

FluMOMO v4.2 Standard Operating Procedure

FluMOMO v4.2 is available in both Stata and R, setup, running and output is the same for both. Hence, the instructions below cover both packages.

Changed v4.1 to v4.2

Weather/temperature data can now be downloaded from the EuroMOMO website. The former sources is not available any longer.

NOTE: FluMOMO v4.2 cannot use weather data from the former source.

The FluMOMO v4.2 program can download temperature data automatically.

NUTS0 country code has been added as needed information in the setup.

All input and output files have been changes to be “;” separated txt-files.

Except, for the A-MOMO complete data file, which is still “,” separated, but a txt-file.

Limitations:

The Stata version was coded in Stata version 14, and have not been tested in any other version.

The R version was coded in R version 3.5.0, and have not been tested in any other version.

The output from the Stata and the R versions are the same, but there may be slight differences due to rounding. There are also slight differences in the graphic designs.

Install the FluMOMO v4.2 programs:

1. Create the general folder (work directory) for your FluMOMO program files
2. Download and place the program files: **FluMOMO_v42**, **Estimation_v42**, **Output_txt_v42**, **Output_IA_ET_v42**, **Output_calendar_v42** and **Output_cumulated_v42** files here
3. Create a subfolder called **data**, for input data

Note: The R version demand some R-packages to be installed, which is a onetime action. Commands to do this are at the top of the R-program FluMOMO_v42. Remove the #'s and run.

Input datasets

All input data must be placed in the subfolder **data**.

Number of deaths (mandatory)

This must be aggregated number of deaths per week and age group.

These data can be:

- from A-MOMO
Save the complete A-MOMO output file you want to use (EUROMOMOV4-3-COMplete-[Your country name]-[year]-[week]) in the input directory, data.

Rename it to: **A-MOMO data.txt**.

You may use a later A-MOMO output file to bypass delay-adjustment.

- self-provided

Provide a txt-file (“;” separated) containing number of deaths (deaths) **by age group, year, week** (i.e. *year, week, agegrp: 0 = 0-4, 1 = 5-14, 2 = 15-64, 3 = 65+, 4 = total*).

Save in the input directory, data, as **deaths.txt**

Population (optional)

If you have population figures (N) on age group, year and week, then they can be included in the estimation, and mortality rates will be calculated.

Estimated number of deaths associated to IA and ET will always be calculated, but if you have population figures, mortality rates will also be created.

Save a txt-file (“;” separated) with population figures (agegrp, year, week, N) in the input directory, data, as **population.txt**

Influenza Activity data (mandatory)

A txt-file (“;” separated) containing indicators for weekly Influenza Activity (IA) **by age group** (i.e. *IA, week, year, agegrp: 0 = 0-4, 1 = 5-14, 2 = 15-64, 3 = 65+, 4 = total*) and save it in the input directory, data, as **IA.txt**

If you do not have information about IA for each age group, you can use the same over-all for each age group.

The variable called ‘IA’, describing the influenza activity may be ILI, ARI, Positive Percent or (preferable) the Goldstein Indicator (ILI*positive percent).

Temperature data (mandatory)

Weather data from NOAA combined with NUTS3 population data from EuroSTAT can be downloaded from <http://www.euromomo.eu/methods/weather/weather.php>.

- Weather data from <http://www.euromomo.eu/methods/weather/weather.php> can be downloaded automatically by the FluMOMO program (see setup)
- Or it can be manually downloaded or obtained from other sources.
A txt-file (“;” separated) having at least the variables date, pop3, NUTS3 and temp, and named **wdata_countrycode.txt** must be placed in the input directory, data.

NOTE

- Each input datasets must cover at least the calendar period of interest.
- There must be a record for all weeks in the calendar period (no holes).
If for example there are no IA, then the record may have either IA=0 or IA=missing.
- Age groups must be numbers: 0 (0-4), 1 (5-14), 2 (15-64), 3 (65+), 4 (Total)
- The datasets are merged on age group, year, week (only year, week for temperature data) and only data common for all is used.

Setup of FluMOMO

Open the program FluMOMO_v42

1. Write name of your country
2. Write your NUTS0 country code
3. Define the work directory: wdir (see installation 1.)
4. Define study period by start_year, start_week and end_year, end_week
 - It is recommended to use maximum a 5 year/season period, and minimum a 3 year/season period
5. Define if deaths input data will be from A-MOMO output or a self-provided file
 - see Input datasets, Number of deaths
6. Define if weather/temperature data should be automatically downloaded or you provide a “;” separated txt-file
 - see Input datasets, Temperature data
7. Define if an input file with population data is available
 - if available, mortality output will also be created
 - see Input data, Population
8. Define if output should be restricted to positive effects of IA
 - The FluMOMO model may estimate negative i.e. life saving, effects of IA in some weeks, which is biologically implausible. Hence, we recommend excluding them from the output. For further details, see model description.
 - All outputs restricted to positive effects of IA will be marked ..._IArestricted
9. Define number of lagged effects of IA and ET to be included in the model
 - we recommend 2 weeks for both

Please don't change anything else in the program FLUMOMO_v42, or any of the other programs.

Run FluMOMO_v42

Run the FluMOMO program, this will run all the program files, and create all outputs

A new sub directory: **FluMOMO_end_year***wend_week* will be created, with two subdirectories:

- data - containing a copy of all input data
- output - containing all outputs

FluMOMO_v42 output

Note: If restricted to positive IA effect, then all output have the extension ..._IArestricted

Cumulated deaths attributable to IA and ET

Three txt-files (“;” separated) containing cumulated number of deaths attributable to IA (cAI) and ET (cET) with 95% confidence intervals, plus cumulated excess number of deaths relative to the baseline (excess), and cumulated residual excess relative to the full model including both IA and ET (uexcess):

- summer_deaths_v4.txt
 - covering week 21 to and including week 39 each year
- winter_deaths_v4.txt
 - covering week 40 to and including week 20 the following year
- year_deaths_v4.txt
 - covering the calendar year, week 1 to and including week 52/53

Cumulated mortality attributable to IA and ET

Note: Only if file with population is available (see setup)

Three txt-files (“;” separated) containing cumulated mortality rates attributable to IA (cAI) and ET (cET) with 95% confidence intervals, plus cumulated excess mortality relative to the baseline (excess), and cumulated residual excess relative to the full model including both IA and ET (uexcess):

- summer_mr_v4.txt
 - covering week 21 to and including week 39 each year
- winter_mr_v4.txt
 - covering week 40 to and including week 20 the following year
- year_mr_v4.txt
 - covering the calendar year, week 1 to and including week 52/53

Graphs showing IA and ET

Temperature_v4.png

- Graph showing ambient temperatures and excess temperatures (ET) used in the FluMOMO model.

IA_agegroups_v4.png

- Influenza Activity (IA) used in the FluMOMO model, by age group

For each age group (a): 0=0-4, 1=5-14, 2=15-64, 3=65+, 4=Total

- IA_agegroup_a_v4.png

Graphs showing deaths over calendar time

deaths_agegroups_v4.png

- graph showing observer number of deaths, baseline, and effects of IA and ET, by age group

For each age group (*a*): 0=0-4, 1=5-14, 2=15-64, 3=65+, 4=Total
 - deaths_agegroup_a_v4.png

Graphs showing mortality over calendar time

Note: Only if file with population is available (see setup)

mr_agegroups_v4.png

- graph showing observer mortality rate, baseline, and effects of IA and ET, by age group

For each age group (*a*): 0=0-4, 1=5-14, 2=15-64, 3=65+, 4=Total

- mr_agegroup_a_v4.png

Graphs showing cumulated deaths attributable to IA

For each *period*: summer, winter and calendar year, by age group

- cumulated_IA_deaths_period_agegroups_v4.png

For each age group (*a*): 0=0-4, 1=5-14, 2=15-64, 3=65+, 4=Total

- cumulated_IA_deaths_period_agegroup_a_v4.png

Graphs showing cumulated mortality attributable to IA

Note: Only if file with population is available (see setup)

For each *period*: summer, winter and calendar year, by age group

- cumulated_IA_mr_period_agegroups_v4.png

- cumulated_IA_mr_period_agegroup_a_v4.png

TXT- file ("," separated) with total output data: [country]_output_v4.txt

Variable	
country	Your country, as defined
IArestricted	1 if restricted to only positive IA effects
Agegrp	age group (0=0-4, 1=5-14, 2=15-64, 3=65+, 4=total)
Year	ISO year
Week	ISO week
Deaths	number of deaths
Vdeaths	Overdispersed variance of number of deaths
N	Population, 1 by default
IA	Influenza Activity
ET	Extreme Temperatures
EB	Baseline
EB_95L	Lower 95% baseline reference interval
EB_95U	Upper 95% baseline reference interval
VB	Residual baseline variance
EIA	Mean effect where ET is excluded

VIA	Variance of EIA
EET	Mean effect where IA is excluded
VET	Variance of EET
EdIA	Mean number of deaths attributable to IA = EIA - EB
EdIA_95L	Lower 95% EdIA confidence interval
EdIA_95U	Upper 95% EdIA confidence interval
EdET	Mean number of deaths attributable to ET = EET - B
EdET_95L	Lower 95% EdET confidence interval
EdET_95U	Upper 95% EdET confidence interval
cexcess_year	Cumulated excess, observed - EB
cuexcess_year	Cumulated unexplained excess = observed - (EB + EdIA + EdET) If IArestricted = 1, then observed - (EB + max(0,EdIA) + EdET)
cEdIA_year	Cumulated Mean number of deaths attributable to IA (EdIA) If IArestricted = 1, then cumulated over max(0,EdIA)
cEdIA_year_95L	Cumulated Lower 95% cEdIA confidence interval
cEdIA_year_95U	Cumulated Upper 95% cEdIA confidence interval
cEdET_year	Cumulated mean number of deaths attributable to ET (EdET)
cEdET_year_95L	Cumulated lower 95% cEdET confidence interval
cEdET_year_95U	Cumulated upper 95% cEdET confidence interval
summer	Year of the summer (20 < week < 40)
cexcess_summer	Cumulated excess = observed - EB
cuexcess_summer	Cumulated unexplained excess = observed - (EB+EdIA+EdET)
cEdIA_summer	Cumulated Mean number of deaths attributable to IA (EdIA) If IArestricted = 1, then cumulated over max(0,EdIA)
cEdIA_summer_95L	Cumulated Lower 95% cEdIA confidence interval
cEdIA_summer_95U	Cumulated Upper 95% cEdIA confidence interval
cEdET_summer	Cumulated mean number of deaths attributable to ET (EdET)
cEdET_summer_95L	Cumulated lower 95% cEdET confidence interval
cEdET_summer_95U	Cumulated upper 95% cEdET confidence interval
winter	Start year og the winter (40 ≤ week or week ≤ 20)
cexcess_winter	Cumulated excess = observed - EB
cuexcess_winter	Cumulated unexplained excess = observed - (EB+EdIA+EdET)
cEdIA_winter	Cumulated Mean number of deaths attributable to IA (EdIA) If IArestricted = 1, then cumulated over max(0,EdIA)
cEdIA_winter_95L	Cumulated Lower 95% cEdIA confidence interval
cEdIA_winter_95U	Cumulated Upper 95% cEdIA confidence interval
cEdET_winter	Cumulated mean number of deaths attributable to ET (EdET)
cEdET_winter_95L	Cumulated lower 95% cEdET confidence interval

cEdET_ winter _95U	Cumulated upper 95% cEdET confidence interval
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