# CODECHECK Report


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|---|---|
| **Title** | Integrating agent-based disease, mobility, and wastewater models: Dealing with differences in spatiotemporal resolutions. |
| **Authors** | Néstor DelaPaz-Ruíz, Ellen-Wien Augustijn, Mahdi Farnaghi, Shaheen A. Abdulkareem, Raul Zurita-Milla |
| **Reference** | Preprint in Geospatial Health (Paper link) |
| **Codechecker** | Amira Al Balushi (ORCID ID: 0009-0002-8188-6271)<br>Angelina Momin (ORCID ID: 0000-0002-6875-1551)<br>Jasper van Doninck (ORCID ID: 0000-0003-2177-7882) |
| **Date of check** | 2024-09-26 15:00:00 |
| **Summary** | Codecheck performed on the .nlogo and .Rproj files to generate Figures 2-6 of the paper. The resulting figures were not an exact match due to stochasticity. However, the overall patterns of the figures were similar to the patterns of the paper's figures |

Table 1: CODECHECK summary

## Summary

The codecheck was performed using Windows system. We ran into multiple issues when trying to setup using MacOS.

For Windows, the reproduction of the paper's figures was relatively straightforward besides a few issues encountered in the setup. We were able to reproduce Figures 2, 4, 5 and 6. Although they were not an exact match with the Figures in the paper due to stochasicity, the overall pattern in the figures we generated were consistent with the figures in the paper.

For Figure 3, the files only generated one subplot, particularly Figure 3d, out of four subplots shown in the paper. We did not attempt changing parameters to generate the remaining three subplots of Figure 3.

| Generated figure | Corresponding paper figure | Size |
|---|---|---|
| Figures/figure_2.png | Figure 2 | 57 KB |
| Figures/figure_3d.png | Figure 3d | 20 KB |
| Figures/figure_4.png | Figure 4 | 12 KB |
| Figures/figure_5.png | Figure 5 | 41 KB |
| Figures/figure_6a.png | Figure 6a | 86 KB |
| Figures/figure_6b.png | Figure 6b | 45 KB |

Table 2: Summary of output files generated

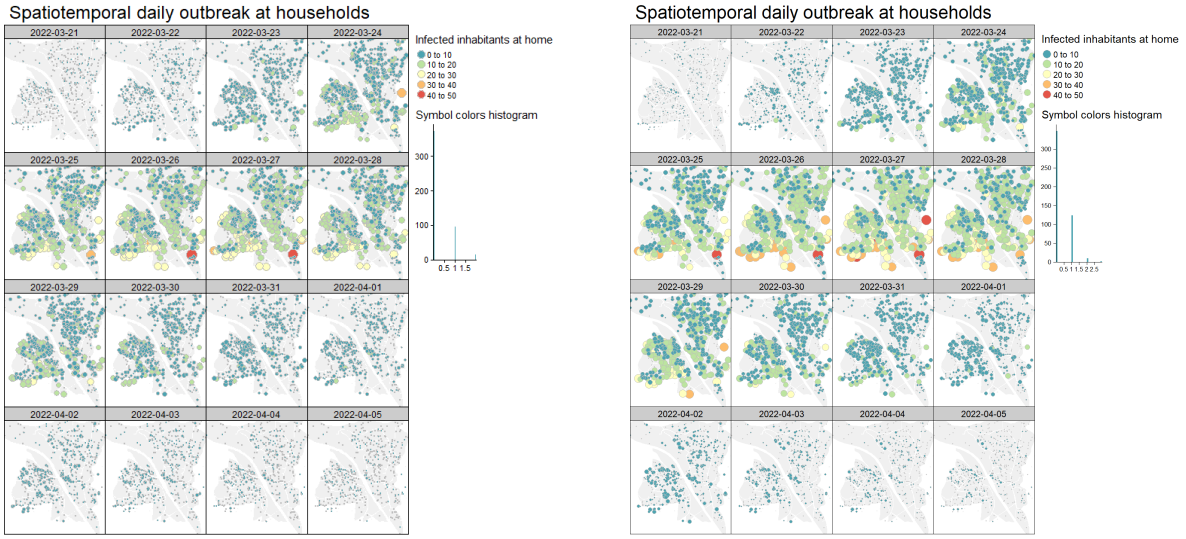


Figure 1: Comparison between CODECHECK generated (left) and original Figure 2 (right)

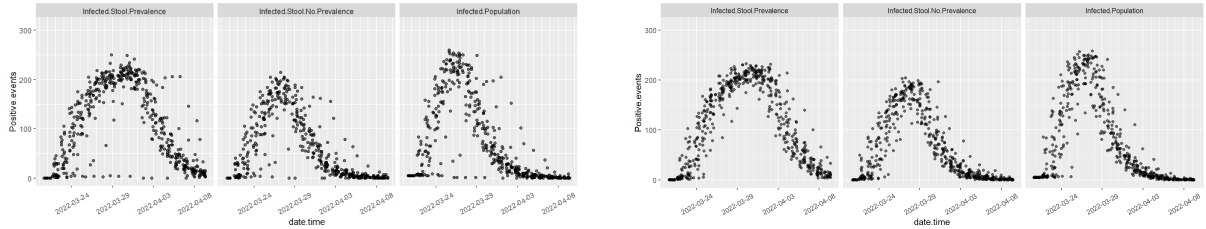


Figure 2: Comparison between CODECHECK generated (left) and original Figure 3d (right)

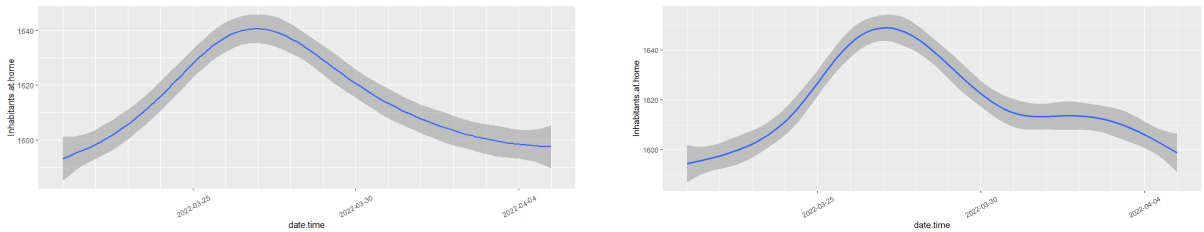


Figure 3: Comparison between CODECHECK generated (left) and original Figure 4 (right)

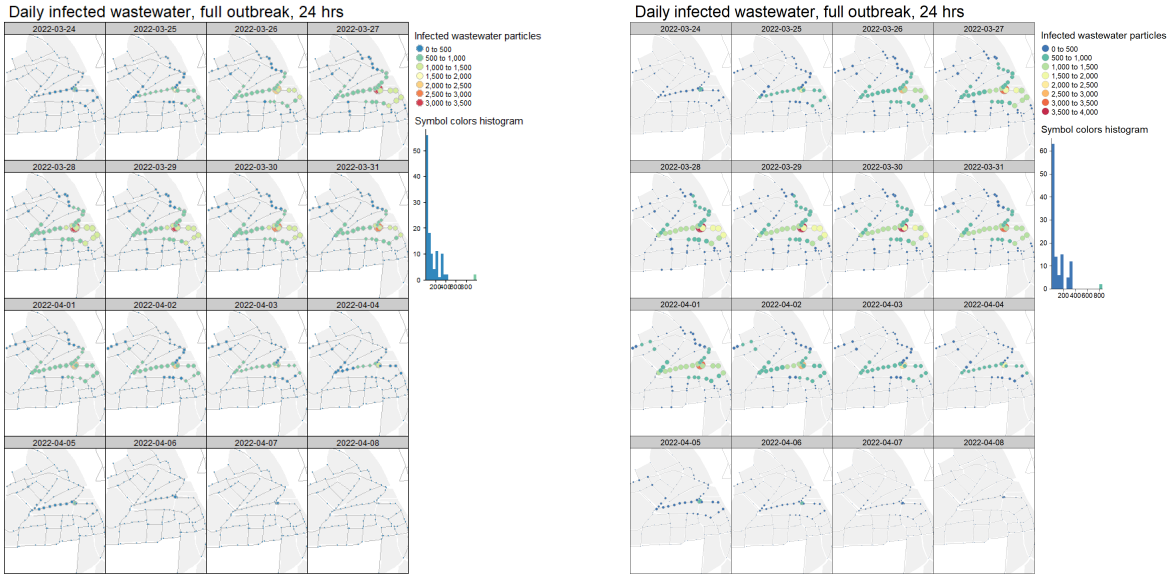


Figure 4: Comparison between CODECHECK generated (left) and original Figure 5 (right)

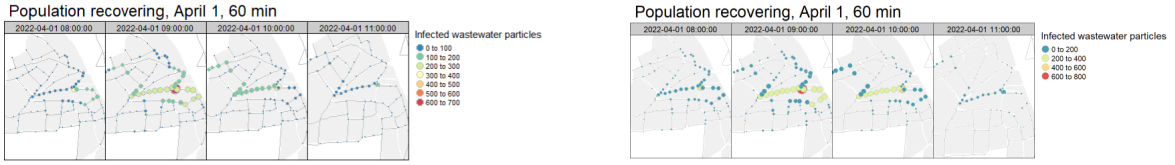


Figure 5: Comparison between CODECHECK generated (left) and original Figure 6a (right)

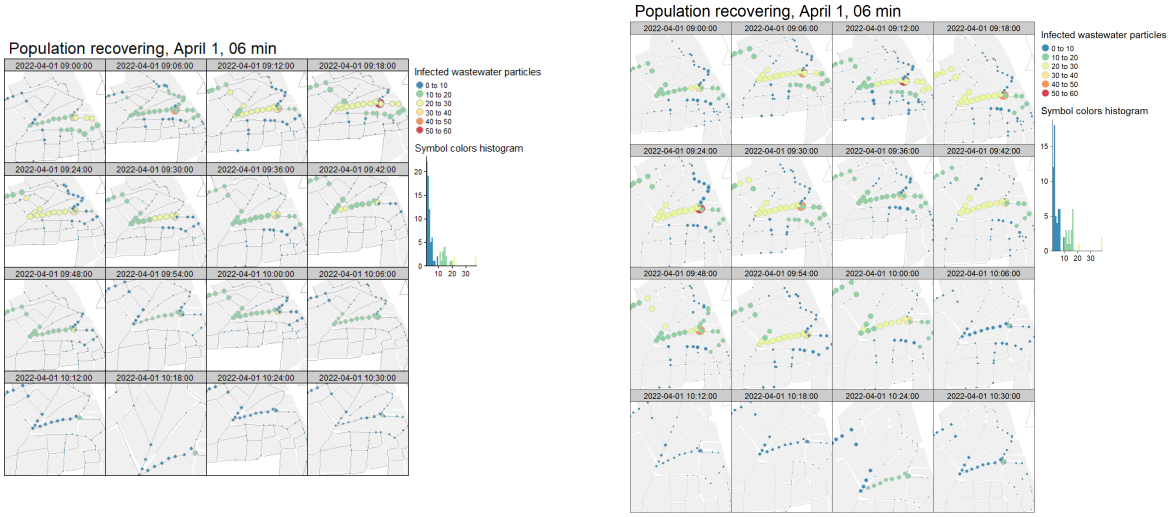


Figure 6: Comparison between CODECHECK generated (left) and original Figure 6b (right)

# CODECHECKER Notes

## Using Windows OS

### Pre-requirements

- After pasting the `NetLogo.cfg` file as per the `README` instructions, NetLogo no longer works. This is because of the mismatch in the NetLogo versions written on the `README.md` on GitHub and the version users are asked to install.

### Quick reproducibility

- In step 1 of the `README.md` we encountered an error when executing the second command. After cloning the repository to a new directory, the directory needed to be changed to run second command successfully.

### Code performance

- All 25 runs of the NetLogo simulation was successfully.
- The RProj file ran as expected without any issues. Installing and updating the libraries took a long time.

### Figure validation

The figures we generated were a close but not an exact match with the paper's figures. The overall patterns of the two set of figures matched.

We spoke to one of the authors of the paper to ask whether such a result was expected. He said that an exact match is unlikely as the method and simulation on NetLogo are generally based on stochasticity. Additionally, random functions are applied.

- Figure 2, 4, 5, 6a, and 6b: All figures were reproduced successfully.
- Figure 3: One of the four subplots was successfully generated, in particular subplot d. Additional NetLogo simulations with different parameter sets are required to reproduce the remaining three subplots.

### Using Mac OS

#### Pre-requirements

When you download NetLogo for macos from the website, it downloads a `.dmg` file. Opening this `.dmg` file opens a local disk folder (see image below). However you cannot edit the `netlogo.cfg` file in this location because it is a read only system. Without editing the RAM in the `netlogo.cfg` file then the simulation will stop midway (atleast that was my case where the simulations stopped at 00:25 or so.

The NetLogo folder needed to be moved to applications and only then could the `netlogo.cfg` file be edited.

#### Code performance

- The NetLogo simulation ran fine without any errors.
- We could not successfully run the `.RProj` file. There were issues with installing the `nlme` package. We encountered an error stating that

  > *R was unable to find the gfortran binary.*

#### Figure validation

No figures could be generated on the Mac OS because we could not successfully run the `.Rproj` file.

## Recommendations

To improve reproducibility it would be helpful to make the scripts generate all four subplots of Figure 3.

For better readability we would recommend the following changes in the Github `README.md` file:

- Include instructions for MacOS users.
- Add a disclaimer that running the NetLogo simulation might result in errors on machines with insufficient memory.
- Add a disclaimer on how long it takes to install dependencies in the `.RProj` file. It took us more than 5 minutes to install the dependencies.
- Add hyperlinks to the file instead of naming the files. This way users can be redirected to the correct file with direct clicks:

  [Link Text](relative-or-absolute-path-to-file)

- Differentiate file names from snippets of code by using different stylizing elements for each. For example using backticks for the file names and using bash highlighting for snippets of code.

## Acknowledgements

We would like to express our gratitude to Néstor DelaPaz-Ruíz for guiding us in how to use NetLogo and helping us troubleshoot throughout the CODECHECK process.