

Variable name structure

Estimates of (1) Daily Deaths, (2) Total Deaths, (3) Daily Cases (incident or prevalent), and (4) Total Cases (incident) from component studies, are the primary outcome variables of interest in this review. Hospital-related and other outcomes from component studies are the secondary outcome variables.

Primary variables were taken from component studies. Secondary variables were calculated in this review. In order to facilitate data management, the primary variables were `-rename-` d or `-renvar-` ed using the variables from component studies according to following conventions. The same set of conventions were adhered to in naming all outcome variables.

As described below through an example, primary variable names have 7 parts, each part denoting one piece of info about the variable.

All the variables have descriptive var `-label-` s that show what the variable stores.

`Stata` commands are displayed as `-command-` and `Stata` non-command syntax as `-syntax-`.

Variable names

Primary outcome variable names:

Example:

TotDeaMeRaA01S00V03

1234567890123456789

-varname- has 19 positions.

Tot...Dea...Me....Ra.....A01.....S00.....V03

1-3...4-6...7-8...9-10...11-13...14-16..17-19

- Positions 1-3: Tot or Day: Total (cumulative) or Daily
- Positions 4-6: Dea, Cas, or Act: Dea for Deaths, Cas for incident Cases, or Act for Active cases (for primary outcomes; for secondary outcomes see below)
- Positions 7-8: Me, Lo, or Up: Mean, Lower, or Upper (uncertainty bound)
- Positions 9-10: Ra or Sm: Raw (not smoothed) or Smoothed
- Positions 11-13: A00 to A05: Component study number (see details below)
- Positions 14-16 S??: Scenario number within component study (see details below)
- Positions 17-19: V??: Version of the model in component study (see details below)

Version of the model in component study is the only part that is fixed within each component study in this review.

The example primary variable name, TotDeaMeRaA01S00V03, denotes Total Deaths, mean, raw, DELPHI, single scenario, model version 3.

Secondary outcome variable names:

- Positions 4-6 in variable name can be, for instance, *Act*, that means *Active cases* [in study *DELP*]
- Positions 4-6: meaning [study]
- Act: Active cases [DELP]
- Adm: Admissions (hospital admissions by day) [IHME]
- Bed: Bed need (covid beds needed by day) [IHME]
- Beo: Bed over ([covid all beds needed] - ([total bed capacity] - [average all bed usage])) [IHME]
- Hod: Hospital Demand [IMPE]

- Hos: Hospitalized [DELP]
- Hoi: Hospital incidence [IMPE]
- Icd: ICU Demand [IMPE]
- Ici: ICU incidence [IMPE]
- Icn: ICU new (number of new people going to the ICU by day) [IHME]
- Ico: ICU over ([covid ICU beds needed] - ([total ICU capacity] - [average ICU bed usage])) [IHME]
- Icu: ICU need (ICU covid beds needed by day) [IHME]
- Pre: Prevalence [IMPE]
- Ref: R effective [IMPE]
- Rtt : R t [IMPE]
- Ser: Seroprevalence (seroprevalence) [IHME]
- Tes: Tests (total tests) [IHME]
- Ven: Ventilated [DELP]
- Ven: Vent need (invasive Ventilation needed by day) [IHME]

Example: The -varname- DayIcdMeRaA03S01V07 carries -varlabel- "Daily ICU demand Mean A03 S01 V07". It is the daily ICU demand, mean estimate, in study A03 (IMPE), scenario 1, model version 7.

Secondary variable names:

Secondary variables have 3 subtypes: (1) store values and dates of peaks, (2) store a calculated daily CFR, (3) store values created for visualization of temporal succession of daily cases and daily deaths peaks.

(1) store values and dates of peaks

Positions 20-22 are related to values and dates of peaks (or other time points) of daily deaths

and daily cases, ending in the following three characters: P??

- Positions 20-22: P??
- Position 20 P: Peak (or other time point)
- Position 21 ?: Number of peak (or other time point). 0: One peak (only one peak shown), 1: Peak 1, 2: Peak 2, 3: Peak 3, 4: Peak 4, 5: Start of plateau after peak three (in JOHN), 6: Start of increase after peak three (in JOHN), 7: Start time (of provided estimates), 8: End time (of provided estimates)
- Position 22: V or D: Value or Date (of estimate)

Example:

In DayDeaMeRaA01S00V03P0D, P0D denotes "One peak, Date", and the whole variable name DayDeaMeRaA01S00V03P0D denotes Date of one peak shown in DayDeaMeRaA01S00V03.

Example:

In DayDeaMeRaA01S00V03P0V, P0V denotes "One peak, Value", and the whole variable name DayDeaMeRaA01S00V03P0V denotes Value of one peak shown in DayDeaMeRaA01S00V03.

(2) store a calculated daily CFR

- Positions 4-6 read as CFR.

Example:

DayCfrMeRaA00S00V00 "Daily CFR JOHN"

(3) store values created for visualization of temporal succession of daily cases and daily deaths peaks

- CaM: (Cases Mean) Daily Cases Mean (within each country in EMR) [JOHNEMR]
- CbD (Cases by Deaths) "Daily cases mean div by daily deaths mean JOHN" [JOHNEMR]
- DeM: (Deaths Mean) Daily Deaths Mean (within each country in EMR) [JOHNEMR]
- DayDeamultip "Daily deaths scaled (times means of cases by deaths) only for visualization JOHN" [JOHNEMR] This one is a deviation from the overarching nomenclature rules.

Component study number:

A00 JOHN Johns Hopkins

A01 DELP DELPHI (Differential Equations Leads to Predictions of Hospitalizations and Infections)

A02 IHME Institute for Health Metrics and Evaluation

A03 IMPE Imperial College

A04 LANL Los Alamos National Laboratory

A05 SRIV Srivastava

A06 SOLT Soltani

A07 GHAN Ghanbari

References for component studies

A00 JOHN Johns Hopkins University. Coronavirus resource center.
<https://coronavirus.jhu.edu/map.html>

A01 DELP COVID Analytics. DELPHI epidemiological case predictions. Cambridge: Operations Research Center, Massachusetts Institute of Technology
<https://www.covidanalytics.io/projections>

A02 IHME Institute for Health Metrics and Evaluation (IHME). COVID-19 mortality, infection, testing, hospital resource use, and social distancing projections. Seattle: Institute for Health Metrics and Evaluation (IHME), University of Washington. <http://www.healthdata.org/covid>

A03 IMPE MRC Centre for Global Infectious Disease Analysis (MRC GIDA). Future scenarios of the healthcare burden of COVID-19 in low- or middle-income countries. London: MRC Centre for Global Infectious Disease Analysis, Imperial College London. <https://mrc-ide.github.io/global-lmic-reports>

A04 LANL Los Alamos National Laboratory (LANL). COVID-19 cases and deaths forecasts. Los Alamos: Los Alamos National Laboratory (LANL). <https://covid-19.bsvgateway.org>

A05 SRIV University of Southern California (USC). COVID-19 forecast. Los Angeles: University of Southern California. <https://scc-usc.github.io/ReCOVER-COVID-19>

A06 SOLT Soltani K, Rezazadeh G. A New Dynamic Model to Predict the Effects of Governmental Decisions on the Progress of the CoViD-19 Epidemic. arxiv preprint. Submitted on 15 Aug 2020. <https://arxiv.org/abs/2008.11716>

A07 GHAN Ghanbari B. On forecasting the spread of the COVID-19 in Iran: The second wave. Chaos Solitons Fractals. 2020 Nov;140:110176. doi: 10.1016/j.chaos.2020.110176. Epub 2020 Jul 28. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7386426/>

Scenario number within component study

[Names within brackets assigned by this review study.]

- **A00 JOHN**

- S00 = [Not Applicable]

- **A01 DELP**

- S00 = [Single scenario]

- **A02 IHME**

- S01 = Reference scenario [Status Quo]
- S02 = Best scenario (Universal masks) [Best]
- S03 = Worse scenario (Mandates easing) [Worst]

- **A03 IMPE**

- S01 = Additional 50% Reduction [Best]
- S02 = Current level of interventions [Reference]
- S03 = Relax Interventions 50% [Worst]
- S04 = Surged Additional 50% Reduction [Best, Surged]
- S05 = Surged Maintain Status Quo [Reference, Surged]
- S06 = Surged Relax Interventions 50% [Worst, Surged]

- **A04 LANL**
- S00 = [Single scenario]
- **A05 SRIV**
- S00 = [current]
- **SOLT Soltani**
- S01 = Reopening scenario 1 = [Percentage of population "free from quarantine" upon reopening at lowest point between second and third peaks (about 2020-09-01) is 35% and at lowest point between third and fourth peaks (about 2021-03-01) is 20%].
- S02 = Reopening scenario 2 = [Percentage of population "free from quarantine" upon reopening at lowest point between second and third peaks (about 2020-09-01) is 32% and at lowest point between third and fourth peaks (about 2021-03-01) is 22%].
- **GHAN Ghanbari**
- Ghanbari has two subtypes of Daily Cases, “Density of the infected population with a strong immunity system”, and “Density of the infected population with a weak immunity system or with a historical medical illness as diabetic, blood pressure, heart issue, and others.”
[*verbatim*] Each subtype is presented with 18 different values (aka model subtypes) based on different values of three parameters in their model. The median scenario, first subtype was selected for digitalization. It is the model subtype number 9 out of 18 subtypes [named S09 here], with the following details. Model subtype parameter: $\gamma_1 = 0.09$, where γ_1 is recovery rate in population subtype 1. Time point: Second peak. Estimate type: Mean. Peak value mentioned: 897,264. Peak date Solar: 1399-11-30. Peak date Gregorian: 2021-02-18. Source: Fig 4a, green curve.

Version of the model in component study

- A00 JOHN = V00 [Version Not Applicable; updates daily]
- A01 DELP = V03
- A02 IHME = V03
- A03 IMPE = V07
- A04 LANL = V02

- A05 SRIV = V00 [Version Not Mentioned; or could not be located]
- A06 SOLT = V00 [Version Not Applicable; non-updating study]
- A07 GHAN = V00 [Version Not Applicable, non-updating study]

Note: Johns Hopkins, obviously not an "estimation study", is used as a benchmark gauge of the *under-reported* so-called "Ground Truth".

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