Comparative CoViD-19 Mortality Indicators: An Early Assessment

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Background

• Make suggestions to non-demographers public; illustrate w/ “real” data, need frequent updating:
  medRxiv paper (May 5)
  https://doi.org/10.1101/2020.04.29.20085506

• Reflecting back, what works/doesn’t, needs further investigation
#1: Deaths rather than cases

- Data on “excess” deaths => ~ 4:5 ratio to CoViD-19 deaths
- Not necessarily death undercount (depending on mortality from other causes) but order of magnitude smaller than case undercount: ~1:10 (Commercial Lab Seroprevalence Survey)
- Deaths more meaningful metric anyway
#2: Rates rather than ratios

• Deaths per capita: D/P
• v. CDR: D[0,T]/T.P(T/2)
• Diff. easy to miss when T=1 year, here dividing by days/366 to compare w/ overall mortality:

\[
CCDR[t_1, t] = \frac{D^C[t_1, t]}{N(t_m). (t - t_1)}
\]
#3: Standardize (yes you can)

- CoViD-19 death rates by age & sex may not be available => indirect standardization (CMR)

\[
CCMR[t_1, t] = \frac{D^C[t_1, t]}{\sum_j \sum_i U^S M^C_{ij}. N_{ij}(t_m)}
\]

- \(CCMR\) compares to 1, to compare to (direct) \(ASCDR\), mult. by US \(CCDR\):

\[
ISCDR[t_1, t] = \sum_j \sum_i (U^S M^C_{ij}. CCMR[t_1, t]). U^S N_{ij}(t_m)
\]
#4: Estimate life expectancies (l.t. & some assembly required)

- Reverse MDLT => ASDLT, w/ pre-CoViD-19 l.t. as ASDLT (-> independent prob.) & CoViD-19 death rates (-> dependent prob.)
- Most intuitive metric, can compare across populations & w/ previous public health crises (e(0) historical time series widely available)
LL1: Indirect standardization works
LL2: Duration still matters
LL3: Population size still matters

Crude CoViD-19 Death Rate (CCDR) for the US

Date
Mar | Apr | May | Jun | Jul

CCDR per 1,000 person-years
0.0  | 0.2  | 0.4  | 0.6  | 0.8  | 1.0  | 1.2  | 1.4  

July 15, 2020
PAA Webinars Series
The US in Comparative Perspective

Crude CoViD-19 Death Rate (CCDR)

- Belgium
- France
- Germany
- Italy
- Spain
- Sweden
- United Kingdom
- US

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Population size still matters (cont.)
Crude CoViD-19 Death Rate (CCDR) for the 9 MOST Populous US Counties

- New York (New York)
- Los Angeles (Los Angeles)
- Cook (Chicago)
- Maricopa (Phoenix)
- Philadelphia (Philadelphia)
- Bexar (San Antonio)
- San Diego (San Diego)
- Dallas (Dallas)
- Santa Clara (San Jose)
Heterogeneity Ruse (cont.)

CCDR for the 9 MOST Populous US Counties (except New York)

County
- Los Angeles (Los Angeles)
- Cook (Chicago)
- Maricopa (Phoenix)
- Philadelphia (Philadelphia)
- Bexar (San Antonio)
- San Diego (San Diego)
- Dallas (Dallas)
- Santa Clara (San Jose)

CCDR per 1,000 person-years

Date
- Apr/01
- May/01
- Jun/01
- Jul/01
LL4: \( e(0) \) may not impress

- \( \Delta e(0) \) rarely huge: in the US, -.3 yr b/w 2014 & 2017, and b/w 1992 & 1993
- In Europe & US, <1 yr for countries, may reach ~1.5 yr in Euro regions & 2 yr in US states
- In LatAm countries, maybe up to 2+ yr but CoViD trend harder to predict there
- Non-CoViD mortality trend hard to predict *everywhere*