

Guide to Create a Mitigation, Mobility, and Epidemiology Graph

A mitigation, mobility, and epidemiology (MME) graph displays the effects that mitigation measures might have on community mobility and on the incidence of COVID-19 in a geographical zone over time.

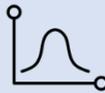
CDC developed this job aid and an Excel template to help public health professionals in other countries to generate and customize their own MME graphs to understand their local COVID-19 situation.



Mitigation measures include restrictions on travel, gatherings, and movement; border entry screening, traveler isolation or quarantine; and school and business closures. Relevant data are abstracted from public sources such as US embassy and country websites, media reports compiled by the Global Public Health Intelligence Network, or the [WHO Tracking Public Health and Social Measures \(PHSM\)](#) database.

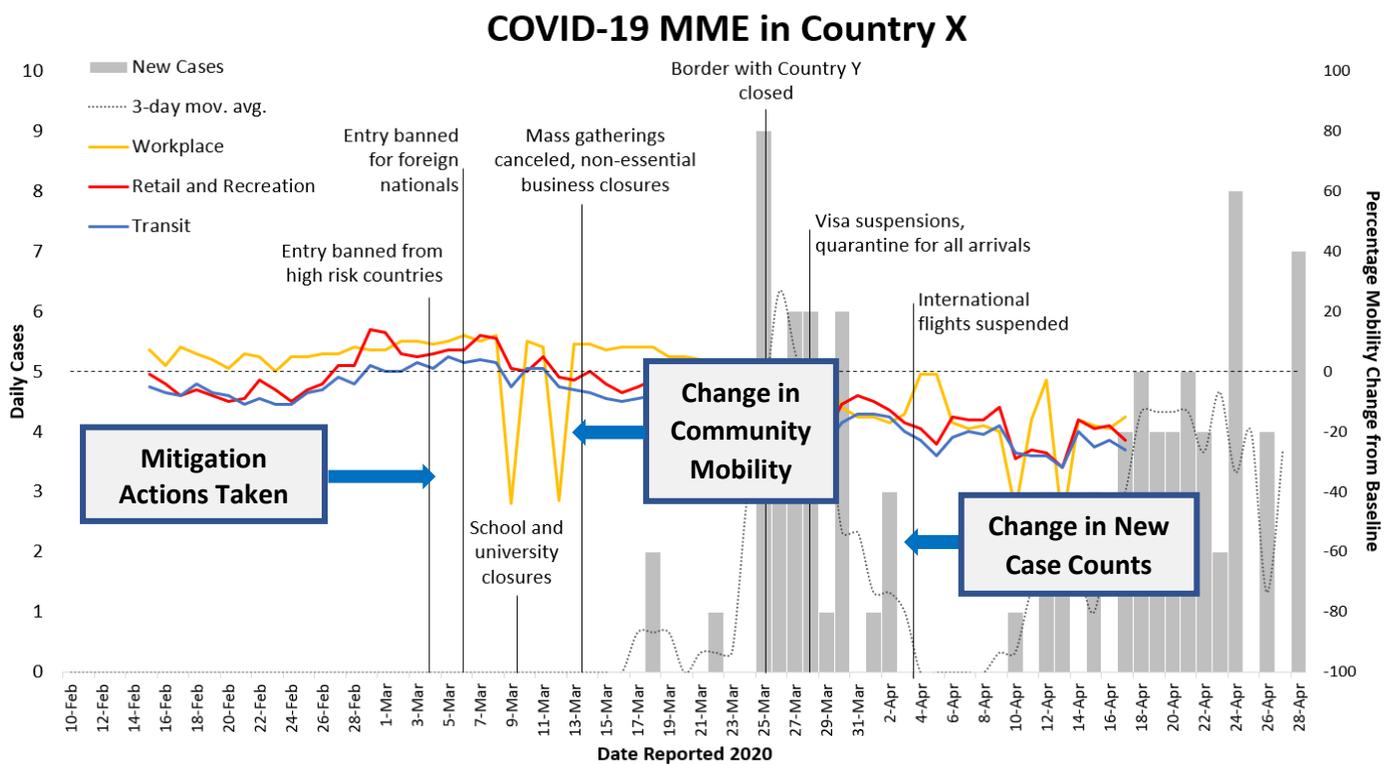


Mobility reports provide insights into changes in mobility at transit stations, retail stores, recreation areas, and workplaces. Relevant data sources include [Google Community Mobility Reports](#) and [Apple mobility data](#).



Case counts help display changes in the local epidemiology of COVID-19. Case count data can come from in-country data, [WHO](#), or from the [Johns Hopkins University COVID-19](#) database.

This is what an MME graph looks like:



How these data can be used

- Understand the types of mitigation measures that a particular country is implementing
- Assess whether mitigation measures are working
 - Assess changes in mobility after implementation of particular measures
 - Assess changes in the number of new cases approximately two weeks after mitigation measures
 - Assess changes in the number of new cases approximately two weeks after changes in mobility

Limitations of these data

- **MME** graphs do not show causality. They can only give us a sense of whether mitigation measures are working.
- **Mitigation** data from publicly available sources may be incomplete. Data at a sub-national level are limited.
- **Mobility** data are collected from people with smartphones in areas of mobile phone service and may not be representative of the broader population, particularly people of lower socioeconomic status or areas without mobile phone reception.
- **Epidemiology** data may be limited by testing availability and capacity and incomplete data.

Steps to Develop the *Mitigation, Mobility, and Epidemiology* Graph

Requirements: Microsoft Excel and Power Point, [R free statistical software](#), access to internet.

Skills needed: User should have basic skills with Microsoft Excel and Power Point, and [R free statistical software](#)

Data needed: data on mitigation measures, mobility, and case count from the locality of interest. For mobility and case count data, this guide uses [Google Community Mobility data](#) and [Johns Hopkins University \(JHU\) epidemiological data](#).

1. Open Excel MME Template -> [Excel MME Template](#)

| | A | B | C | D | E | F | G | H | I | J | K | L | M | N |
|---|---------|------|-----------|------------------|------------|-------------------|-----------------|-----------------------|----------------------|-------|---------|-----------|-------------|-----------|
| 1 | Country | Date | New Cases | Cumulative Cases | New Deaths | Cumulative Deaths | 3-day mov. avg. | Retail and Recreation | Grocery and Pharmacy | Parks | Transit | Workplace | Residential | Zero Line |
| 2 | | | | | | | | | | | | | | 0 |
| 3 | | | | | | | #DIV/0! | | | | | | | 0 |
| 4 | | | | | | | #DIV/0! | | | | | | | 0 |
| 5 | | | | | | | #DIV/0! | | | | | | | 0 |
| 6 | | | | | | | #DIV/0! | | | | | | | 0 |
| 7 | | | | | | | #DIV/0! | | | | | | | 0 |
| 8 | | | | | | | #DIV/0! | | | | | | | 0 |
| 9 | | | | | | | #DIV/0! | | | | | | | 0 |

2. Insert relevant case data.

- Obtain JHU data at https://github.com/CSSEGISandData/COVID-19/tree/master/csse_covid_19_data/csse_covid_19_time_series
 - Use statistical software to merge global case (`time_series_covid19_confirmed_global.csv`) and death (`time_series_covid19_deaths_global.csv`) data, reshape from wide to long, and calculate daily new cases and new deaths
Note: Refer to R script for data manipulation steps -> [R Script for JHU data](#). Also notice that cumulative count cases are not necessary for the MME graph, the R script and Excel MME template keep them for reference.
- Insert data in Excel MME template.
- Adjust column headers as necessary if using data at subnational level (e.g., changing "Country" to "District")

| | A | B | C | D | E | F | G | H | I | J | K | L | M | N |
|---|-----------|-----------|-----------|------------------|------------|-------------------|-----------------|-----------------------|----------------------|-------|---------|-----------|-------------|-----------|
| 1 | Country | Date | New Cases | Cumulative Cases | New Deaths | Cumulative Deaths | 3-day mov. avg. | Retail and Recreation | Grocery and Pharmacy | Parks | Transit | Workplace | Residential | Zero Line |
| 2 | Country X | 4/6/2020 | 79 | 1133 | 8 | 36 | | | | | | | | 0 |
| 3 | Country X | 4/7/2020 | 132 | 1265 | 3 | 39 | 132.33 | | | | | | | 0 |
| 4 | Country X | 4/8/2020 | 186 | 1451 | 4 | 43 | 136.67 | | | | | | | 0 |
| 5 | Country X | 4/9/2020 | 92 | 1451 | 1 | 44 | 127.00 | | | | | | | 0 |
| 6 | Country X | 4/10/2020 | 103 | 1554 | 4 | 48 | 89.67 | | | | | | | 0 |
| 7 | Country X | 4/11/2020 | 74 | 1628 | 8 | 56 | 88.00 | | | | | | | 0 |
| 8 | Country X | 4/12/2020 | 87 | 1715 | 7 | 63 | 80.33 | | | | | | | 0 |
| 9 | Country X | 4/13/2020 | 80 | 1795 | 9 | 72 | 115.67 | | | | | | | 0 |

3. Insert relevant mobility data.

- Obtain the Google Community Mobility data at <https://www.google.com/covid19/mobility/>
 - Select "Download global CSV"
- Insert data in Excel MME template
- Adjust column headers as necessary if using a different mobility dataset (e.g., changing "Parks" to "Workplace")

| | A | B | C | D | E | F | G | H | I | J | K | L | M | N |
|---|-----------|-----------|-----------|------------------|------------|-------------------|-----------------|-----------------------|----------------------|-------|---------|-----------|-------------|-----------|
| 1 | Country | Date | New Cases | Cumulative Cases | New Deaths | Cumulative Deaths | 3-day mov. avg. | Retail and Recreation | Grocery and Pharmacy | Parks | Transit | Workplace | Residential | Zero Line |
| 2 | Country X | 4/6/2020 | 79 | 1133 | 8 | 36 | | -79 | -47 | -81 | -74 | -64 | 29 | 0 |
| 3 | Country X | 4/7/2020 | 132 | 1265 | 3 | 39 | 132.33 | -77 | -41 | -78 | -71 | -62 | 31 | 0 |
| 4 | Country X | 4/8/2020 | 186 | 1451 | 4 | 43 | 136.67 | -77 | -41 | -81 | -71 | -54 | 27 | 0 |
| 5 | Country X | 4/9/2020 | 92 | 1451 | 1 | 44 | 127.00 | -83 | -54 | -87 | -76 | -52 | 26 | 0 |
| 6 | Country X | 4/10/2020 | 103 | 1554 | 4 | 48 | 89.67 | -75 | -41 | -77 | -70 | -60 | 26 | 0 |
| 7 | Country X | 4/11/2020 | 74 | 1628 | 8 | 56 | 88.00 | -82 | -30 | -72 | -64 | -59 | 25 | 0 |
| 8 | Country X | 4/12/2020 | 87 | 1715 | 7 | 63 | 80.33 | -82 | -28 | -69 | -63 | -58 | 24 | 0 |
| 9 | Country X | 4/13/2020 | 80 | 1795 | 9 | 72 | 115.67 | -83 | -30 | -75 | -67 | -63 | 27 | 0 |

4. Additional fields:

- 3-day mov. avg:** Uses a formula already inserted in the template; it will auto-calculate the value. Note that the formula should exclude the first day and the last day of data since it will be an average of only 2 days of data in both cases.
- Zero line:** Make sure 0 is entered here for all entries.

| | A | B | C | D | E | F | G | H | I | J | K | L | M | N |
|---|-----------|-----------|-----------|------------------|------------|-------------------|-----------------|-----------------------|----------------------|-------|---------|-----------|-------------|-----------|
| 1 | Country | Date | New Cases | Cumulative Cases | New Deaths | Cumulative Deaths | 3-day mov. avg. | Retail and Recreation | Grocery and Pharmacy | Parks | Transit | Workplace | Residential | Zero Line |
| 2 | Country X | 4/6/2020 | 79 | 1133 | 8 | 36 | | -79 | -47 | -81 | -74 | -64 | 29 | 0 |
| 3 | Country X | 4/7/2020 | 132 | 1265 | 3 | 39 | 132.33 | -77 | -41 | -78 | -71 | -62 | 31 | 0 |
| 4 | Country X | 4/8/2020 | 186 | 1451 | 4 | 43 | 136.67 | -77 | -41 | -81 | -71 | -54 | 27 | 0 |
| 5 | Country X | 4/9/2020 | 92 | 1451 | 1 | 44 | 127.00 | -83 | -54 | -87 | -76 | -52 | 26 | 0 |
| 6 | Country X | 4/10/2020 | 103 | 1554 | 4 | 48 | 89.67 | -75 | -41 | -77 | -70 | -60 | 26 | 0 |
| 7 | Country X | 4/11/2020 | 74 | 1628 | 8 | 56 | 88.00 | -82 | -30 | -72 | -64 | -59 | 25 | 0 |
| 8 | Country X | 4/12/2020 | 87 | 1715 | 7 | 63 | 80.33 | -82 | -28 | -69 | -63 | -58 | 24 | 0 |
| 9 | Country X | 4/13/2020 | 80 | 1795 | 9 | 72 | 115.67 | -83 | -30 | -75 | -67 | -63 | 27 | 0 |

5. Make sure data in columns align.

- Data from different sources might have different start/end dates. Make sure that all columns (including those with formulas) have values entered in the corresponding dates (except for the 3-day mov. avg., in which the first and last rows should be empty)
- A graph will be generated automatically containing the incidence and community mobility data

6. Copy image from Excel template into PowerPoint.

7. Manually insert lines and text boxes on the graph for the mitigation measures.

For any questions, please contact the International Task Force at eoevent223@cdc.gov.