The COVID-19 Diagnostics Commons is designed to take back control. By collecting testing data and information, disseminating knowledge, convening experts to share real-world experience, and increasing smart testing, we can help economies open more safely and sustainably in the era of COVID-19.

The Diagnostics Commons is updated weekly.
Testing Commons

A one-stop, reliable source for comprehensive information about COVID-19 tests worldwide.

Search all tests in the market and in the pipeline by multiple parameters including test type, technology, regulatory status, country of origin and more.

The Testing Commons is updated weekly.

Upon entering the site, you will be greeted with these interactive parameters which can be easily adjusted to fit your company’s area(s) of interest regarding COVID-19 testing. Each of the above options has its own drop-down menu to allow for customized data.
A closer look at the data that can be configured using the adjustable parameters.
Survey Overview

5 Continents  |  23 Industries  |  29 Countries  |  1,125 Companies  |  1,141 Facilities

Top 5 types of facilities in rank order [left to right]

- Office Work
- Light Manufacturing
- Distribution / Warehouse
- Hospitality / Entertainment
- Data Center / Tech Services

Top 10 industries represented in rank order

- Business + Professional Services (Accounting, Banking, Corporate Banking, Legal, etc.)
- Consumer Retail Services
- Technology and Software
- Non-profit Organization
- Manufacturing
- Construction
- Retail Stores (Malls, Clothing, Car Dealerships, etc.)
- Media + Entertainment
- Healthcare, Hospitals, and Clinics
- Agriculture + Food Production
## Actions Taken

63% (714) Companies that made temporary adjustments  
55% (625) Companies that made permanent adjustments

### Top adjustment made due to financial pressures: Reduction in workforce

**What actions have you taken?** *(Permanent / Temporary)*

<table>
<thead>
<tr>
<th>Action</th>
<th>Permanent</th>
<th>Temporary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction in workforce</td>
<td>29%</td>
<td>28%</td>
</tr>
<tr>
<td>Hiring freeze</td>
<td>25%</td>
<td>23%</td>
</tr>
<tr>
<td>Reduced hours for hourly workers</td>
<td>24%</td>
<td>22%</td>
</tr>
<tr>
<td>Closure</td>
<td>23%</td>
<td>17%</td>
</tr>
<tr>
<td>Executive / management pay cuts</td>
<td>19%</td>
<td>12%</td>
</tr>
<tr>
<td>Furloughs</td>
<td>11%</td>
<td>10%</td>
</tr>
<tr>
<td>Reduced internship opportunities</td>
<td>11%</td>
<td>11%</td>
</tr>
<tr>
<td>Rescinding job offers</td>
<td>8%</td>
<td>5%</td>
</tr>
<tr>
<td>Bonuses or other incentives</td>
<td>10%</td>
<td>2%</td>
</tr>
<tr>
<td>Reduced pay for non-management workers</td>
<td>7%</td>
<td>1%</td>
</tr>
<tr>
<td>Changes in employee health benefits</td>
<td>6%</td>
<td>4%</td>
</tr>
<tr>
<td>Increased salary for hourly workers</td>
<td>4%</td>
<td>2%</td>
</tr>
<tr>
<td>Increased hiring</td>
<td>4%</td>
<td>1%</td>
</tr>
</tbody>
</table>

*Multiple responses are allowed*
Short articles on current COVID diagnostics related issues and technologies for a lay audience.

The good, the bad, and the ugly of COVID-19 superspreaders.
November 17, 2020 | Nichole Eshelman
Superspreaders: They're nothing to sneeze at. Some people are simply more infectious than others who have the same disease. What's more, these folks are likely responsible for the majority of COVID-19 cases. Learn what we know about superspreaders, what we don't know and how to lower your risk of catching the virus.

Pooling test samples: How and when it works.
November 13, 2020 | Mara Aspinall, Carl Yamashiro
Pooled testing combines samples from several people into one test for infectious disease. It helps public health officials test more people in less time and with lower costs. Here's how it works and when to use it.

COVID-19 primarily infects its victims via expired breath – so why are we not using breath to detect it?
October 21, 2020 | Mara Aspinall, Saja El Youacoub
Breath tests are sophisticated enough today to detect more than 900 compounds present in 60 diseases, but none that are caused by viruses. Yet dogs appear to be able to sniff out the presence of COVID-19 particles in expired air, so a simple, inexpensive COVID-19 breathalyzer can’t be far behind right? Don’t hold your breath.

COVID-19 Test Accuracy: When is too much of a good thing bad?
October 9, 2020 | Mara Aspinall
Inexpensive, while-you-wait tests administered often may be the key to controlling the COVID-19 epidemic, even if those tests are less accurate. Here’s why high-accuracy COVID-19 tests don’t help prevent disease spread as well as less sensitive ones.
Evidence Commons is the first interactive national repository of information on COVID-19 test research.

Diagnostic testing is critical to the pandemic response and containment. Evidence Commons will provide clear and easy access to comprehensive data on planned, active and completed research, operational, and clinical studies of COVID-19 related tests and protocols.

Evidence Commons will enable users to search and filter fields including trial/study type, tests and protocols evaluations, sample populations, and more, to satisfy their individual research needs.

Evidence Commons will be updated through partnerships with public health, research and clinical communities.
Evidence Commons

Users will be able to view, download and share test information and pilot status - including a description of each, the location at which it is being worked on, link to evidence details, and research priorities.
A one-stop reliable source for comprehensive information about COVID-19 tests worldwide. Search all tests in the market and in the pipeline by multiple parameters including test type, technology, regulatory status, country of origin and more.

COVID-19 Testing Commons, part of COVID Diagnostics Commons initiative at Arizona State University’s College of Health Solutions.

Testing Commons is made possible with support from The Rockefeller Foundation
19% of global commercially-available tests have been authorized for US use

- **FDA EUA**: All EUAs: Molecular, Antigen, Serology & Patient Management
- **LDT**: Laboratory Developed Tests: Schedule IV notifications & Umbrella Molecular EUAs
- **CE-IVD**: EU self-certified to be CE-IVD compliant
- **Research Use Only**: Commercially available in at least one country but not US/EU authorized
- **Development**: Tests & Technologies publicly announced to be under development
- **FDA Revoked**: Revoked includes Revoked, Rejected, Withdrawn, Warning letter, Fraud (DOJ)

1. Incomplete list after 10/7/20 when HHS/FDA announced policy to not require authorization for any LDT
All early EUA's were central Lab RTqPCR and ELISA Antibody tests for clinical care.

Number of tests is less important than capacity per test – many EUA's have small manufacturing volumes and little distribution.

FDA backlog of potential new tests has delayed faster/simpler tests needed for pandemic control.
Profile of US FDA EUA’s

- CLIA High Complexity Labs required by the preponderance of early test EUAs
- Designing simpler tests for POC/Self testing required longer engineering effort, only recently achieving EUAs
- Anterior nasal swaps (or Saliva) have eclipsed Nasopharyngeal swabs (NP) – a more invasive, risky viral collection method
- Self collection (AN swab or saliva) set to become dominant methods in 2021

1. Only a single Swab type per test counted here, in least to most invasive priority order: Saliva; ANS; lastly NPS/OPS. All PCR tests are sensitive enough to work with nearly all of these swab types: later authorizations specify ANS in addition to other swab methods.
2. No specific Healthcare Professional training is required by the EUA (at Laboratory discretion)
What’s New & What Matters

What happened last week
- Three new major EUA’s for home testing: Abbott BINAX At-Home / Ellume / Quidel QuickVue
  - BINAX At-Home: On-line ordering and Rx / Capacity: 10 million a month Q1 - 30 million a month starting April / Data collected on NAVICA app
  - Ellume: Fully at home with no RX needed / Age 2 and above / Results only visible on smartphone / Zip code data collected / Low capacity
  - QuickVue: Rapid Antigen Test / No instrument Point of Care test / Capacity projections: Rising from 10 million to 40 million a month by June

What should happen this week
- Expecting final 2020 blast of EUA’s but most will be updates: 28 EUA’s on 12.28.20 – 100% amendments / updates
- Key EUA’s to watch for: Roche (POC White label of SD Biosensor test) Cellex (Home test)

What needs to happen
- Analyzing and prioritizing (as appropriate) the FDA backlog of EUA’s
  - Unconfirmed Reports: There are 1,700 EUA’s of all technologies in the FDA cue
  - Additional EUAs could generate significant testing capacity gains
- Clarifying regulatory path for “voluntary EUAs” for LDT’s
  - NCI steps in? PREP act protection for LDT’s?

Note Worthy:
- Central Antigen Tests can create significant capacity BUT Becton Dickinson and OrthoClinical pending EUA’s are for NP Swabs
- Saliva Direct expansion: 70 labs are now trained and using protocols
## Estimated Monthly Capacity of All Tests (M)

<table>
<thead>
<tr>
<th>Test Type</th>
<th>Sep 2020</th>
<th>Dec 2020</th>
<th>Jan 2021</th>
<th>Feb 2021</th>
<th>Mar 2021</th>
<th>Apr 2021</th>
<th>May 2021</th>
<th>Jun 2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antigen Point of Care EUA Today</td>
<td>36</td>
<td>95</td>
<td>110</td>
<td>140</td>
<td>157</td>
<td>172</td>
<td>184</td>
<td>204</td>
</tr>
<tr>
<td>Home DIY EUA Today</td>
<td>0</td>
<td>2</td>
<td>7</td>
<td>11</td>
<td>14</td>
<td>35</td>
<td>36</td>
<td>40</td>
</tr>
<tr>
<td>PCR Point of Care EUA Today</td>
<td>5</td>
<td>6</td>
<td>9</td>
<td>11</td>
<td>13</td>
<td>13</td>
<td>13</td>
<td>15</td>
</tr>
<tr>
<td><strong>Subtotal POC &amp; Home EUA Today</strong></td>
<td><strong>41</strong></td>
<td><strong>104</strong></td>
<td><strong>126</strong></td>
<td><strong>163</strong></td>
<td><strong>183</strong></td>
<td><strong>220</strong></td>
<td><strong>233</strong></td>
<td><strong>258</strong></td>
</tr>
<tr>
<td>Antigen Point of Care Future</td>
<td>0</td>
<td>0</td>
<td>18</td>
<td>80</td>
<td>105</td>
<td>140</td>
<td>197</td>
<td>215</td>
</tr>
<tr>
<td>Home DIY Future</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>33</td>
<td>83</td>
<td>114</td>
<td>139</td>
<td>154</td>
</tr>
<tr>
<td>PCR Point of Care Future</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>8</td>
<td>10</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td><strong>Subtotal POC &amp; Home Future</strong></td>
<td><strong>0</strong></td>
<td><strong>0</strong></td>
<td><strong>21</strong></td>
<td><strong>117</strong></td>
<td><strong>196</strong></td>
<td><strong>264</strong></td>
<td><strong>347</strong></td>
<td><strong>381</strong></td>
</tr>
<tr>
<td><strong>Total POC &amp; Home</strong></td>
<td><strong>41</strong></td>
<td><strong>104</strong></td>
<td><strong>147</strong></td>
<td><strong>280</strong></td>
<td><strong>379</strong></td>
<td><strong>484</strong></td>
<td><strong>580</strong></td>
<td><strong>639</strong></td>
</tr>
<tr>
<td>Lab Based PCR Today</td>
<td>75</td>
<td>100</td>
<td>100</td>
<td>105</td>
<td>115</td>
<td>125</td>
<td>125</td>
<td>130</td>
</tr>
<tr>
<td><strong>Total Antigen Central Lab Future</strong></td>
<td><strong>0</strong></td>
<td><strong>1</strong></td>
<td><strong>2</strong></td>
<td><strong>27</strong></td>
<td><strong>44</strong></td>
<td><strong>59</strong></td>
<td><strong>59</strong></td>
<td><strong>66</strong></td>
</tr>
<tr>
<td>Additional Lab Based PCR with Pooling</td>
<td>0</td>
<td>0</td>
<td>25</td>
<td>37.8</td>
<td>138</td>
<td>187.5</td>
<td>225</td>
<td>234</td>
</tr>
<tr>
<td><strong>Total Central Lab</strong></td>
<td><strong>75</strong></td>
<td><strong>101</strong></td>
<td><strong>127</strong></td>
<td><strong>170</strong></td>
<td><strong>297</strong></td>
<td><strong>372</strong></td>
<td><strong>409</strong></td>
<td><strong>430</strong></td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td><strong>116</strong></td>
<td><strong>205</strong></td>
<td><strong>274</strong></td>
<td><strong>449</strong></td>
<td><strong>676</strong></td>
<td><strong>856</strong></td>
<td><strong>989</strong></td>
<td><strong>1069</strong></td>
</tr>
</tbody>
</table>
Estimate US Monthly Capacity of All Tests (M)
The primary choice outside of the US has been the cheaper, quicker, simpler but less sensitive Lateral Flow technology for both Antigen and Antibody tests.

Antibody tests were initially proposed for disease detection but proved ineffective since antibodies only detectable after the infectious period.

Antigen tests using Lateral Flow technology displaced Antibodies for detection, but are much more difficult to develop.

Molecular tests remain essential for confirmation and clinical care.
Research Use Only Tests (excluding US & EU)

- Technology mix of RUOs reflects that of CE-IVD Lateral Flow focus outside of the US.
- These are primarily of two types: either: “local” manufacturers/labs with me-too tests without global aspirations and/or who may or may not meet minimum CE-IVD certification requirements or: newer tests that are in the process of approval, frequently in the home country first (primarily China and further-Asia), then CE-IVD, then US.
- Strong innovative products are being introduced from China, Korea and Singapore.
There are many innovative molecular technologies efforts to replace PCR in development. Many have potential to be lower cost, closer to the patient and with near PCR accuracy.

Lateral Flow Antigen tests are the future of pandemic large scale screening/surveillance representing ~20% of all new development.

Antibody tests are an already overcrowded field with very limited demand today, but may grow in importance if vaccine effectiveness becomes an issue.
The cheap, quick and simple Lateral Flow Antibody tests from China/Asia were available in bulk quantities in Q1 2020 – many authorities placed early multi-million quantity orders but were quickly disappointed. These early tests were not effective technologically and when they did function - antibody testing was poor at diagnosing new disease. This led to an extensive culling of the herd.

As viral load and transmissibility came into greater focus later in the year, a new generation of Lateral Flow technology adapted to Antigen tests has proven more accurate and reliable.
The US FDA has maintained a “clinical grade” approach that delayed the introduction of “surveillance grade” tests (e.g. pooling, antigen, and isothermal techniques).

US diagnostic innovation has accelerated dramatically and 2021 will see many novel accurate and cheap technologies brought to market for clinical and screening applications.

China, Korea and Singapore (and others) were the fastest to introduce less complex, decentralized testing that has proven highly effective.
How well does the US marshal global resources?

- 38% of US originated tests have received an EUA versus 11% of those from Europe.
- China, with the longest experience of COVID19, has achieved US EUA status for just 6% of its tests. For Korean companies, 24% of their tests have achieved US EUAs.
Companies with the largest number of EUAs

- Siemens: 8
- Abbott: 7
- Quest: 6
- Quidel: 6
- Roche: 6
- Cepheid: 4
- LabCorp: 4

The US In-Vitro Diagnostic industry has long been highly concentrated. The critical question at the start of 2021 is whether they can fulfill the promise of ramping up manufacturing supply.
I would like to thank the following people & organizations for their support for Testing Commons.

- Arizona State University’s Decision Theater team. Their brilliant work was instrumental in designing, implementing and maintaining our state-of-the-art COVID-19 testing tracking database. Special thanks to Sri Kandala and Kayleigh Steele.
- ASU’s College of Health Solutions team including Dean Deborah Helitzer, Julie Krell, Leo Pardo and the CHS Marketing Group and especially, my co-PI, Nate Wade.
- Advisors including Simon Johnson, Massachusetts Institute of Technology and Melea Atkins, Covid-19 Policy Alliance

Lastly, none of this would be possible without the advice and support from The Rockefeller Foundation.

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