

Startups Helping to Build a Pandemic Preparedness and Response Infrastructure

Treating future outbreaks will rely on technology-driven solutions

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Key takeaways

- The COVID-19 outbreak not only brought the global economy to a standstill; it exposed the inadequacies of the developed world's health systems in addressing fast-spreading pandemics. As governments, health systems and businesses contend with the current crisis and (eventually) start to consider how they will approach the next, we expect this to drive significant investments in startups helping to build pandemic preparedness and response infrastructure.
- The adoption of telemedicine services has been slow, in part due to prohibitive regulatory hurdles. Since the onset of the crisis, however, federal and state regulators have taken several actions to make telemedicine more accessible. While lifting these regulatory burdens is only a temporary initiative, it may be hard to undo once patients, providers and insurers become accustomed to telemedicine.
- In the near term, we believe government organizations and NGOs will be most interested in funding biopharma companies with coronavirus-focused solutions. Heightened awareness surrounding the importance of continued epidemiology-focused biopharma innovation will be a tailwind accelerating future investment.
- Testing delays and shortages of testing supplies have hindered the ability to track the pandemic. Startups have rushed to offer at-home tests for individuals who have been unable to attain one from a healthcare facility. However, federal regulators effectively shut down at-home test deployment; in response, startups have filed for accelerated emergency clearance through the FDA.
- Disease tracking and public healthcare data startups can help identify new viruses and at-risk populations. We expect a near-term spike in demand for companies operating in this space, as organizations focused on public health scramble for tools to help monitor and "flatten the curve" of virus spread. Emergency funding will foster adoption and broaden access for government organizations and NGOs. Longer-term, elevated awareness of pandemics is likely to sustain investment in monitoring systems, though a deep recession could cause government organizations and NGOs to cut funding for these types of tools.
- Shortages of medical supplies are already straining healthcare systems struggling to deal with increasing patient loads, putting front-line care administrators at risk and impeding the ability to provide care and prevent further spread of the virus. The private sector is addressing the need in multiple ways, with businesses ranging from large manufactures to startups producing a variety of medical equipment and other devices such as testing machines and ventilators.

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Overview

The COVID-19 outbreak not only brought the global economy to a standstill; it exposed the inadequacies of the developed world's health systems in addressing fast-spreading pandemics. At the outset of the crisis, government officials and healthcare professionals around the globe either failed to heed early warning systems or grasp the scope of the looming crisis. As the threat grew, it became clear that necessary testing equipment was not available, and procedures needed to safely track its spread were not in place. In areas where outbreaks have surged, local health responders face shortages of personal protective equipment (PPE), such as gloves and masks, as well as therapeutic devices, such as ventilators. All the while, many citizens have found themselves unable to see doctors or receive normal medical care for fear of overwhelming the health system or potentially exacerbating the pandemic.

As governments, health systems and businesses contend with the current crisis and (eventually) start to consider how they will approach the next, they have renewed interest in technologies and initiatives that can provide solutions. We expect these stakeholders to make long-term investments in pandemic preparedness and response infrastructure systems that can help predict and identify outbreaks and establish more robust frameworks to facilitate testing and treatment. While ongoing stimulus and relief aid will drive near-term growth opportunities in healthtech, the need to institute competent systems for future outbreaks is also likely to propel sustained long-term funding that'll likely exceed pre-COVID-19 levels.

Public funding for initiatives related to COVID-19

In this section, we outline public funding initiatives across the US and Europe, subsets of which could be used to fund healthtech startups addressing COVID-19.

US funding

\$150 billion for state and local governments as part of the Coronavirus Aid, Relief, and Economic Security (CARES) Act: Most of this will go toward ongoing funding concerns as states see a decline in tax revenue and an increase in unemployment claims. However, we expect a portion of this will be allocated toward health response measures.

\$100 billion for hospitals as part of the CARES Act: This funding is aimed at helping hospitals ramp up quickly to meet the expected spike in patient loads.

\$10.5 billion in defense spending as part of the CARES Act: This funding includes spending for national pandemic response equipment, vaccines, treatment facilities, medical supplies and PPE.

\$8.3 billion under the Coronavirus Preparedness and Response Supplemental Appropriations Act: Much of this funding is geared toward immediate response initiatives, including vaccines, therapeutics, diagnostics and telemedicine services.

\$3.4 billion under the Families First Coronavirus Response Act: While much of this funding is geared toward helping the unemployed, a portion will support insurance companies that provide free diagnostic testing.

\$274 million available from the US Agency for International Development: This funding will be spent on health and humanitarian assistance in countries of need.

European funding

£330 billion in government-backed loans and guarantees (UK): The British finance minister announced that this funding will be used to support jobs and businesses, provide supplementary funding to the National Health Service and address other related needs.

€200 billion economic aid package (Spain): This funding package is primarily economic, providing credit guarantees for Spain-based companies, as well as loans and aid for the unemployed.

€156 billion for a “supplementary budget” (Germany): Funding will be used to launch a comprehensive response, addressing both healthcare and economic issues.

€45 billion to provide companies with economic support (France): The use of funds has not been finalized but could include worker support and funding initiatives for France-based businesses, possibly including nationalization.

€37 billion for crisis response spending from the European Union: Effective April 1, this funding will be used to support healthcare, SMEs and labor markets as part of the Coronavirus Response Investment Initiative directed at the most affected EU member states and citizens

€25 billion to support the healthcare system and economy (Italy): This funding will be used to aid companies and workers through the crisis and provide additional funding for Italy’s health system. Of the rescue package, €1.2 billion will go to the health system and €1.5 billion will go to the civil protection agency, which is managing the country’s coronavirus response.

€164 million available for R&D via the European Commission’s European Innovation Council: Funding is available for coronavirus-relevant innovations focused on treating, testing, monitoring or other aspects addressing the pandemic.

The pandemic preparedness and response ecosystem

We believe a robust pandemic preparedness and response infrastructure is likely to consist of several technology-based capabilities focused on predicting, identifying, tracking, containing and treating outbreaks. This will call upon companies developing solutions in disease tracking, disease testing, telemedicine, biopharmaceutical research, disease testing, disease tracking and medical supplies. It is unlikely this will all emerge as a singular effort but

will consist of several overlapping systems funded by various stakeholders, including governments, non-governmental organizations (NGOs), health systems and businesses. We expect startups focused on these opportunities could benefit from current and future investment into pandemic infrastructure.

Disease tracking and public health care data: Tracking solutions can function as crucial early warning systems that alert key stakeholders (governments, health systems, businesses and the public) of potential disease outbreaks. They provide critical information as to the type of infection and how it is spreading so that all parties can react quickly to ensure public safety, implement business continuity plans and potentially begin ramping up treatment and testing capabilities. Tracking systems will also be needed throughout the pandemic to gauge ongoing risk, recovery rates and threat levels as outbreaks move through different stages. They are likely to be met with the most resistance as it relates to privacy concerns.

Disease testing: Testing infrastructure will be of utmost importance immediately following the identification of new infections. Tests will be crucial in helping contain outbreaks at an early stage, monitoring how a disease could be spreading among at-risk populations and determining the magnitude of treatment that may be necessary as infections spread. Test providers must be able to respond quickly to new disease information to ensure a test can be safely administered and rapidly processed for large segments of the population.

Telemedicine: It is increasingly evident that the ability to treat patients remotely can dramatically improve care levels while protecting front-line care providers from exposure. This will be critical during a disease outbreak when care may be required to scale quickly and safely if the infection is not well understood. Telemedicine can help inform large populations and supply rapid first-level screening and consultation. As the treatment phase deepens, telemedicine can help doctors care for multiple patients in remote locations as well as provide patients with communication tools for friends and families. Robots are likely the next phase of telemedicine as they can be used to administer drugs and sanitation services without spreading disease.

Biopharma: When a new disease or virus is identified, the biopharma industry will be a key stakeholder in developing therapeutics, vaccines and diagnostics that can mitigate the spread and improve the health of those already ill. It will be critical to ensure that biopharma companies have access to infection data at the earliest possible stage of the epidemic to begin testing new treatments.

Medical supplies: As more people are infected and hospitals experience a surge in patients, stakeholders must guarantee the availability of basic medical supplies and PPE. This may also include specialized diagnostic machines, therapeutic devices (such as ventilators) and emergency treatment facilities. The ability to track and monitor outbreaks at an early stage will help ensure that medical supply chains can be ramped up in locations where the demand is the highest and that supplies can be stockpiled for future use. [Manufacturers capable of augmenting supply chains](#) will benefit from centralized disease tracking systems that can highlight expected shortages early so suppliers have time to reorient supply chains.

Notable healthtech VC deals in Q1 2020 by size

COMPANY	DEAL SIZE (\$M)	CLOSE DATE	POST-MONEY VALUATION (\$M)	STAGE	SUBSECTOR
EQRx	\$200	January 12	\$300	Series A	Biopharma
Elevatebio	\$170	March 30	N/A	Series B	Biopharma
Karius	\$165	February 24	N/A	Series B	Biopharma
KRY	\$156	January 7	N/A	Series C	Telemedicine
Element Science	\$146	March 3	N/A	Series C	Telemedicine
SutroVax	\$110	March 26	N/A	Series D	Biopharma
Lyra Health	\$75	March 11	\$557	Series C	Telemedicine
Amwell	\$60	March 13	N/A	Late	Telemedicine
K Health	\$48	February 27	\$458	Series C	Telemedicine
Vineti	\$35	February 5	\$135	Series C	Decision and risk analysis software
Pager	\$33	March 6	N/A	Series B	Telemedicine
GNS Healthcare	\$28	January 7	\$148	Series D	Decision and risk analysis software
Doctor Anywhere	\$27	March 31	N/A	Series B	Telemedicine
Lunit	\$26	January 8	N/A	Series C	Diagnostic equipment
Adarza BioSystems	\$25	February 4	\$45	Series D	Diagnostic equipment
Ripple Therapeutics	\$25	February 11	N/A	Series A	Diagnostic equipment
Scipher Medicine	\$25	February 19	\$95	Series B	Decision and risk analysis software
BenchSci	\$22	February 4	N/A	Series B	Decision and risk analysis software
Bardy Diagnostics	\$12	February 27	\$136	Late	Telemedicine
Bright.md	\$8	March 20	N/A	Series C	Telemedicine

Source: PitchBook
*As of March 31, 2020

Disease tracking and public health care data

Identifying and tracking an outbreak will be a critical focus of future pandemic preparedness and response systems designed to contain infections before they spread. Disease tracking and public healthcare data startups can help pinpoint new viruses as well as at-risk populations. BlueDot's early warning system flagged the COVID-19 outbreak in Wuhan approximately nine days before the World Health Organization (WHO) announced the discovery of the virus. These platforms rely on large datasets derived from social media and other inputs and use AI to detect patterns and predict how diseases can proliferate. We expect stakeholders to rely on multiple systems to identify and track outbreaks.

Tracking systems are likely to be the most controversial given privacy concerns, especially when it comes to monitoring individuals who are or might be infected. Several countries, such as China, are utilizing smartphones and other digital surveillance tools to improve contact tracking as well as to help officials identify whether an individual is deemed healthy and able to travel. The Singaporean government launched TraceTogether, a mobile application, which quickens complete contact tracing on a national level. While health and law enforcement authorities are eager to employ every tool possible to combat infection, these efforts may meet resistance as countries debate the need for public safety relative to personal privacy.

Other novel monitoring approaches include BioBot Analytics, a startup that tracks viruses by analyzing sewage samples collected from wastewater treatment facilities across the US. Carrot Health, a startup providing healthcare business intelligence, launched a dashboard that ranks the populations most likely to experience critical illnesses but does not predict where outbreaks will occur. This software can help government organizations and NGOs better coordinate resources to protect those most at risk.

We expect a near-term spike in demand for disease tracking and public health care data services, as public health-focused organizations scramble for tools to help monitor and “flatten the curve” of virus spread. The recently signed Coronavirus Preparedness and Response Supplemental Appropriations Act in the US carved out over \$4 billion to broaden access to diagnostic tests. Over the long term, raising awareness of the impact and possibility of future pandemics is likely to sustain investment into monitoring systems, though a deep recession could cause government organizations and NGOs to cut funding for these types of tools.

Decision and risk analysis software VC deal activity



Source: PitchBook | Geography: Global
*As of March 31, 2020

Disease tracking and public health care data companies by most recent deal size

COMPANY	DEAL SIZE (\$M)	CLOSE DATE	STAGE	VC RAISED TO DATE (\$M)	POST-MONEY VALUATION (\$M)
Metabiota	\$16	February 1, 2017	Late	\$50	\$141
BlueDot	\$7	July 29, 2019	Late	\$10	N/A
TransformativeMed	\$6	May 7, 2019	Early	\$12	\$13
Biobot Analytics	\$3	May 8, 2018	Angel & seed	\$3	N/A
MDMetrix	\$3	May 14, 2019	Angel & seed	\$3	\$11
Carrot Health	N/A	November 19, 2015	Accelerator	N/A	N/A

Source: PitchBook
*As of March 31, 2020

Disease testing

Testing delays and shortages in supplies have hindered the ability to track the pandemic. As the uncertainty related to infection rates urges stay-at-home orders and other more extreme quarantine measures—all of which effectively shut down an economy—we believe at-home testing is likely to become an indispensable part of future pandemic preparedness and response systems.

In the current pandemic, several startups have rushed to offer at-home tests for individuals who have been unable to attain one from a healthcare facility. Most of these startups were focused on other specialties (e.g. STI and HIV testing) but have pivoted toward coronavirus, putting other efforts on hold. Federal regulators in the US effectively shut down this deployment, issuing stern guidance on March 21 that no at-home testing kits have been approved and warning consumers to be wary of “unauthorized fraudulent COVID-19 test kits.” Although this primarily aimed to curb the sale of sham tests, it has impacted reputable startups as well. Carbon Health and Nurx subsequently suspended sales of their kits. Everlywell has continued its efforts but is targeting healthcare companies with workers on the frontlines. Scanwell Health, which currently sells an at-home, smartphone-based UTI test, has filed for accelerated emergency clearance through the FDA.

Potential issues with at-home tests include accuracy, timing and shortage in testing material supplies. LetsGetChecked’s test takes two to three days to ship to the patients and up to a week to deliver results. Taking the test incorrectly or too early may corrupt accuracy. We expect the FDA to eventually adopt clearer guidelines around at-home testing such that businesses can respond more quickly to future pandemics.

Diagnostic equipment VC deal activity



Source: PitchBook | Geography: Global
*As of March 31, 2020

Disease testing companies by most recent VC deal size

COMPANY	DEAL SIZE (\$M)	CLOSE DATE	STAGE	VC RAISED TO DATE (\$M)	POST-MONEY VALUATION (\$M)
EverlyWell	\$50	April 16, 2019	Early	\$66	\$175
Carbon Health	\$30	June 5, 2019	Early	\$37	N/A
LetsGetChecked	\$30	May 8, 2019	Late	\$43	N/A
Scanwell Health	\$4	November 5, 2019	Angel & seed	\$4	N/A

Source: PitchBook
*As of March 31, 2020

Telemedicine

The telemedicine industry (also referred to as telehealth, telemonitoring and teletherapy) has often been viewed as a critical component of expanding low-cost healthcare services, but regulatory barriers and piecemeal adoption have slowed growth. However, we believe the crisis may serve as the catalyst for telemedicine to become a more permanent fixture of the healthcare landscape.

The industry is uniquely suited to deal with a pandemic. These services are easily scalable to reach large numbers of people while minimizing human contact. Since the onset of the coronavirus pandemic, telemedicine providers, such as Kry and AmWell, have experienced a surge in demand. Startups are also lowering their costs to increase access. For example, K Health is waiving its usual \$19 fee for televisits related to coronavirus.

Patient monitoring tools enable physicians to monitor patients with little-to-no direct contact. Examples of companies providing this service include TytoCare, which partnered with Israel's Sheba Medical Center to enable physicians to remotely tend to quarantined patients. The startup's device allows these patients to carry out physical exams—capturing data from the heart, lungs, throat, ears, skin and abdomen—and share their results in real-time with remote physicians. Another includes Blue Spark Technologies' TempTraq, a single-use Bluetooth temperature monitor that has been repurposed for COVID-19 response.

Televisits also free up hospital resources for more severe cases as teletherapy products can help doctors remotely communicate with patients in the hospital. InTouch Health has seen an uptick in demand for its wheeled cart that includes a video screen and connectivity options so a doctor can remotely treat patients. Teletherapy devices are increasingly being deployed in remote and rural medical facilities to connect patients with off-site medical specialists.

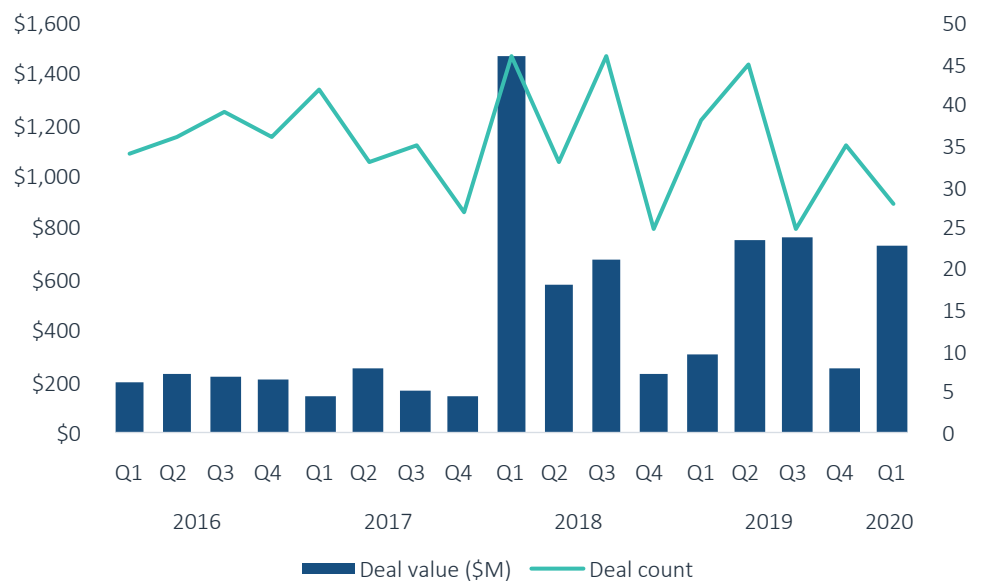
Numerous telemedicine companies have created free or low-cost COVID-19 online screening tools to help individuals determine if they need to seek in-person care. Although not FDA-approved, startups that have launched a COVID-19 assessment include Ro Health, Doctor On Demand, K Health, 98point6, Bright.MD, Memora Health and Orbita.

Historically, regulatory hurdles have been a significant headwind to the expansion of telemedicine primarily owing to concerns related to privacy/HIPAA compliance and liability. Telemedicine is also viewed as disruptive to the status quo, which likely drives lobbying efforts. However, since the onset of the crisis, US federal and state regulators have taken several actions to make telemedicine more accessible. These include:

- The Coronavirus Preparedness and Response Supplemental Appropriations Act authorized the US Secretary of Health and Human Services to waive Medicare restrictions on telemedicine services during the health crisis.
- The declaration of a national emergency prompted the DEA to allow registered practitioners to issue prescriptions for controlled substance medications via telemedicine.
- The Department of Health and Human Services announced it would waive HIPPA violations against healthcare providers offering teletherapy through non-HIPPA compliant communication technologies (e.g. FaceTime or Skype).

According to the US Center for Connected Health Policy, as of March 31, 45 states had taken legislative action to support telemedicine, with the most common being expanded Medicaid coverage. Finally, a growing number of private insurers are adding telemedicine coverage to existing plans. For example, US insurer Blue Cross began to offer no-cost virtual care through Doctor On Demand. While lifting these regulatory burdens is only a temporary initiative, it may be hard to undo once patients, providers and insurers become accustomed to telemedicine. Furthermore, the government may realize the multiple benefits of telemedicine and decide the regulations are best fully eliminated.

Telemedicine VC deal activity



Source: PitchBook | Geography: Global
*As of March 31, 2020

Telemedicine companies by most recent VC deal size

COMPANY	DEAL SIZE (\$M)	CLOSE DATE	STAGE	VC RAISED TO DATE (\$M)	POST-MONEY VALUATION (\$M)
DoctoLib	\$170	March 20, 2019	Late	\$311	\$1,280
KRY	\$156	January 7, 2020	Late	\$251	N/A
Roman Health	\$85	June 1, 2019	Early	\$176	\$500
Doctor On Demand	\$74	April 25, 2018	Late	\$165	\$299
AmWell	\$60	March 13, 2020	Late	\$659	\$972
98point6	\$50	October 30, 2018	Late	\$80	\$170
K Health	\$48	February 27, 2020	Late	\$104	\$458
Biofourmis	\$35	May 1, 2019	Early	\$41	N/A
Tyto Care	\$34	January 16, 2018	Late	\$52	N/A
Blue Spark Technologies	\$15	February 12, 2019	Late	\$37	\$71
Bright.MD	\$8	March 20, 2020	Late	\$21	\$27

Source: PitchBook
*As of March 31, 2020

Biopharma

Biopharma companies focused on therapeutics, vaccines and diagnostics have pivoted to address the pandemic. Historically, the biotech industry has not concentrated on vaccines given the market opportunity can be difficult to assess as outbreaks can be short-lived. While this complicates private

capital fundraising efforts for vaccine research, government-led initiatives can guarantee adequate funding is available when outbreaks occur. EpiVax, SAB Biotherapeutics and AbCellera are three biopharma startups working swiftly to develop treatments designed to target the novel coronavirus. SAB began working on both reagent antibodies for diagnostic testing and therapeutic antibodies to treat the virus but is waiting to hear if government funding will be available to scale its technology. EpiVax created a vaccine that could be ready by August 2020; however, the company’s founder and CEO, Dr. Anne De Groot, says success depends on funding and has asked the US federal government for over \$300 million to ensure the vaccine is safe and effective. To mitigate financing constraints, AbCellera teamed up with Eli Lilly to develop antibodies for the treatment and prevention of COVID-19.

Biopharma startups are also focused on developing tests that deliver results more quickly. Previously, coronavirus tests had to be sent to a centralized lab for analysis, taking days to deliver results. This slow process has led to further transmission of the disease before confirming patients were carriers. Mesa Biotech has developed a rapid, compact, point-of-care test that can deliver results in just 30 minutes, which received emergency FDA approval on March 25. This will speed along the diagnostic process, ending unnecessary isolation and allowing medical resources to be directed toward positive cases.

In the near term, we believe government organizations and NGOs will be most interested in funding biopharma companies with coronavirus-focused solutions. We do not believe that a potential recession would significantly curb investment in this space. Heightened awareness surrounding the importance of continued epidemiology-focused biopharma innovation will be a tailwind compelling future investment.

Biopharma VC deal activity



Source: PitchBook | Geography: Global
*As of March 31, 2020

Biopharma companies by most recent VC deal size

COMPANY	DEAL SIZE (\$M)	CLOSE DATE	STAGE	VC RAISED TO DATE (\$M)	POST-MONEY VALUATION (\$M)
AbCellera	\$10	September 27, 2018	Late	\$10	N/A
Mesa Biotech	\$3	October 28, 2019	Late	\$27	\$78
SAB Biotherapeutics	\$2	November 16, 2019	Late	\$31	\$70
EpiVax	N/A	December 18, 2019	Early	N/A	N/A

Source: PitchBook
*As of March 31, 2020

Medical supplies

For pandemics that aren't contained at an early stage, such as the ongoing COVID-19 crisis, the eventual demand for mass treatment capabilities is likely to strain medical equipment supply chains. This is proving to be true in the current crisis as governments globally seek to obtain and stockpile supplies to accommodate increasing patient loads and surges in certain areas. Specifically, this includes PPE for front-line care administrators but can also include products such as hand sanitizer, fumigation devices, emergency hospital beds and temporary facilities. As evident with the existing pandemic, the need is intense, with hospitals going so far as to cobble together make-shift supplies, salvage scrapped supplies from dumpsters and transform stadiums and convention centers into temporary treatment facilities. The private sector is tackling the issue in multiple ways, with large manufacturers such as GM, Ford and Tesla in the US reorienting production toward medical equipment and other devices such as testing machines and ventilators.

Startups involved in 3D printing have been actively working to address the supply shortage. Silicon Valley unicorn Carbon has developed open-source plans for a 3D-printed face shield, as well as medical testing swabs (awaiting regulatory approval). Barcelona-based 3D printer startup BCN3D has pledged its 63-printer "print farm" to produce "scientifically-validated projects." Other products undergoing development by 3D printer companies include ventilators, oxygen valves and safety goggles. Although 3D printers have a relatively slow manufacturing speed compared to larger manufacturers, the main advantage is the rapid design cycle, allowing companies to develop or adapt products swiftly. Other startups pivoting toward the crisis include Sonovia Ltd, which is applying an antimicrobial material to the production of medical face masks, and Soapy Care, which is integrating a plant-based antiviral ingredient into its handwashing stations. While the private sector has been very active in addressing the current crisis, we believe centralized pandemic preparedness and response systems could prove valuable in coordinating these efforts.

Medical supplies VC deal activity



Source: PitchBook | Geography: Global
*As of March 31, 2020

Medical supplies companies by most recent VC deal size

COMPANY	DEAL SIZE (\$M)	CLOSE DATE	STAGE	VC RAISED TO DATE (\$M)	POST-MONEY VALUATION (\$M)
Carbon	\$260	June 3, 2019	Late	\$682	\$2,400
BCN3D	\$3	March 27, 2019	Angel & seed	\$3	N/A
Sonovia	N/A	October 15, 2018	Angel & seed	N/A	N/A
Soapy Care	N/A	N/A	Early	N/A	N/A

Source: PitchBook
*As of March 31, 2020

Appendix

Top angel & seed investors in healthtech by deal count (2018-Q1 2020)

INVESTOR	DEAL COUNT	INVESTOR TYPE
SOSV	24	VC
Connecticut Innovations	12	VC
Plug and Play Tech Center	11	Accelerator
High-Tech Gründerfonds	8	VC
Alexandria Venture Investments	8	CVC
Y Combinator	8	Accelerator
Alumni Ventures Group	7	VC
Social Starts	7	VC
Elevate Ventures	7	VC
Felicis Ventures	7	VC
KdT Ventures	7	VC

Source: PitchBook
*As of March 31, 2020

Top early-stage VC investors in healthtech by deal count (2018-Q1 2020)

INVESTOR	DEAL COUNT	INVESTOR TYPE
Alexandria Venture Investments	47	CVC
OrbiMed	43	PE
ARCH Venture Partners	34	VC
Keiretsu Forum	30	VC
RA Capital Management	30	VC
Novo Holdings	30	CVC
F-Prime Capital Partners	25	VC
New Enterprise Associates	24	VC
Versant Venture Management	23	VC
SOSV	22	VC

Source: PitchBook
*As of March 31, 2020

Top late-stage VC investors in healthtech by deal count (2018-Q1 2020)

COMPANY	DEAL COUNT	INVESTOR TYPE
OrbiMed	27	PE
HBM Healthcare Investments	24	VC
Alexandria Venture Investments	23	CVC
Keiretsu Forum	22	VC
Foresite Capital Management	21	Growth
Novo Holdings	20	CVC
RA Capital Management	19	VC
Qiming Venture Partners	19	VC
Lilly Asia Ventures	18	VC
Perceptive Advisors	18	Hedge fund
New Enterprise Associates	18	VC
The Invus Group	18	PE

Source: PitchBook
*As of March 31, 2020

Key startups actively addressing COVID-19

DoctoLib (France): DoctoLib enables doctors and patients to communicate and manage appointments. The company charges doctors €79 per month to use its video consultation platform. Management recently cited a 40% increase in inbound requests from doctors looking to offer televisits related to COVID-19. DoctoLib subsequently announced it would allow all doctors in France to use its platform for free during the pandemic and will reimburse the 3,500 doctors already paying for the service.

RoHealth (US): Ro is a D2C full-service telemedicine company that can provide diagnosis and medicine delivery services. Its digital health clinics include Roman for men's health, Rory for women's health and Zero for fighting addiction. Ro partnered with patient engagement startup, Memora Health, to create a free COVID-19 televisit service with a chatbot that digitally connects the patient to a provider that can arrange treatment.

Memora Health (US): Memora Health helps automate patient follow-up and nursing operations in hospitals. The platform consists of a patient-facing, AI-backed conversational interface and a physician-facing web application and includes automated patient reminders, care instructions and responses to common questions via SMS. The software provides hospitals with comprehensive analytics on the allocation of staff time and quality of care. In partnership with Ro, Memora is providing an online COVID-19 screening and tracking tool.

Kry (Sweden): Kry enables patients to book and conduct video consultations with doctors. Management recently reported that demand for viral symptom-related services surged 240% since February 1 across all its markets due to the pandemic.

Doctor On Demand (US): Doctor On Demand connects consumers to licensed physicians across the US to conduct video medical and mental health consultations. It provides D2C services in addition to those offered via employers and health plans. Doctor On Demand's COVID-19 assessment tool provides patients with a risk-level assessment and educational material to help determine if they should seek in-person care or visit an urgent care facility.

K Health (US): K Health's DTC medical app that uses AI to deliver care via K Health's free chatbot investigates the patient's symptoms and shows how doctors have diagnosed similar patients. For \$19, the user can chat with a physician. K Health added a risk assessment tool for COVID-19 and is waiving the usual fee for coronavirus-related televisits.

98point6 (US): 98point6 operates a healthcare platform that provides personalized consultation, sends care plans and recommends treatment options based on individual needs and health issues from physicians. 98point6 added COVID-19 screening questions to its app and reports an excess demand since the pandemic.

TytoCare (US): Tyto is a handheld exam kit and app that lets a customer perform guided medical exams with a healthcare provider remotely. It partnered with Israel's Sheba Medical Center to implement unique telemedicine solutions amid the pandemic. Sheba's physicians use Tyto's device to tend to patients quarantined at the medical center.

Bright.MD (US): Bright.MD offers a virtual care platform, SmartExam, which connects patients to their physicians via a home computer or mobile device. Bright.md is offering all US hospitals free access to its COVID-19 evaluation, screening and escalation tool. Bright.MD had screened over 30,000 patients as of March 25.

AmWell (US): AmWell's platform connects consumers with healthcare professionals via video over the web or mobile. They partner with over 55 health plans, covering more than 150 million individuals and more than 240 health systems. Due to COVID-19, AmWell experienced extreme demand, which caused long wait times and frequent IT crashes. To improve operational efficiency and quality of care during the pandemic, AmWell launched a national Telehealth Response Program which established an always-on-call infection control officer, COVID-19 specific clinical workflows and a COVID-19 Readiness Team.

Buoy (US): Buoy's personalized symptom checker and chatbot leverages AI to interpret symptoms and suggest what level of care patients should seek. In response to the pandemic, Buoy joined forces with researchers from HealthMap, a digital epidemiology tool, to fine-tune its algorithm and launch a coronavirus feature to help educate patients on symptoms and provide action steps.

Blue Spark Technologies (US): Blue Spark Technologies traditionally manufactures thin, flexible printed battery technology designed to offer innovative, eco-friendly and cost-effective printed power sources. Blue Spark Technologies launched TempTraq in response to COVID-19, a patch that continuously monitors and records axillary temperature and wirelessly transmits real-time data for up to 72 hours.

Orbita (US): Orbita's voice-first platform provides conversational AI technologies and services that enable healthcare organizations to create secure, enterprise-grade voice- and chatbot-powered virtual assistants. Orbita created a COVID-19 virtual assistant chatbot that offers easy access to coronavirus-specific Q&A and screening tools. Orbita is providing the technology at no cost to healthcare organizations.

HealthCall (US): HealthCall's automated patient response and engagement system. These systems enable physicians to provide more timely and relevant health information to patients, reduce readmissions and improve clinical outcomes. HealthCall created a COVID-19 Telehealth Screening with Biomedical Monitoring application, which provides its EHR customers access to its real-time telemedicine platform.

Biofourmis (Singapore): Biofourmis' health analytics platform predicts patient health deterioration, enabling medical professionals to intervene preemptively. Researchers in Hong Kong are using Biofourmis' remote monitoring and analytics platform to remotely monitor coronavirus patients and determine more effective interventions. Researchers also want to use remote monitoring technology to better understand how the disease affects the body.

Scanwell Health (US): Scanwell Health develops smartphone-enabled, at-home diagnostics. Their flagship product is an at-home urinary tract infection test and treatment service. Scanwell Health secured exclusive rights to license and distribute a COVID-19 rapid serology test from INNOVITA for at-home use, and it partnered with Lemonaid Health to distribute the test in the US.

EverlyWell (US): EverlyWell offers over 30 at-home kits, ranging from fertility to food sensitivity tests. The company added COVID-19 testing to its service suite though initial supply has been allocated to healthcare workers. EverlyWell plans to have testing and diagnosis capacity for 250 thousand people weekly. The test will be available for \$135, at no profit to EverlyWell, and will be covered by participating HSA and FSA providers.

Nurx (US): Nurx's platform allows users to get their prescriptions and at-home testing kits delivered straight to their door without visiting a doctor. They developed a proprietary mail-in coronavirus test in partnership with Molecular Testing Labs. Nurx subsequently suspended sales of their kits after the FDA issued guidance against at-home test kits on March 21.

Carbon Health (US): Carbon Health healthcare network offers primary care services through a mobile application allowing users to follow-up on a treatment plan, manage prescriptions and see lab reports through an app. Carbon Health launched a coronavirus assessment tool and created an at-

home test available for \$167.50, which is essentially at cost. It also suspended shipment following the FDA's guidance.

BlueDot (Canada): BlueDot's AI platform tracks the spread of infectious diseases around the world. BlueDot flagged a cluster of "unusual pneumonia" cases happening around a market in Wuhan nine days before the WHO released a statement declaring the discovery of a "novel coronavirus." BlueDot's AI can also forecast how pandemics will be spread. In the case of COVID-19, the AI successfully identified the cities where the virus would be transferred to after it surfaced in Wuhan.

BioBot (US): BioBot provides a wastewater analysis tool to map population health. The analysis measures opioids and other drugs in sewage to estimate overall consumption in cities, enabling government officials to prioritize interventions and measure effectiveness over time. Biobot wants to test sewage for COVID-19 and use the data to create a map of the virus as it spreads to new places.