Methods Report on age and sex modeling of COVID-19 excess mortality

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Introduction

Summary of approaches taken

Data

Here data sources for deaths and exposures should be presented. I only add the table and items I presented in the talk.

- Criteria for selecting sources/year:
  - 2020 must be available
  - 2015-2019 when coming from the same source
  - prioritize source coherence with respect to longer periods
  - preference for more detailed age-groups
- Sources for the exposures: UN WPP (single year of age)
- Age-range: 0-100

Methods

For ease of presentation, we formulate the model on a given population, both sexes combined. Sex-specific estimations will be presented in the next sub-section

We suppose that we have deaths from different sources and in general they are provided by age-groups

, and exposures to risk, arranged in two ma- trices, Y = (yij) and E = (eij),

```
load("Outputs/OutPrepandemic2020.Rdata")
ls()
```

```
##   [1] "age.gr1"      "age.gr2"      "age.low.i"    "age.up.i"     "betas"
##   [6] "C"            "c.hat"        "c.hatL"       "c.hatU"       "C1"
```

Source	# of populations	2020	
		Total # deaths	Mean # of age-groups
WHO	13	6.6	19
STMF	27	4.6	18
Statistical bureaus	7	4.0	78
Eurostat	9	1.3	19
UN PD	11	0.5	20
Totals	67	6.6	25

```
##  [11] "C2"           "coeff"        "col1"         "col1T"        "col2"
##  [16] "col2T"        "colc"         "colcou"       "colcouT"      "colcT"
##  [21] "cold"         "coldT"        "Ddelta"       "delta.hat"    "delta.hatL"
##  [26] "delta.hatU"   "Deta1"        "diagVbetas"   "dif.eta"      "e1"
##  [31] "E1"           "e1g"          "e2"           "e2g"          "EE"
##  [36] "EE.i"         "EE0"          "EE1"          "eta"          "eta.old"
##  [41] "eta.st"       "eta1.hat"     "eta1.hatL"    "eta1.hatU"    "eta2.hat"
##  [46] "eta2.hatL"    "eta2.hatU"    "fit1.0"       "fit2.0"       "G"
##  [51] "G1"           "G2"           "gamma"        "GpP"          "H"
##  [56] "H0"           "i"            "it"           "j"            "kappa"
##  [61] "lambda.delta" "lambda.eta1"  "len1"         "len2"         "LHS"
##  [66] "lmx1g"        "lmx2g"        "low1"         "low2"         "m"
##  [71] "max.it"       "mu"           "n1"           "n2"           "nt1"
##  [76] "OUT"          "OUT.j"        "p"            "P"            "PLOT"
##  [81] "pop"          "Pr"           "r"            "RHS"          "se.betas"
##  [86] "se.c"         "se.delta"     "se.eta1"      "se.eta2"      "t1"
##  [91] "tDDdelta"     "tDDeta1"      "tXr"          "U"            "U0"
##  [96] "U1"           "U2"           "up1"          "up2"          "V.eta12"
## [101] "Vbetas"       "w"            "whi"          "x"            "X"
## [106] "y"            "y1"           "Y1"           "y1.st0"       "y2"
## [111] "Y2"           "y2.st0"       "YY"           "YY.i"         "YY0"
## [116] "YY1"
```

Including sex

Results