

ResearchFairGraphs

November 16, 2025

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[9]: import pandas as pd
import numpy as np
import matplotlib.pyplot as plt

CSV_PATH = "Depression.In.Women.csv"
df = pd.read_csv(CSV_PATH)
df.columns = df.columns.str.strip()

rename_map = {
    "Time Window": "Year",
    "Age_Strata": "Age",
    "Incidence Proportion (Depression)": "Inc_Dep",
    "Prevalence (Depression)": "Prev_Dep",
    "Incidence Rate (cases/person-day) (Depression)": "Rate_Dep",
    "Incidence Proportion (antidepressant uses)": "Inc_AD",
    "Prevalence (antidepressant uses)": "Prev_AD",
    "Incidence Rate (cases/person-day) (antidepressant uses)": "Rate_AD",
    "Incidence Proportion (Depression or antidepressants)": "Inc_Either",
    "Prevalence (Depression or antidepressants)": "Prev_Either",
    "Incidence Rate (cases/person-day) (Depression or antidepressants)": "
↪Rate_Either"
}

df = df.rename(columns={k: v for k, v in rename_map.items() if k in df.columns})

# Order age groups
def age_lower_bound(s: str) -> float:
    s = str(s).strip().lower()
    if "older" in s:
        return 85.0
    s = s.replace(" ", "")
    if "-" in s:
        try:
            return float(s.split("-")[0])
        except Exception:
            return np.nan
    try:
        return float(s)
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    except Exception:
        return np.nan

df["AgeKey"] = df["Age"].map(age_lower_bound)

age_order = (
    df[["Age", "AgeKey"]]
    .drop_duplicates()
    .sort_values("AgeKey")
    .loc[:, "Age"]
    .tolist()
)
df["Age"] = pd.Categorical(df["Age"], categories=age_order, ordered=True)

# Per-year
years = sorted(df["Year"].unique())
df_by_year = {y: df[df["Year"] == y].sort_values("Age") for y in years}

period_labels = {
    2005: "2005-2009",
    2010: "2010-2014",
    2015: "2015-2019",
    2020: "2020-2025"
}

colors = {2005: '#1f77b4', 2010: '#ff7f0e', 2015: '#2ca02c', 2020: '#d62728'}

# Calculate rates per 1,000 person-years
for y in years:
    df_by_year[y] = df_by_year[y].copy()
    df_by_year[y]["Rate_Dep_per1000py"] = df_by_year[y]["Rate_Dep"] * 365.0 * 1000.0
    df_by_year[y]["Rate_AD_per1000py"] = df_by_year[y]["Rate_AD"] * 365.0 * 1000.0
    df_by_year[y]["Rate_Either_per1000py"] = df_by_year[y]["Rate_Either"] * 365.0 * 1000.0

peak_ages = ["10 - 14", "15 - 19"]
peak_indices = [age_order.index(age) for age in peak_ages if age in age_order]

# Graph 1: Depression Diagnosis
fig, ax = plt.subplots(figsize=(10, 6))

for y in years:
    d = df_by_year[y]
    ax.plot(d["Age"], d["Rate_Dep_per1000py"],
            marker="o", linewidth=2.5, markersize=6,

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        label=period_labels[y],
        color=colors[y])

ax.set_xticks(range(len(age_order)))
ax.set_xticklabels(age_order, rotation=45, ha="right", fontsize=10)
ax.set_xlabel("Age group", fontsize=12, fontweight='bold')
ax.set_ylabel("Incidence rate (new cases per 1,000 person-year)",
              fontsize=12, fontweight='bold')
ax.set_title("Depression incidence rate by age and year",
            fontsize=14, fontweight='bold', pad=20)

ax.legend(title="Year", loc="upper right", frameon=False, fontsize=10)
ax.set_ylim(0, 40)

for i in range(len(age_order)):
    ax.axvline(x=i, color='gray', linestyle=':', linewidth=0.8, alpha=0.5)

plt.tight_layout()
plt.savefig("G1_Depression_Diagnosis_2020-2025.png", dpi=300,
           bbox_inches='tight')
plt.show()
print("Graph 1: Depression Diagnosis")

# GRAPH 2: Antidepressants Uses

fig, ax = plt.subplots(figsize=(10, 6))

for y in years:
    d = df_by_year[y]
    ax.plot(d["Age"], d["Rate_AD_per1000py"],
          marker="o", linewidth=2.5, markersize=6,
          label=period_labels[y],
          color=colors[y])

ax.set_xticks(range(len(age_order)))
ax.set_xticklabels(age_order, rotation=45, ha="right", fontsize=10)
ax.set_xlabel("Age group", fontsize=12, fontweight='bold')
ax.set_ylabel("Incidence rate (new cases per 1,000 person-year)",
              fontsize=12, fontweight='bold')
ax.set_title("Antidepressants Uses",
            fontsize=14, fontweight='bold', pad=20)

ax.legend(title="Year", loc="upper right", frameon=False, fontsize=10)
ax.set_ylim(0, 65)

for i in range(len(age_order)):
    ax.axvline(x=i, color='gray', linestyle=':', linewidth=0.8, alpha=0.5)

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plt.tight_layout()
plt.savefig("G2_Antidepressants_Uses_2020-2025.png", dpi=300,
            ↳bbox_inches='tight')
plt.show()
print(" Graph 2: Antidepressant Uses")

# Graph 3
d = df_by_year[2020]

fig, ax = plt.subplots(figsize=(10, 6))

# Prevalence
ax.plot(d["Age"], d["Prev_Either"] * 100, # "Prevalence (Depression or
            ↳antidepressants)"
        marker="s", linewidth=3, markersize=8,
        label="Prevalence (Depression or Antidepressants)",
        color='#ff7f0e') # orange

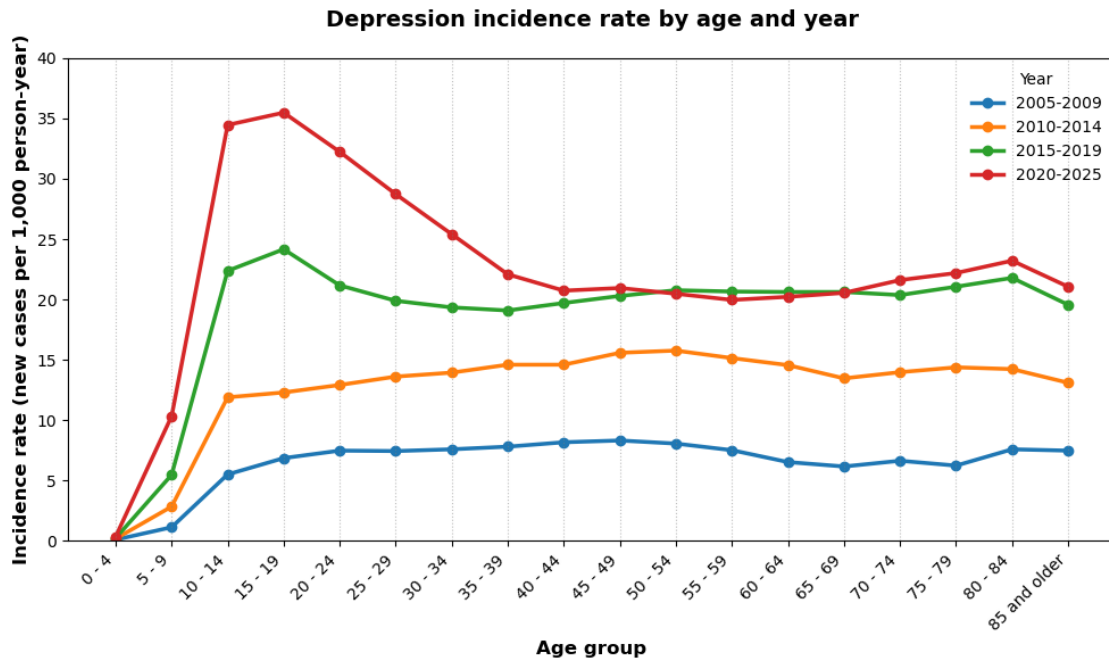
# INcidence
ax.plot(d["Age"], d["Inc_AD"] * 100, # "Incidence Proportion (antidepressant
            ↳uses)"
        marker="o", linewidth=3, markersize=8,
        label="Incidence proportion (Antidepressants)",
        color='#1f77b4') # blue

ax.set_xticks(range(len(age_order)))
ax.set_xticklabels(age_order, rotation=45, ha="right", fontsize=10)
ax.set_xlabel("Age group", fontsize=12, fontweight='bold')
ax.set_ylabel("Proportion", fontsize=12, fontweight='bold')
ax.set_title("Prevalence and Incidence by Age (2020-2025)",
            fontsize=14, fontweight='bold', pad=20)

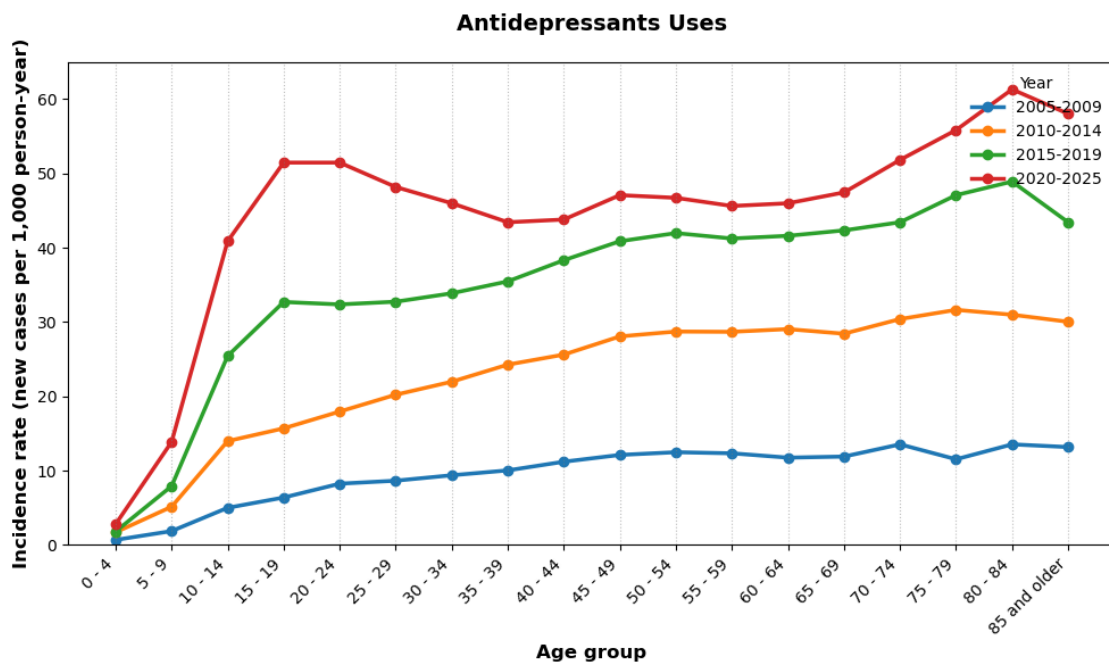
ax.legend(loc="upper left", frameon=True, fontsize=11)
ax.grid(True, alpha=0.3)

plt.tight_layout()
plt.savefig("G3_Prevalence_Incidence_Corrected.png", dpi=300,
            ↳bbox_inches='tight')
plt.show()

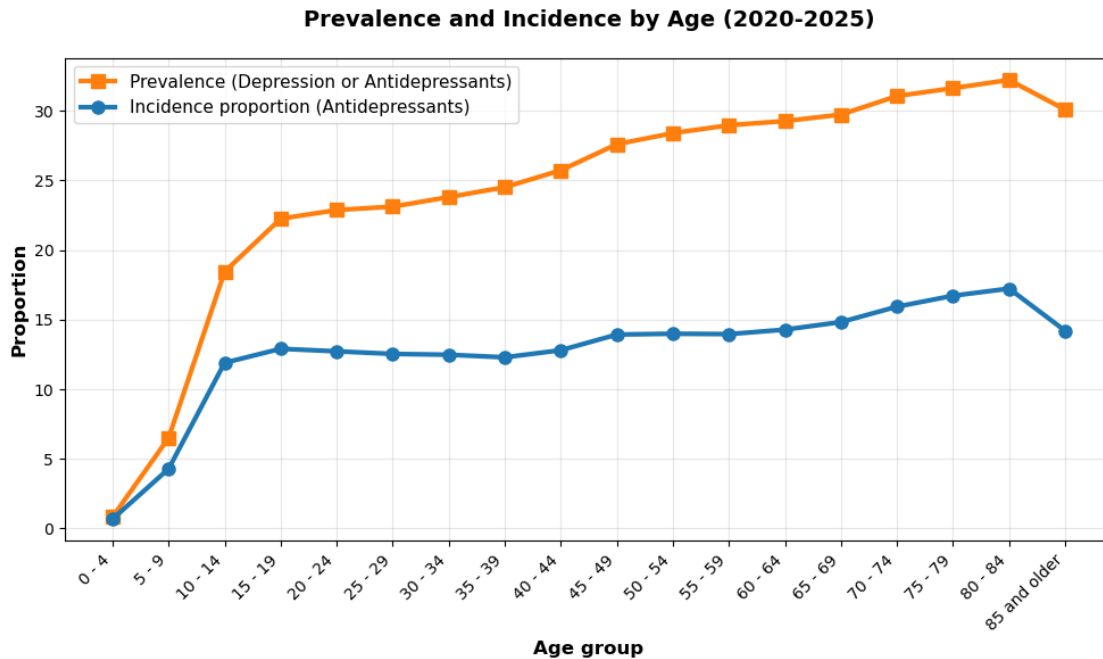
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Graph 1: Depression Diagnosis



Graph 2: Antidepressant Uses



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[8]: d = df_by_year[2020]

fig, ax = plt.subplots(figsize=(10, 6))

# Prevalence of Depression OR Antidepressants (existing patients)
ax.plot(d["Age"], d["Prev_Either"],
        marker="s", linewidth=3, markersize=8,
        label="Prevalence (Antidepressant use)",
        color='#ff7f0e') # Orange

# Incidence of Antidepressants (new users)
ax.plot(d["Age"], d["Inc_AD"],
        marker="o", linewidth=3, markersize=8,
        label="Incidence proportion",
        color='#1f77b4') # Blue

#Dashed line
age40_idx = (d["AgeKey"] - 40).abs().idxmin()
xpos = list(d["Age"]).index(d.loc[age40_idx, "Age"])
ax.axvline(x=xpos, linestyle='--', linewidth=2, color='gray', alpha=0.7)

ax.set_xticks(range(len(age_order)))
ax.set_xticklabels(age_order, rotation=45, ha="right", fontsize=10)
ax.set_xlabel("Age group", fontsize=12, fontweight='bold')
ax.set_ylabel("Proportion", fontsize=12, fontweight='bold')
```

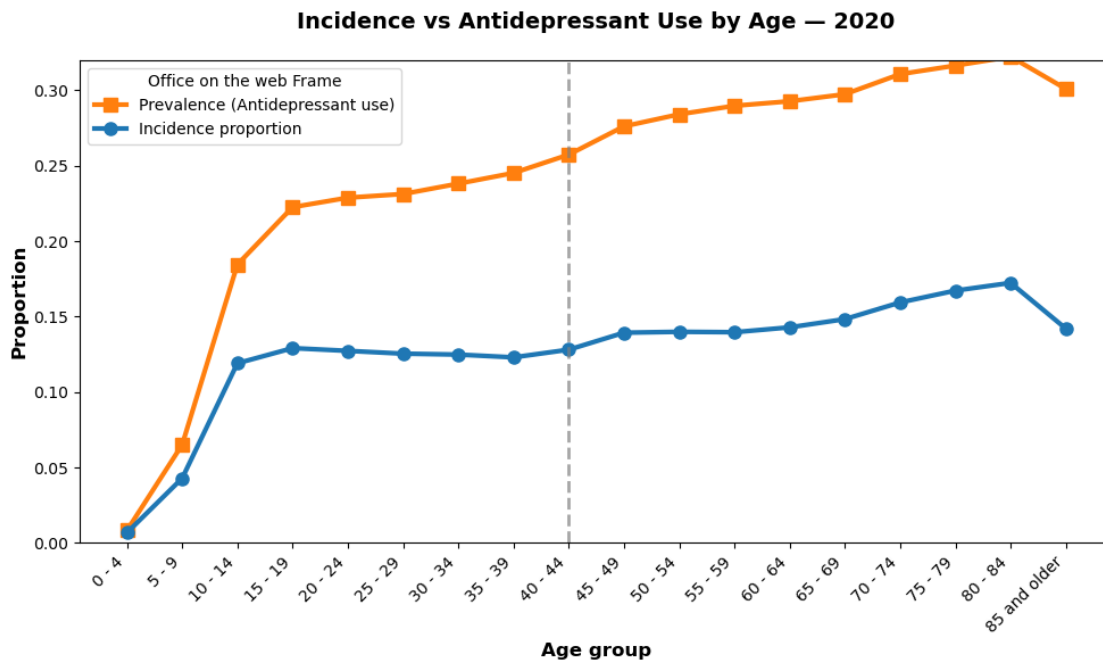
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ax.set_title("Incidence vs Antidepressant Use by Age - 2020",
             fontsize=14, fontweight='bold', pad=20)

ax.legend(loc="upper left", frameon=True, fontsize=10,
          title="Office on the web Frame")
ax.set_ylim(0, 0.32)

plt.tight_layout()
plt.savefig("G3_Prevalence_Incidence_2020.png", dpi=300, bbox_inches='tight')
plt.show()
print(" Graph 3: Prevalence (existing) + Incidence (new), 2020-2025")

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Graph 3: Prevalence (existing) + Incidence (new), 2020-2025