

Life Expectancy by sex between 2000 and 2021 in Kenya (WHO)

Plot showing the life expectancy using data from the World Health Organization (WHO) between 2000 and 2021 in Kenya.

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Imports

```
import pandas as pd
import urllib.parse
import matplotlib.pyplot as plt
import seaborn as sns

def plot_who_data(
    raw_data: pd.DataFrame,
    title: str,
    year_col = "Year",
    value_col = "Value",
```

```

pivot_columns = "Sex",
pivot_data_columns = [
    {
        "name": "TOTAL",
        "options": {
            'marker': 'o',
            'linewidth': 2,
            'color': 'purple'
        }
    },
    {
        "name": "MALE",
        "options": {
            'marker': 's',
            'linewidth': 2,
            'color': 'blue'
        }
    },
    {
        "name": "FEMALE",
        "options": {
            'marker': '^',
            'linewidth': 2,
            'color': 'pink'
        }
    },
]:
data = raw_data.copy()
# Convert Year to numeric and Value to float
data[year_col] = pd.to_numeric(data[year_col])
data[value_col] = pd.to_numeric(data[value_col])
# Pivot the data to have columns for each sex category
pivot_data = data.pivot_table(index=year_col, columns=pivot_columns, values=value_col)
# Set the style
sns.set_style("whitegrid")
fig, ax = plt.subplots(figsize=(12, 6))
# Plot the data
for column in pivot_data_columns:
    sex = column['name']
    ax.plot(pivot_data.index, pivot_data[sex], label=sex, **column['options'])
# Add title and labels
ax.set_title(title, fontsize=16)

```

```

ax.set_xlabel(year_col, fontsize=12)
ax.set_ylabel(value_col, fontsize=12)
ax.legend(title=pivot_columns)
ax.grid(True, alpha=0.3)
# Add some annotations - show max and min values
for sex in pivot_data.columns:
    max_year = pivot_data[sex].idxmax()
    max_val = pivot_data[sex].max()
    ax.annotate(f"max: {max_val:.1f}",
                xy=(max_year, max_val),
                xytext=(5, 5),
                textcoords='offset points',
                fontsize=9)

# Adjust the layout
fig.tight_layout()
# Add data source note
fig.text(0.1, 0.01, "Data Source: WHO Xmart API", fontsize=8, style='italic')
# Add a watermark to the center of the plot
ax.text(0.95, 0.02, 'ToKnow.ai', ha='right', va='bottom',
        fontsize=18, color='gray', alpha=0.5, transform=ax.transAxes, rotation=45)

def url_encode(url):
    return urllib.parse.quote(url, safe=":/?&=$")

```

Life expectancy, Kenya

The average number of years that a newborn could expect to live. Kenya, by sex, 2000 - 2021.

```

life_expectancy_filter = "IND_ID eq '90E2E48WHOSIS_000001' and GEO_NAME_SHORT eq 'Kenya'"
life_expectancy_select = "DIM_GEO_CODE_M49, GEO_NAME_SHORT, DIM_TIME, IND_NAME, DIM_SEX, AMO"
life_expectancy_data = pd.read_csv(url_encode(
    f"https://xmart-api-public.who.int/DATA_/RELAY_WHS?${filter}=${select}"
    names=[
        "Country Code",
        "Country",
        "Year",
        "Indicator",
        "Sex",
        "Life expectancy (at birth)"
    ],

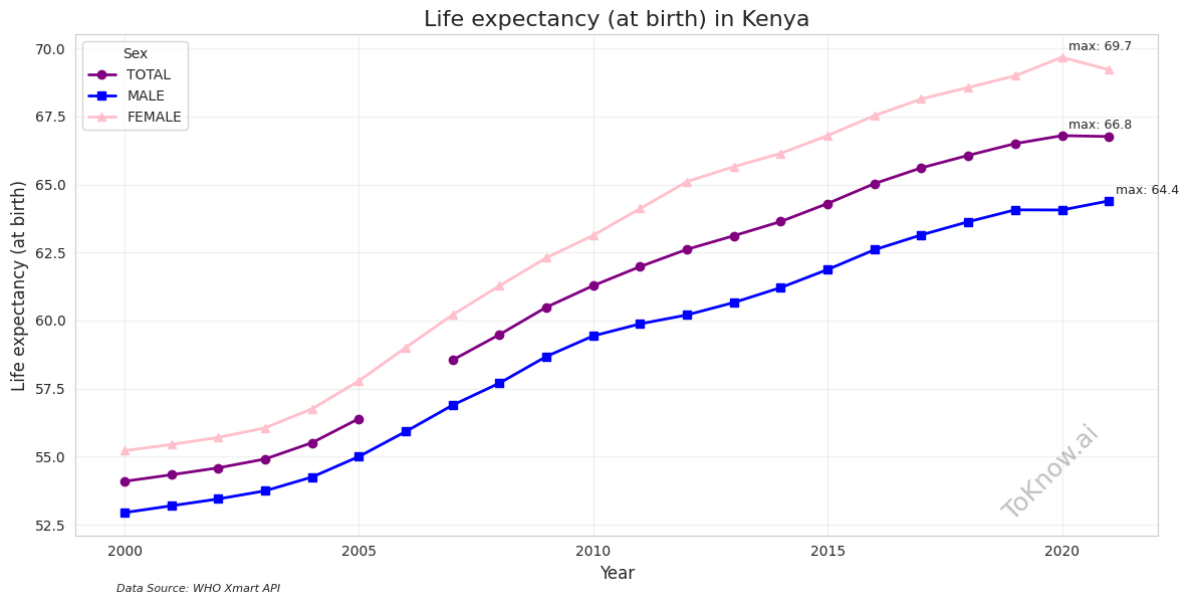
```

```
header=1)
```

```
life_expectancy_data
```

	Country Code	Country	Year	Indicator	Sex	Life expectancy (at birth)
0	404	Kenya	2009	Life expectancy (at birth)	TOTAL	60.490621
1	404	Kenya	2010	Life expectancy (at birth)	TOTAL	61.282761
2	404	Kenya	2012	Life expectancy (at birth)	TOTAL	62.615857
3	404	Kenya	2014	Life expectancy (at birth)	TOTAL	63.636944
4	404	Kenya	2001	Life expectancy (at birth)	TOTAL	54.332836
...
60	404	Kenya	2019	Life expectancy (at birth)	FEMALE	68.991063
61	404	Kenya	2006	Life expectancy (at birth)	FEMALE	59.008718
62	404	Kenya	2007	Life expectancy (at birth)	FEMALE	60.214093
63	404	Kenya	2011	Life expectancy (at birth)	FEMALE	64.116368
64	404	Kenya	2018	Life expectancy (at birth)	FEMALE	68.566521

```
plot_who_data(  
  life_expectancy_data,  
  "Life expectancy (at birth) in Kenya",  
  value_col="Life expectancy (at birth)")
```



Summary Statistics

```
life_expectancy_data.pivot_table(
    index="Year",
    columns="Sex",
    values="Life expectancy (at birth)").describe()
```

Sex	FEMALE	MALE	TOTAL
count	22.000000	22.000000	21.000000
mean	62.856168	58.951730	61.050339
std	5.099057	3.984922	4.563089
min	55.217093	52.941969	54.092039
25%	58.087847	55.232042	56.395140
50%	63.623846	59.656871	61.981267
75%	67.346733	62.419297	65.032495
max	69.673467	64.395877	66.793450

Healthy life expectancy (HALE) at birth

The average number of years that a person can expect to live in “full health” from birth. Kenya, by sex, 2000 - 2021.

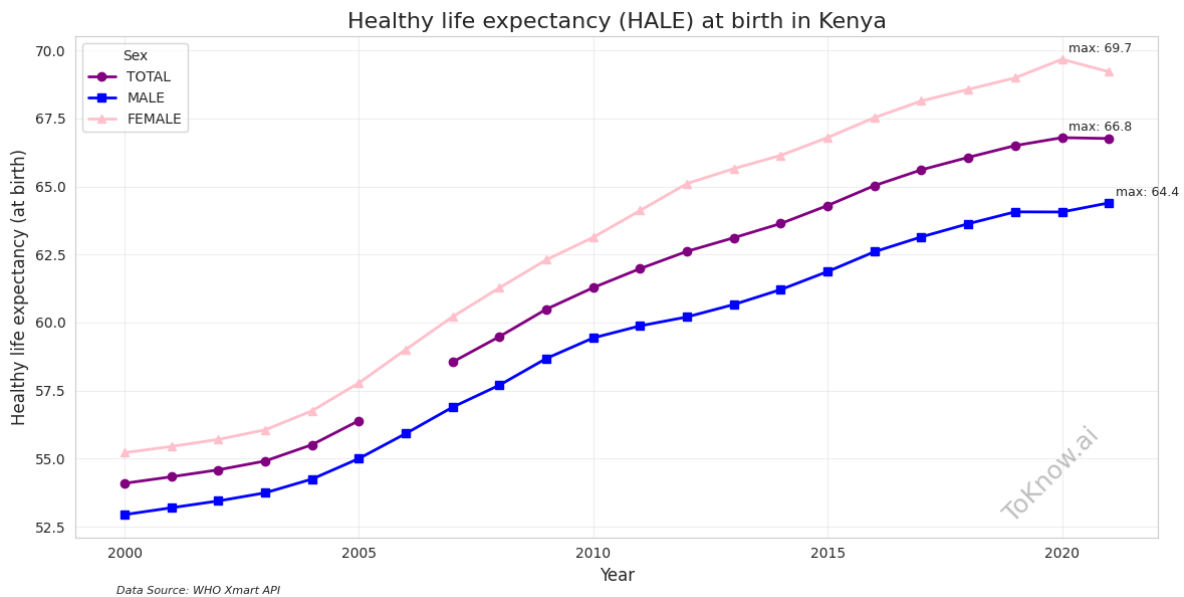
```
healthy_life_expectancy_filter = "IND_ID eq 'C64284DWHOSIS_000002' and GEO_NAME_SHORT eq 'Kenya'"
healthy_life_expectancy_select = "DIM_GEO_CODE_M49, GEO_NAME_SHORT, DIM_TIME, IND_NAME, DIM_INDICATOR_CODE"
healthy_life_expectancy_data = pd.read_csv(url_encode(
    f"https://xmart-api-public.who.int/DATA_/RELAY_WHS?${filter}&${select}"
),
    names=[
        "Country Code",
        "Country",
        "Year",
        "Indicator",
        "Sex",
        "Healthy life expectancy (at birth)"
    ],
    header=1)
```

```
healthy_life_expectancy_data
```

	Country Code	Country	Year	Indicator	Sex	Healthy life expectancy (at birth)
0	404	Kenya	2009	Life expectancy (at birth)	TOTAL	60.490621

	Country Code	Country	Year	Indicator	Sex	Healthy life expectancy (at birth)
1	404	Kenya	2010	Life expectancy (at birth)	TOTAL	61.282761
2	404	Kenya	2012	Life expectancy (at birth)	TOTAL	62.615857
3	404	Kenya	2014	Life expectancy (at birth)	TOTAL	63.636944
4	404	Kenya	2001	Life expectancy (at birth)	TOTAL	54.332836
...
60	404	Kenya	2019	Life expectancy (at birth)	FEMALE	68.991063
61	404	Kenya	2006	Life expectancy (at birth)	FEMALE	59.008718
62	404	Kenya	2007	Life expectancy (at birth)	FEMALE	60.214093
63	404	Kenya	2011	Life expectancy (at birth)	FEMALE	64.116368
64	404	Kenya	2018	Life expectancy (at birth)	FEMALE	68.566521

```
plot_who_data(
  healthy_life_expectancy_data,
  "Healthy life expectancy (HALE) at birth in Kenya",
  value_col="Healthy life expectancy (at birth)")
```



Summary Statistics

```
healthy_life_expectancy_data.pivot_table(
  index="Year",
  columns="Sex",
  values="Healthy life expectancy (at birth)").describe()
```

Sex	FEMALE	MALE	TOTAL
count	22.000000	22.000000	21.000000
mean	62.856168	58.951730	61.050339
std	5.099057	3.984922	4.563089
min	55.217093	52.941969	54.092039
25%	58.087847	55.232042	56.395140
50%	63.623846	59.656871	61.981267
75%	67.346733	62.419297	65.032495
max	69.673467	64.395877	66.793450

References

Source: [World Health Organization \(WHO\)](#)

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