

Where Did All the PPE Go? The COVID-19 Disconnect Between Hospitals and the Healthcare Supply Chain

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Testing Bottleneck:

A recent survey published by the U.S. Department of Health and Human Services Office of the Inspector General found:¹

- Significant delay in coronavirus testing results, with some hospitals reporting a wait of seven days or longer. For context, 24 hours for a standard hospital virus test is considered a long turnaround.
- The testing delay is partly due to reliance on outside laboratories (which have become overwhelmed with test processing), infrequent or delayed specimen pickups and mailings, and limitations placed on external laboratories' business hours.

For example, as of April 6, 2020, Quest Diagnostics announced a backlog of 80,000 coronavirus tests. This is a decrease from 160,000 tests as of March 25. While Quest Diagnostics states that wait times have decreased, they do acknowledge that in some hot spot areas, turnaround times may be three or more days due to increased demand.¹

Impacts of the testing bottleneck:

COVID-19 testing delays increase the pressure on already strained hospital resources such as hospital staff, available beds and PPE, as facilities continue to care for presumptive positive patients.²

Overall Personal Protective Equipment (PPE) Market Landscape:

PPE encompasses respiratory, fall, ear, head and hand protection as well as protective clothing. As of 2019, hand protection was the largest PPE market segment, accounting for 24.22% of the market, while respiratory protection made up 13.1% of the market.³ The market share by revenue of PPE imports into the U.S. is:⁴

- 25% from Ireland
- 15.5% from China
- 10.2% from Malaysia
- 8.7% from Mexico

¹ Quest Diagnostic (April 6, 2020). *Quest Diagnostics Media Statement about COVID-19 Testing*.

<https://newsroom.questdiagnostics.com/COVIDTestingUpdates>

² U.S. Department of Health and Human Services, Office of Inspector General (April 4, 2020). *Hospital Experiences responding to the COVID-19 Pandemic: Results of a National Pulse Survey March 23-27, 2020*. <https://oig.hhs.gov/oei/reports/oei-06-20-00300.pdf>

³ Personal protective equipment market value by product category U.S. 2014-2026. (n.d.). Statista. Retrieved April 2, 2020, from <http://www.statista.com/statistics/895706/personal-protective-equipment-market-value-by-product-category-us/>

⁴ Masters, N. (2019). Personal Protective Equipment Manufacturing. IBISWorld. <https://www.ibisworld.com/united-states/market-research-reports/personal-protective-equipment-manufacturing-industry/>. Although Ireland is a leading exporter of medical devices and medical technology and captures the largest market share based on revenue for U.S. imports, the majority of PPE imports come from low-wage countries.

Specifically within the U.S. market for respiratory protection equipment, healthcare accounted for only 2.7% of the market, while construction accounted for 12.8%.⁵ See Figure 1 for more details regarding industry usage of respiratory protection equipment.

The healthcare market share is expected to grow in response to increased demand due to COVID-19. Based on the most recent publicly available data (from 2010) on the number of ventilators in the U.S., it is estimated that:^{6,7}

- U.S. hospitals have 62,000 full-featured mechanical ventilators
- U.S. hospitals have an additional 98,000 ventilators that are not full-featured, but can provide basic functions
- The CDC Strategic National Stockpile (SNS) has about 12,700 ventilators for national deployment

Effects of COVID-19 on PPE Supply:

Global demand has drastically outpaced global supply of PPE, and supply chains are struggling to increase production in order to meet this growing demand.⁸ In addition, panic buying, hoarding and misuse have contributed to the shortage.⁹

The World Health Organization (WHO) has stated that global PPE manufacturing needs to increase by 40% in order to meet rising global demand.¹⁰ Specifically, WHO estimates that, on a global level, medical professionals will need the following amount of PPE per month:¹¹

- 89 million masks
- 76 million examination gloves
- 1.6 million goggles

CDC Guidelines for PPE Shortage:¹²

- Healthcare facilities should operate under PPE contingency strategies, which include eliminating all elective and non-urgent procedures and appointments and using reusable PPE.
- Healthcare facilities experiencing PPE shortages should operate under PPE crisis capacity strategies, which includes using intact PPE beyond manufactured shelf life and prioritizing PPE for selected activities.

⁵ Curran, J. (2020). Respiratory Protection Equipment Manufacturing. MyIBISWorld. <https://my-ibisworld-com.libproxy.lib.unc.edu/us/en/industry-specialized/od4603/products-and-markets>

⁶ Center for Health Security (2020, April 1). *Ventilator Stockpiling and Availability in the US*. <http://www.centerforhealthsecurity.org/resources/COVID-19/200214-VentilatorAvailability-factsheet.pdf>

⁷ Rubinson, L., Vaughn, F., Nelson, S., Giordano, S., Kallstrom, T., Buckley, T., Burney, T., Hupert, N., Mutter, R., Handrigan, M., Yeskey, K., Lurie, N., & Branson, R. (2010). Mechanical Ventilators in US Acute Care Hospitals. *U* 199–206. <https://doi.org/10.1001/dmp.2010.18>

⁸ 3M (n.d.). *Novel Coronavirus and COVID-19 Outbreak - 3M Personal Protective Equipment (PPE) Considerations* https://www.3m.com/3M/en_US/worker-health-safety-us/all-stories/full-story-detail/?storyid=8855304f-01cb-4af2-8937-83096cdb4113

⁹ World Health Organization (2020, March 3). *Shortage of personal protective equipment endangering health workers worldwide*. <https://www.who.int/news-room/detail/03-03-2020-shortage-of-personal-protective-equipment-endangering-health-workers-worldwide>

¹⁰ World Health Organization (2020, March 3). *Shortage of personal protective equipment endangering health workers worldwide*. <https://www.who.int/news-room/detail/03-03-2020-shortage-of-personal-protective-equipment-endangering-health-workers-worldwide>

¹¹ World Health Organization (2020, March 3). *Shortage of personal protective equipment endangering health workers worldwide*. <https://www.who.int/news-room/detail/03-03-2020-shortage-of-personal-protective-equipment-endangering-health-workers-worldwide>

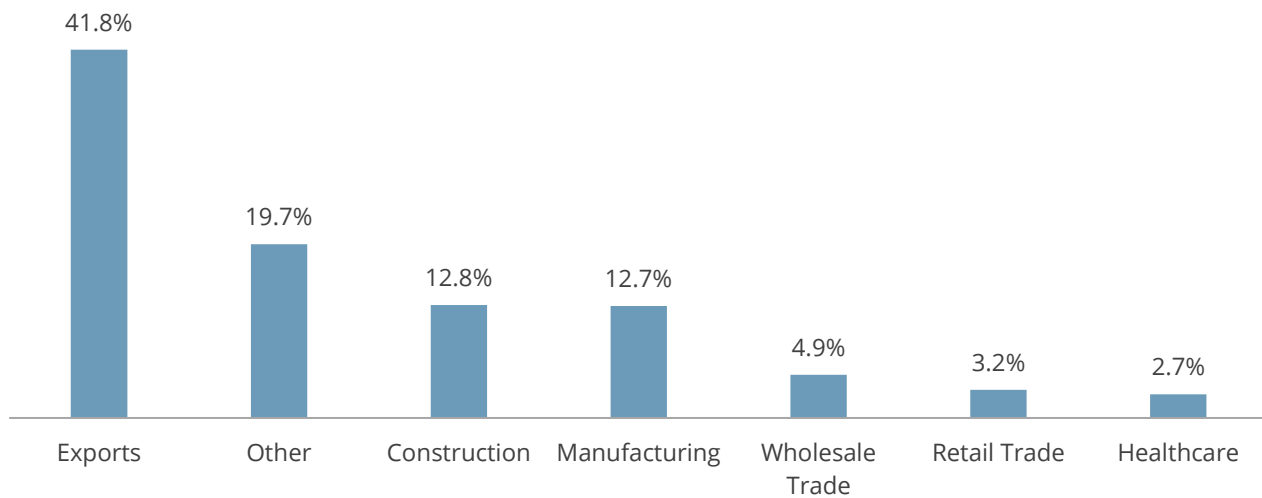
¹² Center for Disease Control and Prevention (April 3, 2020). *Coronavirus Disease 2019: Optimize PPE Supply*. <https://www.cdc.gov/coronavirus/2019-ncov/hcp/ppe-strategy/index.html>

Possible Solutions for Sourcing PPE During COVID-19:

The Journal of the American Medical Association (JAMA) recently issued an online call for ideas to address the PPE shortage to help develop recommendations.¹³ After receiving more than 100,000 views and 250 comments, *JAMA* editors developed an outline of major themes received. These include such recommendations as:

- Increasing imports from China
- Reclaiming PPE from other industries, such as farming, construction, universities, dentists and other sources
- Sourcing or reclaiming PPE from charitable movements and public or private buybacks (see Figure 1)
- Creating sterilization processes that will allow the reuse of PPE
- Limiting healthcare worker staffing to those who are immune to COVID-19

Figure 1: Respiratory Protection Equipment Industry Segmentation¹⁴



Source: IBISWorld

¹³ Livingston, E., Desai, A., & Berkwits, M. (2020). Sourcing Personal Protective Equipment During the COVID-19 Pandemic. *JAMA*. <https://doi.org/10.1001/jama.2020.5317>

¹⁴ Curran, J. (2020). Respiratory Protection Equipment Manufacturing. IBISWorld. <https://www.ibisworld.com/united-states/market-research-reports/respiratory-protection-equipment-manufacturing-industry/>