Maricopa COVID vaccination Data Analysis Report

Question 1:

How do the vaccination totals between age groups compare?

Pretty plot for question 1:

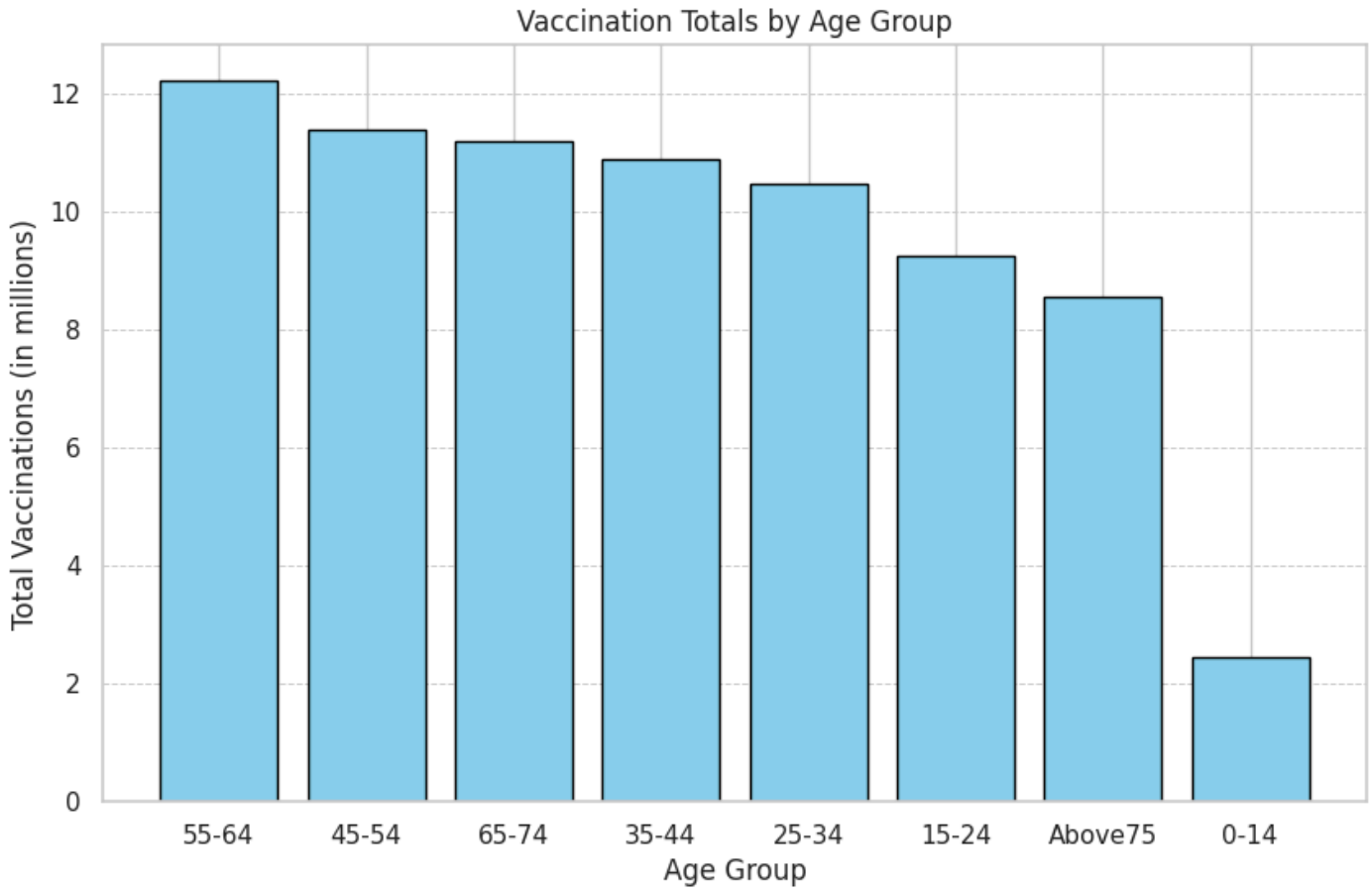
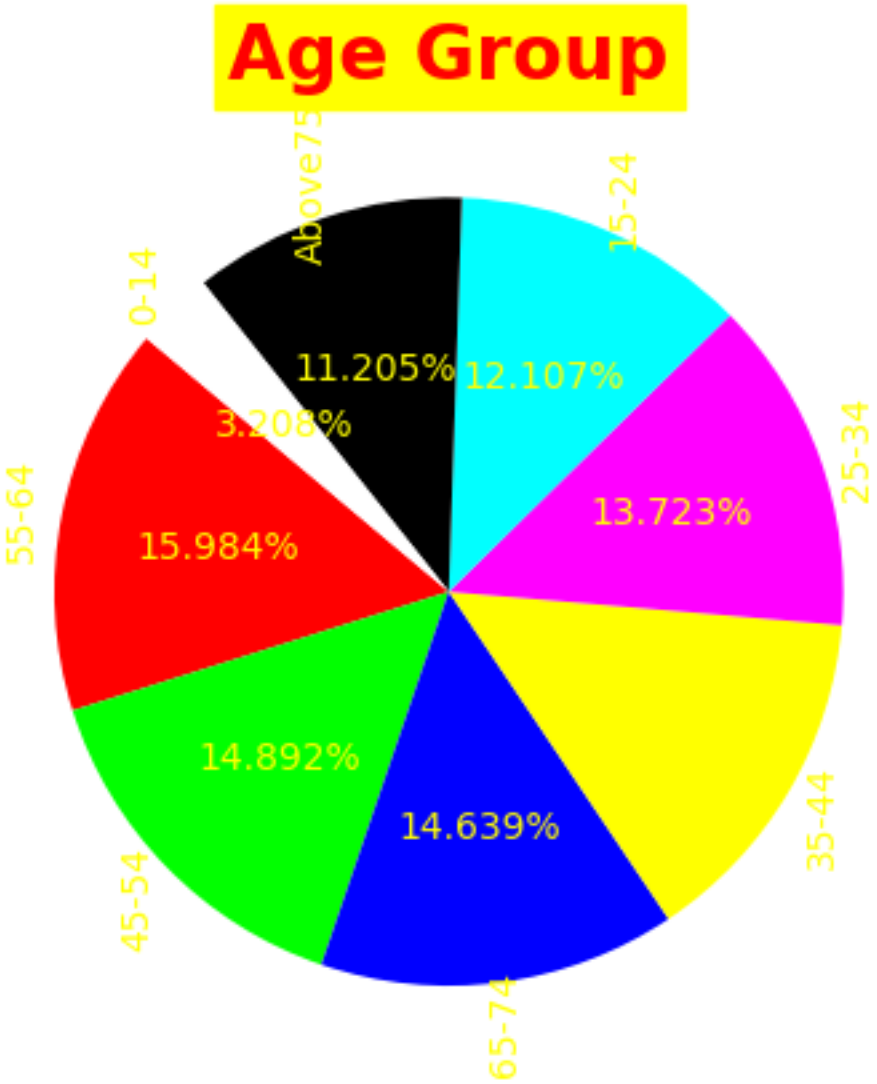


Figure 1. Total COVID Vaccinations Administered by Age Group in Maricopa county: This bar chart illustrates the distribution of vaccinations across various age groups, highlighting that the 55-64 years age group received the highest number of vaccinations, followed by the 45-54 years age group. Notably, the 0-14 age group had the lowest vaccination totals. Y axis shows Total vaccinations (in millions).

Ugly plot for question 1:

The chart shows the number of vaccinations given to various age groups, with the 55-64 years old age group get many vaccinations and the age group 0-14 years having the less vaccinations.
The chart represents the total number of vaccinations in millions of vaccinations.



Question 2:

How have the average vaccination totals changed over time in Maricopa County?

Pretty plot for question 2:

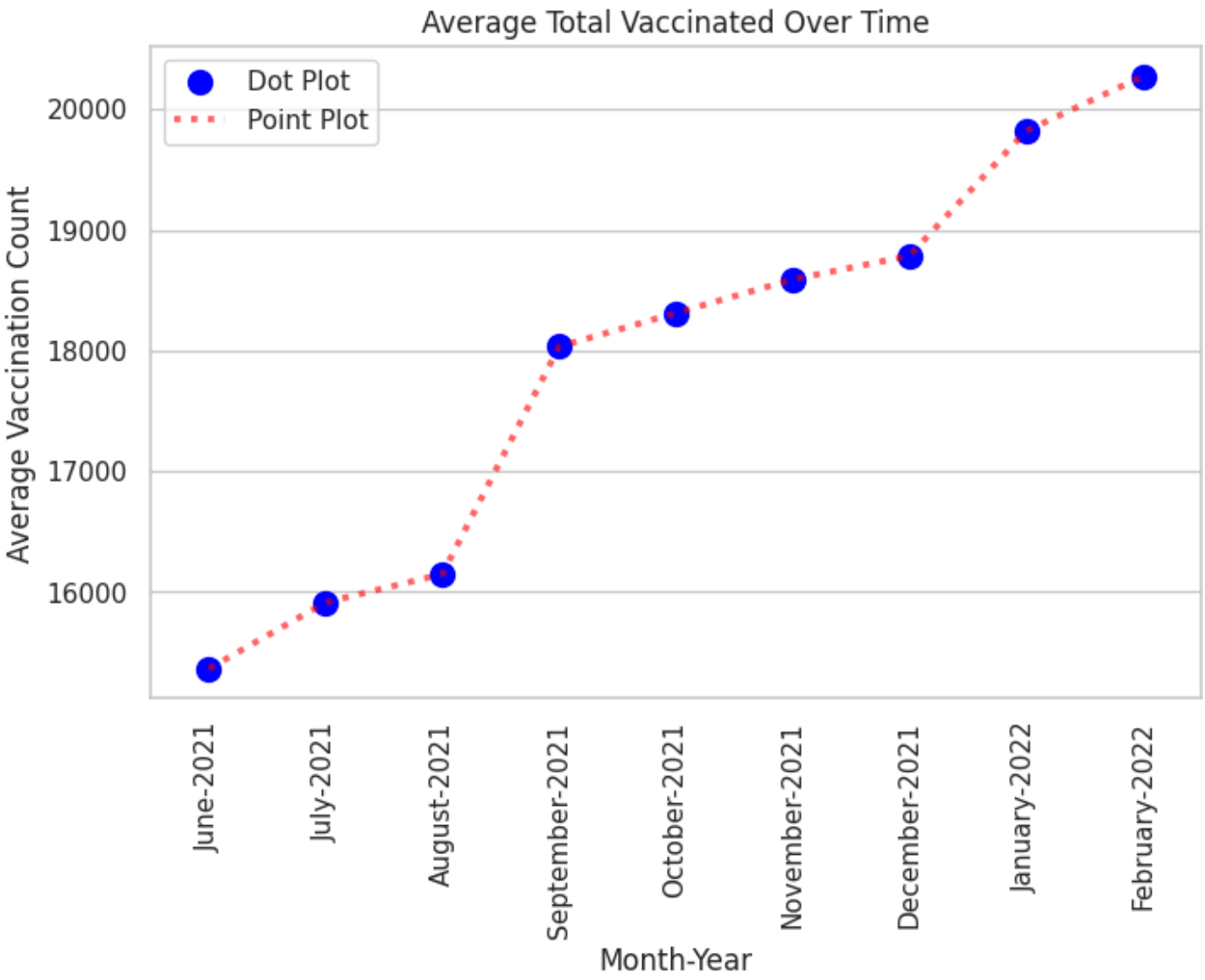
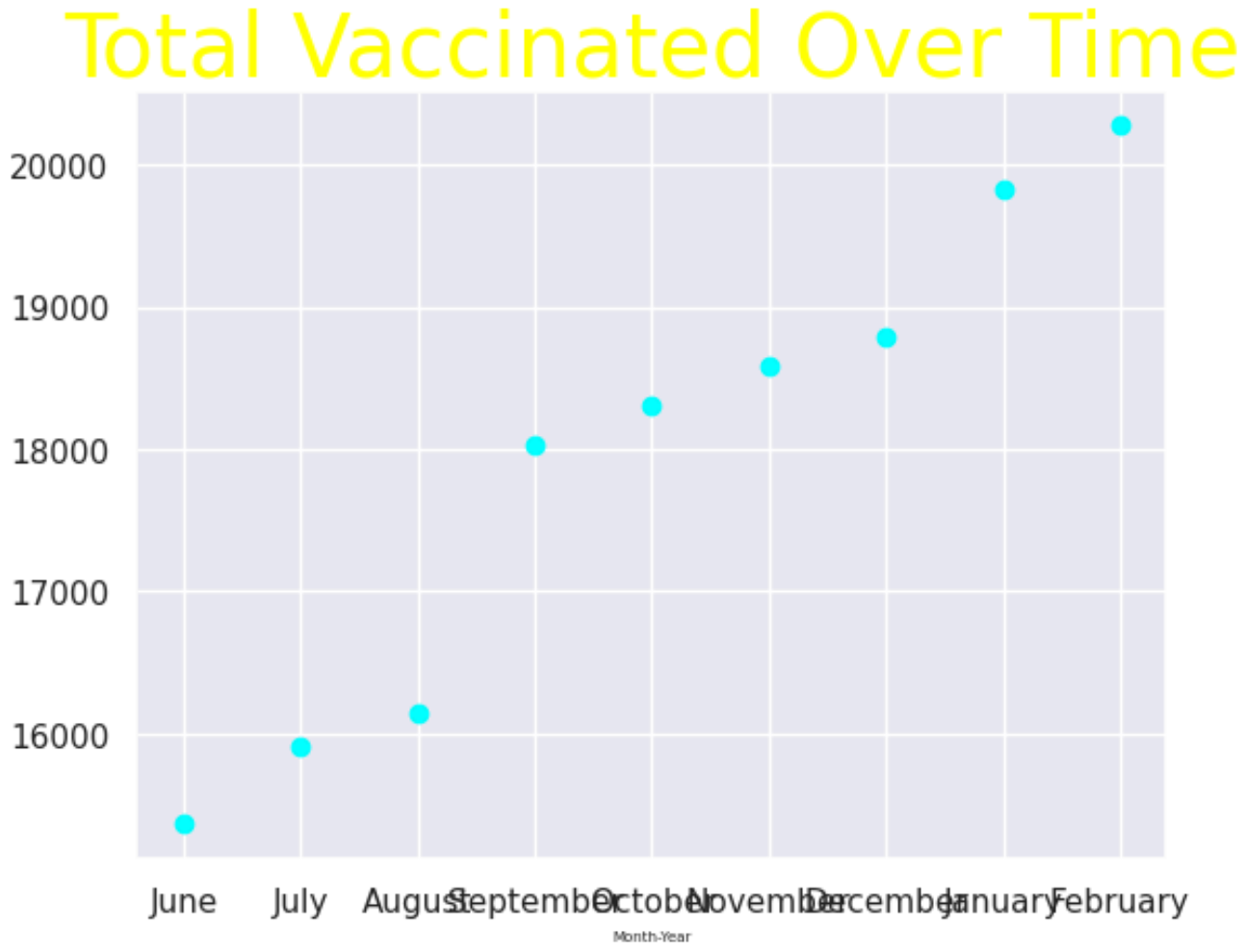


Figure 3. Average Monthly COVID-19 Vaccination Counts (June 2021 - February 2022): The graph shows a steady increase in average monthly vaccinations, with a notable rise from August to September 2021 and continued growth through February 2022. Blue dots represent data points, connected by a red dotted line indicating overall trends.

Ugly plot for question 2:

Average Month - Year Trend of COVID-19 Vaccine Counts: This graph is showing a steady increase in the average monthly vaccinations.
The light blue dots are the data points that show the annual trend from the year 2021 to 2022."



Code used to make these plots:

Below are the code snippets used to make these plots.

Code snippet for **Pretty plot for question 1:**

```
import matplotlib.pyplot as plt
from matplotlib.ticker import FuncFormatter

# Define a formatter function
def millions(x, pos):
    'The two args are the value and tick position'
    return '%d' % (x * 1e-6)

# Create a bar plot (Pretty plot)
plt.figure(figsize=(10, 6))
plt.bar(age_groups_vaccination_totals['Age Group'],
age_groups_vaccination_totals['Total'], color='skyblue',
edgecolor='black')
plt.xlabel('Age Group')
plt.ylabel('Total Vaccinations (in millions)')
plt.title('Vaccination Totals by Age Group')

# Format the y-axis to show millions
formatter = FuncFormatter(millions)
plt.gca().yaxis.set_major_formatter(formatter)

# Enable grid for the plot
plt.grid(True, axis='y', linestyle='--', linewidth=0.7)

plt.show()
```

Code snippet for **Ugly plot for question 1:**

```
#Ugly Plot
# Define clashing and unpleasant colors
ugly_colors = ['#ff0000', '#00ff00', '#0000ff', '#ffff00', '#ff00ff',
'#00ffff', '#000000', '#ffffff']

# Create the pie chart with awkward aesthetics
patches, texts, autotexts = plt.pie(
```

```
    age_groups_vaccination_totals['Total'],
    labels=age_groups_vaccination_totals['Age Group'],
    autopct='%1.3f%%',
    startangle=140,
    textprops=dict(rotation_mode='anchor', ha='center', fontsize=10,
color='yellow'),
    colors=ugly_colors
)
for text in texts:
    text.set_rotation(90)
# Add a title with unpleasant aesthetics
plt.title('Age Group', fontsize=20, color='red', fontweight='heavy',
backgroundcolor='yellow')
plt.show()
```

Code snippet for **Pretty plot for question 2:**

```
# Define the correct order of months
months_order = ['January', 'February', 'March', 'April', 'May', 'June',
'July', 'August', 'September', 'October', 'November', 'December']
avg_vaccination_totals_over_time['VaccinatedMonth'] =
pd.Categorical(avg_vaccination_totals_over_time['VaccinatedMonth'],
categories=months_order, ordered=True)

# Sort by year and then by month
avg_vaccination_totals_over_time =
avg_vaccination_totals_over_time.sort_values(by=['VaccinatedYear',
'VaccinatedMonth'])

# Create a new column for plotting purposes
avg_vaccination_totals_over_time['Month-Year'] =
avg_vaccination_totals_over_time['VaccinatedMonth'].astype(str) + '-' +
avg_vaccination_totals_over_time['VaccinatedYear'].astype(str)

# Plotting
sns.set(style="whitegrid")
plt.figure(figsize=(8, 5))

# Dot Plot using Matplotlib
```

```
plt.plot(avg_vaccination_totals_over_time['Month-Year'],
avg_vaccination_totals_over_time['Average_Total_Vaccinated'], 'o',
color='blue', markersize=10, label='Dot Plot')

# Overlay the point plot using Seaborn
sns.pointplot(x='Month-Year', y='Average_Total_Vaccinated',
data=avg_vaccination_totals_over_time, marker=None,linestyles=':',
color='red', label='Point Plot', alpha=0.6)

plt.title('Average Total Vaccinated Over Time')
plt.xlabel('Month-Year')
plt.ylabel('Average Vaccination Count')
plt.xticks(rotation=90)
plt.legend(loc='upper left')
plt.show()
```

Code snippet for **Ugly plot for question 2:**

```
#Ugly plot
# Set the style of seaborn
sns.set(style="darkgrid")

# Dot Plot using Matplotlib
plt.plot(avg_vaccination_totals_over_time['VaccinatedMonth'],
avg_vaccination_totals_over_time['Average_Total_Vaccinated'], 'o',
color='aqua')

plt.title('Total Vaccinated Over Time', fontsize=30, color='Yellow')
plt.xlabel('Month-Year', fontsize=5)
plt.show()
```

The key errors in Ugly plot of question 1:

- A pie plot isn't a great choice here.
- The caption has poor grammar and is less effective. Also it gives the wrong description by stating that the chart describes the total number of vaccinations. Factually, it shows the percentage distribution of vaccinations per age group.
- Yellow is virtually invisible for labels and the percentage text yellow overlaps with the yellow portion of the pie chart.

- The title is incomplete, just mentions age group and does not state the vaccination totals.
- The percentages are not well formatted upto 2 decimals making it longer.
- The age groups intersect with the pie chart border hence the overall pie chart looks very messy.
- No proper spacing between the title and the pie chart labels.
- The figure size isn't set properly due to which all the text depictions are messy overlapping with one another.
- Overall the pie plot looks messy, not readable and very unpleasant to refer and understand the data.

The key errors in Ugly plot of question 2:

- The caption mentions Month -Year trend whereas the graph shows only months.
- The title is inaccurate as it states total vaccinations over years. The right title should be "Average total vaccinated over time".
- Light blue is virtually invisible.
- The dark grid style does not suit well with the color used for dot plot.
- The x axis texts are overlapping with each other and have no rotation set properly.
- The x-axis label states "Month-Year" whereas only months are displayed and the font-size is so tiny for this label.
- The y-axis label is not present.