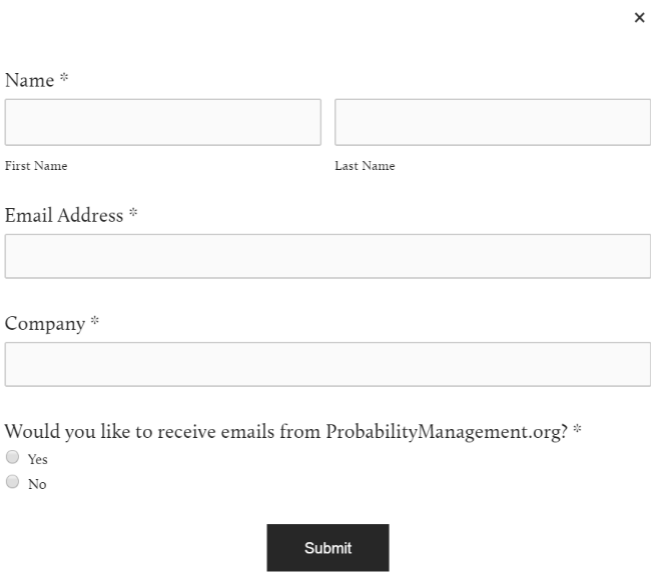
EXCEL INSTRUCTIONS FOR MONTE CARLO SIMULATIONS (GEN, August 2020)

INSTALLATION

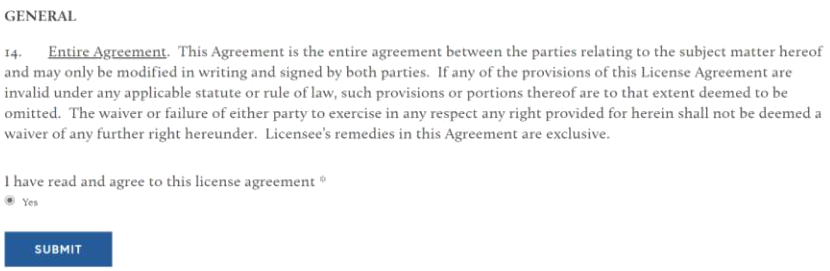
1. Use the plugin from https://www.probabilitymanagement.org/tools-1 .

2. Select one of the options based on your OS

3. A pop up will ask for basic information. After you add it, click submit.



4. **For Mac:**
   You will see a link to download:


GENERAL

14. Entire Agreement. This Agreement is the entire agreement between the parties relating to the subject matter hereof and may only be modified in writing and signed by both parties. If any of the provisions of this License Agreement are invalid under any applicable statute or rule of law, such provisions or portions thereof are to that extent deemed to be omitted. The waiver or failure of either party to exercise in any respect any right provided for herein shall not be deemed a waiver of any further right hereunder. Licensee's remedies in this Agreement are exclusive.

I have read and agree to this license agreement *

Yes

SUBMIT

- The link asks for you to agree and submit.
- Click 'SUBMIT' if you agree to the agreement.
- Click on the link to download:

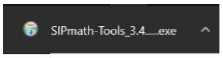

Download for Mac (Excel 2016 or newer)

- Open the zip file to access the downloaded plugin:

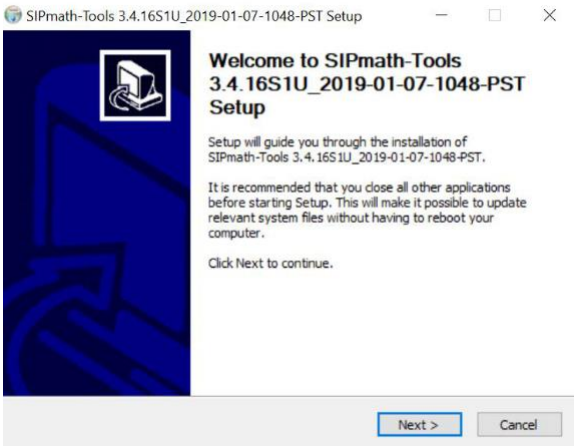
5. **For Windows:**
   You will see a link to download:


Download for Windows (Excel 2010 and Newer)

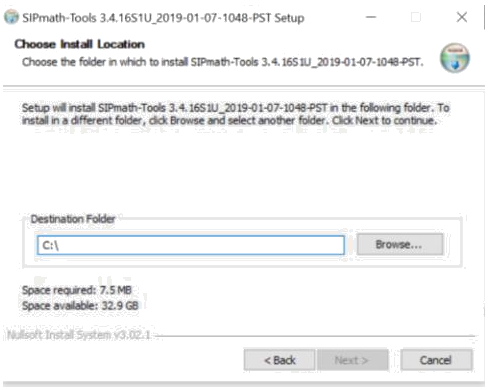
- Click on the .exe file to initiate installation:



- Click on 'Next' to begin the setup:



- The setup will display the license agreement. Click 'I Agree' if you agree and want to install.
- Choose the installation file folder by giving a file path:

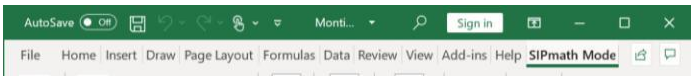


- Click on ‘Install’ to initiate installation.

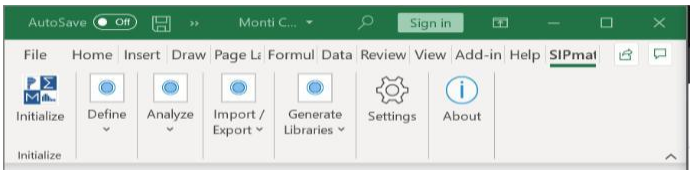
USING THE TOOL FOR MONTE CARLO

(*More advanced activity may require learning about this tool . You can use following link https://www.probabilitymanagement.org/tools-1)

1. For ‘R0’, ‘Infection Fatality Rate’ and ‘Weeks from Infection to Death’ input in cells A15, A15 and A17, select the ‘Low’, ‘Likely’ and ‘High’ values from the drop down option in each cell.
2. The inputs need to satisfy following conditions:
   ‘Low’<=’Likely’
   ‘Likely’<‘High’
3. Add the ‘Latest Weekly Data’ in cell B22.
   By Default, the weeks are ending on ‘20-Apr-20’
4. In toolbar, click on’SIPmath Model’



5. Click on ‘Initialize’ in the menu.



6. You will be asked Number of trials, which have been set at 1000 by default. Click ‘OK’ after selecting the number of trials.

7. In case you want to update the last week for simulation:
   - Change the last weekly data in cell B22 the simulation will update the forecasts automatically.
   - Change the Weeks given in cells C33:R33 and R6:R24
   - The new forecast will begin with the week after last weekly data was put. Example: if the weekly data input is for week ending April 20th, the forecast will begin with week ending April 27th (immediate next week).

FINDING THE FORECAST WEEK FROM MONTE CARLO OUTPUT

1. Find the state wise threshold for the number of deaths from flu and pneumonia annually in the US.
    - The Highest annual death rate for US in last decade has been 150/1million.(We are using it as default).
    - Since flu is seasonal in nature, the flu related deaths are assumed to be concentrated in few months of the year.
    - Therefore, the annual US death rate of 150/1million is assumed to be concentrated in 2-4 months of the year.
    - We therefore have multiplied the death rate by factor of 3.
    - The death rates can be varied based on data from each state.
    - To find the threshold death rate per week for each state, we have used following formula:

    Weekly Threshold = 450 * (Population of state) * 7 / 365

    Example: The population of Washington is 7.61m and New York is 19.45m. Their threshold is:

    X1 – 7.61 (WA) >> X1 = 450 * 7.61 * 7 / 365= 65.7099

    X2 – 19.45 (NY) >> X2 = 450 * 19.45 * 7 / 365=167.8821

2. From the Monte Carlo forecast table, find the week where the weekly death is below the average flu related deaths in the state per week. We have used 50%ile output for our prediction.