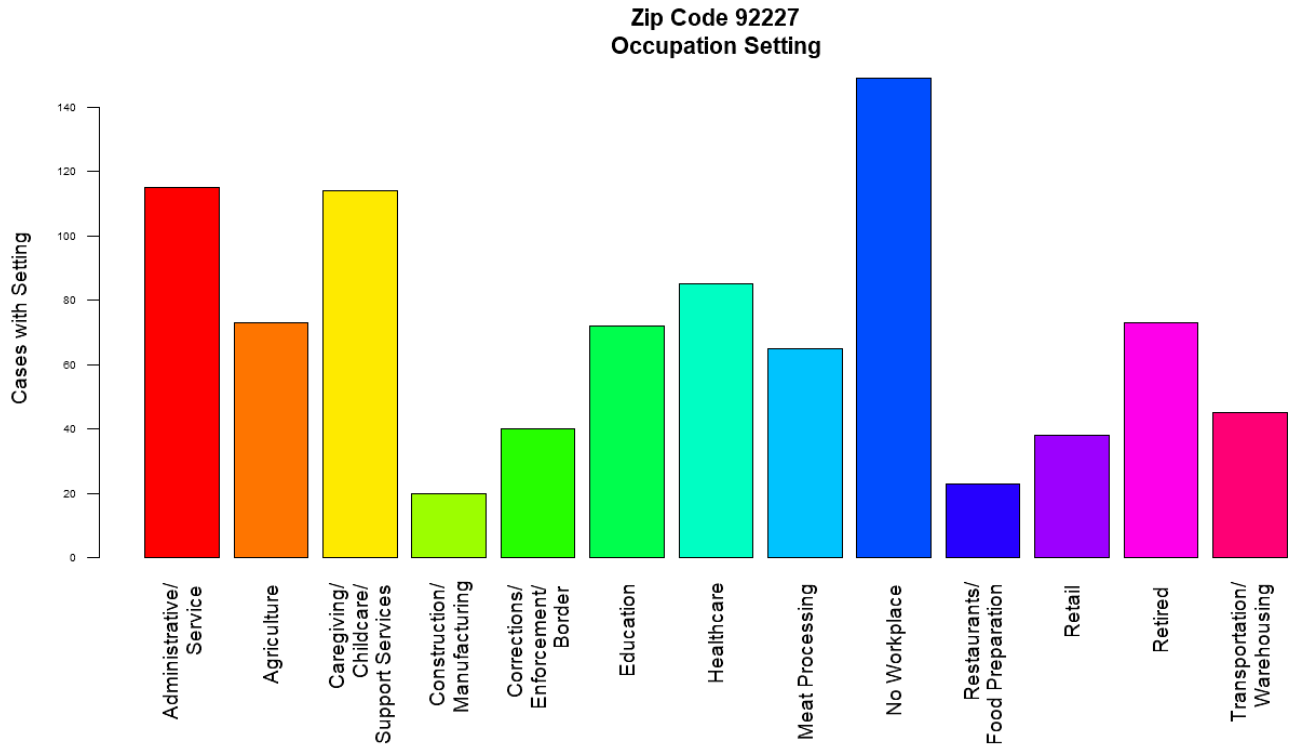
ZIP Code 92227 generally comprises the geographic area including and surrounding Brawley, CA. At the time of analysis, a total of 1,442 cases had been reported from this ZIP code. Roughly, half of cases were under 40 years of age, a slight majority of cases were female, and roughly one-tenth of cases were associated with travel to/from Mexico. These demographics largely reflect those of Imperial County cases overall.

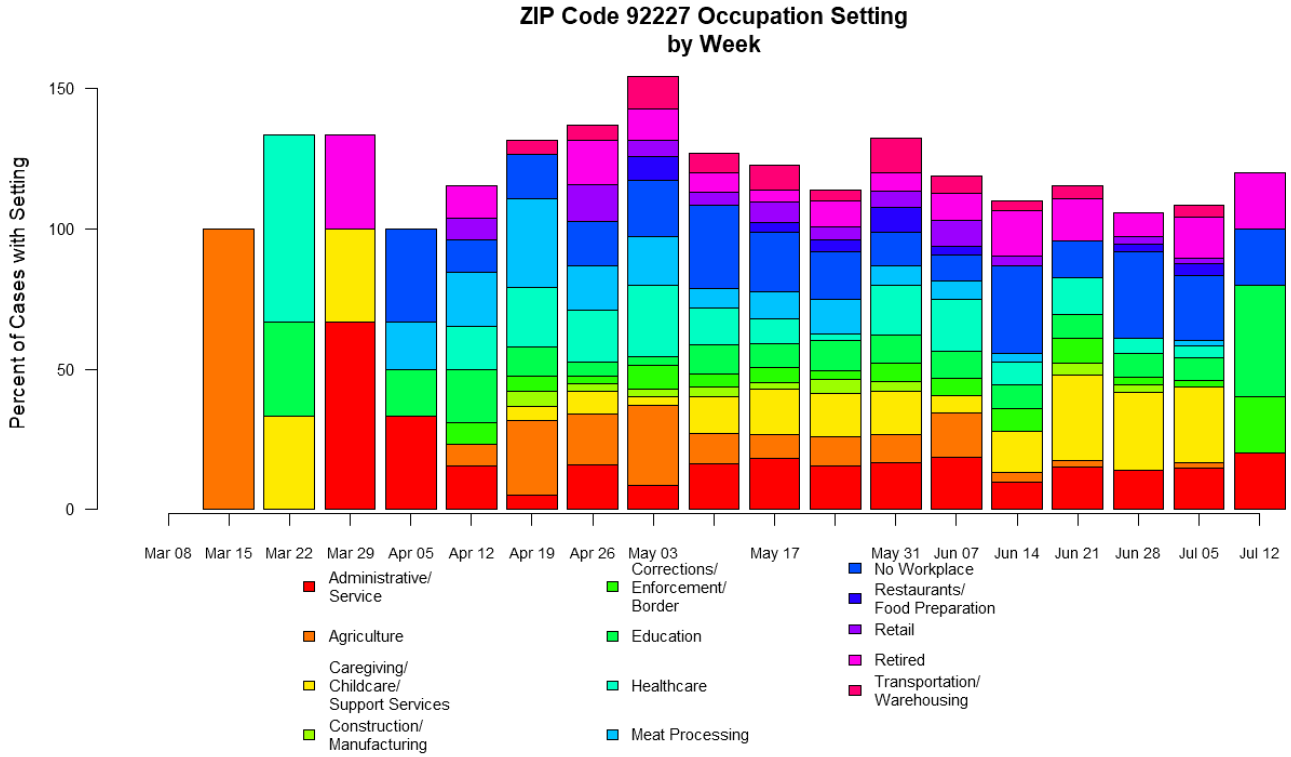


The earliest identified case occurred during the week of March 15. Daily cases increased rapidly beginning the week of May 10 and continuing through the week of May 31, rising from a daily average of 6 cases

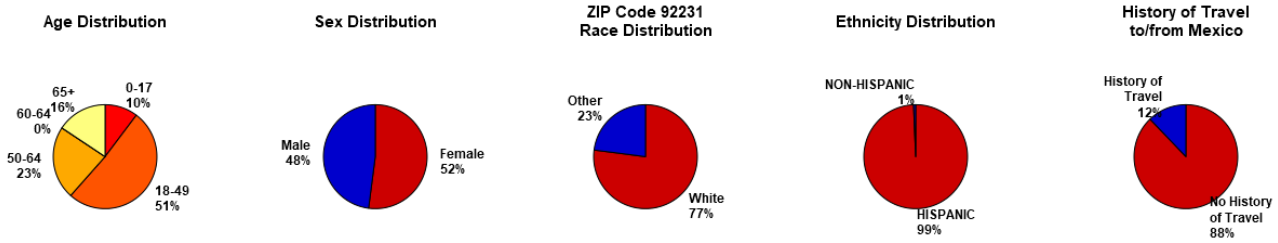
to 30 cases per day. The greatest number of average daily cases was reported on June 22. A total of 16 deaths have been reported from this ZIP code.

Among cases which could be categorized by occupational setting, a plurality was categorized as having No Workplace. This was followed by cases which were categorized as Administrative/Service. Temporal trends in occupational setting did not exhibit notable trends.

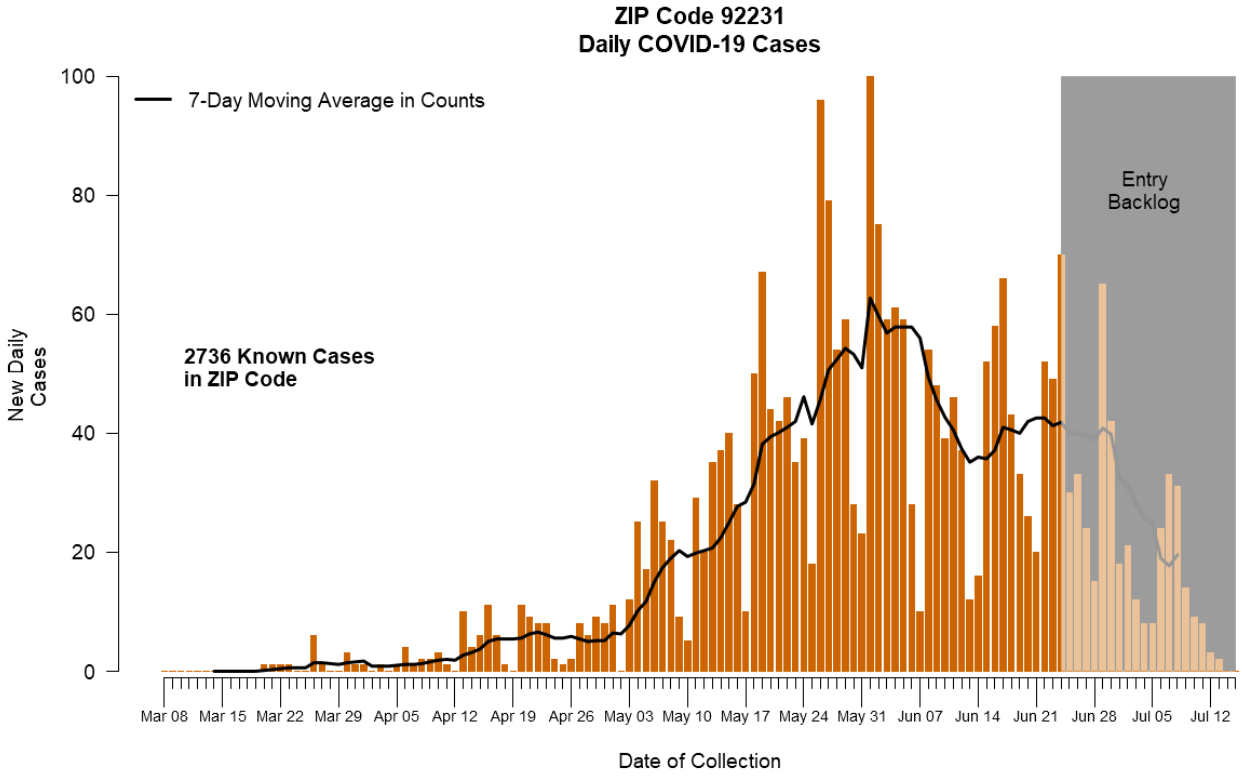




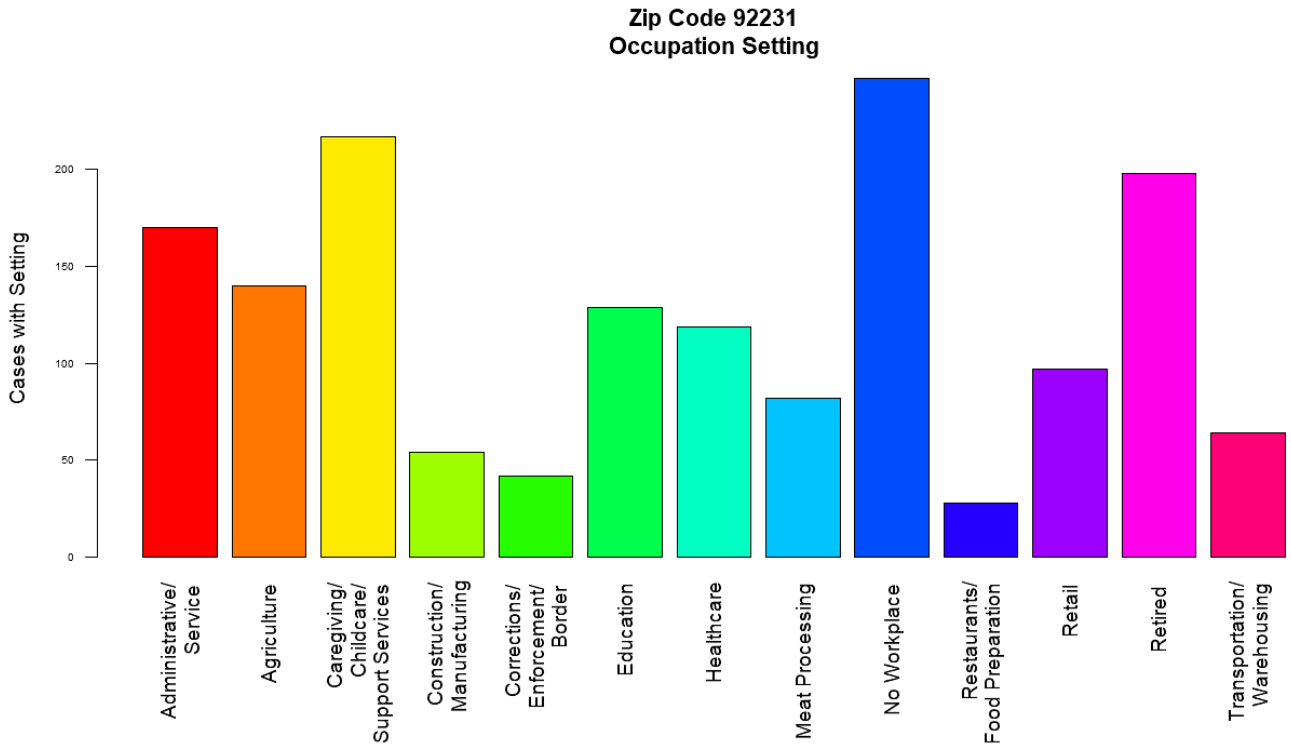
ZIP Code 92231



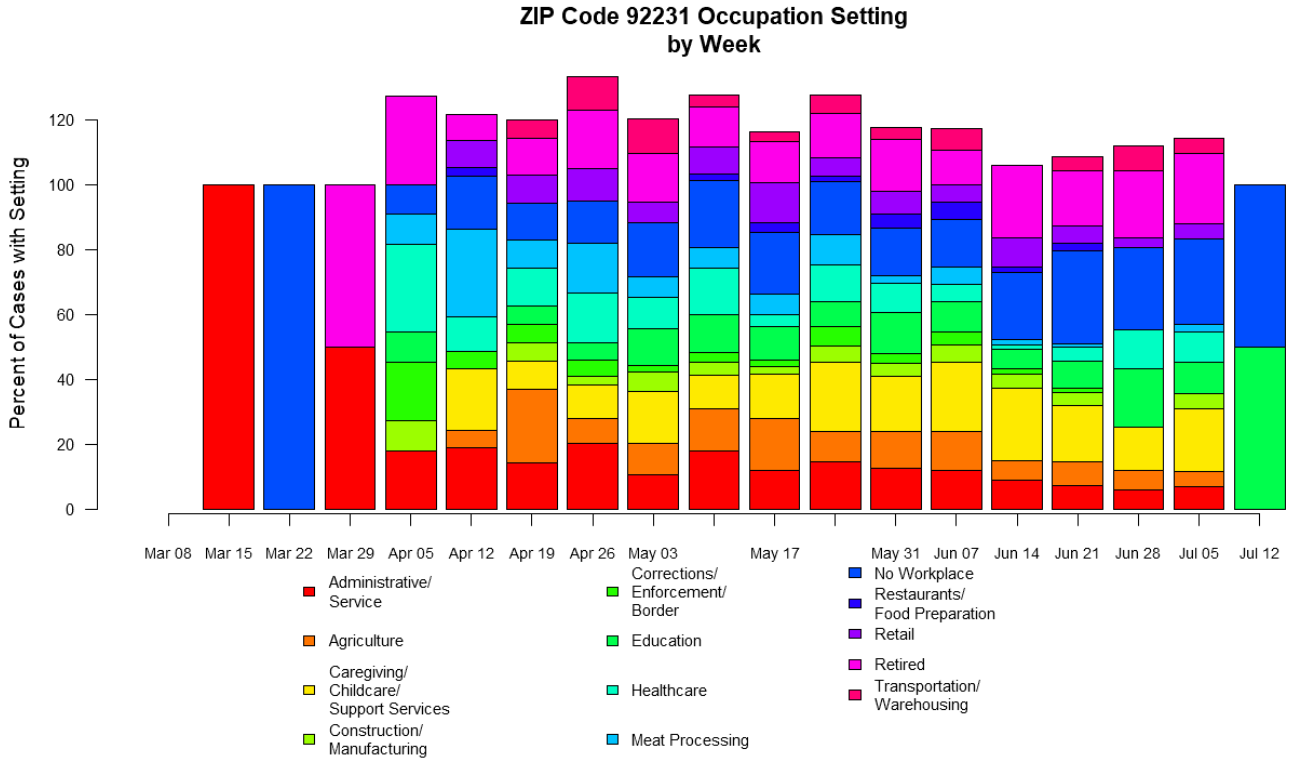
ZIP Code 92331 generally comprises the geographic area including and surrounding Calexico, CA. At the time of analysis, a total of 2,736 cases had been reported from this ZIP code, the greatest number of cases from any ZIP code. Roughly half of cases were under 40 years of age, a slight majority of cases were female, and roughly one-tenth of cases were associated with travel to/from Mexico.



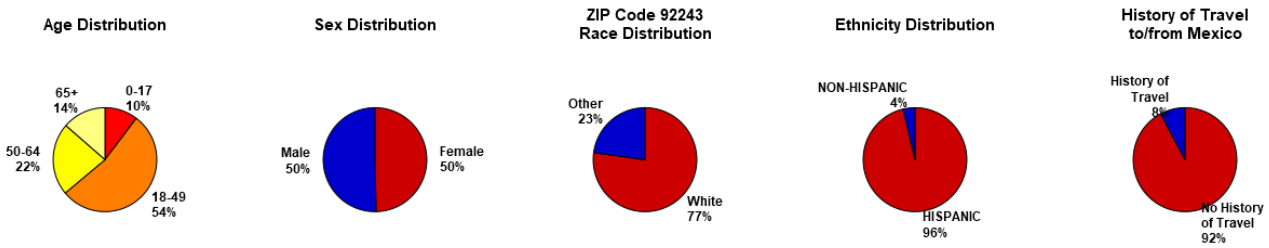
The earliest identified case occurred during the week of March 15. Daily cases increased rapidly beginning the week of May 3 and continuing through the week of May 31, rising from a daily average of 8 cases to 65 cases per day. The greatest number of average daily cases was reported on June 1. A total of 59 deaths have been reported from this ZIP code.



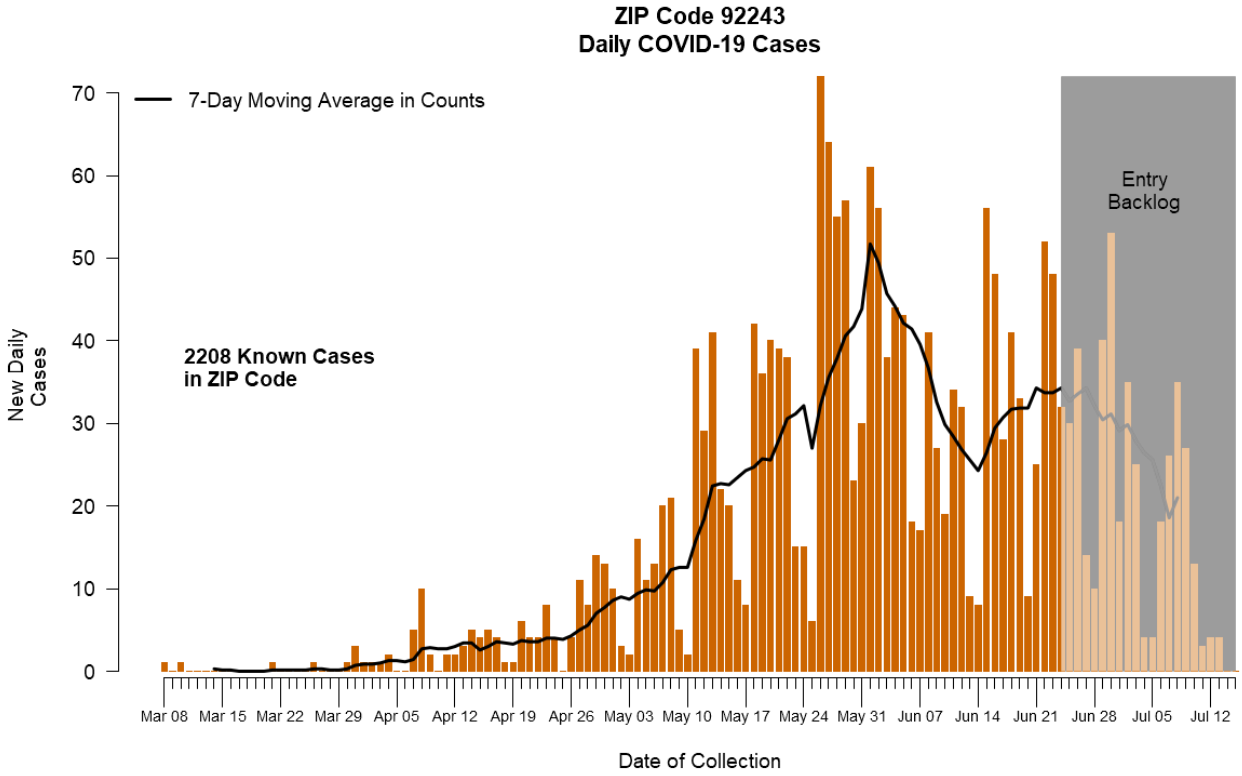
Among cases which could be categorized by occupational setting, a plurality was categorized as having No Workplace. This was followed by cases which were categorized as Caregiving/Childcare/Support Services. Temporal trends in occupational setting did not exhibit notable trends with one exception: the proportion of cases categorized as having No Workplace has increased substantially from 15% of categorized cases during the week of April 5 to 26% during the week of July 5. This parallels the same trend in Imperial County cases overall.



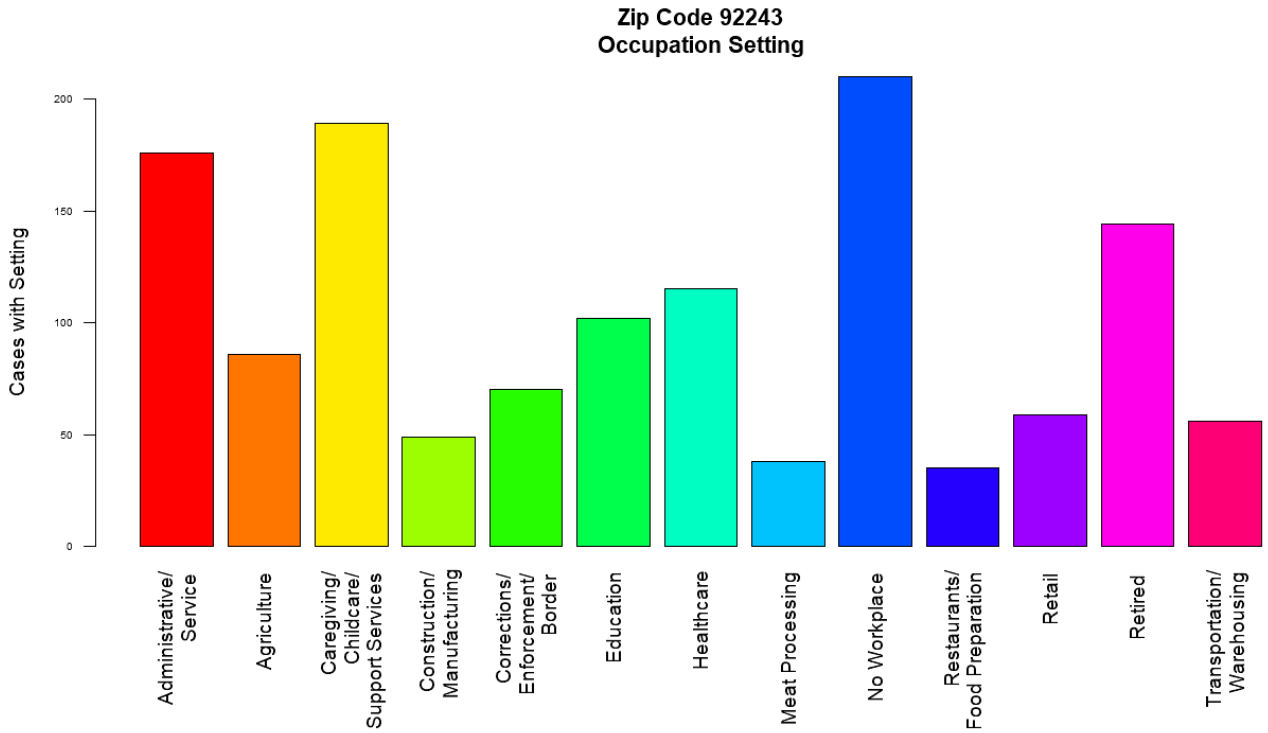
ZIP Code 92243



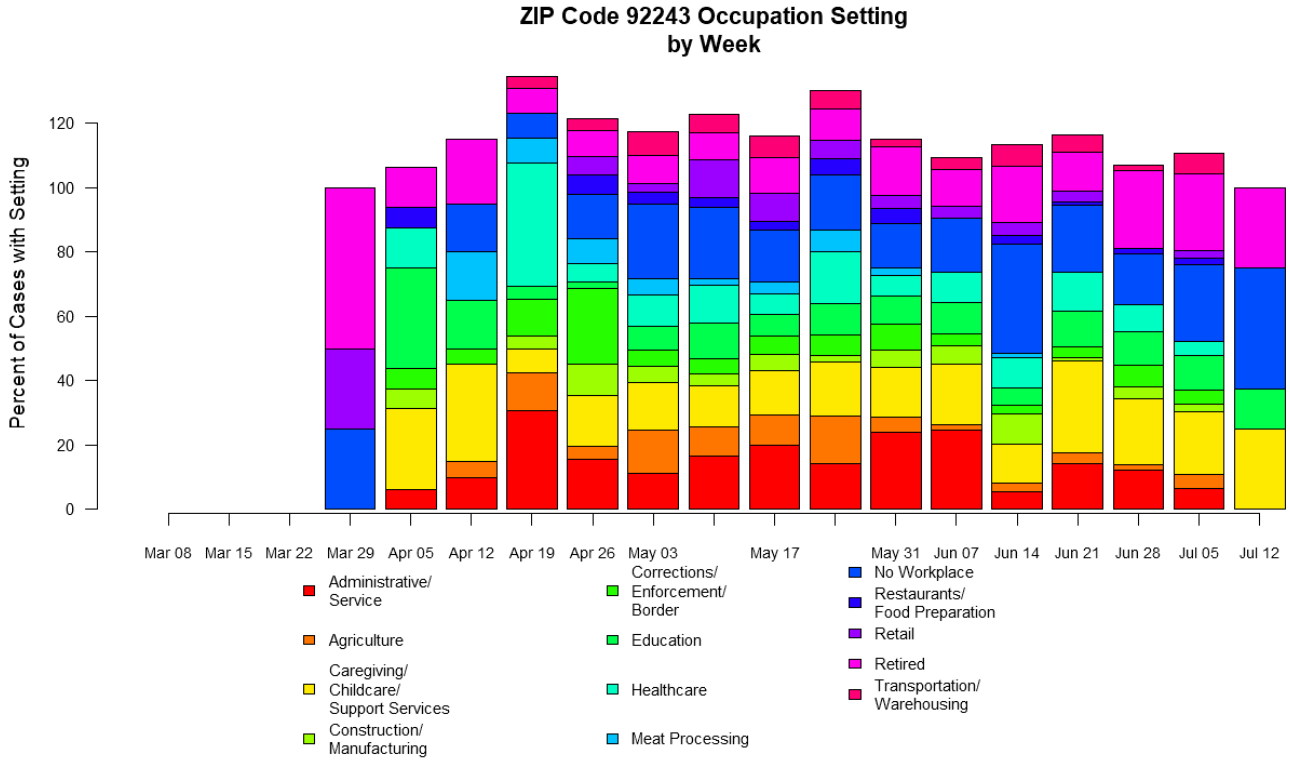
ZIP Code 92243 generally comprises the geographic area including and surrounding El Centro, CA. At the time of analysis, a total of 2,208 cases had been reported from this ZIP code. Roughly half of cases were aged 20- 49 years, half of cases were female, and roughly one-tenth of cases were associated with travel to/from Mexico.



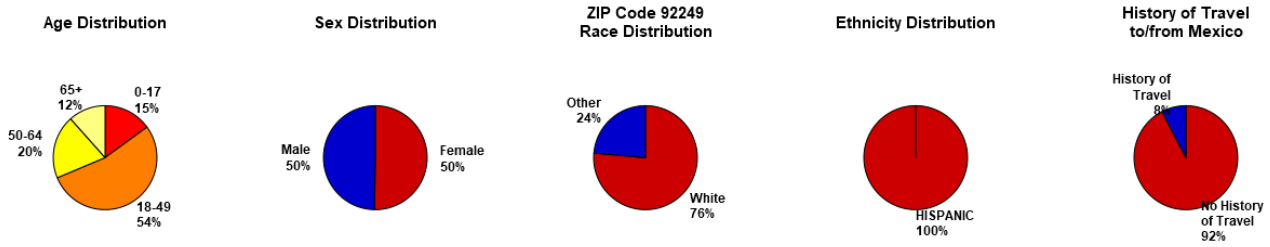
The earliest identified case occurred during the week of March 15. Daily cases increased gradually beginning the week of April 6 and accelerating more rapidly beginning the week of May 10. The greatest number of average daily cases was reported on June 1. A total of 46 deaths have been reported from this ZIP code.



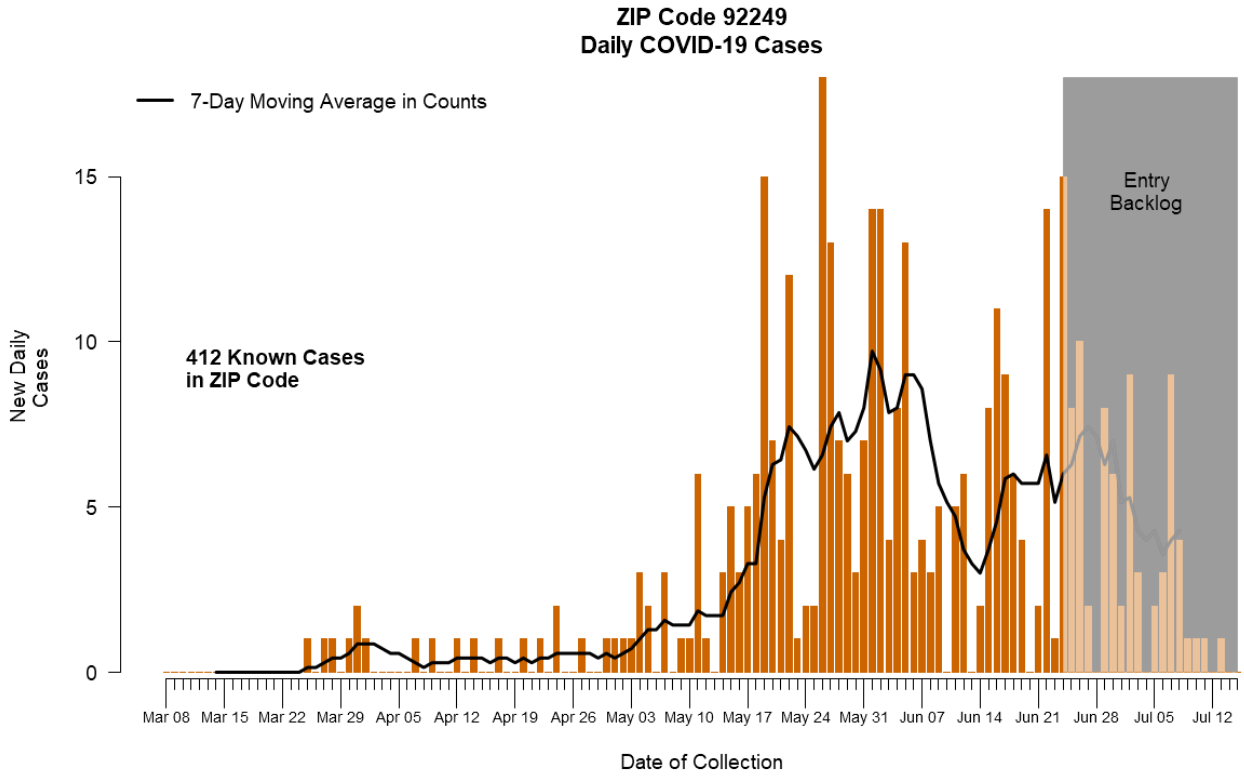
Among cases which could be categorized by occupational setting, a plurality was categorized as having No Workplace. This was followed by cases which were categorized as Administrative/Service. Over time, the proportion of cases categorized as Caregiving/Childcare/Support Services, Retired, and as having No Workplace all appear to be increasing as a fraction of all cases, while those categorized as Administrative/Service have been decreasing.



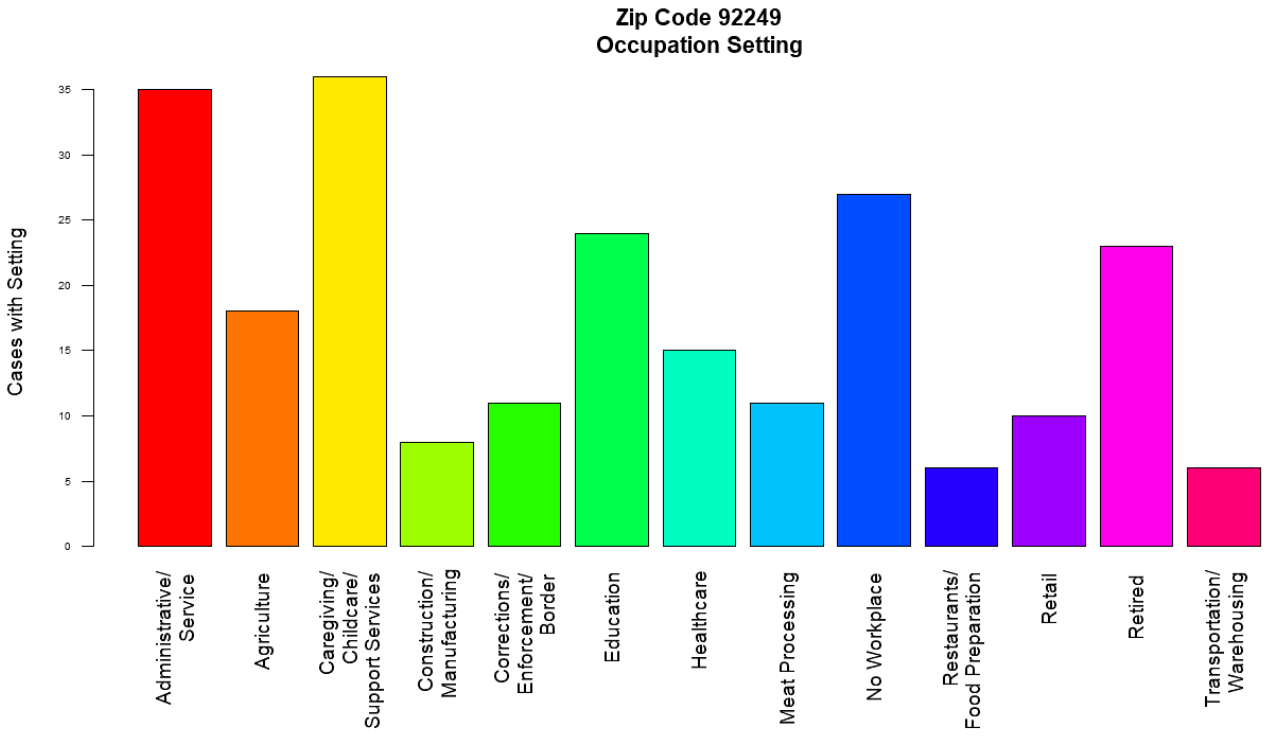
ZIP Code 92249



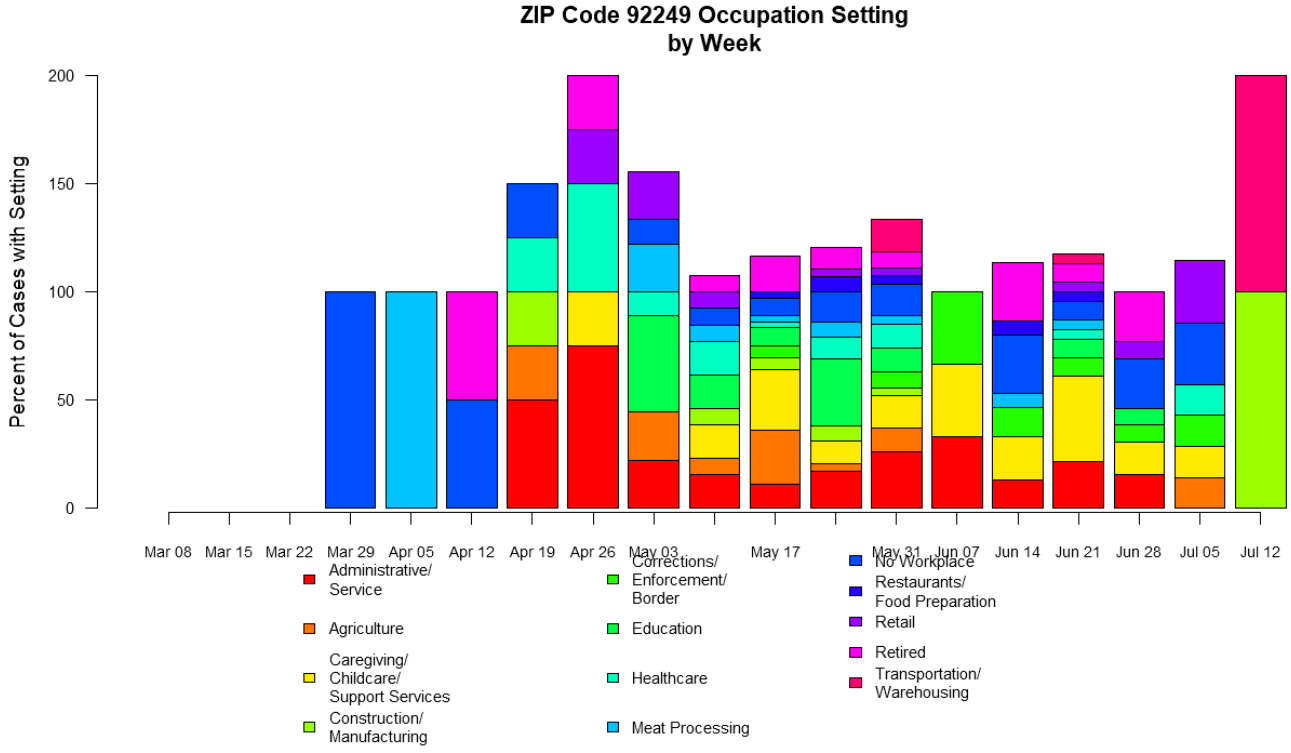
ZIP Code 92249 generally comprises the geographic area including and surrounding Heber, CA. At the time of analysis, a total of 412 cases had been reported from this ZIP code. Roughly half of cases were aged 20- 49 years, half of cases were female, and roughly one-tenth of cases were associated with travel to/from Mexico.



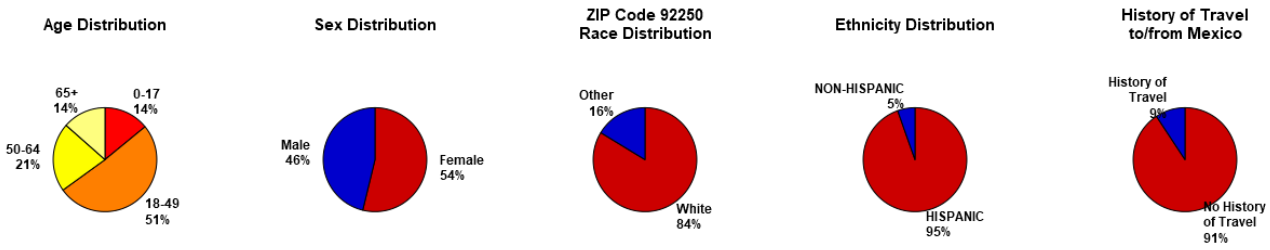
The earliest identified case occurred during the week of March 22. Daily cases increased rapidly beginning the week of May 10 and continuing through the week of May 31, rising from a daily average of 2 cases to 10 cases per day. The greatest number of average daily cases was reported on June 2. A total of 4 deaths have been reported from this ZIP code.



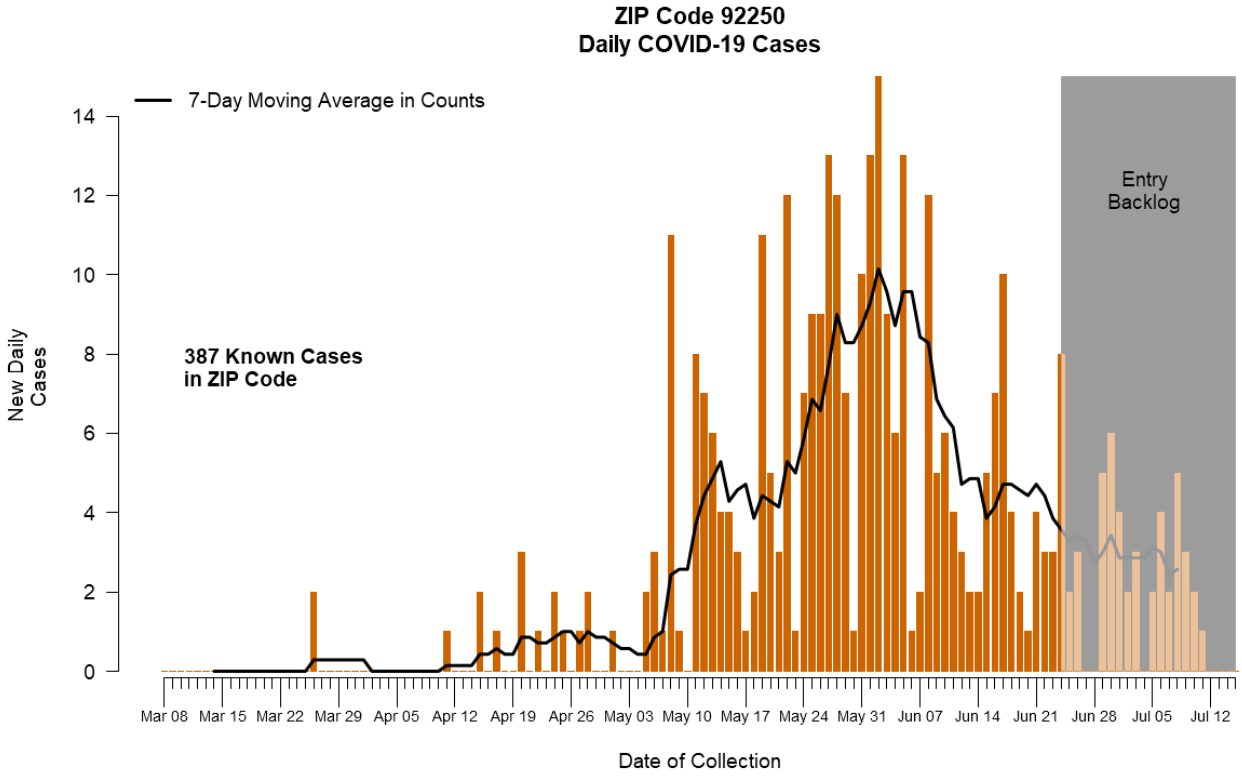
Among cases which could be categorized by occupational setting, a plurality was categorized as Administrative/Service and Caregiving/Childcare/Support Services. This ZIP code is notable for having relatively fewer categorized as Retired or as having No Workplace compared to Imperial County overall. Temporal trends in occupational setting did not exhibit notable trends.



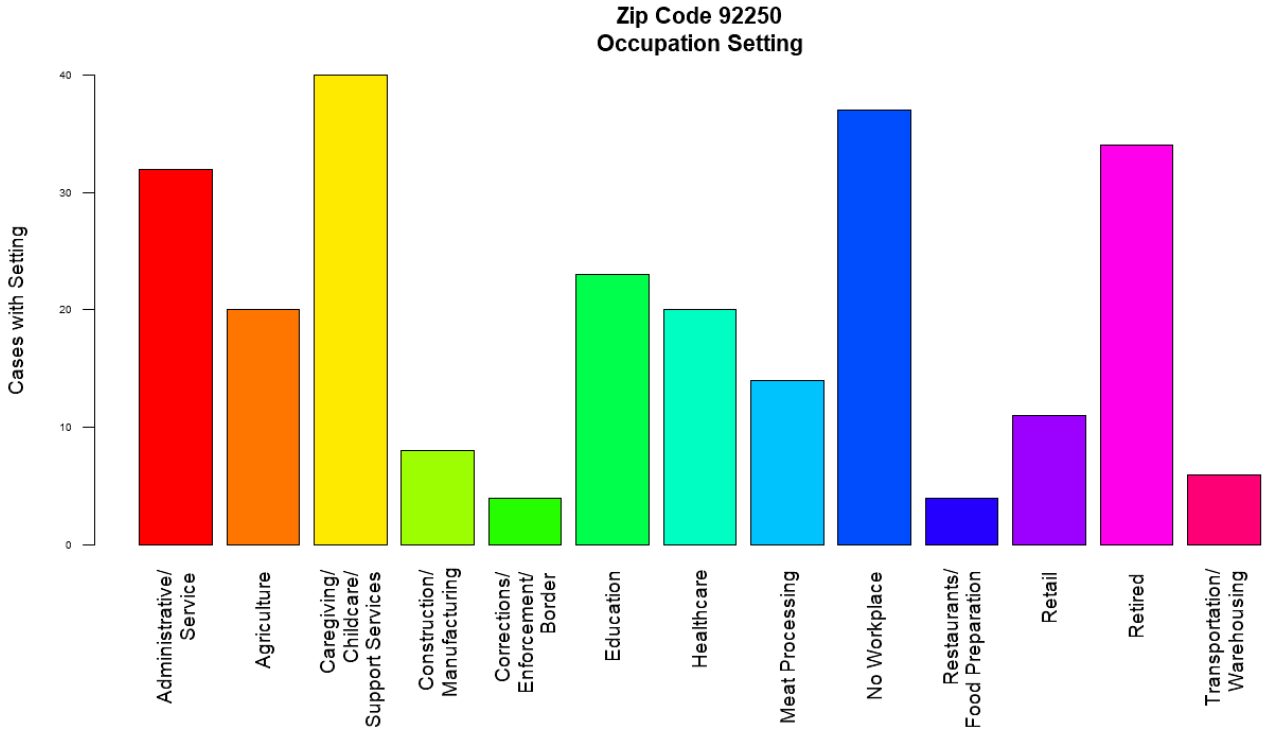
ZIP Code 92250



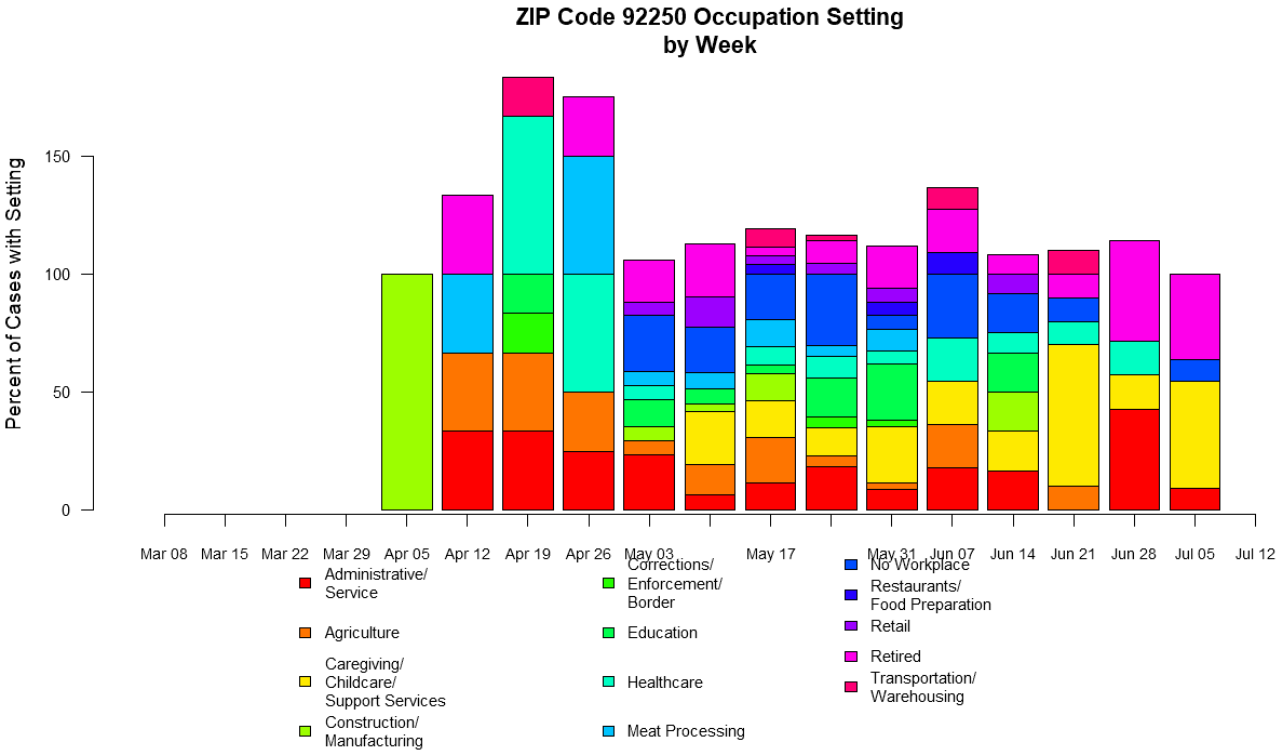
ZIP Code 92250 generally comprises the geographic area surrounding Holtville, CA. At the time of analysis, a total of 387 cases had been reported from this ZIP code. Roughly half of cases were aged 20-49 years, a slight majority of cases were female, and roughly one-tenth of cases were associated with travel to/from Mexico.



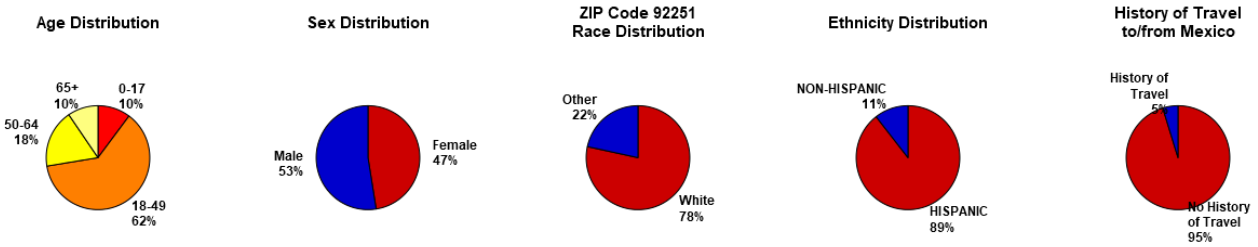
The earliest identified case occurred during the week of March 22. Daily cases increased rapidly beginning the week of May 3 but fell the following week. The greatest number of average daily cases was reported on June 2. A total of 10 deaths have been reported from this ZIP code.



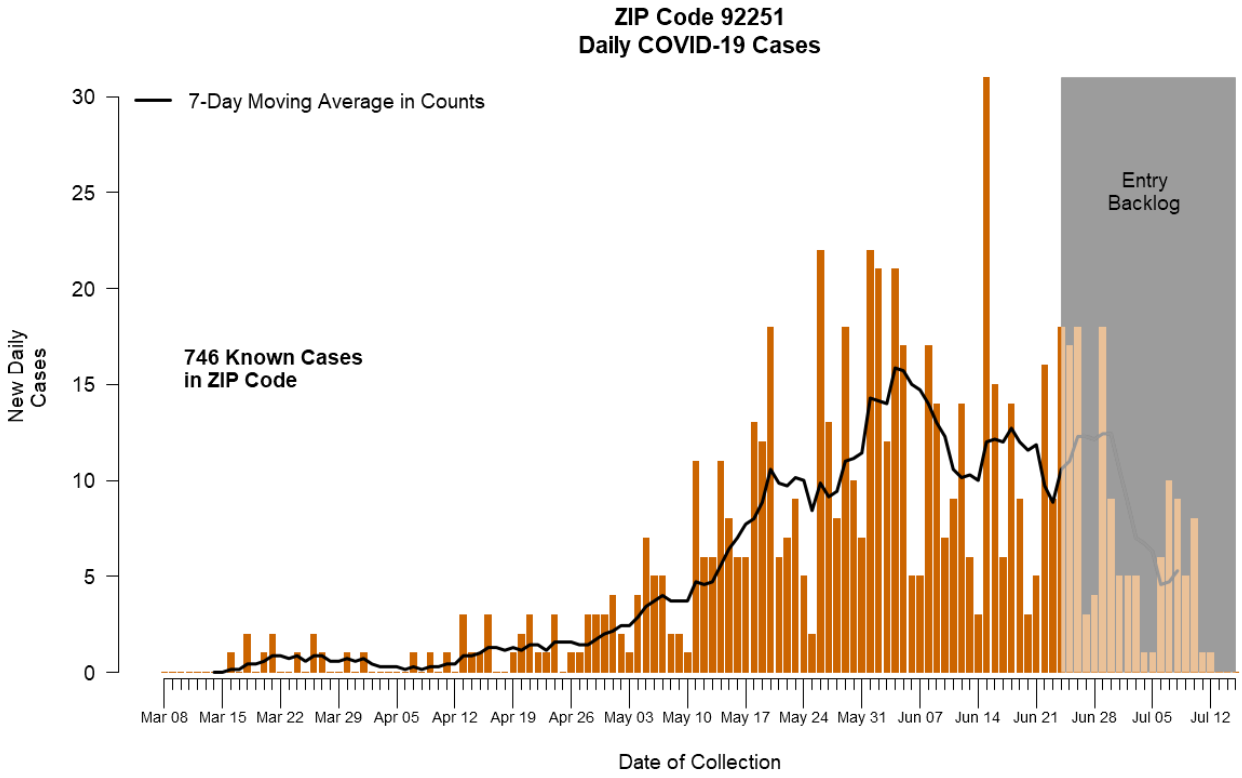
Among cases which could be categorized by occupational setting, a plurality was categorized as Caregiving/Childcare/Support Services. This was followed by cases which were categorized as having No Workplace. Over time, trends in cases categorized in different occupational settings are somewhat noisy. The proportions of cases which could be categorized as Retired or in Caregiving/Childcare/Support Services have increased over time. These trends are consistent with trends observed for Imperial County overall. Additionally, the proportion of cases categorized as having No Workplace may be decreasing over time (the reverse of Imperial County overall).



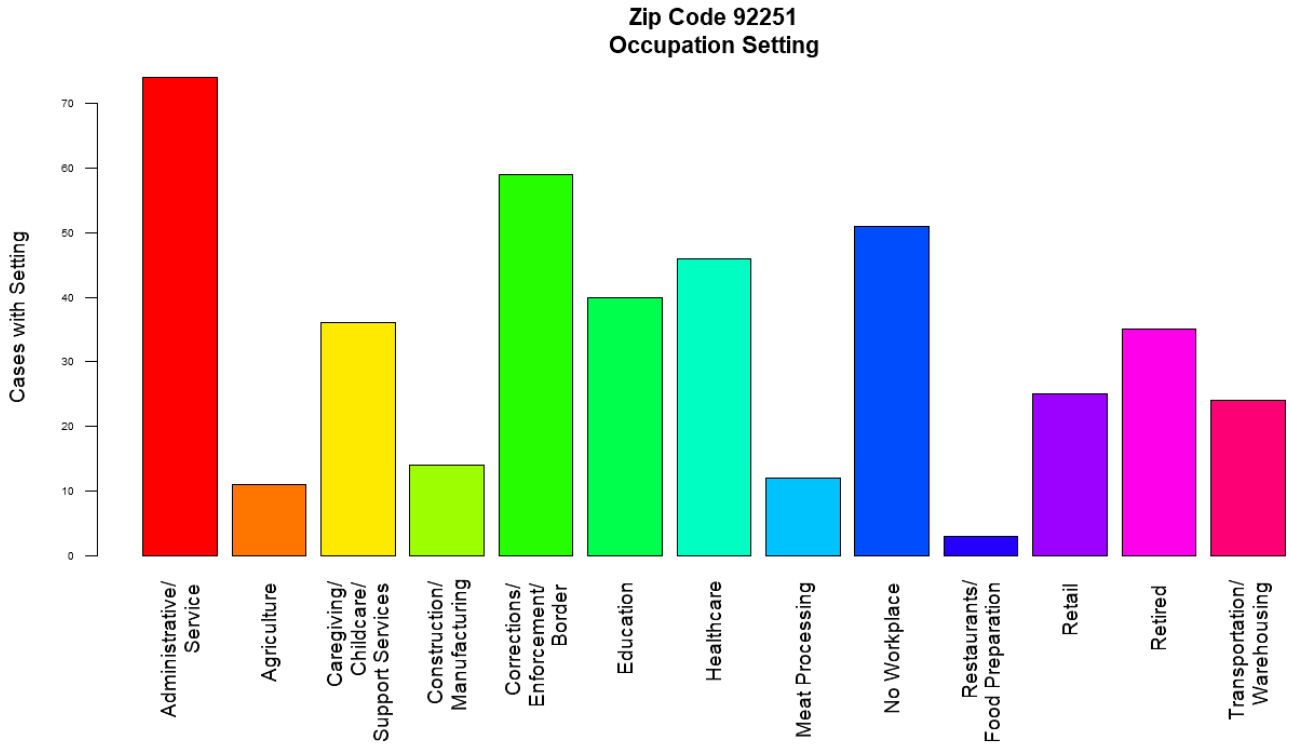
ZIP Code 92251



ZIP Code 92251 generally comprises the geographic area including and surrounding Imperial, CA. At the time of analysis, a total of 746 cases had been reported from this ZIP code. Roughly half of cases were aged 20- 49 years, a slight majority of cases were male, and only 5% of cases were associated with travel to/from Mexico.



The earliest identified case occurred during the week of March 15. Daily cases increased gradually beginning the week of April 26 and accelerating the week of May 10. The greatest number of average daily cases was reported on June 4. These data suggest that trends in case incidence in this ZIP code was preceded by increases in other Imperial County ZIP codes. A total of 11 deaths have been reported from this ZIP code.



Among cases which could be categorized by occupational setting, a plurality was categorized as Administrative/Service. This ZIP code is notable for having relatively fewer categorized as Retired or as having No Workplace (compared to Imperial County overall). Temporal trends in occupational setting did not exhibit notable trends, although the proportion of cases categorized as Administrative/Service may be decreasing slightly over time.