COVID-19 “Round 2” – Findings & way forward

Summary
June 12th, 2020
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Objectives of this document

- Briefly introduce scenario planning for a potential second COVID-19 wave
- Compare supply vs. demand for the next months under various scenarios
- Present results from API survey
1. Executive Summary
2. Demand
3. Supply vs. demand
4. API Survey
We have developed three scenarios for a second COVID-19 wave indicating that...

Scenario planning suggests that
- A best case, base case and worst case could occur
- Governments need to consider additional factors (e.g., tourism) in their planning

The available data indicates that
- Stock levels will drop significantly from their peaks in May
- But a shortage of any class of molecules during June, July and August is unlikely

...EU/EEA shortage during the summer months is unlikely, but...

Preliminary analyses suggest a second COVID-19 wave may hit member states hard!

- Shortages in Oct/Nov are a real possibility, especially for NMBs
- The industry needs a clear demand signal from member states to prepare adequately

Source: Medicines for Europe; Kearney
1. Executive Summary
2. Demand
3. Supply vs. demand
4. API Survey
Estimations are based on the following:

– This calculator is not an epidemiology model. The inputs, such as projected deaths, no. of days on ventilation, choice of ventilation medicines are based on the available information as well as expert and academic opinion.

– This calculator is not a prediction of the expected effects of COVID-19.

– This model was created solely to estimate the potential demand for critical medicines due to Covid-19.

– The parameters in the scenario are estimates intended to support public health preparedness and planning.

– These inputs and corresponding outputs may not reflect the reality of what users will ultimately see.

– The forecasting does not reflect the impact of any behavioral changes, social distancing, or other interventions.

– Users are discouraged from drawing strong conclusions about deaths or new cases on the basis of these estimates.

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A model was developed to estimate the demand of critical medicines for a potential second COVID-19 wave.

**Demand forecasting model**
- Initially developed by Medicines for Europe and Accord Healthcare for the *first COVID-19 wave*
- Enhanced with additional parameters by Kearney for a potential *second COVID-19 wave*

### Approach
- **Favoring overestimation of cases** due to the fact that the risk of underestimating is higher than the risk of overestimating.
- **Not reflecting the impact** of any behavioral changes, social distancing, or other interventions which could influence case numbers.
- **Not addressing** the impact of tourism potentially occurring in late summer/early autumn.
- **Using number of reported deaths per country** as base for estimation.
- **Using three different parameters** to plan for future demand scenarios (# deaths, MV usage, treatment duration).

### Data sources
- **Actual data** of number of daily deaths as of May 21st 2020.
- Worldometer Coronavirus reports.
- WHO Situation Reports.
- Expert opinions.
- Secondary research, e.g.
  - Robert-Koch-Institute, Germany.
  - International Long-Term Care Policy Network (https://ltccovid.org/).
  - ICNARC – Intensive Care National Audit & Research Centre.
  - Various scientific articles (e.g., Grasselli et al., JAMA; Bhatraju et al., NEJM).

### Key assumptions
- **Herd immunity** will not be achieved by any country during first COVID-19 wave.
- **Individual country responses** to a second COVID-19 wave will be identical to responses to the first wave.
- The development of the second COVID-19 wave will be similar to the first wave.
- Only COVID-19 related deaths occurring in ICUs will cause demand in critical medicines.
- Number of daily deaths will decrease around 28 days post-lockdown.

Source: Medicines for Europe; Accord Healthcare; Kearney
Three different scenarios – best, base and worst case – will indicate medicines demand for a potential second COVID-19 wave

### Selected scenario overview for a second COVID-19 wave

#### Key characteristics

<table>
<thead>
<tr>
<th>Scenario illustration for molecule demand</th>
<th>Best Case</th>
<th>Base Case</th>
<th>Worst Case</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lowest absolute demand (kg)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Likely demand (kg)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Highest likely demand (kg)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model parameters</th>
<th>Best Case</th>
<th>Base Case</th>
<th>Worst Case</th>
</tr>
</thead>
<tbody>
<tr>
<td># of new deaths vs. first wave</td>
<td>- 50%</td>
<td>Same</td>
<td>+ 50%</td>
</tr>
<tr>
<td>% patients on MV</td>
<td>50%</td>
<td>50%</td>
<td>100%</td>
</tr>
<tr>
<td>Treatment duration</td>
<td>Likely</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total # new ICU patients (October 1st – November 30th 2020)</th>
<th>Best Case</th>
<th>Base Case</th>
<th>Worst Case</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>33’153</td>
<td>66’306</td>
<td>99’459</td>
</tr>
</tbody>
</table>

Source: Kearney
Even countries that were less affected in a first COVID-19 wave need to prepare for a potential second wave.

Illustrative – based on data from 21.05.2020

<table>
<thead>
<tr>
<th>Country</th>
<th>Best case</th>
<th>Base case</th>
<th>Worst case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>13</td>
<td>26</td>
<td>39</td>
</tr>
<tr>
<td>Belgium</td>
<td>5</td>
<td>10</td>
<td>14</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>5</td>
<td>11</td>
<td>16</td>
</tr>
<tr>
<td>Croatia</td>
<td>2</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Cyprus</td>
<td>6</td>
<td>13</td>
<td>19</td>
</tr>
<tr>
<td>Czechia</td>
<td>25</td>
<td>50</td>
<td>76</td>
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<tr>
<td>Denmark</td>
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<td>22</td>
<td>32</td>
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<tr>
<td>Estonia</td>
<td>14</td>
<td>27</td>
<td>41</td>
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<tr>
<td>Finland</td>
<td>82</td>
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<td>245</td>
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<td>France</td>
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<td>Germany</td>
<td>164</td>
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<td>Greece</td>
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<td>Lithuania</td>
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<td>Malta</td>
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<td>Portugal</td>
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<td>Romania</td>
<td>14</td>
<td>28</td>
<td>43</td>
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<tr>
<td>Slovakia</td>
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<td>Slovenia</td>
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<td>Spain</td>
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<td>Switzerland</td>
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<td>73</td>
<td>109</td>
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<tr>
<td>UK</td>
<td>-185</td>
<td>3705</td>
<td>5555</td>
</tr>
</tbody>
</table>

Source: Medicines for Europe; Kearney
Governments should consider a “tourism factor” when planning for a second COVID-19 wave

Illustrative Example: 
Tourism in Greece during summer months

“I tourism factor”: Explanation

– Situation:
  – Popular holiday destinations are likely to reopen for tourists during summer months
  – This is currently not figured into the second wave projection

– Impact:
  – Population within holiday destination will grow by factor X during summer months
  – Number of cases will be larger than assumed in the model (due to increased number of visitors) for both host and destination country

– Example:
  – Greece had 28mn visitors in 2018, which is almost 3x its population
  – Tourism numbers for 2020 are likely to be significantly lower
  – Assuming around 10mn visitors in the summer of 2020 would double Greece’s population susceptible to a COVID-19 infection

– Recommendations:
  – Governments should include a “tourism factor” in planning for second COVID-19 wave
  – This factor needs to consider tourists within the country as well as returning citizens

Source: Medicines for Europe; Kearney
1. Executive Summary
2. Demand
3. Supply vs. demand
4. API Survey
Demand was compared against supply under twelve different scenarios.

### Reported supply vs. extrapolated supply

- **Two scenarios:**
  - Only actual supply reported back by MAH
  - Actual supply reported back by MAH, extrapolated to full market size (based on 2019 figures)

### Second wave scenario planning

- **Three scenarios:**
  - **Best case:**
    lowest absolute demand
  - **Base case:**
    likely demand
  - **Worst case:**
    highest likely demand

### Available supply for COVID-19 patients

- **Two scenarios:**
  - Avg. 50 % of supply available for COVID-19
  - Avg. 75 % of supply available for COVID-19

Source: Medicines for Europe; Kearney
Summary: The summer months should be used to restock in preparation for a potential second COVID-19 wave in autumn.

1. The industry scaled up supplies massively during April/May 2020 – however, this may not be maintained over the summer months!

2. The industry analysis, based on experts’ hypotheses, suggests shortages across Europe are less likely during the summer months.

3. However, in the event of a second wave in autumn, there are supply risks for Europe, most poignantly in neuromuscular blockers.

Source: Medicines for Europe; Kearney
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Our survey of participating MAH suggests that API challenges currently do not seem to pose a major risk for the industry.

We asked MAH the following question:
“Do you experience notable API challenges that pose a significant threat to manufacturing in terms of quantity, quality or time of delivery?”

Results
– Only few manufacturers report at least one notable API challenge
– These are restricted to neuromuscular blockers and sedatives
– Common themes are short-term supplier capacity, committed volumes and own use of API by supplier

Implications
– Generally, API supply does not seem to be a major risk factor
– However, capacity constraints may cause manufacturing bottlenecks
– This conclusion needs to be corroborated from the perspective of non-EU manufacturers

Source: Medicines for Europe; Kearney
1. Appendix
### Key model parameters were defined using various sources, including from governmental agencies

**Rationale and sources for key demand model parameters**  
*Non-exhaustive, high-level*

<table>
<thead>
<tr>
<th>Model parameter</th>
<th>Rationale</th>
<th>Key sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of COVID-19 related deaths</td>
<td>– The number of deaths is a more reliable indicator than the number of cases</td>
<td>– Worldometer</td>
</tr>
</tbody>
</table>
| % of COVID-19 related deaths in hospital | – Only patients who are admitted to ICU consume ICU medicines – therefore, patients who died outside of hospitals should not be included | – Robert-Koch-Institute, Germany  
– International Long-Term Care Policy Network  
– ICNARC – Intensive Care National Audit & Research Centre |
| MV rates for COVID-19 patients | – There is a mounting trend towards putting fewer patients with COVID-19 on MV as an adverse impact on treatment outcome as been observed in some studies  
– A 50% MV rate was used as a “lower-bound” estimate based on available studies  
– All patients not on MV are assumed to be on non-invasive ventilation | – Grasselli et al., JAMA, 2020  
– Bhatraju et al., NEJM, 2020  
– Yang et al., Lancet Resp Med, 2020  
– Wang et al., Annals of Intensive Care, 2020  
– Gattinoni et al., AJRCCM, 2020  
– Clinical experts |
| ICU treatment | – Dosage and duration of ICU treatment differs by molecule class  
– Country-specific differences need to be “averaged out” | – Clinical experts from various countries  
– Various scientific articles (e.g., Grasselli et al., JAMA, 2020) |

Source: Medicines for Europe; Kearney