Estimating the Burden of COVID-19

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Adult Immunization Board (AIB) Technical meeting, 20 - 21 April 2023 Antwerp
Burden of infectious diseases

• Aim to estimate the public health impact of infectious diseases
  – Ranking, policy prioritisation
  – Heterogeneity of clinical course, severity, sequelae and mortality of diseases

• Hazard, incidence-based approach

Source: DALY calculation in practice: a stepwise approach
European Burden of Disease Network

COST Action CA18218
European Burden of Disease Network
Technical platform to integrate and strengthen capacity in burden of disease assessment across Europe and beyond.
European Burden of Disease Network

WG1 – NCDs and Injuries
WG2 – Infectious Diseases
WG3 – Risk Factors
WG4 – Methods
WG5 – Knowledge Translation
COVID-19

• Infectious disease by SARS-CoV-2
• Declared as a pandemic by WHO in March 2020
• High public health impact globally
COVID-19

Challenges

- Emerging virus
  - Lack of data
  - Lack of knowledge on health effects

Opportunities

- We were ready
- Abundant data
Burden of COVID-19 Task Force

The European Burden of Disease Network established the Burden of COVID-19 Task Force, as a sub-group of WG2 Infectious Diseases. The TF welcomes members who are conducting or interested in launching national studies to estimate the burden of disease of COVID-19.

Its aims are to:

- Share experiences in national burden of COVID-19 studies
- Support each other with calculations, model assumptions, data gaps
- Harmonize methodologies and align strategies for communicating results
- Discuss research projects and upcoming evidence on long-COVID

The TF meets approximately every six weeks. We select a different topic for each meeting, and focus mostly on technical discussions. We also have the opportunity to arrange ad-hoc meetings and discussions as needed/requested by members of the TF, and to use the burden-eu discussion forum.

You can find the minutes of our meetings on the Google Drive.

If you are interested in joining, contact Sara Pieters.

Other resources on COVID-19 disease burden are available on this page.
Burden of COVID-19 Task Force

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Burden of disease of COVID-19
PROTOCOL FOR COUNTRY STUDIES

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Provide guidance for data requirements, methodology and communicating results
Burden of COVID-19 Disease model (Version 1)
Burden of COVID-19 Data Requirements

- Incidence - Individuals testing positive for SARS-CoV-2
- Incidence (Proportion) of symptomatic cases
- Number of hospitalized and ICU cases
- Number of COVID-related deaths
- Duration of disease
- Demographics data
- Disability weights and life expectancy
Burden of COVID-19 Data Requirements

• Definitions (example):
  – Admission: ‘COVID-19-related’ if patient had confirmed SARS-CoV-2 and 1st positive test performed 14 days prior to admission until date of discharge
  – Intensive care treatment: ‘COVID-19-related’ if IC provided during a COVID-19-related admission
  – Death: ‘COVID-19-related’ if it occurred within 30 days from first positive test
## COVID-19 health states and disability weights

<table>
<thead>
<tr>
<th>Type</th>
<th>Name</th>
<th>Description</th>
<th>Disability weight (95% uncertainty interval)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Acute, infectious disease</strong></td>
<td>Asymptomatic</td>
<td>Has infection but experiences no symptoms</td>
<td>Nil</td>
</tr>
<tr>
<td></td>
<td>Moderate</td>
<td>Has a fever and aches, and feels weak, which causes some difficulty with daily activities.</td>
<td>0.051 (0.032-0.074)</td>
</tr>
<tr>
<td></td>
<td>Severe</td>
<td>Has a high fever and pain, and feels very weak, which causes great difficulty with daily activities.</td>
<td>0.133 (0.088-0.190)</td>
</tr>
<tr>
<td></td>
<td>Intensive care</td>
<td>Intensive care unit admission</td>
<td>0.655 (0.579-0.727)</td>
</tr>
<tr>
<td><strong>Chronic, infectious disease</strong></td>
<td>Post-acute consequences (fatigue, emotional lability, insomnia)</td>
<td>Is always tired and easily upset. The person feels pain all over the body and is depressed.</td>
<td>0.219 (0.148-0.308)</td>
</tr>
</tbody>
</table>
BoD COVID-19 Studies

BoD-COVID Studies
- Netherlands
- Scotland
- Germany
- Malta
- Ireland
- Denmark
- France
- Belgium
- Ireland
- Sweden
## BoD COVID-19 Studies

<table>
<thead>
<tr>
<th>Country</th>
<th>Period of analysis</th>
<th>Long-COVID included</th>
<th>DALY/100,000</th>
<th>% YLD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>1 Jan-31 Dec 2020</td>
<td>Yes, estimated</td>
<td>32.7</td>
<td>3.5%</td>
</tr>
<tr>
<td>Belgium</td>
<td>Mar 2020- 31 Dec 2021</td>
<td>Yes</td>
<td>1,968</td>
<td>5%</td>
</tr>
<tr>
<td>Cyprus</td>
<td>9 March 2020 – 8 March 2021</td>
<td>N/A</td>
<td>1,881 YLL</td>
<td>NA</td>
</tr>
<tr>
<td>Denmark</td>
<td>28 Feb 2020-28 Feb 2021</td>
<td>No</td>
<td>520</td>
<td>1.6%</td>
</tr>
<tr>
<td>France</td>
<td>Jan- 31 Dec 2020</td>
<td>Yes, limited</td>
<td>1,472</td>
<td>1%</td>
</tr>
<tr>
<td>Germany</td>
<td>1 Jan-31 Dec 2020</td>
<td>No</td>
<td>368</td>
<td>0.7%</td>
</tr>
<tr>
<td>Ireland</td>
<td>1 Mar 2020 – 28 Feb 2021</td>
<td>Yes, estimated</td>
<td>1,033</td>
<td>1.3%</td>
</tr>
<tr>
<td>Malta</td>
<td>7 Mar 2020-31 Mar 2021</td>
<td>Yes, limited</td>
<td>1,086</td>
<td>5%</td>
</tr>
<tr>
<td>Netherlands</td>
<td>1 Jan-31 Dec 2020</td>
<td>No</td>
<td>1,570</td>
<td>1%</td>
</tr>
<tr>
<td>Scotland</td>
<td>1 Jan-31 Dec 2020</td>
<td>Yes, limited</td>
<td>1,770- 1,980</td>
<td>2%</td>
</tr>
<tr>
<td>Sweden</td>
<td>Mar 2020- Oct 2021</td>
<td>Yes</td>
<td>1,418</td>
<td>0.7%</td>
</tr>
</tbody>
</table>
BoD COVID-19 Studies

- National burden of COVID-19 ranged between 32 and app. 2,000 DALYs/100,000 inhabitants
- Consistent large contribution of mortality to the burden, between 95% and >99%
BoD COVID-19 Studies

• Harmonized efforts and methodologies have allowed for **comparable estimates** and **communication** of results

• Future studies should evaluate the **impact of interventions** and unravel the indirect health impact of the COVID-19 crisis

• Burden of disease indicators, and standardization of approaches where applicable, can be useful for **monitoring within- and across-country public health in an ongoing pandemic**
Impact

What can we learn from these estimates?

• BoD useful to measure effect of interventions, e.g. vaccination programs
  – Within and across populations
  – Across population groups

• Standardization of methods and sharing of capacity is key
Impact

What is to be done?

- Expand to include long-COVID-19
- Measure effect of interventions

The pandemic's true health cost: how much of our lives has COVID stolen? (nature.com)
Burden of COVID-19

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