Covid 19 Data Exploration SQL Queries

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/*
Skills used: Joins, CTE's, Temp Tables, Windows Functions, Aggregate Functions, Creating Views, Converting Data Types
*/

Select *
From PortfolioProject..CovidDeaths
Where continent is not null
order by 3,4;

-- Select Data that we are going to be starting with
Select Location, date, total_cases, new_cases, total_deaths, population
From PortfolioProject..CovidDeaths
Where continent is not null
order by 1,2;


-- Total Cases vs Total Deaths
-- Shows likelihood of dying if you contract covid in your country
Select Location, date, total_cases,total_deaths, (CONVERT(float, total_deaths) / NULLIF(CONVERT(float,
total_cases),0))*100  AS DeathPercentage
From PortfolioProject..CovidDeaths
Where location like '%states%'
and continent is not null
order by 1,2;


-- Total Cases vs Population
-- Shows what percentage of population infected with Covid
Select Location, date, Population, total_cases, (CAST(total_cases AS FLOAT) / CAST(Population AS FLOAT))*100 as
PercentPopulationInfected
From PortfolioProject..CovidDeaths
--Where location like '%states%'
order by 1,2;


-- Countries with Highest Infection Rate compared to Population
Select Location,
Population,
MAX(CAST(total_cases AS FLOAT)) AS HighestInfectionCount,
MAX((CAST(total_cases AS FLOAT) / CAST(Population AS FLOAT)) * 100
AS PercentPopulationInfected
From PortfolioProject..CovidDeaths
--Where location like '%states%'
Group by Location, Population
order by PercentPopulationInfected DESC;

-- Countries with Highest Death Count per Population
Select Location, MAX(cast(Total_deaths as int)) as TotalDeathCount
From PortfolioProject..CovidDeaths
--Where location like '%states%'
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Where continent is not null
Group by Location
order by TotalDeathCount DESC;


-- Global numbers
SELECT
	SUM(CAST(new_cases AS BIGINT)) AS total_cases,
	SUM(CAST(new_deaths AS BIGINT)) AS total_deaths,
	(SUM(CAST(new_deaths AS BIGINT)) _ 1.0 / NULLIF(SUM(CAST(new_cases AS BIGINT)), 0)) * 100 AS
DeathPercentage
FROM PortfolioProject..CovidDeaths
WHERE continent IS NOT NULL
ORDER BY total_cases DESC, total_deaths DESC;



-- Total Population vs Vaccinations
-- Shows Percentage of Population that has received at least one Covid Vaccine
Select dea.continent, dea.location, dea.date, dea.population, vac.new_vaccinations
, SUM(CAST(vac.new_vaccinations AS BIGINT)) OVER (PARTITION BY dea.loaction ORDER BY dea.date) AS
RollingPeopleVaccinated,
(SUM(CAST(vac.new_vaccinations AS BIGINT)) OVER (PARTITION BY dea.location ORDER BY dea.date) * 1.0 /
NULLIF(CAST(dea.population AS BIGINT), 0)) * 100
From PortfolioProject..CovidDeaths dea
Join PortfolioProject..CovidVaccinations vac
	On dea.location = vac.location
	and dea.date = vac.date
where dea.continent is not null
order by 2,3;



-- Using CTE to perform Calculation on Partition By in previous query
WITH PopvsVac AS (
SELECT dea.continent,
Dea.location,
Dea.date,
Dea.population,
Vac.new_vaccinations,
SUM(CAST(vac.new_vaccinations AS BIGINT)) OVER (PARTITION BY dea.location ORDER BY dea.date) AS
RollingPeopleVaccinated
FROM PortfolioProject..CovidDeaths dea
JOIN PortfolioProject..CovidVaccinations vac
ON dea.location = vac.location
AND dea.date = vac.date
WHERE dea.continent IS NOT NULL)

SELECT *, (CAST(RollingPeopleVaccinated AS FLOAT) / NULLIF(CAST(Population AS FLOAT), 0)) * 100 AS
VaccinationPercentage
FROM PopvsVac
ORDER BY location, date;
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-- Using Temp Table to perform Calculation on Partition By in previous query
– Drop the table if it exists
DROP Table if exists #PercentPopulationVaccinated;

– Create the temporary table with appropriate numeric types
Create Table #PercentPopulationVaccinated
(
Continent nvarchar(255),
Location nvarchar(255),
Date datetime,
Population numeric(18,2),
New_vaccinations numeric(18,2),
RollingPeopleVaccinated numeric(18,2)
);

– Insert data into the temporary table with proper conversion to numeric types and safe data handling
Insert into #PercentPopulationVaccinated
Select dea.continent,
Dea.location,
TRY_CAST(dea.date AS datetime) AS Date,
TRY_CAST(dea.population AS numeric(18,2)) AS Population,
TRY_CAST(vac.new_vaccinations AS numeric(18,2)) AS New_vaccinations,
SUM(TRY_CAST(vac.new_vaccinations AS numeric(18,2)))
OVER (PARTITION BY dea.location ORDER BY TRY_CAST(dea.date AS datetime)) AS RollingPeopleVaccinated
FROM PortfolioProject..CovidDeaths dea
JOIN PortfolioProject..CovidDeaths vac
ON dea.location = vac.location
AND TRY_CAST(dea.date AS datetime) = TRY_CAST(vac.date AS datetime)
WHERE dea.continent IS NOT NULL AND TRY_CAST( dea.date AS datetime) IS NOT NULL AND TRY_CAST(vac.date
AS datetime) IS NOT NULL;

– Query the temporary table to calculate vaccination percentage
Select *, (RollingPeopleVaccinated / NULLIF(Population, 0)) * 100 AS VaccinationPercentage
FROM #PercentPopulationVaccinated;


-- Creating View to store data for later visualizations
Create View PercentPopulationVaccinated as
Select dea.continent, dea.location, dea.date, dea.population, vac.new_vaccinations
, SUM(CONVERT(int,vac.new_vaccinations)) OVER (Partition by dea.Location Order by dea.location, dea.Date) as
RollingPeopleVaccinated
--, (RollingPeopleVaccinated/population)*100
From PortfolioProject..CovidDeaths dea
Join PortfolioProject..CovidVaccinations vac
        On dea.location = vac.location
        and dea.date = vac.date
where dea.continent is not null;
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