Global Shortage of Personal Protective Equipment Amid COVID-19: Supply Chains, Bottlenecks, and Policy Implications

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Unprecedented excess demand for PPEs

Shortage of personal protective equipment endangering health workers worldwide

Mask shortage for most health-care workers extended into May, Post-Ipsos poll shows

Medical supplies shortage in ASEAN

Coronavirus: in the Philippines, health workers without protective equipment fear exposure
Frontline healthcare workers at risk

**Distribution of physicians and nurses, by sex**

<table>
<thead>
<tr>
<th>Region</th>
<th>Nurses</th>
<th>Physicians</th>
<th>Nurses</th>
<th>Physicians</th>
</tr>
</thead>
<tbody>
<tr>
<td>African Region</td>
<td>65%</td>
<td>28%</td>
<td>35%</td>
<td>72%</td>
</tr>
<tr>
<td>Region of the Americas</td>
<td>86%</td>
<td>46%</td>
<td>14%</td>
<td>54%</td>
</tr>
<tr>
<td>Eastern Mediterranean Region</td>
<td>79%</td>
<td>35%</td>
<td>21%</td>
<td>65%</td>
</tr>
<tr>
<td>European Region</td>
<td>84%</td>
<td>53%</td>
<td>16%</td>
<td>47%</td>
</tr>
<tr>
<td>Southeast Asia Region</td>
<td>84%</td>
<td>53%</td>
<td>16%</td>
<td>47%</td>
</tr>
<tr>
<td>Western Pacific Region</td>
<td>84%</td>
<td>53%</td>
<td>16%</td>
<td>47%</td>
</tr>
</tbody>
</table>

**Distribution of health care workers infections, by sex**

- **Italy**: Female 66%, Male 34%
- **Spain**: Female 72%, Male 28%

Source: Committee for the Coordination of Statistical Activities
Domestic and international disruptions throughout the PPE supply chains

**Raw Materials**
- Nonwoven polypropylene fabric
- Suppliers are in France and nearby European countries

**Manufacturing**
- Manufacturers are in France; the PRC; Taipei, China; and the United States
- Spike in demand: The factory in France typically makes around 170 million masks a year, but it has received orders of half a billion

**Distribution**
- Distributors are in Canada; Japan; Taipei, China; Ukraine; and the United States
- Trade restrictions: Factories in the PRC and Taipei, China have been forced to temporarily halt exports to comply with government demands

**End User**
- Longer lead time due to transport and shipping constraints; hoarding and profiteering; and limited workforce capacity due to illness

**Sources:** Asian Development Bank based on Alderman (2020), Feng and Cheng (2020), Hufford and Evans (2020), Henneberry (n.d.)
Global market for PPE

Market Share by PPE Product and Region (revenue $ million; %)

By product
- Gloves 631 25%
- Suits/Coveralls 546 22%
- Other Products 121 5%
- Wipes 108 5%
- Protective Eyewear and Cleanroom Goggles 202 8%
- Aprons 204 8%
- Facemasks and Hats 356 14%
- Footwear and Overshoes 324 13%

By region
- Europe 541 22%
- Asia-Pacific 704 28%
- Latin America 262 11%
- Middle East & Africa 156 6%
- North America 829 33%
- Latin America 262 11%

Source: Mordor Intelligence 2020
Highly concentrated PPE production in Asia

PPE production concentration in Asia has intensified

HS 630790 Including Surgical Mask

Trade barriers to PPE supply

Number of export restrictions by sector
(As of May 2020)

<table>
<thead>
<tr>
<th>SECTOR</th>
<th>INTERVENTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pharmaceutical products</td>
<td>45</td>
</tr>
<tr>
<td>Made-up textile articles</td>
<td>41</td>
</tr>
<tr>
<td>Medical &amp; surgical equipment &amp; orthopaedic appliances</td>
<td>27</td>
</tr>
<tr>
<td>Wearing apparel, except fur apparel</td>
<td>24</td>
</tr>
<tr>
<td>Other rubber products</td>
<td>13</td>
</tr>
</tbody>
</table>

Source: Global Trade Alert

Average MFN applied duty of medical goods and its categories

Source: Committee for the Coordination of Statistical Activities (2020)
## National efforts to ramp up PPE production

<table>
<thead>
<tr>
<th>Country</th>
<th>Manufacturing response for critical supplies</th>
</tr>
</thead>
</table>
| PRC     | • Repurposing state-owned firms to supply medical materials  
          • Loans and subsidies for firms producing critical supplies |
| EU      | • Accelerated joint procurement procedure with 26 Member States to ensure supply of medical equipment across Europe  
          • Structural funds can be directed to supply of medical equipment |
| India   | • Financial incentives for domestic manufacturing of critical supplies  
          • Digital platform to identify and fill shortages of critical supplies |
| Japan   | • Business subsidies for mask production for widespread use among the population |
| US      | • Defense Production Act activated to mobilize domestic industrial base |
ADB’s responses to COVID-19

• Provided COVID-assistance package for the needs of its developing member countries.
  
  o **Supply Chain Finance Program** allotted $200 million to support companies that make and distribute medicines and other items needed to combat COVID-19.

  o Additional financing of $800 million in **Trade Finance Program** to mobilize financial support.

For more information: [https://www.adb.org/site/trade-finance-program/covid-19-response](https://www.adb.org/site/trade-finance-program/covid-19-response)
Supply Chain Maps for Pandemic-Fighting Products

These maps provide banks, investors, governments and health care professionals with the information they need to ensure available and timely access to critical supplies around the world, through the Asia Development Bank (ADB).
Policy implications and lessons from past health crises

• Monitor PPE use and distribution and centralize visibility on orders placed.

• Improve just-in-time supply system and sharing responsibility.

• Improve domestic manufacturing surge capacity at the time of an event.

• Share information and communicate regularly.

Source:
Future of supply chains: Diverse sourcing and digitization

• Global firms will likely diversify their supply chains to other manufacturing hubs

• Incentivizing firms to produce health-critical items at home

• Digital supply networks: digitizing the buyer-supplier relationship which is still predominantly paper-based
Thank you