

# Global age group fertility case study



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The capacity to conceive a child is known as **fertility**. The majority of us take our fertility for granted, but since conception is a complicated process, some people may have trouble getting pregnant.

Fertility rates are typically determined using two standard assumptions. To initiate, it is assumed that each woman's fertility follows general age-specific fertility trends throughout her childbearing years (peaking in her early 30s). Second, it presumes that each woman will survive her childbearing years (ages 15 to 44, or in some cases, ages 15 to 49).

Another thing to keep in mind is that the fertility rate is a theoretical number based on real data, but it is not real data in and of itself. In other words, the fertility rate is not a precise count of how many children each actual living woman in a specific country has at any given time. It is instead the calculated average number of children that a woman in that country is likely to have over her lifetime. The "**total fertility rate**" is another name for this.

In this, we are going to analyze the global fertility dataset using SQL which provides us with more organized and accurate data. The following codes will help us to analyze the data.

## i. Maximum total fertility rate from 1950 to 2023

```
SELECT
country_name,
year,
MAX (total_fertility_rate) AS Max_total_fertility_rate

FROM `bigquery-public-data.census_bureau_international.age_specific_fertility_rates`

WHERE year BETWEEN 1950 AND 2023
GROUP BY country_name,year
ORDER BY Max_total_fertility_rate DESC

LIMIT 1;
```

## Result:

Row	country_name	year	Max_total_fertility_rate
1	Rwanda	1978	8.07

This results in **Rwanda** having the highest total fertility rate from 1950 to 2023, with a rate of **8.07** life births per woman in 1978.

## ii. Maximum fertility rate for all the age groups by countries in descending order

```
SELECT

country_name,
MAX(fertility_rate_15_19) AS max_fertility_rate_15_19,
MAX(fertility_rate_20_24) AS max_fertility_rate_20_24,
MAX(fertility_rate_25_29) AS max_fertility_rate_25_29,
MAX(fertility_rate_30_34) AS max_fertility_rate_30_34,
MAX(fertility_rate_35_39) AS max_fertility_rate_35_39,
MAX(fertility_rate_40_44) AS max_fertility_rate_40_44,
MAX(fertility_rate_45_49) AS max_fertility_rate_45_49

FROM `bigquery-public-data.census_bureau_international.age_specific_fertility_rates`

WHERE year BETWEEN 1950 AND 2023

GROUP BY country_name
ORDER BY country_name DESC;
```

## Result:

Row	country_name	max_fertility_rate_15_19	max_fertility_rate_20_24	max_fertility_rate_25_29	max_fertility_rate_30_34
1	Zimbabwe	133.0	294.0	303.0	268.0
2	Zambia	160.0	318.2	322.6	289.4
3	Yemen	110.3	300.4	348.6	311.9
4	Western Sahara	175.7	275.5	289.0	282.8

This tells us the data based on the **maximum age group fertility** in that particular country.

### iii. Maximum gross reproduction rate in ascending order (Female life births per woman)

The **gross reproduction rate** is the average number of girls born healthy to a hypothetical cohort of women if they lived to the end of their reproductive years and accomplished the age-specific fertility that women in each age category experience in a specific year or timespan of years.

```
SELECT  
  
country_name,  
MAX(gross_reproduction_rate) AS Max_gross_reproduction_rate,  
MIN(gross_reproduction_rate) AS Min_gross_reproduction_rate  
  
FROM `bigquery-public-data.census_bureau_international.age_specific_fertility_rates`  
  
WHERE year BETWEEN 1950 AND 2023  
  
GROUP BY country_name  
ORDER BY country_name ASC;
```

#### Result:

Row	country_name	Max_gross_reproduction_rate	Min_gross_reproduction_rate
1	Afghanistan	3.9024	2.2088
2	Albania	1.4878	0.6812
3	Algeria	2.5815	1.1289
4	American Samoa	2.1209	1.0355
5	Andorra	0.7488	0.5458

The aforementioned information displays the **highest** and **lowest** gross reproduction rates in that nation from 1950 to 2023. This shows Afghanistan has a max gross reproduction rate of 3.9024 while the min gross reproduction rate is 2.2088.

### iv. Average Fertility Rate

```

SELECT

country_name,
AVG(total_fertility_rate) as average_total_fertility_rate

FROM `bigquery-public-data.census_bureau_international.age_specific_fertility_rates`

GROUP BY country_name
ORDER BY country_name ASC;

```

## Result:

Row	country_name	average_total_fertility_rate
2	Albania	1.84306935483871
3	Algeria	2.62575625
4	American Samoa	2.4503921568627454
5	Andorra	1.455639344262295
6	Angola	6.1275432098

This tells the **average total fertility rate** of the countries over a century.

## v. Total Fertility Rate greater than 2.1

```

SELECT

country_name,
total_fertility_rate

FROM `bigquery-public-data.census_bureau_international.age_specific_fertility_rates`

WHERE year = 2022 AND total_fertility_rate > 2.1

ORDER BY total_fertility_rate ASC;

```

## Result:

Row	country_name	total_fertility_rate
1	Kazakhstan	2.108
2	Cabo Verde	2.128
3	Djibouti	2.15
4	Mexico	2.1568

Row	country_name	total_fertility_rate
5	Argentina	2.182

The mentioned information reveals the total fertility rate for the nations that is higher than 2.1. According to the table, Even after 2022, the population of these nations will continue to grow. While **Kazakhstan** has the least 2.108 and **Angola** has the most 5.8291.

## vi. Countries where the sex ratio at birth is less than 1.0 in 2022

The number of resident male live births (for a particular geography, such as a country, state, or county, for a specific time period) is known as the Sex Ratio at Birth

$$\text{Sex ratio at birth} = \frac{\text{Number of male birhts}}{\text{Number of female births}}$$

Following code tells us the countries sex ratio at birth which is less than 1 in 2022 -

```
SELECT
DISTINCT (country_name), sex_ratio_at_birth
FROM `bigquery-public-data.census_bureau_international.age_specific_fertility_rates`
WHERE year = 2022 AND sex_ratio_at_birth < 1.0
ORDER BY country_name ASC,
sex_ratio_at_birth ASC;
```

### Result:

Row	country_name	sex_ratio_at_birth
1	Kazakhstan	0.9368
2	Nauru	0.8333
3	United States	-9.0

This information reveals a list of nations where the sex ratio is less than 1, which indicates that there are fewer men than women in each nation.

## vii. Highest Age-specific fertility rate for age 25-29 (births per 1,000 population) between 1950 to 2050

```
SELECT
country_name,
year,
MAX (fertility_rate_25_29) AS max_fertility_rate_25_29

FROM `bigquery-public-data.census_bureau_international.age_specific_fertility_rates`

WHERE year BETWEEN 1950 AND 2023
GROUP BY country_name, year
ORDER BY max_fertility_rate_25_29 DESC

LIMIT 1;
```

### Result:

Row	country_name	year	max_fertility_rate_25_29
1	Pakistan	1987	369.2

According to the information above, **Pakistan**, with a **fertility rate of 369.2**, has the highest fertility rate in the world for those aged 25 to 29. According to this, there are 369.2 live births for every 1000 people. Additionally, this is the world's greatest fertility rate ever for a certain time period.

### Data Source: -

bigquery-public-data.census\_bureau\_international.age\_specific\_fertility\_rates