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Easing Medical Device Regulatory Oversight: The FDA and Testing Amidst the COVID-19 Pandemic

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The FDA already subjects most medical devices to much less stringent approval requirements than drugs and biologics, and attempts to speed up rollout during the COVID crisis have been problematic. Agency decisions, including to allow antibody test marketing without emergency use authorization or review, and the back-and-forth guidance on laboratory-developed tests, have met harsh criticism and unreliable results. Though the long-term results of these decisions are unclear, the FDA's credibility, reliability, and commitment to safety are threatened by even further lessening medical device regulatory oversight during the coronavirus pandemic. The relaxed and fix-it-later approach to many of the FDA's public health emergency decisions regarding medical devices reflect the ongoing criticisms of medical device regulation in general, specifically the 510(k) process and laboratory developed test regulation, offering a point of reflection towards reform. Adaptive legislation and a risk-based and evidentiary approach to premarket and postmarket review can begin to address these issues both generally and in an emergency context.

I. INTRODUCTION

COVID-19[1] emerged in December 2019 and quickly spread across the world, becoming a pandemic unlike any experienced in the last one hundred years. To date, there have been over 163 million cases and 3.3 million deaths globally.[2] The coronavirus

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[1]Official names include COVID-19 or the coronavirus disease. *Naming the Coronavirus Disease (COVID-19) and the Virus that Causes It*, World Health Org., https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/naming-the-coronavirus-disease-(covid-2019)-and-the-virus-that-causes-it [https://perma.cc/USV2-HK8S] (last visited Oct. 20, 2020). Official names for the virus that causes COVID-19 include severe acute respiratory syndrome coronavirus 2 or SARS-CoV-2. *Id.*

[2]*COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU)*, Johns Hopkins U. Med.: Coronavirus Resource Ctr., https://coronavirus.jhu.edu/map.html [https://perma.cc/6542-PLH3] (last visited Dec. 6, 2020).

pandemic (referred to here on out as "the pandemic") hit the United States particularly hard, accounting for over thirty-two million cases and over half a million deaths.[3] The pandemic will have lasting impact for years, maybe even decades, to come in both unknown and clear ways.[4] Much of the government response has fallen onto the U.S. Food and Drug Administration ("FDA") to address widespread shortages of necessary medical supplies and the need for new products.[5] Specifically, the FDA is responsible for the availability, safety, and efficacy of medical devices such as face masks, respirators, ventilators, diagnostic tests, and serology tests.[6] The FDA's regulatory decisions made over the course of the pandemic to address these needs, their consequences, and their criticisms echo the general call for heightened oversight over medical devices. How medical device regulation during the pandemic will impact medical device oversight generally is yet to be seen. The relaxed and fix-it-later nature of COVID-19 medical device emergency regulations, however, has clearly impacted the effectiveness of the COVID-19 response and reflects the continuous problems with medical device regulation as a whole.

This Note seeks to explore the initial COVID-19 response regarding medical devices, the state of medical device regulation generally, and the implications going forward. Part II will provide background on the pandemic and the need for medical devices. Part III will set the foundation for further discussion by explaining the law behind medical device regulation, the FDA's responsibilities, and the public health emergency response. The section will first describe medical device regulation under ordinary circumstances, including its problems, before describing the Emergency Use Authorization ("EUA"), the FDA's main tool in addressing public health emergencies. Part IV will examine the agency's response to the pandemic by focusing on four types of medical devices: face masks and respirators, ventilators, diagnostic and laboratory developed tests ("LDTs"), and serological "antibody" tests. FDA action and EUA outcomes for each of these medical devices have met both successes and failures. While some decisions remain on course, the FDA has rolled back various other measures in reaction to harsh criticism and public health safety risks.

After reviewing the state of medical device regulation and the impact (so far) of COVID-19 EUAs, Part V will discuss the benefits, necessities, and inherent flaws concerning use of the EUA in pandemics. Comparing EUA utilization during the Zika virus crisis and the EUA utilization during the pandemic will emphasize the importance of review in the EUA process. Part VI will discuss the potential implications of COVID-19 device regulation on the medical device regulatory landscape generally and vice versa. First, the section will discuss how the rules and advisories for laboratory developed tests are evolving and whether certain decisions made during the pandemic may continue to be

[3] *Id.*

[4] *See, e.g.*, Kurt Campbell & Rush Doshi, *The Coronavirus Could Reshape Global Order: China is Maneuvering for International Leadership as the United States Falters*, Foreign Affairs, March 18, 2020, at 1 (examining the effects of the Chinese and American responses to the coronavirus pandemic on foreign affairs); Carlos del Rio et al., *Long-term Health Consequences of COVID-19*, 324 JAMA 1723, 1723 (2020) (reviewing the potential long-term health consequences of COVID-19); Maria Nicola et al., *The Socio-economic Implications of the Coronavirus Pandemic (COVID-19): A Review*, 78 Int'l J. Surgery 185, 185 (2020) (summarizing the socio-economic effects of COVID-19 on the world economy).

[5] *See* Food & Drug Admin., *Coronavirus (COVID-19) Supply Chain Update* (Feb. 27, 2020), https://www.fda.gov/news-events/press-announcements/coronavirus-covid-19-supply-chain-update [https://perma.cc/UJ7G-4F5S].

[6] *See* Food & Drug Admin., *Coronavirus (COVID-19) and Medical Devices* (Apr. 9, 2021), https://www.fda.gov/medical-devices/emergency-situations-medical-devices/coronavirus-covid-19-and-medical-devices [https://perma.cc/PV6H-F7L5].

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applied after the crisis. The potential impact of the VALID Act, a bill introduced in Congress in early 2020 seeking to increase LDT regulation, will be discussed. Second, the section will draw comparisons between the controversial 510(k) clearance process and the FDA's emergency response to highlight the need for heightened regulatory oversight of medical devices as a whole. Additionally, this Note will make recommendations to provide adequate and appropriate controls on medical device risks without sacrificing efficiency in the approval process, both generally and during a public health emergency. Ultimately, this Note will conclude that legislation like the VALID Act and reform emphasizing premarket and postmarket review offer the best path forward.

II. THE PANDEMIC AND MEDICAL DEVICES

Even before the pandemic struck the world, medical devices in the United States were already subject to much less stringent requirements than many other FDA-regulated products.[7] The most stringent regulatory process for medical devices, premarket approval ("PMA"), requires only one clinical trial, while new drugs typically require at least two randomized controlled trials.[8] Less than ten percent of medical devices, however, are even subject to PMA.[9] The 510(k) process allows most medical devices to sidestep these required trials entirely,[10] while other devices are exempt from even the 510(k) process.[11] Experts argue there is a "very low bar" to gain medical device regulatory approval in general.[12] A 2010 survey of medical device manufacturers revealed that only sixteen percent believed the FDA's medical device approval process to be very good or excellent.[13] Another investigation found that the FDA received more than 1.7 million injury reports and 83,000 death reports related to medical devices in just a ten-year period,[14] further underlining the importance of properly evaluating medical devices.

For these reasons and more to be discussed later on, medical device regulation has been criticized in the medical, scientific, and industry communities for its relaxed

[7] *See generally* Food & Drug Law Inst., A Practical Guide to FDA's Food and Drug Law and Regulation (Kenneth R. Piña & Wayne L. Pines, 6th ed. 2017). To be discussed later on, the premarket approval process is easily sidestepped by the 510(k) substantially equivalent pathway. *See id.* at 13-15.

[8] Carl Heneghan & Mathew Thompson, *Rethinking Medical Device Regulation*, 105 J. Royal Soc'y Med. 186, 186-87 (2012).

[9] *Learn if a Medical Device Has Been Cleared by FDA for Marketing*, U.S. Food & Drug Admin., https://www.fda.gov/medical-devices/consumers-medical-devices/learn-if-medical-device-has-been-cleared-fda-marketing#:~:text=43%25%20of%20medical%20devices%20fall,devices%20fall%20under%20this%20category [https://perma.cc/E4KS-L6YR] (last updated Dec. 29, 2017). Other sources report that this number may be as low as one percent. Daniel B. Kramer, Shuai Xu & Aaron S. Kesselheim, *How Does Medical Device Regulation Perform in the United States and the European Union? A Systematic Review*, 9 PLoS Med. 1 (2012).

[10] *See* 21 U.S.C. § 360c(i) (2018); 21 C.F.R. § 807.92(a)(3) (2020).

[11] For a list of 510(k) exempted Class II devices, *see Medical Device Exemptions 510(k) and GMP Requirements*, U.S. Food & Drug Admin., https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfpcd/315.cfm [https://perma.cc/PEP6-FFNV] (last updated Oct. 19, 2020).

[12] Heneghan & Thompson, *supra* note 8, at 186-87.

[13] Josh Makower et al., FDA Impact on U.S. Medical Technology Innovation: A Survey of Over 200 Medical Technology Companies 24 (2010), http://www.medtecheurope.org/wp-content/uploads/2015/09/01112010_FDA-impact-on-US-medical-technology-innovation_Backgrounder.pdf [https://perma.cc/3ULU-CSF9]. In contrast, industry has a more favorable view of the regulatory landscape for vaccines and relies on the FDA's regulation to instill public confidence. During the pandemic, vaccine manufacturers have even urged the FDA to not abandon its typical rigor in vaccine review in granting an EUA. The same concern for FDA review of medical devices, particularly serological tests, has not matched.

[14] *How Global Journalists Investigated Medical Device Safety*, Associated Press (Nov. 25, 2018), https://www.ap.org/ap-in-the-news/2018/how-global-journalists-investigated-medical-device-safety [https://perma.cc/H5CL-GRLS].

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regulatory approach.[15] Failures in device efficacy and safety can cause significant harm, up to and including death, and cost both money and resources.[16] Patients, the medical community, and other users of medical devices rely on FDA approval for guidance and protection from these industry failures. The significance of this reliance is amplified in the current worldwide pandemic.

The pandemic presents challenges to the FDA, the medical community, and the world in general. As the infection situation worsened and the impact of the pandemic became clearer in 2020, government action proved to be necessary.[17] Diagnostic tests for COVID-19 had yet to be developed, and existing devices such as respirators, face masks, and ventilators were quickly becoming crucial supplies in high demand.[18] On January 31, 2020, Secretary of the Department of Health and Human Services ("DHHS") Alex Azar determined that a public health emergency exists in the United States regarding the novel coronavirus, pursuant to section 319 of the Public Health Service Act.[19] On February 4, 2020, the Secretary declared that the public health emergency has created circumstances which permitted the authorization of the emergency use of in vitro diagnostics for detection and diagnosis of COVID-19.[20] To explain the importance of this government action, Stephen Hahn, the FDA's Commissioner of Food and Drugs, notes that, "medical devices, particularly diagnostic tests, are the first line of defense against an emerging outbreak."[21]

With little time to prepare, the COVID-19 pandemic required an adaptable government response to address testing and contact tracing, medical equipment supply, and other domains.[22] Shortages of personal protective equipment ("PPE"), critical supplies and materials, ventilators, and testing supplies immediately challenged hospitals in March and continue to do so.[23] In order to curb the spread of COVID-19 effectively, experts called for the expansion of testing.[24] As the Centers for Disease Control ("CDC") and public health laboratories lack the capacity to process testing on such a mass scale,

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[15] *See, e.g.*, Daniel M. Fox & Diana M. Zuckerman, *Regulatory Reticence and Medical Devices*, 92 Milbank Q. 151, 151 (2014); Heneghan & Thompson, *supra* note 8, at 186-87; Madelyn Lauer, *FDA Device Regulation*, 114 Mo. Med. 283, 286 (2017).

[16] *See* Heneghan & Thompson, *supra* note 8, at 186-87. For example, a hip replacement implanted in 100,000 patients was recalled just two years after 510(k) substantial equivalence approval because there was a reported 49% failure rate. Lauer, *supra* note 15, at 286.

[17] Sam Baker & Andrew Witherspoon, *The Pandemic is Getting Worse Again*, AXIOS (Oct. 22, 2020), https://www.axios.com/coronavirus-pandemic-getting-worse-9e2dc6ee-fe03-4f08-9425-12017c6b32cb.html [https://perma.cc/XJE7-BJQD].

[18] *See* Megan L. Ranney et. al., *Critical Supply Shortages – The Need for Ventilators and Personal Protective Equipment during the Covid-19 Pandemic,* 382 New Eng. J. Med e41, e41 (2020).

[19] Alex Azar, *Determination that a Public Health Emergency Exists Nationwide as the Result of the 2019 Novel Coronavirus*, U.S. Dep't Health & Human Servs.: Pub. Health Emergency (Jan. 31, 2020), https://www.phe.gov/emergency/news/healthactions/phe/Pages/2019-nCoV.aspx [https://perma.cc/ZDB5-CXYK]. This declaration has been renewed continuously since.

[20] Determination of Public Health Emergency, 85 Fed. Reg. 7,316, 7,316 (Feb. 7, 2020); Public Health Service Act § 319, 42 U.S.C. § 247d (2018).

[21] Stephen M. Hahn, *A Closer Look at the FDA's Center for Radiological Health's Unprecedented Efforts in the COVID-19 Response*, U.S. Food & Drug Admin. (Sept. 29, 2020), https://www.fda.gov/news-events/fda-voices/closer-look-fdas-center-devices-and-radiological-healths-unprecedented-efforts-covid-19-response#Numbers [https://perma.cc/4AXS-MY43].

[22] Marijn Janssen & Haiko van der Voort, *Agile and Adaptive Governance in Crisis Response: Lessons from the COVID-19 Pandemic*, 55 Int'l J. Info. Mgmt. 102180, 102180 (2020).

[23] Office of Inspector Gen., U.S. Dep't of Health and Human Servs., Hospital Experiences Responding to the COVID-19 Pandemic: Results of a National Pulse Survey March 23-27, 2020 1-3, 6-7 (2020).

[24] *See, e.g.*, Amesh A. Adalja et al., *Priorities for the US Health Community Responding to COVID-19*, 323 JAMA 1343, 1344 (2020) (calling for testing of "all patients who have unexplained [severe

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major clinical diagnostic companies had to develop and manufacture testing kits to test effectively.[25] To meet this need, the FDA turned to its emergency procedures, including EUAs.[26]

As of September 18, 2020, the FDA had authorized 516 medical device EUAs during the pandemic, almost ten times the number authorized in all prior national emergencies.[27] By November 2020, there existed 289 EUAs for COVID-19 tests, including both tests for active SARS-CoV-2 infection and antibodies from prior infection.[28] Over the course of the pandemic up to September 2020, the FDA received over 1734 pre-EUAs and 3040 EUA applications.[29] While these EUAs have helped ensure availability of and access to devices necessary to combat the pandemic, the expedited approval of some of these tools has been met with controversy and backlash for allowing devices on the market that simply do not work. During such a grand scale public health emergency, failures in efficacy, safety, and accuracy can jeopardize individuals, health care workers, the public health, and the government response as a whole.

Ideally, every moderate to high-risk medical device would be subject to a high standard of review requiring clinical trials and other scientific evidence supporting the efficacy of the device. In reality, this level of review is unattainable during public health emergencies that require timely action. EUAs and FDA enforcement discretion in times of crisis lower the review standard or waive review altogether. The question then becomes not whether EUA devices are effective, safe, and accurate when no clinical trials have been performed, but whether these devices are effective, safe, and accurate when no review has been conducted at all. Recent emergency decisions reflect regulators' lack of concern for medical device review as a whole, despite the FDA's obligation to protect the public health and the potential and significant consequences of unsafe, ineffective, or inaccurate devices.

The FDA decisions regarding EUAs for four products essential to the pandemic response—face masks and facepiece respirators, ventilators, diagnostic tests, and serological tests—demonstrate the need to prioritize speed in a pandemic, but also the consequences of prioritizing speed over safety. To understand the implications of these emergency decisions on the medical device regulatory landscape as a whole, medical device regulation must be examined in non-emergent times and then compared with emergency regulatory authority.

III. MEDICAL DEVICE REGULATION UNDER THE FDCA

The FDA[30] is responsible for regulating medical devices as well as drugs, food, cosmetics, tobacco products, and radiation-emitting devices.[31] In total, the agency

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acute respiratory distress syndrome] or severe pneumonia, and … patients who have mid symptoms consistent with COVID-19").

[25]*Id.*

[26]U.S. Food & Drug Admin., FDA Combating COVID-19 with Medical Devices 1 (Aug. 25, 2020), https://www.fda.gov/media/136702/download [https://perma.cc/FR6P-Z3GW].

[27]Hahn, *supra* note 21.

[28]U.S. Food & Drug Admin., FDA COVID-19 Response: At-a-Glance Summary 1 (Nov. 20, 2020), https://www.fda.gov/media/137005/download [https://perma.cc/5AGX-A8G5].

[29]Hahn, *supra* note 21.

[30]The FDA is a specialized agency within the Department of Health and Human Services (DHHS), authorized and given legal authority by the Food, Drug, and Cosmetic Act (FDCA). *See* Federal Food, Drug, and Cosmetic Act (FDCA), 21 U.S.C. § 301-399g (2018). The Center for Devices and Radiological Health (CDRH) is the FDA division responsible for regulating medical devices. Food & Drug Law Inst., *supra* note 7, at 94.

[31]Food & Drug Law Inst., *supra* note 7, at 94.

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oversees about twenty-five percent of all U.S. consumer spending.[32] The FDA's mission statement has three pronouncements particularly relevant to this Note:

> The [FDA] is responsible for protecting the public health by ensuring the safety, efficacy, and security of … medical devices… FDA is responsible for advancing the public health by helping to speed innovations that make medical products more effective, safer, and more affordable and by helping the public get the accurate, science-based information they need to use medical products and foods to maintain and improve their public health. FDA … [fosters] development of medical products to respond to deliberate and naturally emerging public health threats.[33]

The overriding purpose of the FDA is to protect the public from unsafe, ineffective, and deceptively labeled products.[34] The agency's obligations to the general public, scientific and medical communities, and government are even more pronounced during the pandemic and response.[35] Despite the need for timely action in public health emergencies, the FDA's priorities should ultimately remain the safety, efficacy, and security in its medical device decisions and guidance. The FDA has systems in place to accomplish this purpose.

A. Regulating Under Ordinary Circumstances

The Medical Device Amendments of 1976 ("MDA") authorized the FDA to regulate medical devices.[36] The MDA defines medical device as "an instrument, apparatus, implement, machine, contrivance, implant, in vitro reagent, or other similar or related article, including any component, part, or accessory, which is … intended for use in the diagnosis of disease or other conditions, or in the cure, mitigation, treatment, or prevention of disease."[37] Ventilators, for example, are "machines" for the purpose of this definition while "in vitro reagents" include both diagnostic and serology tests for COVID-19. The MDA created a range of standards, or classes, for medical devices regulation, dependent on the amount of oversight necessary to ensure safety and efficacy.[38]

Medical devices are categorized into three classes, with Class I subject to the least regulatory oversight and Class III to the most.[39] Class I devices[40] come with minimal risks and, as such, are typically only subject to general controls.[41] Class II

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[32]Global Engagement, U.S. Food & Drug Admin. 2 (2013), http://www.ipqpubs.com/wp-content/uploads/2013/05/FDA_Global-Engagement.pdf [https://perma.cc/PY4Q-CYAC].

[33]*What We Do*, U.S. Food & Drug Admin. (Mar. 28, 2018), https://www.fda.gov/about-fda/what-we-do#mission [https://perma.cc/34GT-YJ38].

[34]Food & Drug Law Inst., *supra* note 7, at 68.

[35]*See id.* at 83-84.

[36]Medical Device Amendments of 1976, Pub. L. No. 94-295, § 2, 90 Stat. 539 (1976).

[37]FDCA, 21 U.S.C. § 321(h) (2018). The official definition also includes products recognized in the official National Formulary, the United States Pharmacopeia, or any supplement to them or intended to affect the structure or any function of the body. *Id.*

[38]Food & Drug Law Inst., *supra* note 7, at 213.

[39]*Overview of Device Regulation*, U.S. Food & Drug Admin. (Sep. 4, 2020), https://www.fda.gov/medical-devices/device-advice-comprehensive-regulatory-assistance/overview-device-regulation [https://perma.cc/SY5Y-7DAJ].

[40]Examples of Class I devices are bandages, examination gloves, and certain surgical implements. Food & Drug Inst., *supra* note 7, at 213.

[41]*See* FDCA, 21 U.S.C. § 360c(a)(1)A) (2018). General controls include registration and listing, labeling, good manufacturing practices, and premarket notifcation. *Id.* All Class I devices are exempt from

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devices are subject to special controls because they require more oversight to ensure safety and efficacy.[42] Most Class II devices are subject to the 510(k) clearance process, requiring a finding from the FDA that a device is "substantially equivalent" to another device legally in U.S. commercial distribution.[43] For such a finding, the device must have the same intended use as the predicate device and either the same technological characteristics or different technological characteristics that do not raise questions about safety and effectiveness.[44] If a device is found to be "not substantially equivalent" to a predicate device, or if the developer determines there is no substantially equivalent predicate device on the market, the developer may submit a de novo request to reclassify the device as Class I or II.[45] De novo classification is a risk-based process for low to moderate risk devices.[46] The classification is intended to provide a pathway for novel medical devices of which general and special controls alone can provide reasonable assurance of safety and effectiveness, avoiding the extensive PMA process.[47]

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premarket notification requirements except those that are intended for a use that is of substantial importance in preventing the impairment of human health or that presents a potentially unreasonable risk of injury or illness. *Id.* § 360(l). About 74% of Class I devices are exempt from the premarket notification processes. *Classify Your Medical Device*, U.S. Food & Drug Admin., https://www.fda.gov/medical-devices/overview-device-regulation/classify-your-medical-device [https://perma.cc/V5TY-HZJ3] (last updated Feb. 7, 2020).

[42]21 U.S.C. § 360c(a)(1)(B); *see also* Food & Drug Law Inst., *supra* note 7, at 68. Examples of Class II devices include powered wheelchairs, infusion pumps, and surgical drapes. *Id.* at 213. Special controls are usually specific to the device and can include performance standards, postmarket surveillance, patient registries, and 510(k) premarket notification, unless exempt. 21 U.S.C. § 360(k); 21 U.S.C. § 360c(a)(1)(B); *see also* The Abbreviated 510(k) Program: Guidance for Industry and Food and Drug Administration Staff, U.S. Food & Drug Admin. 4 (2019), https://www.fda.gov/media/72646/download [https://perma.cc/TY8W-GDEG]. For a list of 510(k) exempted Class II devices, see *Medical Device Exemptions 510(k) and GMP Requirements*, *supra* note 11.

[43]Most Class II devices require a 510(k) Premarket Notification submission at least ninety days before market introduction. 21 U.S.C. § 360(k); *Overview of Device Regulation*, *supra* note 39; *see also* The 510(k) Program: Evaluating Substantial Equivalence in Premarket Notifications [510(k)]: Guidance for Industry and Food and Drug Administration Staff, U.S. Food & Drug Admin. 3 (2014), https://www.fda.gov/media/82395/download [https://perma.cc/GUT7-6HHX].

[44]21 U.S.C. § 360c(i)(1)(A).

[45]21 U.S.C. § 360c(f)(2); *see also De Novo Classification Request*, U.S. Food & Drug Admin., https://www.fda.gov/medical-devices/premarket-submissions/de-novo-classification-request [https://perma.cc/4S8X-3JXU] (last updated Nov. 20, 2019).

[46]*See* Factors to Consider When Making Benefit-Risk Determinations in Medical Device Premarket Approval and De Novo Classifications, U.S. Food & Drug Admin. (2019), https://www.fda.gov/media/99769/download [https://perma.cc/PRY6-LUC9].

[47]21 U.S.C. § 360c(f)(2); *see also De Novo Classification Request*, *supra* note 45. However, the de novo review process can often take just as long as the PMA process. Zvi Ladin et al., Boston MedTech Advisors, FDA Review Patterns of 'De Novo' Submissions 2 (2010), https://www.bmtadvisors.com/docs/2010_06_10_FDA%20Review%20Patterns%20of%20De%20Novo%20Submissions_Final.pdf [https://perma.cc/7XKE-FRMM]. The FDA proposed a new rule in late 2018 to streamline the de novo process, reduce unnecessary expenditures on industry, and provide structure and clarity. *See* Medical Device De Novo Classification Process, 83 Fed. Reg. 63,127, 63,127 (Dec. 7, 2018) (to be codified at 21 C.F.R. pt. 860). The proposed rule is part of an effort to reduce 510(k) clearance applications and phase out predicates older than ten years. *See* Press Release, Scott Gottlieb, Comm'r of Food and Drugs, U.S. Food & Drug Admin., & Jeffrey Shuren, Dir., Ctr. for Devices and Radiological Health, Statement from FDA Comm'r Scott Gottlieb, M.D. and Jeff Shuren, M.D., Dir. of the Center for Devices and Radiological Health, on Transformative New Steps to Modernize FDA's 510(k) Program to Advance the Review of the Safety and Effectiveness of Medical Devices (Nov. 26, 2018), https://www.fda.gov/news-events/press-announcements/statement-fda-commissioner-scott-gottlieb-md-and-jeff-shuren-md-director-center-devices-and; Maria Rachal, *FDA Seeks to Boost Use of De Novo Pathway with Proposed Rule*, MedTech Drive (Dec. 5, 2018), https://www.medtechdive.com/news/fda-seeks-to-boost-use-of-de-novo-pathway-with-proposed-rule/543564/ [https://perma.cc/SJB6-P75X].

Class III devices are subject to the more stringent PMA review process because they either pose a significant risk to safety, support or sustain human life, or prevent impairment of human health.[48] New devices not found to be substantially equivalent to other legally marketed devices are also considered Class III devices subject to PMA, unless reclassified under the de novo pathway.[49] There are only three limited situations in which a Class III device will not be subject to PMA.[50] PMA is based on a determination that sufficient scientific evidence standing on its own exists to assure that the device is safe and effective for its intended use.[51] Valid scientific evidence may include controlled studies, objective clinical trials, well-documented case histories, and reports of significant experience.[52] Importantly, PMA typically requires at least one clinical investigation.[53] Clinical studies in support of PMA are subject to investigational device exemption ("IDE") regulations and must be approved by an Institutional Review Board ("IRB").[54] Upon achieving PMA, a device may still be subject to post-approval requirements such as conducting postmarket surveillance studies and reporting clinical studies using the device.[55] The PMA process is, obviously, much more stringent than the 510(k) clearance process. These safeguards are based in evidence and go above the various general controls[56] applied to all medical devices to better ensure safety and reliability where the stakes are higher.

[48] *See* 21 U.S.C. § 360c(a)(1)(C).

[49] 21 U.S.C. § 360c(f)(2). Preamendment devices, i.e. Class III devices on the market prior to the MDA, may be marketed through the 510(k) premarket notification process until the FDA requires a PMA.

[50] Class III devices on the market prior to the MDA were grandfathered and not subject to the PMA process. 21 U.S.C. § 360e(b)(1)(A). Devices shown to be substantially equivalent to these grandfathered, preamendment devices through the 510(k) process are also exempt from the PMA process. 21 U.S.C. § 360e(b)(1)(B). Lastly, the investigational device exemption applies to experimental technology and allows human subject research trials to use unapproved devices. 21 U.S.C. § 360e(a), 360j(g).

[51] 21 U.S.C. § 360c(a)(1)(C); Medical Device Classification Procedures, 21 C.F.R. § 860.7 (2020). A PMA application will include full reports of all studies on the device, a full description of the device and its components, ingredients, properties, and principles of operation, a full description of the methods and facilities for manufacturing, processing, and packaging the device, samples, proposed labeling, and more. 21 U.S.C. § 360c(e)(c)(1); 21 C.F.R. § 814.20 (2020).

[52] 21 C.F.R. § 860.7(c)(2). "Isolated case reports, random experience, reports lacking sufficient details to permit scientific evaluation, and unsubstantiated opinions are not regarded as valid scientific evidence to show safety or effectiveness. Such information may be considered, however, in identifying a device with questionable safety or effectiveness." *Id.* Non-clinical studies must be conducted in compliance with Good Laboratory Practice for Nonclinical Laboratory Studies, 21 C.F.R. § 58.

[53] *See* 21 U.S.C. § 360c(a)(3)(A).

[54] *See* 21 C.F.R. § 812; *see also Overview of Medical Device Classification and Reclassification*, U.S. Food & Drug Admin., https://www.fda.gov/about-fda/cdrh-transparency/overview-medical-device-classification-and-reclassification [https://perma.cc/GKW5-LHXE] (last updated Dec. 19, 2017).

[55] *See* 21 U.S.C. § 360i; 21 C.F.R. § 814.84(b)(2).

[56] All three classes are subject to various general controls prior to and beyond the approval process. For example, all medical device manufacturers must register their establishments and list their medical devices with the FDA. 21 C.F.R. § 807 (2020). They are subject to the Quality System Regulation and Current Good Manufacturing Practices (CGMPs), establishing requirements for designing, purchasing, manufacturing, packaging, labeling, storing, installing, and servicing. 21 C.F.R. § 820 (2020). Medical devices are also subject to specific labeling requirements. *See* 21 C.F.R. § 801 (2020). These requirements apply to labels, advertising, and informational literature accompanying the device. *Id.* The Medical Device Reporting Program is especially important because it requires both manufacturers and user facilities to report adverse events, such as incidents in which a device may have caused or contributed to a death, serious injury, or certain malfunctions. 21 C.F.R. § 803 (2020). The program is intended to detect problems so they can be corrected in an efficient and timely manner. *Overview of Medical Device Classification and Reclassification*, *supra* note 54. The FDA can recall its approval of a medical device based this information and must do so if it determines that a device is unsafe or ineffective under the label conditions. FDCA, 21 U.S.C. §§ 360e(e)(1), 360h(e) (2018).

1. 510(k) Approval: Innovation Over Review

As will be discussed later on, the 510(k) program controversy offers a point of comparison and reflection for FDA emergency response.[57] Currently, the 510(k) clearance offers an avenue for many medical device manufacturers to sidestep the PMA process and its requirements, thereby evading review and the need to present scientific evidence showing safety and efficacy.[58] The FDA reports that fewer than ten percent of medical devices are subject to PMA,[59] while other sources report the number may be as low as one percent,[60] thanks to the availability of the 510(k) clearance process. The medical device industry harbors a widespread belief that devices do not require the same level of safety and efficacy evidence as drugs in order to be approved and used.[61] Yet the vast number of approved 510(k) clearances, which often lack scientific evidence and review and come with potential for risks, carry significant implications for the public's health. Between 2003 and 2009, for example, eight and a half percent of devices cleared under a 510(k) were subject to recall within six years.[62] During this time, recalls were much more likely to affect life sustaining Class III devices with significant patient risks.[63]

Advocates in the scientific and medical community argue the bar for device regulatory approval is too low.[64] Substantial equivalence is often a relatively easy standard to meet, as 510(k) applications are rarely denied.[65] Further, the standard on its own is not designed to evaluate safety or efficacy. The Institute of Medicine ("IOM") published a report on the 510(k) clearance process that concluded "the 510(k) clearance process is not intended to evaluate the safety and effectiveness of medical devices" because the substantial equivalence standard cannot replace a premarket evaluation.[66] Substantial equivalence does not guarantee that a device poses only the same risks as an older predicate, and the logic of the standard only works in cases where the device is a clone of a currently marketed predicate.[67] Further, even where the device is a clone, "[s]ubstantial equivalence determinations provide little protection to the public … . If the earlier device poses a severe risk or is ineffective, then the latter device may also be risky or ineffective."[68] The IOM report

[57] *See infra* Part VI, Section B.

[58] *See* 21 U.S.C. § 360c(f)(2).

[59] *Learn if a Medical Device Has Been Cleared by FDA for Marketing*, U.S. Food & Drug Admin., https://www.fda.gov/medical-devices/consumers-medical-devices/learn-if-medical-device-has-been-cleared-fda-marketing [https://perma.cc/9MJ8-DHCB] (last updated Dec. 29, 2017).

[60] Kramer, Xu & Kesselheim, *supra* note 9, at 1; Inst. of Med., Medical Devices and the Public's Health: The FDA 510(k) Clearance Process at 35 Years 4 (2011).

[61] Heneghan & Thompson, *supra* note 8, at 187 (referencing Kirsty Sprange & Maxine Clift, *The NICE Medical Technologies Evaluation Programme (MTEP): Manufacturer Submission Challenges*, 105 J. Royal Soc. Med. S4 (2012)).

[62] Inst. of Med., Public Health Effectiveness of the FDA 510(k) Clearance Process: Measuring Postmarket Performance and Other Select Topics: Workshop Report 13 (Theresa Wizemann ed., 2011). More than half of these recalls were due to manufacturing process errors or device design issues. *Id.*

[63] Inst. of Med., *supra* note 60, at 15.

[64] *See, e.g.*, Heneghan & Thompson, *supra* note 8, at 186-87; *How Global Journalists Investigated Medical Device Safety*, *supra* note 14 (finding that the FDA "puts people at risk by pushing devices through an abbreviated approval process, then responds slowly when it comes to forcing companies to correct sometimes life-threatening products.").

[65] *See* Ctrs. for Devices and Radiological Health, Initial Result of 510(k) Audit: Analysis of Not Substantially Equivalent (NSE) Determinations 2 (2011), https://www.fda.gov/media/92614/download [https://perma.cc/3Z8Q-LCG2].

[66] Inst. of Med., *supra* note 60, at 5.

[67] *Id.* Even more worrisome, a 510(k) application can use a predicate that is old, discontinued, or approved but never marketed. *Id.*

[68] Medtronic, Inc. v. Lohr, 518 U.S. 470, 493 (1996).

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questioned how the 510(k) process is serving either industry or patients,[69] and it seems to fail to meet its own goals of ensuring safety and efficacy while promoting innovation. The report's primary criticism was that the 510(k) clearance process does not involve any kind of evaluation, premarket or postmarket.[70] The report ultimately recommends the design of a completely new regulatory framework for Class II devices involving additional studies and delaying approval for competitive devices.[71] One recommendation suggests developing a modified and risk-based de novo process for evaluating the safety and effectiveness of Class II devices.[72]

In response, the FDA announced changes to modernize the 510(k) clearance process.[73] No Class III device was cleared through the 510(k) process in 2018.[74] While these actions have had some positive effects, they ultimately fall short of the IOM's recommendations for a new regulatory program to eliminate the logical inconsistencies within the substantial equivalence standard.[75] There are also FDA efforts to update the de novo classification process to reduce 510(k) applications and phase out predicates older than ten years,[76] but the results of these efforts are yet to be seen.

A. Emergency Use Authorizations

Despite the efficiencies of the 510(k) clearance process and the theoretical assurances of the more rigorous PMA process, in public health emergencies the FDA must look for a speedier approach to address medical device needs and shortages. Following the World Trade Center attacks on September 11, 2001, Congress recognized a clear need for FDA emergency authorities.[77] The Project Bioshield Act of 2004[78] first introduced the EUA procedure into section 564 of the FDCA.[79]

The Secretaries of DHHS, Defense, or Homeland Security each have authority to determine that an emergency or significant potential for emergency exists involving a chemical, biological, radiological, and/or nuclear ("CBRN") agent.[80] After this determination, the Secretary of DHHS may make an EUA declaration, declaring that

[69] *See* Inst. of Med., *supra* note 60, at 4.

[70] *See id.* at 37.

[71] *See id.* at xii.

[72] *See id.* at 11. A modified de novo review process could provide a scientific and risk-based review of Class II devices while still expediting approval of lower-risk devices. *Id.*

[73] *See* Press Release, Scott Gottlieb & Jeff Shuren, *supra* note 47. These changes included increasing expectations for premarket evidence to determine substantial equivalence, implementing a refuse-to-accept policy, improving consistency and thoroughness of review, working to eliminate Class III device 510(k) approval, and eliminating the use of medical devices with safety concerns as predicates. U.S. Food & Drug Admin., FDA Has Taken Steps to Strengthen The 510(k) Program (2018), https://www.fda.gov/media/118500/download [https://perma.cc/K3NE-HXVA].

[74] U.S. Food & Drug Admin., *supra* note 73, at 7.

[75] *See* Inst. of Med., *supra* note 62. It is debatable, for example, whether the 150% increase in the average number of pages for each 510(k) since 2009 is an improvement to safety and efficacy review or merely a hinderance to manufacturers and innovation.

[76] *See* Medical Device De Novo Classification Process, *supra* note 47; Press Release, Scott Gottlieb & Jeff Shuren, *supra* note 47; Rachal, *supra* note 47.

[77] John D. Blum & Jordan Paradise, *Public Health Preparedness & Response: An Exercise in Administrative Law*, 20 DePaul J. Health Care L. 2, 13 (2018).

[78] Project Bioshield Act of 2004, § 2, Pub. L. No. 108-276, 118 Stat. 835 (2004).

[79] FDCA § 564, 21 U.S.C. § 360bbb-3 (2018). Subsequent amendments were made by the Pandemic and All-Hazards Preparedness Reauthorization Act of 2013 (PAHPRA) § 302(b), 21 U.S.C. § 360bbb-3 (2018), the 21st Century Cures Act of 2016 § 3088, 21 U.S.C. § 360bbb-4a (2018), and Federal Food, Drug, and Cosmetic Act Amendments, Pub. L. No. 115-92, § 1, 131 Stat. 2023 (2017).

[80] 21 U.S.C. § 360bbb-3. The Secretary of Homeland Security may also identify a material threat sufficient to affect national security or the health and security of U.S. citizens living abroad. *Id.*

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circumstances exist justifying authorization for emergency use.[81] Only then will the FDA have authority to issue an EUA for an unapproved medical product, and only if certain criteria are present.[82]

An EUA comes with statutory authorization conditions as well as additional conditions the FDA will impose if deemed necessary. The EUA must ensure that both health care providers administering and patients receiving the product are informed about the circumstances of the product's EUA and the risks.[83] As with medical devices generally, manufacturers of an unapproved product under an EUA must monitor the product and report adverse events,[84] as well as maintain records accessible by the FDA.[85] An EUA may also impose additional conditions relating to distribution, administration, and advertising,[86] or waive or limit compliance with other medical device regulations.[87] For example, while EUA products are generally expected to comply with CGMPs, a specific EUA may waive CGMP requirements on a case-by-case basis.[88] Prescription requirements may also be waived based on the circumstances of the emergency.[89]

An EUA will specify the effective date and generally remain in effect for the duration of the EUA declaration under which it was issued.[90] The FDA can revoke an EUA earlier, however, if the criteria for issuance are no longer met or as appropriate to protect the public health and safety.[91] The FDA should periodically review the circumstances of an EUA, including those that might warrant revocation, and regularly assess the progress made on approval, licensure, or clearance of the EUA product.[92] Significant adverse inspectional findings at the manufacturing site, reports of adverse events linked to the

[81] *Id.*

[82] These criteria are: (1) The threat in the EUA declaration is capable of causing a serious or life-threatening illness or condition; (2) A reasonable belief based on scientific evidence that the product may be effective in diagnosing, treating, or preventing the illness or condition; (3) The known and potential benefits of the product for the use above outweigh any known and potential risks; and (4) No adequate, approved, and available alternative exists. *Id.* § 360bbb-3(c); *see also* U.S. DEP'T OF HEALTH AND HUMAN SERVS., EMERGENCY USE AUTHORIZATION OF MEDICAL PRODUCTS AND RELATED AUTHORITIES: GUIDANCE FOR INDUSTRY AND OTHER STAKEHOLDERS 7-8 (2017), https://www.fda.gov/media/97321/download [https://perma.cc/7U58-7FJV] (referring to the risk-benefit analysis of the known and potential benefits and risks as a "'may be effective' standard").

[83] 21 U.S.C. § 360bbb-3(e)(1)(A)(i). Patients must be informed that the product was authorized under an EUA and about the significant known and potential benefits and risks of the product's emergency use, the extent to which such benefits and risks are unknown, and the available alternatives to the product, their benefits, and risks. *Id.*

Recipients must also be informed that they have the option to accept or refuse the EUA product, and about any consequences of such a refusal. *Id.* § 360bbb-3(e)(1)(A)(ii). The FDA recommends developers requesting an EUA create a fact sheets for providers and patients. U.S. DEP'T OF HEALTH AND HUMAN SERVS., *supra* note 82, at 22. For more on what this fact sheet should include, see *id.* at 22-25,

[84] 21 U.S.C. § 360bbb-3(e)(1)(A)(iii). Such monitoring and reporting conditions may be imposed for an EUA for an unapproved use of an approved product as well. *Id.* § 360bbb-3(e)(2)(A).

[85] 21 U.S.C. § 360bbb-3(e)(1)(A)(iv). Records expected to be kept include the names and addresses of facilities receiving the product and the number of doses, devices, or units received. *See id.*; U.S. DEP'T OF HEALTH AND HUMAN SERVS., *supra* note 82, at 26. The records and reporting requirements aid in the FDA's review of the EUA and potential circumstances for its revocation.

[86] 21 U.S.C. §§ 360bbb-3(e)(1)(B), 360bbb-3(e)(4); *see also* U.S. DEP'T OF HEALTH AND HUMAN SERVS., *supra* note 82, at 26-27.

[87] *See* U.S. DEP'T OF HEALTH AND HUMAN SERVS., *supra* note 82, at 27-28.

[88] 21 U.S.C. § 360bbb-3(e)(3).

[89] *Id.* For example, a large-scale emergency response may require large numbers of individuals to receive a medical product at locations that are not traditional health care settings, the goal being to dispense the EUA product as quickly as possible to protect the public health. U.S. DEP'T OF HEALTH AND HUMAN SERVS., *supra* note 82, at 27.

[90] 21 U.S.C. § 360bbb-3(f).

[91] *Id.* § 360bbb-3(g)(2).

[92] U.S. DEP'T OF HEALTH AND HUMAN SERVS., *supra* note 82, at 29.

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EUA product, product failure, product ineffectiveness, material changes in the risk/benefit assessment, approval status changes, or a request from the manufacturer may all warrant EUA revocation.[93]

In the case of diagnostic tests, an EUA may indicate whether the test is categorized so that it may be performed at a point-of-care setting, such as through testing kits, or only in a laboratory certified for high complexity testing.[94] Along with additional conditions for testing EUAs, the Clinical Laboratory Improvement Amendments ("CLIA")[95] govern COVID-19 diagnostic and serology testing in laboratory settings. CLIA certification requirements help to ensure that test results are reliable and accurate,[96] primarily done by assessing an LDT's analytical validity, or whether the test performs as intended, after the laboratory has already started testing.[97] CLIA plays an especially important role in respect to LDTs, to be discussed later on.[98] Whether the FDA has authority to require premarket review of LDTs, or EUAs for LDTs developed at CLIA-compliant high complexity laboratories, is unclear.[99] This Note discusses EUAs, as well as both successes and revocations, for four types of medical devices needed in the pandemic response.

1. The PREP and CARES Acts

The Public Readiness and Emergency Preparedness ("PREP") Act and the Coronavirus Aid, Relief, and Economic Security ("CARES") Act are other laws outside the FDCA relevant to medical devices during the pandemic.[100] The PREP Act authorizes the DHHS Secretary to issue a declaration providing immunity from liability, except for

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[93] *Id.*

[94] *See* 21 U.S.C. § 360bbb-3(m). The categorization will be made if the scientific evidence shows it would be beneficial to protecting the public health and the known and potential benefits of such categorization outweigh the risks. *Id.* Diagnostic tests are categorized by their complexity as either waived tests, moderate complexity tests, and high complexity tests after clearance or authorization. 21 C.F.R. §§ 493.15(c), 493.17 (2020). The categorization made for an EUA is effective only for the time of the EUA. U.S. DEP'T OF HEALTH AND HUMAN SERVS., *supra* note 82, at 28; *see also* FDCA § 564(m), 21 U.S.C. § 360bbb-3(m) (2018).

[95] Clinical Laboratory Improvement Amendments, 42 U.S.C. § 263a (2018). CLIA requires certification of clinical laboratories seeking to perform diagnostic testing by the Centers for Medicare and Medicaid Services (CMS). 42 U.S.C. § 263a; 21 C.F.R. § 493 (2020). The FDA, CMS, and CDC are all responsible for executing CLIA and take on unique roles. *See Clinical Laboratory Amendments (CLIA)*, U.S. FOOD & DRUG ADMIN., https://www.fda.gov/medical-devices/ivd-regulatory-assistance/clinical-laboratory-improvement-amendments-clia [https://perma.cc/463H-HV3C] (last updated Feb. 25, 2020). CMS carries out most of CLIA enforcement, while the CDC is responsible for technical standards, guidance, research, and proficiency testing. *See id.* CMS's CLIA responsibilities include issuing laboratory certifications, collecting user fees, conducting inspections, enforcing regulatory compliance, monitoring laboratory performance, publishing CMS rules and regulations, and more. *Id.* The FDA's main responsibilities are categorizing tests based on complexity, reviewing requests for waivers, and developing rules and guidance for CLIA laboratories. *See id.* Diagnostic tests are categorized by their complexity as either waived tests, moderate complexity tests, and high complexity tests after clearance or authorization. 21 C.F.R. §§ 493.15(c), 493.17 (2020). The categorization provided by the FDA in a test's EUA is independent of that made under CLIA, effective only for the time of the EUA. U.S. DEP'T OF HEALTH AND HUMAN SERVS., *supra* note 94, at 28; *see also* FDCA § 564(m), 21 U.S.C. § 360bbb-3(m) (2018).

[96] *See* CTRS. FOR MEDICARE & MEDICAID SERVS., CLIA OVERVIEW 1 (2013), https://www.cms.gov/Regulations-and-Guidance/Legislation/CLIA/Downloads/LDT-and-CLIA_FAQs.pdf [https://perma.cc/HF4M-T8X3].

[97] *See* 42 C.F.R. § 493.1253(b)(2); CTRS. FOR MEDICARE & MEDICAID SERVS., *supra* note 96.

[98] *See infra* Part IV, Section C, Subsection 1. Currently, CMS is expediting the review process for new CLIA applications, without waiving any application requirements, to ensure laboratories wishing to begin COVID-19 testing may do so as quickly as possible. *See* CTRS. FOR MEDICARE & MEDICAID SERVS., *supra* note 96.

[99] *See* Barbara J. Evans & Ellen Wright Clayton, *Deadly Delay: The FDA's Role in America's COVID-Testing Debacle*, 130 YALE L.J.F. 78, 82-84 (2020) (concluding "the FDA lacked clear statutory authority to require EUAs for LDTs" while recognizing the debate over statutory authority).

[100] *See* Public Readiness and Emergency Preparedness Act, § 319, 42 U.S.C. § 247d (2018).

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willful misconduct, for claims of loss involving medical countermeasures used in public health emergencies.[101] DHHS Secretary Alex Azar has issued several PREP Act declarations to provide liability immunity for medical countermeasures responding to COVID-19.[102] Additionally, the CARES Act established a new category of covered countermeasures eligible for liability immunity during the pandemic.[103] The PREP Act declaration gives liability immunity to any antiviral, drug, biologic, diagnostic, respiratory device, other device, or vaccine used to treat, diagnose, cure, prevent, or mitigate COVID-19 or the transmission of SARS-CoV-2.[104] These benefits are especially important for commercial manufacturers and distributors who may need incentive to develop needed medical devices during the pandemic.[105]

IV. FDA RESPONSE TO THE COVID-19 PANDEMIC AND EMERGENCY USE AUTHORIZATIONS

The FDA has granted EUAs and issued various guidance documents throughout its pandemic response with varying levels of success. FDA decisions regarding EUAs for four medical devices—face masks and facepiece respirators, ventilators, diagnostic tests, and serological tests—demonstrate these varying outcomes. They reflect the FDA's hands-off approach in regulating essential devices despite the public's heightened reliance on such devices in a large-scale crisis. These circumstances ultimately emphasize the dangers of lessening premarket review standards and the importance of postmarket surveillance, while highlighting a need for consistency. Notably, these shortcomings are not completely rooted in emergency circumstances, as the identifiable issues echo the weaknesses in medical device regulation as a whole.

A. Face Masks and Respirators

PPE have been subject to sporadic shortages since the beginning of the pandemic, putting health care workers and patients at risk.[106] Face masks, face shields, and respirators are generally regulated as Class II medical devices, though face masks used by the general public are unclassified to allow for "enforcement discretion" during the pandemic.[107]

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[101] *Id.* § 247d-6d.

[102] *See* Declaration Under the Public Readiness and Emergency Preparedness Act for Medical Countermeasures Against COVID-19, 85 Fed. Reg. 15,198 (Mar. 17, 2020).

[103] Coronavirus Aid, Relief, and Economic Security Act § 3103, 42 U.S.C. § 247d-6d(i)(1)(D) (2020). These new covered countermeasures include respiratory protective devices approved by NIOSH or any successor regulations. *Id.* The Secretary subsequently amended the PREP Act Declaration to extend liability immunity to these devices. Amendment to Declaration Under the Public Readiness and Emergency Preparedness Act for Medical Countermeasures Against COVID-19, 85 Fed. Reg. 21,012 (Apr. 15, 2020).

[104] Amendment to Declaration Under the Public Readiness and Emergency Preparedness Act for Medical Countermeasures Against COVID-19, 85 Fed. Reg. at 21,012. The PREP Act Declaration also gives liability immunity to devices used in the administration of the covered products and all components and materials involved. *Id.*

[105] *See U.S. Can Boost Domestic Production of Essential Medicines and Their Ingredients with Tax Incentives*, Ways and Means Committee (Aug. 6, 2020), https://gop-waysandmeans.house.gov/u-s-can-boost-domestic-production-of-essential-medicines-and-their-ingredients-with-tax-incentives/ [https://perma.cc/U2FB-B8LA].

[106] Office of Inspector Gen., U.S. Dep't of Health & Human Servs., *supra* note 23, at 3-4.

[107] *See Product Classification Database*, U.S. Food & Drug Admin., https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfPCD/classification.cfm [https://perma.cc/MU5S-LJS9] (last visited Oct. 24, 2020) (searching "face mask," "facemask," and "respirator"); *see also* Ctr. for Devices and Radiological Health, U.S. Food & Drug Admin., Enforcement Policy for Face Masks and Respirators During the Coronavirus Disease (COVID-19) Public Health Emergency (Revised): Guidance for Industry and Food

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The FDA has issued numerous EUAs for filtering facepiece respirators used by health care providers, including those approved by the National Institute for Occupational Safety and Health ("NIOSH"),[108] imported disposable filtering facepiece respirators ("FFRs") from certain jurisdictions,[109] and disposable FFRs manufactured in China.[110] The FDA has also issued an EUA for face masks for general public use, though these face masks are not intended for PPE use by health care providers.[111]

Under FDA guidance, face masks used for a medical purpose, but not intended to provide liquid barrier protection, and surgical masks intended to provide liquid barrier protection are not required to submit a 510(k) premarket notification where the face mask does not create an undue risk.[112] Manufacturers must make their own safety determinations, including whether their mask meets fluid testing requirements, without submission of data.[113] Given the importance of masks for preventing the spread of COVID-19, one can argue that any mask without review creates an undue risk. For the most part, and despite large discretion given to manufacturers, these actions have succeeded in increasing the supply and availability of face masks for health providers and the general public.[114]

These decisions produced some drawbacks, however. Originally, the FDA issued an April 2, 2020 guidance allowing distribution and use of certain respirators not FDA-cleared or authorized under another EUA.[115] In just one month between the April guidance and the subsequent May 2020 guidance, certain respirators underperformed and concerns over efficacy grew.[116] CDC testing revealed many respirators and protective face masks unreviewed by the FDA, particularly those subject to different international standards but also those measured by U.S. standards, had filtration efficacy as low as eleven percent.[117]

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and Drug Administration Staff 3 (May 2020), https://www.fda.gov/media/136449/download [https://perma.cc/Z92P-NCRF].

[108]Letter from Denise M. Hinton, Chief Scientist, Food & Drug Admin., to Robert R. Redfield, Dir., Ctrs. for Disease Control and Prevention (Mar. 28, 2020), https://www.fda.gov/media/135763/download [https://perma.cc/TD7S-FUYA].

[109]Letter from Denise M. Hinton, Chief Scientist, Food & Drug Admin., to Manufacturers of Imported, Non-NIOSH-Approved Disposable Filtering Facepiece Respirators, Health Care Personnel, Hospital Purchasing Departments and Distributors, Importers and Commercial Wholesalers, and Any Other Applicable Stakeholders (June 6, 2020), https://www.fda.gov/media/136403/download [https://perma.cc/EYH4-WVKL].

[110]Letter from Denise M. Hinton, Chief Scientist, Food & Drug Admin., to Manufacturers of Imported, Non-NIOSH-Approved Disposable Filtering Facepiece Respirators manufactured in China, Health Care Personnel, Hospital Purchasing Departments and Distributors, Importers and Commercial Wholesalers, and Any Other Applicable Stakeholders (Oct. 15, 2020), https://www.fda.gov/media/136664/download [https://perma.cc/FWB7-AGSD].

[111]Letter from Denise M. Hinton, Chief Scientist, Food & Drug Admin., to Manufacturers of Face Masks, Health Care Personnel, Hospital Purchasing Departments and Distributors, and Any Other Stakeholders (Apr. 24, 2020), https://www.fda.gov/media/137121/download [https://perma.cc/T6PL-Y76P]. This umbrella EUA covers face masks used for a medical purpose intended as source control and neither labeled as a surgical mask nor intended to provide liquid barrier protection. *Id.*

[112]Ctr. for Devices and Radiological Health, *supra* note 107, at 6, 8. A face mask not intended to provide liquid barrier protection would be considered to not pose an undue risk to the public health where appropriate labeling is used, the labeling makes recommending against certain uses, and the labeling does not include uses for infection prevention. *Id.* at 6. A surgical mask intended to provide liquid barrier protection would be considered to not pose an undue risk to the public health where the mask meets fluid resistance testing and flammability requirements, includes appropriate labeling, and is not intended for uses like infection prevention. *Id.* at 8.

[113]*Id.*

[114]*Id.*

[115]*Id.* at 9.

[116]*Id.*

[117]*NPPTL Respirator Assessments to Support the COVID-19 Response*, Ctrs. Disease Control (Dec. 3, 2020), https://www.cdc.gov/niosh/npptl/respirators/testing/NonNIOSHresults.html [https://perma.cc/H5DZ-HRMC].

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The CDC also found a high prevalence of counterfeit products, meaning that some products had labels from legitimate manufacturers despite not being produced by those manufacturers.[118] The CDC has no way of verifying neither the authenticity nor the identity of counterfeit masks and respirators—a situation that proves to be especially concerning because some counterfeit products show poor filtration results.[119] The FDA discontinued its policy, recognizing the need for greater oversight of respirators to protect public health.[120] The FDA now recommends only using respirators that are FDA cleared or authorized under an EUA, though other respirators can still be used as face masks by the general public.[121]

As the FDA seeks a balance between availability and efficacy during the pandemic, the reversal of this respirator policy exemplifies regulatory rollback due to safety concerns after no review was initially conducted. The CDC testing also mirrored the benefits of postmarket surveillance by providing the FDA an opportunity to correct itself before too much harm was done. Though the direct consequences of this lack of regulation are unclear, they have potential to be significant. These events also show that not all medical device developers can be trusted to conform to established standards. As such, issues with counterfeits and differing international standards demand further device review.

B. Ventilators

Ventilators and other life-saving medical devices for treating COVID-19 patients became scarce as the number of COVID-19 cases and hospitalizations rose quickly in March 2020.[122] In April, the United States had an estimated 60,000 to 160,000 ventilators, including those with only partial functionality.[123] At the time, the United States was expected to need several hundred thousand to care for COVID-19 patients; the country simply did not have enough ventilators to meet this estimated need.[124] Today, the FDA maintains a public and up-to-date list of devices in shortage, with three types of ventilators still in shortage since August 14, 2020.[125] Notably, as COVID-19 treatment has developed and the medical community turns to other options for breathing management, the need for ventilators has dropped.[126] In fact, the problem

[118] *Id.*
[119] *Id.*
[120] Ctr. for Devices and Radiological Health, *supra* note 107, at 9.
[121] *Id.*
[122] Ranney, *supra* note 18, at e41(1); *see also* Office of Inspector Gen., U.S. Dep't of Health and Human Servs., *supra* note 23, at 6-7.
[123] Ranney, *supra* note 18, at e41(1).
[124] *Id.*
[125] *Medical Device Shortages During the COVID-19 Public Health Emergency*, U.S. Food & Drug Admin. (Sep. 24, 2020), https://www.fda.gov/medical-devices/coronavirus-covid-19-and-medical-devices/medical-device-shortages-during-covid-19-public-health-emergency#shortage [https://perma.cc/7PFX-9V8K]. The Federal CARES Act amended the Food, Drug, and Cosmetic Act to add § 506J, giving the FDA authority to help prevent or mitigate medical device shortages during public health emergencies. *See* Coronavirus Aid, Relief, and Economic Security Act, Pub. L. No. 116-136, § 3121, 134 Stat. 281, 363-64 (2020); 21 U.S.C. § 356j (2020). § 356j(g) requires the FDA to maintain a publicly available and up-to-date list of devices determined to be in shortage. 21 U.S.C. § 356j(g) (2020).
[126] Faiz Siddiqui, *The U.S. Forced Major Manufacturers to Build Ventilators. Now They're Piling Up Unused in a Strategic Reserve*, Wash. Post (Aug. 18, 2020), https://www.washingtonpost.com/business/2020/08/18/ventilators-coronavirus-stockpile/[https://perma.cc/7RXC-7PDV].

at the end of 2020 no longer seemed to be a shortage of ventilators but rather of critical care doctors with training to operate them.[127]

In response to initial supply concerns, the FDA issued an umbrella EUA for ventilators, ventilator tubing connectors, and ventilator accessories that meet safety, performance, and labeling criteria.[128] Generally, most ventilators are Class II devices requiring 510(k) clearance on a showing of substantial equivalence to another device on the market.[129] High-frequency ventilators are designated as Class III and require even more review.[130] The EUA waived CGMPs and quality system requirements, reducing the quality controls for safety and efficacy, though the ventilators must still conform with authorization conditions outlined in the FDCA.[131]

FDA guidance also encourages manufacturers with capability in other sectors to make ventilators and ventilator accessories under the umbrella EUA process.[132] Companies including General Motors, Ford, Dyson, Rolls-Royce, and Tesla shifted some of their manufacturing facilities to produce ventilators.[133] Despite the high stakes involved with ventilators as life sustaining devices, this FDA response is one successful example of EUA utilization that has yet to be met with negative consequences and rollback. Ventilators produced under EUAs have been successful and function properly. This success is partially because ventilators are not new devices created for the pandemic response, nor do they need to be adapted to address COVID-19 specifically.[134] In reality, most ventilators are likely "substantially equivalent" to ventilators on the market before the pandemic.[135] The FDA's emergency review decisions and other similar standards should not be judged solely by their successes, however, and the inherent problems in low review standards will be discussed further.[136] Most significantly, the success of the ventilator EUAs can also be attributed to the umbrella EUA's safety, performance, and labeling criteria because these requirements ensured premarket review.

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[127] Andrew Jacobs, *Now the U.S. Has Lots of Ventilators, but Too Few Specialists to Operate Them*, N.Y. Times (Nov. 22, 2020), https://www.nytimes.com/2020/11/22/health/Covid-ventilators-stockpile.html [https://perma.cc/7ZB7-G4SG].

[128] Letter from Denise M. Hinton, Chief Scientist, Food & Drug Admin., to Manufacturers and Other Stakeholders (Mar. 24, 2020), https://www.fda.gov/media/136423/download [https://perma.cc/UN7T-PD4L].

[129] *See Product Classification Database*, U.S. Food & Drug Admin., https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfPCD/classification.cfm [https://perma.cc/2APC-GA9F] (last visited Oct. 24, 2020) (providing a search engine to find medical device names, product codes, and product classification and searching "ventilator").

[130] *Id.*

[131] Letter from Denise M. Hinton to Manufacturers and Other Stakeholders, *supra* note 122; *see also* 21 C.F.R. § 820 (2020) (including requirements with respect to design, manufacture, packaging, labeling, storage, and distribution). The authorization conditions for all EUAs are outlined in the FDCA § 564(e)(1)(A), 21 U.S.C. § 360bbb-3 (2017).

[132] Ctr. for Devices and Radiological Health, U.S. Food & Drug Admin., Enforcement Policy for Ventilators and Accessories and Other Respiratory Devices During the Coronavirus Disease 2019 (COVID-19) Public Health Emergency: Guidance for Industry and Food and Drug Administration Staff 13 (Mar. 2020), https://www.fda.gov/media/136318/download [https://perma.cc/9Z8S-X2E3].

[133] Amanda Kobokovich, Ctr. for Health Sec., John Hopkins Bloomberg Sch. of Pub. Health, Ventilator Stockpiling and Availability in the U.S. 1 (2020), https://www.centerforhealthsecurity.org/resources/COVID-19/COVID-19-fact-sheets/200214-VentilatorAvailability-factsheet.pdf [https://perma.cc/FZ2N-3EY6].

[134] *See generally* Robert M. Kacmarek, *The Mechanical Ventilator: Past, Present, and Future*, 56 Respiratory Care, 1170, 1170-78 (2011) (providing background on the development of ventilators).

[135] In fact, the FDA is working to promptly issue 510(k) approvals for new and modified ventilators.

[136] *See infra* Part VI, Section B.

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C. Diagnostic Testing

Diagnostic testing for active COVID-19 is an essential part of the pandemic response.[137] For any return to a "new normal" and a safe lessening of restrictions, grand scale and regular testing is needed to contain and reduce community spread.[138] So far, the United States has been unable to meet testing demands, in large part due to supply shortages.[139] The Inspector General's report to DHHS regarding hospitals' pandemic response stated that hospitals saw their "most significant challenges centered on testing."[140] "Severe shortages of testing supplies and extended waits for test results limited hospitals' ability to monitor the health of patients and staff."[141] The inability to meet testing demands further exacerbated other challenges, including bed availability, staffing shortages, patient care, and reducing community spread.[142] The importance of testing is—at least in the public health community—uncontested, and the FDA has sought to increase testing speed and availability by issuing EUAs to new products.[143]

The FDA's initial approach to the EUA process was, however, largely a failure with epic consequences during the early stages of its pandemic response.[144] The FDA

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[137] *See, e.g.*, Eric Schneider, *Failing the Test – The Tragic Gap Undermining the U.S. Pandemic Response*, 383 New. Eng. J. Med. 299, 301 (2020). Schneider explains:

> Testing has many purposes beyond diagnosis and protection of health care workers. Testing data are needed to manage all aspects of a pandemic. For instance, they are a cornerstone of epidemic forecasting models, which are sorely needed to reveal the future demand for care, including the timing of case surges and the magnitude of required emergency medical services, hospital staff, hospital beds, ventilator equipment, and mortuary services. Without good testing data, forecasters have to rely on guesswork and assumptions.
>
> *Id.*

[138] *See, e.g.*, David M. Studdert & Mark A. Hall, *Disease Control, Civil Liberties, and Mass Testing—Calibrating Restrictions during the Covid-19 Pandemic*, 383 New Eng. J. Med. 102, 103-4 (2020) (advocating for a comprehensive testing program as a less intrusive response to the pandemic than restrictions such as stay-at-home orders). "In ordinary times, a comprehensive program of testing, certification, and retesting would be beyond the pale. Today, it seems like a fair price to pay for safely and fairly resuming a semblance of normal life." *Id.*

[139] *See, e.g.*, Schneider, *supra* note 137, at 300. A recent Rockefeller Foundation report estimates that at least 193 million tests are need monthly to support reopening schools and nursing homes, with modified conditions and restrictions, safely. Christina Silcox et al., A National Decision Point: Effective Testing and Screening for COVID-19 16 (2020), https://www.rockefellerfoundation.org/wp-content/uploads/2020/09/A-National-Decision-Point-Effective-Testing-Screening-for-Covid-19-Full-Report.pdf [https://perma.cc/KCD4-ZFNZ]. The Harvard Global Health Institute and Brown School of Public Health suggest a nationwide testing target of almost 4.4 million tests per day, with an ideal target of 14 million, to effectively contain the spread of COVID-19. Rob Stein, *Can the U.S. Use Its Growing Supply of Rapid Tests to Stop the Virus?*, NPR (Oct. 2020, 5:03 a.m.), https://www.npr.org/sections/health-shots/2020/10/01/915793729/can-the-u-s-use-its-growing-supply-of-rapid-tests-to-stop-the-virus [https://perma.cc/ZW3G-3PU3]. For an update on these targets, which varies over time as infection rates change, see *Viral Testing Targets*, Pandemics Explained, https://globalepidemics.org/testing-targets/ [https://perma.cc/XS98-CG7F] (providing an updated interactive map module and testing calculator).

[140] Office of Inspector Gen., U.S. Dep't of Health and Human Servs., *supra* note 23, at 1.

[141] *Id.* Hospitals were unable to meet testing demands because they lacked the necessary supplies such as nasal swabs, viral transfer media, and reagents used to detect the virus. *Id.*

[142] *Id.* at 1-2.

[143] U.S. Food & Drug Admin., *supra* note 26, at 1.

[144] *See* Shawn Boburg et al., *Inside the Coronavirus Testing Failure: Alarm and Dismay Among the Scientists who Sought to Help*, Wash. Post (Apr. 3, 2020), https://www.washingtonpost.com/investigations/2020/04/03/coronavirus-cdc-test-kits-public-health-labs/?arc404=true [https://perma.cc/SK5J-LN4C]; Rachana Pradhan, *CDC Coronavirus Testing Decision Likely To Haunt Nation For Months To Come*, Kaiser Health News (Mar. 23, 2020), https://khn.org/news/cdc-coronavirus-testing-decision-likely-to-haunt-nation-for-months-to-come/ [https://perma.cc/ML3B-U895].

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issued its first diagnostic test EUA to the CDC on February 4, 2020.[145] The test took an extraordinarily fast seven days to develop, and was rolled out to testing facilities in all fifty states.[146] Unfortunately, scientists and lab technicians soon discovered the testing kits were faulty and produced untrustworthy results.[147] Many labs discovered their own solutions to make the tests work, but could not continue testing with the changes because the FDA required an EUA for COVID-19 LDTs.[148] The CDC took twenty-one days to approve a method to make the tests work; critical time to respond to the pandemic was lost and false results threatened public health.[149] Responding to criticism over the stringent EUA process from laboratories and commercial developers, the FDA authorized laboratories certified by CLIA to perform high complexity tests to develop and use their own COVID-19 diagnostic tests, followed by FDA notification and an EUA submission within fifteen days.[150] Given the massive consequences of the botched U.S. testing launch, the first COVID-19 diagnostic test EUA was considered a failure prior to its multiple amendments.[151]

The CDC and FDA prioritized speed over accuracy and safety in the EUA process for testing,[152] raising questions about how safe accelerated review can be. Tests with consistently reliable results are crucial to the pandemic response and individual treatment decisions. As FDA Commissioner Stephen Hahn noted, "[f]alse diagnostic test results can lead to significant adverse public health consequences—not only serious implications for individual patient care but also serious implications for the analyses of disease progression and for public health decision-making."[153] Lab technicians, many working in CLIA labs certified to perform high complexity testing, figured out the issue with the CDC tests and a solution long before the CDC or FDA but were unable to take action because the FDA required an EUA for COVID-19 LDTs .[154] If users could detect the problem so quickly, why did the EUA validation process not catch it before the test was approved and distributed? Since this rocky start, the FDA has issued EUAs for two major categories of diagnostic tests, including polymerase chain reaction ("PCR") tests,[155]

[145]Letter from Denise M. Hinton, Chief Scientist, Food & Drug Admin., to Robert R. Redfield, Director, Ctrs. for Disease Control and Prevention (Mar. 15, 2020) (amending the initial February 4, 2020 EUA). The name of the test is the CDC 2019-Novel Coronavirus (2019-nCoV) Real-Time Reverse Transcriptase (RT)-PCR Diagnostic Panel. *Id.*

[146]Boburg et al., *supra* note 144.

[147]*Id.*; Pradhan, *supra* note 144.

[148]Boburg et al., *supra* note 144.

[149]*Id.*; Pradhan, *supra* note 144. Many labs discovered solutions to make the tests work on their own but could not go ahead with the changes under guidance at the time. *Id.*

[150]*Coronavirus (COVID-19) Update: FDA Issues New Policy to Help Expedite Availability of Diagnostics*, U.S. Food & Drug Admin. (Feb. 29, 2020), https://www.fda.gov/news-events/press-announcements/coronavirus-covid-19-update-fda-issues-new-policy-help-expedite-availability-diagnostics [https://perma.cc/B6S9-8DMU].

[151]Boburg et al., *supra* note 144.

[152]In a January 15, 2020 conference call, leading CDC scientists assured public health officials and scientists that their goal was to get FDA approval as quickly as possible. *See id.*

[153]Letter from Stephen Hahn, Commissioner of Food and Drugs, U.S. Food & Drug Admin., to Grace Kubin, Director, Tex. Dep't of State Health Servs., & Scott J. Becker, Chief Exec. Officer, Ass'n of Pub. Health Labs. (Feb. 26, 2020), https://context-cdn.washingtonpost.com/notes/prod/default/documents/1bbf4d0e-8c11-4126-b3af-24a0575c0012/note/076de12e-172d-49e5-8c50-883688f9c999.#page=1 [https://perma.cc/YKW5-CLC8].

[154]*Id.*; *see also* Boburg et al., *supra* note 144; Pradhan, *supra* note 144.

[155]U.S. Food & Drug Admin., *supra* note 26, at 1. PCR testing involves "a molecular testing technique that detects genetic material from the virus" to diagnose active COVID-19 infections. *Id.* Some PCR tests are automated and require limited training to perform. *Id.* These tests are typically performed by laboratories operating under a CLIA Certificate of Waiver. *Id.* Other PCR tests require highly trained operators to manually perform and are authorized for use by laboratories certified to perform complex tests. *Id.* Molecular diagnostic

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also known as molecular tests, and antigen diagnostic tests.[156] The FDA has issued 224 individual EUAs for molecular tests and seven for antigen tests,[157] as well as an umbrella EUA for molecular LDTs.

1. Laboratory Developed Tests

On March 31, 2020, the FDA issued an umbrella EUA for molecular LDTs for SARS-CoV-2 performed by laboratories certified under CLIA to perform high complexity tests, following its previous February 29, 2020 guidance.[158] Testing under this EUA is limited to the single CLIA laboratory that developed the test.[159] To be eligible, the LDT must be subject to an EUA request using either the CLIA EUA Template provided by the FDA or equivalent data.[160] FDA guidance provides that CLIA laboratories may begin testing while preparing their EUA request as long as the LDT has been validated and the laboratory has notified the FDA of the validation.[161] LDTs whose EUA request demonstrates their eligibility will be added to Appendix A list of authorized LDTs; so far, thirty-four LDTs are authorized under Appendix A.[162] While the FDA guidance is technically non-binding, there is a "practical binding effect" creating widespread compliance.[163]

On August 19, 2020, DHHS announced that the FDA will no longer require premarket review of LDTs.[164] The notice clarified that while laboratories that develop and use LDTs may voluntarily seek FDA approval or an EUA, they are not required to

test systems, which are used to run PCR tests, are generally classified as Class I devices and exempt from the 510(k) approval process. *See Product Classification Database*, *supra* note 129 (searching "molecular test").

[156]U.S. Food & Drug Admin., *supra* note 26, at 1. Antigen diagnostic tests rapidly detect proteins from the SARS-CoV-2 virus that causes COVID-19. *Id.* Coronavirus antigen tests are unclassified by the FDA because they are pre-amendment devices. *See Product Classification Database*, *supra* note 129 (searching "antigen test").

[157]U.S. Food & Drug Admin., *supra* note 28, at 1.

[158]Letter from Denise M. Hinton, Chief Scientist, Food & Drug Admin., to Laboratories Who Have Developed a Molecular-Based Test (LDTs) for Coronavirus Disease 2019 (COVID-19) (Mar. 31, 2020), https://www.fda.gov/media/136598/download [https://perma.cc/8768-AH6M]. LDTs under this EUA, as with any other EUA under the FDCA, are subject to certain conditions of authorization, including reporting to public health authorities, tracking adverse events, and collecting information on performance. *Id.* FDA produced fact sheets for both healthcare providers and patients are required to accompany results reports from LDTs under the EUA. *Id.*; *see also* U.S. Food & Drug Admin., Fact Sheet for Healthcare Providers: Molecular Laboratory Developed Test (LDT) COVID-19 Authorized Tests (2020), https://www.fda.gov/media/136599/download [https://perma.cc/9WB6-E2NT]; U.S. Food & Drug Admin., Fact Sheet for Patients: Molecular Laboratory Developed Test (LDT) COVID-19 Authorized Tests (2020), https://www.fda.gov/media/136600/download [https://perma.cc/UPV6-JFZF].

[159]*Id.*

[160]*Id.* To view the template, see *In Vitro Diagnostics EUAs*, U.S. Food and Drug Admin., https://www.fda.gov/medical-devices/coronavirus-disease-2019-covid-19-emergency-use-authorizations-medical-devices/vitro-diagnostics-euas [https://perma.cc/9PL3-SQ5G] (last updated Mar. 17, 2021) (providing a link to download the template under "Molecular Diagnostic Template for Laboratories").

[161]Ctr. for Devices and Radiological Health, U.S. Food & Drug Admin., Policy for Coronavirus Disease-2019: Tests During the Public Health Emergency (Revised) 7 (May 11, 2020), https://www.fda.gov/media/135659/download [https://perma.cc/6D2D-BL5W]. After validation notification, a CLIA laboratory only has fifteen business days to prepare the EUA submission before the FDA removes the laboratory from its notification list and takes other actions. *Id.*

[162]To view Appendix A, see *In Vitro Diagnostics EUAs*, *supra* note 160 (providing an updated list of approved LDTs under the CLIA EUA).

[163]Evans & Clayton, *supra* note 99, at 94.

[164]*Rescission of Guidances and Other Informal Issuances Concerning Premarket Review of Laboratory Developed Tests*, U.S. Dep't of Health and Human Servs. (Sep. 1, 2020), https://www.hhs.gov/coronavirus/testing/recission-guidances-informal-issuances-premarket-review-lab-tests/index.html [https://perma.cc/QA3F-UY6C].

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do so.[165] Those that do not seek premarket review, however, will not be eligible for liability protections under the PREP Act.[166] The laboratories remain subject to CLIA regulation, and those with active EUAs are unaffected by the new policy.[167] The lack of required review for a medical device with such a dire impact is questionable, possibly echoing the early testing failure of the CDC and FDA's teamwork. Proponents of the decision, however, argue that the FDA's assertion that it could require EUAs for COVID-19 LDTs in its original guidance led to that initial testing delay.

Seven weeks later on October 7, 2020, the FDA announced it "is declining to review EUA requests for LDTs at this time."[168] While concerning for safety reasons as described above and throughout this Note, this announcement is also particularly worrisome for LDT developers seeking the benefits of an official EUA or approval. Though the FDA has called into question the validity of current guidance, thereby implying revised guidance will be issued soon, whether the same benefits afforded LDTs authorized under an EUA will also extend to future LDTs that can no longer seek an EUA is unclear. For example, the CARES Act amended the Families First Coronavirus Response Act ("FFCRA") to require that insurers cover certain COVID-19 tests authorized under EUAs without any cost-sharing requirements or prior authorization.[169] Another benefit for devices authorized under an EUA concerns liability immunity under the PREP Act.[170] Further, clinicians and other consumers often rely on FDA approvals to choose medical products, including COVID-19 tests, hurting both business for future LDTs and individuals far from laboratories with EUA approved LDTs.[171] On November 16, 2020, DHHS Assistant Secretary for Health and White House coronavirus testing czar Brett Giroir sought to reverse the decision and directed the FDA to review EUA applications for COVID-19 LDTs in a timely manner.[172] To date, the FDA has updated its website to reflect the reversal, though it is unclear whether the FDA has caught up with what is likely a backlog of requests.[173]

The FDA has also given flexibility to state LDT authorizations. Beginning with a request from the New York Department of Health to authorize certain state laboratories to begin patient COVID-19 testing, the FDA stated on March 12, 2020 it would not object to

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[165] *Id.* The notice cited the decision was consistent with the President's Executive Order on Reducing Regulation and Controlling Regulatory Costs, 82 Fed. Reg. 9,339, 9,339 (Feb. 2, 2017), and Executive Order on Regulatory Relief to Support Economic Recovery, 85 Fed. Reg. 31,353, 31,353 (May 22, 2020).

[166] *Rescission of Guidances and Other Informal Issuances Concerning Premarket Review of Laboratory Developed Tests*, *supra* note 164.

[167] *Id.*; *see also* Clinical Laboratory Improvement Amendments of 1988, 42 U.S.C. § 263a (2018); 42 C.F.R. § 493 (2020).

[168] *FAQs on Testing for SARS-CoV-2*, U.S. Food & Drug Admin., https://www.fda.gov/medical-devices/coronavirus-covid-19-and-medical-devices/faqs-testing-sars-cov-2#general [https://perma.cc/28JS-5XFZ] (last updated Oct. 21, 2020). Instead, the FDA is focusing its efforts by prioritizing EUA review for point of care tests, home collection tests, and at-home tests to increase testing accessibility as well as tests that would significantly increase testing capacity, such as through wide distribution or reduced reliance on testing supplies. *Id.*

[169] Coronavirus Aid, Relief, and Economic Security Act, § 3202, 42 U.S.C. § 256b (2020).

[170] *See* Amendment to Declaration Under the Public Readiness and Emergency Preparedness Act for Medical Countermeasures Against COVID-19, 85 Fed. Reg. 21,012 (Apr. 15, 2020).

[171] *Understanding the Regulatory Terminology of Potential Preventions and Treatments for COVID-19*, U.S. Food & Drug Admin., https://www.fda.gov/media/138490/download [https://perma.cc/DT88-5HKL] (last updated Oct. 2020).

[172] Greg Slabodkin, *In Shift, FDA Ordered to Provide 'Timely' EUA Reviews for COVID-19 Lab Developed Tests*, MedTech Dive (Nov. 17, 2020), https://www.medtechdive.com/news/giroir-directs-fda-to-provide-timely-eua-reviews-for-covid-19-lab-develop/589159/#:~:text=FDA%20Monday%20updated%20its%20FAQ,for%20agency%20review%20and%20authorization [https://perma.cc/H8ZM-VW62].

[173] *FAQs on Testing for SARS-CoV-2*, *supra* note 168.

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this practice.[174] The next day, President Trump issued a "Memorandum on Expanding State-Approved Diagnostic Tests" and instructed the DHHS Secretary to facilitate state requests to authorize laboratories within the state to develop and perform COVID-19 tests.[175] The FDA's official guidance on COVID-19 testing policies allows states to take responsibility for tests developed and performed by laboratories in their states.[176] A state may also authorize high complexity CLIA-certified laboratories to perform COVID-19 testing under its own authority and processes.[177] The laboratory need not notify the FDA if following this approval route, but rather must only adhere to the state procedures.[178] The FDA will not review state processes, but expects states to have a validation process.[179] The lack of FDA review of even the state's own authorization processes raises concerns over proper review and oversight.[180] Nine states and territories have opted to authorize COVID-19 testing under their own policies and procedures.[181]

2. Testing Accuracy and Risks

So far, no major issues have arisen involving the functioning of diagnostic tests and LDTs such as the problems presented with the initial CDC test EUA. The FDA has not revoked any EUAs for diagnostic tests, including the CDC's.[182] Concerns still remain over testing accuracy, however.[183] The FDA holds out a minimum eighty percent sensitivity standard for diagnostic tests. Given the potential consequences of a test producing false negatives twenty percent of the time, this minimum standard is set too low.[184] Rapid tests, a new focus for test developers and the FDA, are, generally, less accurate than the "gold standard" reverse transcription PCR ("RT-PCR") tests.[185] For example, the first antigen tests to receive EUAs demonstrated sensitivity ranging from 84% to 97.6%, but were often

[174] Ctr. for Devices and Radiological Health, *supra* note 161, at 11.
[175] *See id.*
[176] *Id.*
[177] *Id.*
[178] *Id.*
[179] *Id.*
[180] For example, the FDA has limited oversight over drug compounding as it has allowed state boards of pharmacy to be the primary regulators of drug compounding practices. Nat'l Acads. of Scis., Eng'g, & Med. et al., *Gaps in Regulation, Oversight, and Surveillance*, *in* Compounded Topical Pain Creams: Review of Select Ingredients for Safety, Effectivness, and Use 73 (2020). The lack of FDA oversight and support for state handling of drug compounding eventually led to the New England Compounding Center meningitis outbreak, killing over 64 people and infecting over 753. *Id.* at 81. Immediate legislative efforts under the Drug Quality and Security Act of 2013 were made to grant the FDA more authority over drug compounding. *Id.*
[181] *FAQs on Testing for SARS-CoV-2*, *supra* note 168. These states and territories include Puerto Rico, Colorado, Connecticut, Maryland, Mississippi, Nevada, New Jersey, New York, and Washington State. *Id.*
[182] *See Emergency Use Authorization--Archived Information*, Food & Drug Admin., https://www.fda.gov/emergency-preparedness-and-response/mcm-legal-regulatory-and-policy-framework/emergency-use-authorization-archived-information [https://perma.cc/TT4D-W387] (last updated Oct. 22, 2020). The EUA for the CDC's diagnostic test, however, has been amended multiple times to fix its faulty design. *See* Letter from Uwe Scherf, Director, Division of Microbiology Devices, Ctr. for Devices and Radiological Health, to Wendi Kuhnert-Tallman, EOC Laboratory Task Force Lead, Ctrs. for Disease Control and Prevention (June 12, 2020); Letter from Uwe Scherf, Director, Division of Microbiology Devices, Ctr. for Devices and Radiological Health, to Wendi Kuhnert-Tallman, EOC Laboratory Task Force Lead, Ctrs. for Disease Control and Prevention (July 13, 2020).
[183] Steven Woloshin et al., *False Negative Tests for SARS-CoV-2 Infection – Challenges and Implications*, 383 New Eng. J. Med. e38(1), e38(2)-(3) (2020) (suggesting that tests should have at least 95% sensitivity to be reliable and useful in a large-scale testing effort).
[184] *See id.*
[185] *See Interim Guidance for Rapid Antigen Testing for SARS-CoV-2*, Ctrs. for Disease Control & Prevention (Sep. 4, 2020), https://www.cdc.gov/coronavirus/2019-ncov/lab/resources/antigen-tests-guidelines.html [https://perma.cc/3E6N-QU9G].

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unable to detect antigen levels collected after five to seven days from symptom onset.[186] While the post-test probability of infection despite a negative test result can vary depending on an individual's circumstances, including recent exposure, early symptoms, and community spread, tests with higher sensitivity can provide more confidence that a false negative has not occurred.[187] At the quality of current testing, one working study suggests that up to fifty-four percent of COVID-19 positive patients may have an initial false negative test result.[188] Diagnostic testing can only help open the country safely "if the tests are highly sensitive and validated under realistic conditions against a clinically meaningful reference standard."[189] Steven Woloshin et al. suggest that ninety-five percent sensitivity is a better standard, despite inherent imperfections, because the high sensitivity level can guard against false negatives when coupled with lower pre-test probability—achieved by proper social distancing measures.[190] Many tests on the market report sensitivity of ninety-five percent or higher, so this standard is hardly unattainable.

We depend on the FDA for gatekeeping to ensure high quality results to safeguard our safety in this pandemic. While highly sensitive tests should not be discarded for failing to reach perfection, tests with lower sensitivity pose a risk to people who rely on the test's results. The FDA recognizes that "[p]atients, as well as their physicians, depend on FDA to assure the tests they use to make medical decisions are accurate, reliable, and clinically meaningful."[191] The risk is not only to the individuals receiving coronavirus test results, but to their communities who may be exposed by their reliance on a false negative. Tests that eventually prove to be ineffective after emergency authorization pose an even greater risk to the public.[192] This failure was precisely the issue with initial antibody tests.

D. Serological "Antibody" Tests

The FDA has issued EUAs for serological tests, "which can help identify individuals who have developed an adaptive immune response to the virus, indicating recent or prior infection, by detecting antibodies to SARS-CoV-2 in human blood specimens."[193] Fifty-eight serological tests, also known as antibody tests, have been issued EUAs.[194] Serological tests cannot be used to diagnose active COVID-19 infection,

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[186]Andrea Prinzi, *How the SARS-CoV-2 EUA Antigen Tests Work,* Am. Society For Microbiology (Aug. 31, 2020), https://asm.org/Articles/2020/August/How-the-SARS-CoV-2-EUA-Antigen-Tests-Work [https://perma.cc/9J9B-PW4X].

[187]Steven Woloshin et al., *supra* note 183, at e38(2)-(3) (utilizing the Bayes' theorem to describe how COVID-19 test accuracy and pretest probability of infection interact in estimating false negative probability).

[188]Ingrid Arevalo-Rodriguez et al., *False-Negative Results of Initial RT-PCR Assays for COVID-19: A Systematic Review* 4 (Working Paper, Aug. 13, 2020), https://www.medrxiv.org/content/10.1101/2020.04.16.20066787v2.full.pdf+html [https://perma.cc/A398-4KVD].

[189]Woloshin et al., *supra* note 183, at e38(2)-(3) (describing how use of known or contrived samples in validation studies, as currently permitted by the FDA, may lead to overestimates of test sensitivity).

[190]*Id.*

[191]*Zika Virus Diagnostic Development*, U.S. Food & Drug Admin. (Nov. 26, 2019), https://www.fda.gov/emergency-preparedness-and-response/mcm-issues/zika-virus-diagnostic-development#:~:text=As%20of%20December%2012%2C%202018,IgM)%20antibodies%20in%20human%20blood [https://perma.cc/VX8K-KYMN].

[192]Nick Paul Taylor, *Ex-FDA Chief Scientist Slams 'Chaos' Caused by Agency Approach to Antibody Tests*, MedTech Dive, June 10, 2020, https://www.medtechdive.com/news/ex-fda-chief-scientist-slams-chaos-caused-by-agency-approach-to-antibody/579527/#:~:text=A%20former%20FDA%20chief%20scientist,approach%20to%20regulating%20the%20field [https://perma.cc/BUM6-GUAH].

[193]U.S. Food & Drug Admin., *supra* note 26, at 1.

[194]U.S. Food & Drug Admin., *supra* note 28, at 1. Serology tests in general are unclassified because they are pre-amendment devices, while antibody test systems are Class II devices. *See Product Classification Database*, *supra* note 129 (searching "serology"). Serology tests for more serious conditions, such as a Hepatitis B, are Class III devices. *Id.*

however.[195] The FDA notes these tests are an important tool to help understand a population's exposure to COVID-19 because people who have recovered from exposure to COVID-19 will likely have antibodies to SARS-CoV-2 in their blood.[196] Serological tests may provide information on disease prevalence and the frequency of asymptomatic infection as well as identify potential convalescent plasma donors.[197] The tests may be especially useful in settings where resources are limited, such as in health care and developing countries, because they have a quick turnaround time, cost relatively little, and have the capacity to be produced on a massive scale.[198]

Serological tests come with limitations, however. Studies show that serological tests often do not provide the accuracy needed to produce reliable enough results for a targeted public health response.[199] Even the FDA recognizes that "all tests can provide at least some false results" and urges individuals to perform a serology test at least twice to produce reliable results.[200] Some experts emphasize a great need for high quality clinical studies to evaluate serological tests given their potential benefits.[201] Despite studies warning against early use of serological tests, especially for point-of-care testing, the FDA recently granted its first point-of-care antibody test EUA.[202]

On March 16, 2020, the FDA published guidance that allowed serology tests to be marketed with only FDA notification and certain labeling requirements, but without the

[195]U.S. Food & Drug Admin., *supra* note 26, at 1.

[196]Anand Shah & Jeff Shuren, U.S. Food & Drug Admin., Insight into FDA's Revised Policy on Antibody Tests: Prioritizing Access and Accuracy (May 4, 2020), https://www.fda.gov/news-events/fda-voices/insight-fdas-revised-policy-antibody-tests-prioritizing-access-and-accuracy [https://perma.cc/46B5-WDE7].

[197]Convaslescent plasma therapy, an immunotherapy applied to the treatment of infectious diseases for over a century, involves transfusing blood plasma containing SARS-CoV-2 antibodies from a recovered individual into an infected individual. Kai Duan et al., *Effectiveness of Convalescent Plasma Therapy in Severe COVID-19 Patients*, 117 Proc. Nat'l Acad. Sci. 9490, 9490-91 (2020). Though still experimental and awaiting clinical trial results for full FDA approval, early studies suggest that convalescent plasma "can be an easily accessible, promising, and safe rescue option for severe COVID-19 patients." *Id.* The FDA issued an EUA for the use of convalescent plasma, a biologic, on August 23, 2020. Letter from Denise M. Hinton, Chief Scientist, Food & Drug Admin., to Robert P. Kadlec, Assistant Sec'y for Preparedness and Response, U.S. Dep't of Health & Human Servs. (Aug. 23, 2020).

[198]Beatriz Boger Msc et al., *Systematic review with meta-analysis of the accuracy of diagnostic tests for COVID-19*, Am. J. Infection Control 21, 28 (2021).

[199]*See, e.g.*, Mayara Lisboa Bastos et al., *Diagnostic Accuracy of Serological Tests for COVID-19: Systematic Review and Meta-Analysis*, 370 BMJ, no. 2516, July 2020, at 2, 9 (finding that even three weeks after symptom onset, serological tests can misclassify 30% of results and concluding that "current serological tests for covid-19 have limited utility in the diagnosis of acute covid-19."); Beatriz Boger Msc et al., *supra* note 198, at 28 ("[T]he use of serological tests for detection in the initial/acute phase of the disease can be challenging."); Rodolfo Castro et al., *COVID-19: A Meta-analysis of Diagnostic Test Accuracy of Commercial Assays Registered in Brazil*, 24 Brazilian J. Infectious Diseases 180, 187 (2020) (finding a range of 10-40% of false-negative results in the acute phase of eight evaluated tests marketed in Brazil); J. J. Deeks et al., Cochrane Library: Cochrane Database of Systematic Reviews, Antibody Tests for Identification of Current and Past Infection with SARS-CoV-2 (Review) 4 (2020) (finding that antibody tests detected only 30% of people who had COVID-19 one week after first symptoms compared to 90% after three weeks, giving false positive results in 2% of those who did not have COVID-19. If 1,000 people had antibody tests, 21% would have false positive results and 0.4% would have false negative results).

[200]Anand Shah & Jeff Shuren, *supra* note 196.

[201]Bastos et al., *supra* note 199, at 12.

[202]Letter from Denise M. Hinton, Chief Scientist, Food & Drug Admin., to Frank Lou, Director, Azure Biotech Inc. (Sep. 23, 2020), https://www.fda.gov/media/139789/download [https://perma.cc/PC6E-YMYG]. The Assure COVID-19 IgG/IgM Rapid Test Device was first granted an EUA in July 2020 and then reissued an EUA authorizing point-of-care testing in September 2020. *Id.* The authorization allows the test to be used in care settings like doctor's offices, hospitals, urgent care centers, and emergency rooms without the need of a central lab for testing. *Id.*

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submission of an EUA or evidence of accuracy.[203] The move was intended to expand the number and variety of diagnostic tests and encourage development of serology tests.[204] In addition to this policy, the FDA issued an umbrella EUA for commercial serological tests that are evaluated by the National Institutes of Health's ("NIH") National Cancer Institute ("NIC").[205] As a result, commercial serology tests on the market were fairly inaccurate and inappropriately promoted,[206] with numerous manufacturers marketing fraudulent tests and making fraudulent claims.[207] This put the public at risk because, as the FDA recognized in its statement on the original March 16, 2020 policy, "[i]naccurate diagnoses during a pandemic can impair prevention efforts and delay appropriate treatment for sick patients."[208] Officials and experts grew weary of faulty serological testing, especially concerned over the use serological tests to issue immunity passports or certificates or make point-of-care diagnoses.[209]

The House Committee on Oversight and Reform investigated serology tests and found that the FDA's inability to validate the accuracy of antibody tests already on the market and failure to review any rapid antibody test kits before they went on the market allowed manufacturers to make fraudulent claims about test efficacy.[210] The report lambasted the FDA's handling of serological tests, stating, "[the] FDA has failed to police the coronavirus serological antibody test market, has taken no public enforcement action against any company, and has not conveyed any clear policy on serological tests."[211] In a briefing on the role of serological testing in response to the pandemic, medical experts called the FDA's March 16, 2020 policy "a colossal failure."[212]

After the Committee urged Commissioner Stephen Hahn to update the FDA's policies and guidance on serological testing,[213] the FDA reversed course and put stricter rules in place for the tests.[214] The new policy instructs commercial serological test

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[203]Stephen M. Hahn, *Coronavirus (COVID-19) Update: FDA Provides More Regulatory Relief During Outbreak, Continues to Help Expedite Availability of Diagnostics*, U.S. Food & Drug Admin. (Mar. 16, 2020), https://www.fda.gov/news-events/press-announcements/coronavirus-covid-19-update-fda-provides-more-regulatory-relief-during-outbreak-continues-help [https://perma.cc/45BY-SER8]. The policy required that serological tests include warning statements noting that the test was not FDA approved and should not be used to inform infection status. *Id.*

[204]Ctr. for Devices and Radiological Health, *supra* note 161, at 7.

[205]Letter from Denise M. Hinton, Chief Scientist, Food & Drug Admin., to Manufacturers and Other Stakeholders (Apr. 28, 2020), https://www.fda.gov/media/137470/download [https://perma.cc/VF4G-SWZG]. Tests eligible for this authorization included lateral flow or enzyme-linked immunosorbent assay (ELISA) tests. *Id.*

[206]Ctr. for Devices and Radiological Health, *supra* note 161, at 7.

[207]Comm. on Oversight and Reform, 116th Cong., Memorandum: Preliminary Findings of the Subcommittee's Coronavirus Antibody Testing Investigation 1 (Comm. Print. Apr. 24, 2020).

[208]Hahn, *supra* note 203.

[209]Bastos et al., *supra* note 199, at 9.

[210]Memorandum: Preliminary Findings of the Subcommittee's Coronavirus Antibody Testing Investigation, *supra* note 207 at 1.

[211]*Id.*

[212]Press Release, House Comm. on Oversight and Reform, Subcommittee Briefing Examined State of Coronavirus Antibody Testing (June 9, 2020), https://oversight.house.gov/news/press-releases/subcommittee-briefing-examined-state-of-coronavirus-antibody-testing [https://perma.cc/FB3M-EUMC]. "Dr. Jesse Goodman, former FDA Chief Scientist, stated that health agencies 'stumbled' with early decisions on diagnostic testing, and 'chaos' in antibody tests ensued when 'both qualified and unqualified entities flooded the market with tests.'" *Id.*

[213]Letter from Raja Krishnamoorthi, Chairman, Subcomm. on Economic and Consumer Policy, 116th Cong., to Stephen M. Hahn, Comm'r, U.S. Food & Drug Admin. (Apr. 28, 2020), https://oversight.house.gov/sites/democrats.oversight.house.gov/files/2020-04-28.RK%20to%20Hahn-FDA%20re%20%20Serology%20Tests.pdf [https://perma.cc/843P-6DPV].

[214]Policy for Coronavirus Disease-2019 Tests During the Public Health Emergency, 85 Fed. Reg. 29,461, 29,462 (May 15, 2020); *see also* Ctr. for Devices and Radiological Health, *supra* note 161, at 7.

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manufacturers to notify the FDA of validation before distributing the tests and then submit an EUA request within ten business days.[215] The policy also sets forth performance threshold recommendations for specificity and sensitivity.[216] CLIA-certified laboratories can still develop serology tests in accordance with the notification and labeling requirements originally prescribed in the March 16, 2020 policy.[217] The FDA also began publicly posting test performance data from NIH's NIC validation studies.[218]

The umbrella EUA for serological tests evaluated by the NIH's NIC continued, despite the fact that no tests met the criteria for authorization, until its revocation on July 21, 2020.[219] The FDA determined that revocation was necessary to protect the public health and safety,[220] given continued issues with inaccurate testing despite the updates on policy. The FDA preferred to issue individual EUAs for serological tests instead to allow broader scopes of authorization, unique conditions to address individual tests, and a more streamlined EUA amendment process.[221] While the FDA has granted forty-six individual EUAs for serological tests, it has also revoked two EUAs for tests that later proved ineffective.[222] The FDA found revocation necessary to protect the public health because of the risks accompanying false test results.[223] Further, published serology test performance data show some tests still have a high probability of producing false positive results,[224] particularly dangerous for those who misunderstand what the presence of antibodies can mean in terms of immunity. These rollbacks leave us questioning the validity of the medical device and testing EUA process for responding effectively to public health emergencies.

The FDA is well aware of the potential consequences of allowing a serological test on the market without proven efficacy. For example, the FDA regularly updates a "'removed' test list" for serological tests with significant performance problems, or those that do not submit an EUA request within ten days of marketing.[225] The FDA recommends that laboratories and health care providers stop using the tests on the list and remove

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[215] Ctr. for Devices and Radiological Health, *supra* note 161, at 14-15.

[216] *Id.* at 15, 20. Specificity is "the ability of a test to correctly identify people without the disease" while sensitivity is "the ability of a test to correctly identify patients with a disease." Amelia Swifte et al., *What Are Sensitivy and Specificity?*, 23 Evidence Based Nursing 2, 3 (2020).

[217] *Id.*

[218] *EUA Authorized Serology Test Performance*, U.S. Food & Drug Admin., https://www.fda.gov/medical-devices/coronavirus-disease-2019-covid-19-emergency-use-authorizations-medical-devices/eua-authorized-serology-test-performance [https://perma.cc/S3V4-JXN4] (last updated Dec. 7, 2020); *see also Coronavirus (COVID-19) Update: FDA Publicly Shares Antibody Test Performance Data From Kits as Part of Validation Study*, U.S. Food & Drug Admin. (June 4, 2020), https://www.fda.gov/news-events/press-announcements/coronavirus-covid-19-update-fda-publicly-shares-antibody-test-performance-data-kits-part-validation [https://perma.cc/6M2E-6CZN].

[219] Letter from Denise M. Hinton, Chief Scientist, Food & Drug Admin., to Manufacturers and Other Stakeholders (July 21, 2020), https://www.fda.gov/media/140351/download#:~:text=Instead%2C%20FDA%20will%20issue%20individual,)(C)%20of%20the%20Act [https://perma.cc/5NJ4-5MBM] (revoking the EUA issued for certain serological tests).

[220] *Id.*

[221] *Id.*

[222] Letter from Denise M. Hinton, Chief Scientist, Food & Drug Admin., to Andre Hsiung, Autobio Diagnostics Co., Ltd. (Aug. 6, 2020), https://www.fda.gov/media/140908/download [https://perma.cc/N94H-L58J]; Letter from Denise M. Hinton, Chief Scientist, Food & Drug Admin., to Louise M. Sigismondi, Chembio Diagnostic Systems, Inc. (June 16, 2020), https://www.fda.gov/media/139109/download [https://perma.cc/TH8L-BSQY].

[223] *Id.*

[224] *See EUA Authorized Serology Test Performance*, *supra* note 218.

[225] *Certain COVID-19 Serology/Antibody Tests Should Not Be Used - Letter to Clinical Laboratory Staff and Health Care Providers*, U.S. Food & Drug Admin. (June 19, 2020), https://www.fda.gov/medical-devices/letters-health-care-providers/certain-covid-19-serologyantibody-tests-should-not-be-used-letter-clinical-laboratory-staff-and [https://perma.cc/4EZ9-LXPV].

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remaining stock.[226] Most importantly, the FDA also recommends health care providers evaluate whether prior test results may have been incorrect, and whether the patient should be retested with an FDA-authorized test.[227] This recommendation, while certainly necessary, shows that the FDA recognizes its own regulatory failings in ensuring testing accuracy, and the possible consequences for patient care and public health.

The FDA prioritized the quick development and availability of serological tests over ensuring accuracy, efficacy, and safety. Similarly, the first EUA for the CDC's diagnostic test prioritized speed over accuracy, a move which some have argued resulted in the fast and unmitigated initial spread of COVID-19 throughout the United States. There must be a better balance between the need for timely access to such tests and control measures to protect the public. While the FDA has sought to find this balance, the relaxed and fix-it-later nature of COVID-19 test regulations echoes the persistent problems with medical device regulation as a whole.

V. COSTS AND BENEFITS OF EMERGENCY USE AUTHORIZATIONS IN CRISES

While this Note highlights many of the FDA's mistakes in its handling of medical devices during the pandemic, it also seeks to recognize the FDA's successes. The creation of the EUA has given the FDA a crucial tool for responding to large-scale public health emergencies. For one, medical device EUAs allow the FDA and manufacturers to more quickly rollout essential countermeasure products. Medical device EUAs also ensure that desperately needed products not yet in existence before the crisis can be developed without the burden of various time-consuming and resource-intensive regulatory barriers. FDA requirements for investigational products are difficult to meet in emergency scenarios requiring mass distribution, and EUAs can allow for emergency uses that would otherwise violate the FDCA.[228] The PREP Act also provides important liability protections for EUA devices to remove risk for developers, thus incentivizing production.[229]

Prioritizing speed and efficiency comes with some costs, however, as evidenced by the various EUA revocations over the course of the pandemic.[230] Medical devices under an EUA are held to a "may be effective" standard, providing "for a lower level of evidence than the 'effectiveness' standard that FDA uses for product approvals."[231] Essentially, there is an inherent tradeoff between effectiveness and emergency response in EUA review. As discussed, this tradeoff can have drastic consequences during large-scale public health emergencies.[232] In the case of testing for contagious diseases, the potential risks that should be considered are not only those that are physical and directly related to the patient, but also those that affect the patient's surrounding community.[233] Further, EUAs are often

[226] *Id.*

[227] *Id.*

[228] *See* Brooke Courtney, Susan Sherman, & Matthew Penn, *Federal Legal Preparedness Tools for Facilitating Medical Countermeasure Use During Public Health Emergencies*, 41 J.L. MED. & ETHICS 22, 24 (2013).

[229] *See id.*; *see also supra* Part IV.

[230] *See supra* Part IV.

[231] U.S. DEP'T OF HEALTH AND HUMAN SERVS., *supra* note 82, at 7-8.

[232] *See supra* Part IV, Section C (discussing the botched testing effort after the CDC's initial test malfunctioned).

[233] "In the context of a public health emergency [involving pandemic infectious disease], it is critically important that tests are validated because false results can negatively impact not only the individual patient but also can have broad public health impact." CTR. FOR DEVICES AND RADIOLOGICAL HEALTH, *supra* note 161, at 7-8.

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subject to little or no review to satisfy this "may be effective" standard, heightening safety risks and failing to ensure reliability.

The FDA has some discretion to waive and limit requirements for EUA medical devices, but the best response requires a balance between speed, effectiveness, and safety. The FDA should balance its major goal of protecting the public from unsafe and ineffective products[234] with emergency preparedness, rather than forgoing one in favor of the other.

Ultimately, the FDA's failings in its use of the EUA during the pandemic reflect many of the problems with medical device regulation generally, such as the 510(k) approval process. For example, the FDA's EUA successes reflect an emphasis on review with an effective standard while its failures are rooted in lack of review. The EUA has proven to be a strong tool in the recent past when used with sufficient review mechanisms, such as during the Zika virus crisis.

A. The Zika Virus and Testing Emergency Use Authorizations

While EUAs have been issued in the past to address crises including the Ebola virus, H1N1 virus, the Middle East Respiratory Syndrome Coronavirus, and anthrax attacks,[235] the Zika virus response in particular shows how useful testing EUAs can be. Detection assay and diagnostic testing EUAs were one of the major factors that "triggered an international decline in the incidence of Zika."[236] The FDA required and reviewed performance data before issuing an EUA for the first diagnostic Zika test in 2016,[237] presumably conducting more review than for the CDC's COVID-19 diagnostic test EUA; that test was both developed and authorized under an EUA in just seven days.[238] Comparably, another CDC test for Zika, dengue, and chikungunya, took three months to develop before applying for an EUA.[239] Several EUAs for other Zika diagnostic tests followed and none experienced functioning issues or inaccuracies anywhere near the level of the initial COVID-19 diagnostic test EUAs.[240] Despite the potential for false positives, these tests were fairly successful in mitigating the impact of Zika in the United States.[241] Had the FDA given the same care towards its review of the CDC's

[234] *See* Food & Drug Law Inst., *supra* note 7, at 68.

[235] *Emergency Use Authorization--Archived Information*, U.S. Food & Drug Admin., https://www.fda.gov/emergency-preparedness-and-response/mcm-legal-regulatory-and-policy-framework/emergency-use-authorization-archived-information#anthrax [https://perma.cc/2CWJ-2WVE] (last updated Dec. 4, 2020).

[236] Blum & Paradise, *supra* note 77, at 18. The FDA has issued 19 EUAs for Zika detection assays. *Id.*

[237] *See Zika Response Updates from FDA*, U.S. Food & Drug Admin., https://wayback.archive-it.org/7993/20190422171620/https://www.fda.gov/EmergencyPreparedness/Counterterrorism/MedicalCountermeasures/MCMIssues/ucm485199.htm#bydate [https://perma.cc/QD9U-Y5VN] (last updated Apr. 19, 2019).

[238] *See* Boburg et al., *supra* note 137; Pradhan, *supra* note 137.

[239] *Triple Testing: CDC Works Rapidly to Develop Unprecedented Zika Test*, Ctrs. for Disease Control (Aug. 16, 2016), https://www.cdc.gov/about/24-7/cdcresponders-zika/elisa.html [https://perma.cc/2KUQ-66S6].

[240] *See Emergency Use Authorizations for Medical Devices*, U.S. Food & Drug Admin., https://www.fda.gov/medical-devices/emergency-situations-medical-devices/emergency-use-authorizations-medical-devices [https://perma.cc/DDN9-K7LX] (last updated July 29, 2020); *Emergency Use Authorization--Archived Information*, U.S. Food & Drug Admin., https://www.fda.gov/emergency-preparedness-and-response/mcm-legal-regulatory-and-policy-framework/emergency-use-authorization-archivedinformation#zika [https://perma.cc/NQ8N-FF39] (last updated Dec. 4, 2020) (refer to "Zika Virus EUA – ARCHIVED INFORMATION"); *see also supra* Part IV, Section C (discussing the malfunctioning of the initial CDC test and the delay of testing efforts as a result).

[241] *See* Blum & Paradise, *supra* note 77, at 18. While it is difficult to compare FDA testing responses to Zika and COVID-19 because the Zika virus does not have the potential to reach such mass levels of global impact, the Zika testing EUAs seemed to be subject to more review while also having more immediate positive outcomes.

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initial COVID-19 test, the test's problems may have been identified before distribution and a massive failure could have been avoided despite the EUA ultimately being delayed.

Recently, LDTs for Zika have become more prevalent.[242] The FDA is requesting more information for review and urges that LDTs not be used for clinical diagnoses without FDA approval, reasoning that "it is essential that *in vitro* diagnostic tests for Zika virus provide accurate and reliable results."[243] This level of attention to LDTs is in stark contrast to the FDA's push to drop review of COVID-19 LDTs completely, including the (recently reversed) decision to decline to review voluntary EUA submissions.[244] Given the "relatively greater speed, stealth, and ease of the coronavirus's spread,"[245] accurate and reliable diagnostic testing is even more crucial to the public health than in the case of the Zika virus. The differences in LDT EUA policies also reflect the longstanding and continuing debate over LDT regulation, highlighting the need for reform and clarification.

VI. IMPLICATIONS AFTER CRISIS AND RECOMMENDATIONS

Issues with the FDA's medical device emergency response seem to generally mirror the criticisms of two regulatory areas: LDT regulation and 510(k) approval. While the COVID-19 LDT regulatory inconsistencies are the same obstacles faced by the FDA in non-emergent times, comparisons between the EUA process and the 510(k) program are more abstract. The nature of the 510(k) program emphasizes innovation and cutting corners in initial review, an attitude clearly articulated by the FDA in a few different instances throughout its emergency medical device decisions and guidance. The lack of premarket review in favor of innovation is not exclusive to the 510(k) and EUA programs, but also remains a core argument in the LDT regulation debate. Reform is needed to increase premarket and postmarket review generally, and legislation seeking to do so already exists for LDTs.

A. Laboratory Developed Tests Advisory Beyond COVID-19 Testing

LDTs historically have not been subject to premarket review and other FDA requirements, and are regulated almost entirely by CMS under CLIA.[246] LDTs were once simple lab tests of limited availability but have now evolved and proliferated significantly due to advances in technology.[247] "Some LDTs are now more complex, have a nation-wide reach and present higher risk."[248] Several high-risk LDTs have demonstrated significant issues including claims unsupported by evidence, erroneous results, and data falsification.[249] There has thus been a push in recent years for more FDA involvement in LDT oversight.

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[242] *Zika Virus Diagnostic Development*, *supra* note 191. Recognizing the serious implications of Zika for certain populations, the FDA is encouraging Zika LDT developers to submit an EUA request. *Id.*

[243] *Id.* The FDA requests that developers "submit information about their tests to help FDA better understand their design, validation, and performance characteristics." *Id.*

[244] *See supra* Part IV, Section C.

[245] Nick Schwellenbach, *CDC Whistleblower Identified the "Fatal Flaw" in Testing Years Ago*, Project on Government Oversight (June 4, 2020), https://www.pogo.org/investigation/2020/06/cdc-whistleblower-identified-the-fatal-flaw-in-testing-years-ago/ [https://perma.cc/F2Q4-Z27V].

[246] *See supra* notes 94-99 and accompanying text; *see also Zika Virus Diagnostic Development*, *supra* note 191.

[247] *See Zika Virus Diagnostic Development*, *supra* note 191.

[248] *Id.*

[249] *Laboratory Developed Tests*, U.S. Food & Drug Admin., https://www.fda.gov/medical-devices/vitro-diagnostics/laboratory-developed-tests [https://perma.cc/M4A3-W4HG] (last updated Sept. 17, 2018).

The problem here is that there is no explicit grant of authority to the FDA to regulate LDTs.[250] The FDA regulates products, and LDTs have generally been regarded as services.[251] LDTs also technically fit the FDA's definition of medical devices, however, because they consist of "an instrument, apparatus, implement, machine, contrivance, implant, *in vitro reagent*, or other similar or related article … intended for use in the *diagnosis* of disease or other conditions."[252] An LDT is a type of "in vitro diagnostic test" as included in the definition of medical device.[253] The FDA asserts that it has always retained authority to regulate LDTs despite its enforcement discretion general practice and policy.[254]

For the past decade, the FDA has sought to enhance its regulatory oversight of LDTs.[255] The FDA developed draft guidance in 2014 but opted not to issue a final guidance in favor of awaiting a legislative solution.[256] Various actions, including the call for Zika test LDTs to submit an EUA request for review, have continued to blur the precise limitations on the FDA's current authority over LDTs.[257] For example, DHHS's announcement that it will no longer require premarket review of LDTs seemed to recognize the limited nature of the FDA's authority to regulate LDTs and clarify CLIA's almost exclusive role.[258] DHHS clarified that LDTs may still voluntarily apply for an EUA, which can offer substantial benefits during public health emergencies, further confusing the FDA's authority to conduct premarket review of LDTs.[259] The confusion was only intensified by the FDA's decision, and then reversal, to stop reviewing EUA requests for LDTs.[260]

The reality that the FDA may not have authority to require EUAs for LDTs, along with the fact that FDA guidance is non-binding, could jeopardize the FDA's influence over LDTs in emergency times if an LDT developer were to challenge it.[261] Further, the lack of clear statutory margins for the FDA's authority may have contributed to the major delay in testing development seen in February upon the distribution of the CDC's failed initial COVID-19 diagnostic test.[262] Given the significant problems that can arise from faulty LDTs,[263] the FDA would want to establish controls in a time of crisis. Accurate, reliable, and timely testing is more essential during public health emergencies than any other time.

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[250]*See* Evans & Clayton, *supra* note 99, at 82.

[251]*See* Evans & Clayton, *supra* note 99, at 82, 87 (citing Paul D. Clement & Lawrence H. Tribe, *Laboratory Testing Services, as the Practice of Medicine, Cannot Be Regulated as Medical Devices*, Am. Clinical Lab. Ass'n (Jan. 7, 2015), https://www.acla.com/wp-content/uploads/2o15/ol/Tribe-Clement-White-Paper-6-15.pdf [https://perma.cc/4ET9-UAU7]; Jeffrey S. Mohlman et al., *Laboratory-Developed Tests: A Legislative and Regulatory Review*, 63 Clinical Chemistry 1575, 1582 (Oct. 2017)).

[252]FDCA, 21 U.S.C. § 321(h) (2018) (emphasis added); *see also* Evans & Clayton, *supra* note 99, at 88.

[253]*See* U.S. Food & Drug Admin., Draft Guidance for Industry, Food and Drug Administration Staff, and Clinical Laboratories: Framework for Regulatory Oversight of Laboratory Developed Tests (LDTs) 6 (2014), https://www.fda.gov/media/89841/download [https://perma.cc/JT6E-QL6H]; *Laboratory Developed Tests*, *supra* note 239.

[254]U.S. Food & Drug Admin., *supra* note 253, at 6-7.

[255]*See Laboratory Developed Tests*, *supra* note 239.

[256]U.S. Food & Drug Admin., Discussion Paper on Laboratory Developed Tests (LDTs) 1 (2017), https://www.fda.gov/media/102367/download [https://perma.cc/6AYV-6XFV].

[257]*See Zika Virus Diagnostic Development*, *supra* note 181.

[258]*See Rescission of Guidances and Other Informal Issuances Concerning Premarket Review of Laboratory Developed Tests*, *supra* note 164.

[259]*Id.*; *see also* Evans & Clayton, *supra* note 99, at 82.

[260]Slabodkin, *supra* note 172.

[261]In fact, the FDA's back and forth oversight policies for LDTs are likely direct responses to criticism from both sides of the LDT regulatory debate.

[262]*See supra* Part IV, Section C; *see also* Evans & Clayton, *supra* note 99, at 84-85.

[263]"The FDA is aware of fault LDTs that could have led to: patients being over- or undertreated for heart disease; cancer patients being exposed to inappropriate therapies or not getting effective therapies; incorrect

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But there must also be a balance between increasing the availability of testing—or just developing a test, for that matter—and ensuring that tests produce reliable results. Ultimately, the FDA's assertion of emergency authorities over LDTs, lacking full statutory support, failed to find this balance.

1. The VALID Act as a Potential Solution

The pandemic response highlights the desperate need for legislative reform concerning LDTs. Two opposing bills were introduced early on in the pandemic to address this need: The Verifying Accurate Leading-edge IVCT Development Act of 2020 ("the VALID Act")[264] and the Verified Innovative Testing in American Laboratories Act of 2020 ("the VITAL Act").[265] The VALID Act is a bipartisan effort to grant FDA authority to regulate LDTs through a risk-based framework that categorizes LDTs as high risk or low risk.[266] The VITAL Act, on the other hand, would clarify CLIA's sole authority over LDTs and exclude the FDA from LDT oversight even during public health emergencies.[267] The VITAL Act accomplishes little more than ensuring that FDA guidance never seeks to require anything of LDT developers again, as CLIA already regulates LDTs. It also seeks to alleviate concerns that a new LDT framework could disrupt innovation and limit patient access by placing undue regulatory burden on laboratories.[268] But the VITAL Act does nothing to address the regulatory inconsistencies between LDTs and other diagnostic tests or concerns over testing accuracy.

The VALID Act, on the other hand, seeks to solve the current regulatory problems with LDTs. For example, the FDA has argued that CLIA only addresses analytical validity while ignoring clinical validity,[269] and cites to examples of public health harms when LDTs were later found to be clinically invalid.[270] The VALID Act would apply a standard of review considering both analytical and clinical validity.[271] The Act attempts to align LDT regulation with existing medical device regulations while also diverging in discrete ways to adapt to the idiosyncrasies of LDTs.[272]

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diagnosis of autism; unnecessary antibiotic treatments; and exposure to unnecessary, harmful treatments for certain diseases such as Lyme disease." *Laboratory Developed Tests*, *supra* note 249.

[264]VALID Act of 2020, S. 3404, 116th Cong. (2020).

[265]VITAL Act of 2020, S. 3512, 116th Cong. (2020).

[266]*See* VALID Act of 2020, S. 3404, 116th Cong. (2020).

[267]*See* VITAL Act of 2020, S. 3512, 116th Cong. (2020).

[268]*See id.*

[269]*See* U.S. Food & Drug Admin., *supra* note 253, at 7. Clinical validity asks whether the test results relate to the presence, absence, and/or risk of a disease or condition, while analytical validity only asks whether the test performed as intended. Jonathan R. Genzen, *Regulation of Laboratory-Developed Tests*, 152 Am. J. Clinical Pathology 122, 124 (2019) (noting that both clinical and analytical validity are important to ensure a test is safe but recognizing the risks of overregulation).

[270]U.S. Food & Drug Admin., *supra* note 256, at 1; Office of Pub. Health Strategy and Analysis, U.S. Food & Drug Admin., The Public Health Evidence for FDA Oversight of Laboratory Developed Tests: 20 Case Studies (2015), http://www.nila-usa.org/images/nila/The%20Public%20Health%20Case%20for%20FDA%20Oversight%20of%20LDTs%20110915(2)_508ed%20(1).pdf [https://perma.cc/VU3Y-53R2].

[271]VALID Act of 2020, S. 3404, 116th Cong. § 587(2)-(4) (2020).

[272]VALID Act of 2020, S. 3404, 116th Cong. (2020). Mechanisms included in the act that borrow and expand on existing medical device regulation include premarket review, registration, labeling requirement, adverse event reporting, third-party review, user fees, mitigating measures (similar to special controls), and more. *Id.* The Act adds a grandfather clause for established LDTs fitting certain criteria. *Id.* § 587(c). One section also seeks to build upon the FDA's recent strategic goals by supporting the establishment of collaborative communities and outlining measures for industry participation. *Id.* § 587S. The Act also diverges from existing medical device regulation by creating new pathways for LDTs in circumstances that warrant less regulatory burden and review. *See* VALID Act of 2020, S. 3404, 116th Cong. (2020). The technology certification process

While not perfect,[273] the VALID Act proposes a workable framework to guide the FDA in shaping its new regulations and guidance documents with substantial opportunity for industry input. A more nuanced approach considering the policies that have performed well for low-risk and traditional tests could provide the needed modifications to satisfy both regulators and industry, especially smaller labs.[274] Perhaps most importantly, however, the VALID Act seeks to fix the regulatory inconsistencies between LDTs and other diagnostic tests by regulating LDTs in a clear, standardized manner.

Enacting the VALID Act would also statutorily and clearly establish the FDA's authority to regulate LDTs through EUAs, a notion emerging in 2020 guidance documents but questioned by some scholars.[275] "The proposed VALID Act would solidify the FDA's authority to regulate clinical laboratories, granting powers that the FDA asserted without a clear statutory basis in COVID-19 EUA guidance documents."[276] While some voice concern that granting the FDA power over LDTs in emergency situations will only cause further testing delays like that seen in February,[277] the EUA exceptions echo the edited FDA guidance released after the initial failures and the umbrella EUA for LDTs. The umbrella EUA served to expedite the availability of LDTs while also controlling for potential validity concerns and providing emergency liability protection to developers.[278] The guidance worked well, and over thirty-seven LDTs sought the benefits of an EUA despite the FDA's questionable authority to require an EUA submission.[279]

An adaptive legislative response is needed to address issues with LDTs both in emergency situations and generally, and the VALID Act presents a viable working framework. The Act would settle a longstanding debate overdue for a solution. Though the Act has some flaws and needs modification, the legislative process, as well as the regulatory process if enacted, provides opportunity for substantial editing. The bill should be reintroduced in the coming congressional session with modifications taking into account the parts of LDT regulation over the past decades that have worked well. Conforming parts of LDT regulation with the risk-based approach to medical device

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would allow a developer to use an approved technology certification for a representative test to develop tests within the scope of approval without having to submit for review each time. *Id.* § 587D. The Act also provides for prioritization of and flexibility for breakthrough LDTs. *Id.* § 587C. Perhaps most relevant, the VALID Act exempts LDTs from its regulatory burdens in public health emergency circumstances as long as the developer is seeking an EUA and validates the test prior to use. *Id.* § 587A(5).

[273] *See* Evans & Clayton, *supra* note 99, at 99-100 (criticizing the VALID Act's "one-size-fits-all" approach and pushing for substantial modifications). Given many of the exceptions and pathways carved out throughout the VALID Act, *infra* text accompanying note 277, one can hardly call the Act a "one-size-fits-all" approach. Suggested modifications, however, focus on lessening regulatory burdens for lower-risk and tried-and-true LDTs, an important concern. *See* Evans & Clayton, *supra* 99, at 100.

[274] *See* Evans & Clayton, *supra* note 99, at 100.

[275] *Id.* at 82-83. Evans and Clayton question the FDA's authority to require EUAs for LDTs developed in high-complexity CLIA laboratories, even in times of crisis, because § 564 of the FDCA grants the FDA authority to grant EUAs for medical devices, but not clinical laboratory services. *Id.* at 80. This interpretation, of course, depends on the classification of an LDT as a service rather than a device. Evans and Clayton admit that "technically, LDTs do seem to fit the definition of an FDA-regulable medical device," despite describing LDTs as a technical aid in an ultimate provision of a service. *Id.* at 88. Evans and Clayton note that the passage of the VALID Act would grant the FDA the necessary authority to regulate LDTs through EUAs and other methods, though are ultimately critical of its passage without substantial modifications. *Id.* at 86, 97.

[276] *Id.* at 97; VALID Act of 2020, S. 3404, 116th Cong. § 6 (2020) (amending the FDA's emergency use authorization authorities to explicitly include the term "in vitro clinical test").

[277] *See, e.g.*, VITAL Act of 2020, S. 3512, 116th Cong. (2020).

[278] *See supra* Part IV, Section C.

[279] *See* Evans & Clayton, *supra* note 99, at 94 (citing Emergency Use Authorization: Emergency Use Authorization (EUA) Information, and List of All Current EUAs, U.S. Food & Drug Admin. (July 10, 2020), https://www.fda.gov/emergency-preparedness-and-response/mcm-legal-regulatory-and-policy-framework/emergency-use-authorization [https://perma.cc/NQ49-PX2V]).

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regulation can bring about positive changes, as the pandemic medical device response has highlighted the need for a more risk-based framework for both EUAs and medical devices generally.

B. Emergency Use Authorizations and 510(k) Approval: Parallels and Need for Reform

The deficiencies in the pandemic medical device response have reflected that the FDA should not sacrifice review in the name of speed and efficiency. Regulatory rollbacks after EUA devices proved ineffective, including the debacles with serology testing[280] and respirator policies,[281] particularly emphasized the need for scientific and risk-based review of medical devices in all circumstances. The call for an updated medical device review process with a more scientific, risk-based approach is far from new.[282] Comparisons between the controversial 510(k) approval process and EUAs can provide points for criticism, lessons on regulatory considerations, and recommendations for updates. Both processes involve a low standard of review, if any review at all, are subject to recalls or revocations, and have been met with wide criticism for prioritizing speed over safety.

At the heart of the matter, both the 510(k) process and EUAs are subject to a low standard of review, and the FDA emergency response often excuses review entirely. 510(k) review is subject to the logically flawed substantial equivalence standard, which does not evaluate safety, effectiveness, or the risks of the predicate device.[283] EUA review is subject to a "'may be effective' standard," a term adopted by the FDA that admits the standard's failure to fully evaluate effectiveness.[284] Neither standard is intended to evaluate the safety or effectiveness of medical devices. While the EUA standard at least considers the known and potential risks and benefits, in practice, however, evaluators have seemingly failed to recognize the full weight of some pandemic risks and often excused EUA review completely.[285] And though many devices subject to these standards end up being safe and effective, these successes cannot be a measure of the standards' validity when they are meant to guard against faulty devices. Those failures are what ultimately underscore the standards' flaws.

For example, the EUAs for ventilators were largely successful, possibly owing to the fact that ventilators are not novel devices nor need modifications.[286] The guidance allowing the distribution of respirators that were not FDA-approved or authorized under an EUA and its subsequent failures,[287] however, demonstrated how even devices that do not seem particularly novel or modified can be ineffective and should not be released to the market without review. Ineffective respirators and face masks also pose higher risks during a pandemic, warranting review in order to protect the public health.[288] The FDA's emergency response is intended to include a risk-benefit analysis, even under its low

[280] *See supra* Part IV, Section D.

[281] *See supra* Part IV, Section A.

[282] *See supra* Part III, Section A.

[283] *See supra* notes 64-72 and accompanying text.

[284] *See* U.S. Dep't of Health and Human Servs., *supra* note 82, at 7-8.

[285] The FDA did not seem to consider the risks posed by inaccurate serology tests when it decided to allow serology test kits on the market without any review whatsoever. *See supra* Part IV, Section C.

[286] *See supra* Part IV, Section B. The FDA is reviewing ventilators through both EUA and 510(k) submissions. Ventilators that are essentially the same, or clones of, other functioning and safe ventilators approved for the market offer the only circumstance that the substantial equivalence standard logically works.

[287] *See supra* Part IV, Section A.

[288] The FDA admitted the need for greater oversight over respirators to protect the public health in discontinuing its initial guidance. *See* Ctr. for Devices and Radiological Health, *supra* note 132, at 9.

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"'may be effective' standard,"[289] but the FDA circumvented EUA review in many cases despite the high risks demanding the existence of high benefits to meet the standard. Just as the 510(k) process conducts no risk-benefit analysis, the FDA's pandemic response often sidesteps this review. Ultimately, both the 510(k) program and EUA process, even with its risk-benefit analysis, subject medical devices to a fairly low standard that can in no way ensure reliability.

As a result, devices under both processes are often subject to recalls and revocations.[290] The recalls of 510(k) cleared devices are too numerous to estimate, though one study found that between 400 to 500 FDA recalls of 510(k) devices occurred annually from 2003 to 2009.[291] The presence of ineffective medical devices on the market poses potential safety risks that can jeopardize public health. For example, faulty and untested hip replacements with high failure rates drastically reduce quality of life, and malfunctioning infusion pumps can lead to serious injury and death.[292] The safety risks posed by medical devices during the pandemic are sometimes less direct, as is the case with testing. Though an inaccurate COVID-19 test does not physically harm the patient, "false results not only can negatively impact the individual patient but also can have broad public health impact."[293] Other medical devices used in the pandemic can have more direct consequences, such as a malfunctioning ventilator or surgical mask.[294] The many 510(k) recalls, EUA revocations, and emergency policy reversals recognize the potential, and sometimes realized, safety risks in allowing a device on the market without proper review.

The FDA's main responsibility is to protect public health by ensuring the safety, efficacy, and security of medical devices.[295] Yet both the 510(k) and EUA programs seem to prioritize speed and efficiency. The 510(k) pathway is meant to encourage innovation and competition by allowing devices to enter the market more easily and with fewer burdens than a full review process.[296] Its popularity and widespread use over the years have often led to the prioritization of the "fast-track" process over ensuring medical devices as safe and effective. The scientific and medical communities, industry, and the general public are now less confident in medical device regulation.[297] The EUA program and other FDA emergency authorities likewise seek to speed market entry

[289]U.S. Dep't of Health and Human Servs., *supra* note 82, at 8.

[290]*See* Letter from Denise M. Hinton to Andre Hsiung, *supra* note 222; Letter from Denise M. Hinton to Louise M. Sigismondi, *supra* note 222; *see also supra* text accompanying notes 62-63.

[291]Inst. of Med., *supra* note 62, at 15. This data does not include recalls initiated by the device developer, as the FDA database did not start including this data until January 2017.

[292]*See* Pub. Cit., Substantially Unsafe: Medical Devices Pose Great Threat to Patients; Safeguards Must be Strengthened, Not Weakened 16-26 (2012), https://mkus3lurbh3lbztg254fzode-wpengine.netdna-ssl.com/wp-content/uploads/substantially-unsafe-medical-device-report.pdf [https://perma.cc/5Z8Z-VE77] (outlining four case studies of high profile recalls for dangerous devices cleared under the 510(k) process). A pad meant to shield healthy breast tissue from radiation exposure during breast cancer treatment left tungsten particles behind, causing long-term problems for periodic cancer monitoring and potentially cancer as well as severe disfigurement in some. *Id.* at 17. An infusion pump subject to numerous recalls was linked to four deaths and ten serious injuries. *Id.* at 20. A malfunctioning ligating clip caused six organ donors to die of internal bleeding and injured twelve others despite numerous recalls. *Id.* at 24-26. 93,000 patients received a faulty hip replacement promoted for younger patients, resulting in chronic problems with exercise, walking, and even standing. *Id.* at 26.

[293]Ctr. for Devices and Radiological Health, *supra* note 161, at 7-8.

[294]No ventilator EUAs have been revoked, and the low-performing respirators distributed in the month the FDA's reversed policy was in effect do not seem to be linked to problems in medical settings.

[295]Food & Drug Law Inst., *supra* note 9, at 68.

[296]*See id.* at 234. Notably, however, IOM concluded in its report of the 510(k) process that it is unclear whether the 510(k) process facilitates or inhibits innovation. Inst. of Med., *supra* note 62, at 6.

[297]*See* Josh Makower et al., *supra* note 13, at 24.

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and encourage medical device developers to contribute to an emergency response by lessening regulatory burdens.

Encouraging innovation and emergency preparedness should not come at the expense of ensuring safety and efficacy, however. There was no available COVID-19 test when the pandemic first hit the United States, and the rush to develop and distribute the CDC's test led to the FDA skipping essential review. The FDA prioritized quick distribution over ensuring accuracy and reconsidering its LDT guidance, ultimately causing a disastrous delay to the U.S. pandemic response.[298] Innovation and emergency response should be priorities for the FDA, but only after safety and effectiveness. The 510(k) and EUA processes need reform to find a balance between timely authorization and control measures.

1. Evidentiary, Risk-Based, and Adaptive Review as a Starting Point for Reform

Given the similarities between the criticisms of the 510(k) and the EUA, the recommendations called for by multiple groups over the past decade to overhaul the 510(k) process can be adapted and applied to EUA review and emergency policies. Similarly, lessons from the pandemic echo concerns for medical device regulation in general. Premarket and postmarket review are essential to an effective regulatory scheme, especially in public health emergencies. Reform for medical device regulation and EUA policies should focus on evidentiary and risk-based review, allowing for adaptation where emergency circumstances require it.

The substantial equivalence standard should be replaced with risk-based and evidentiary premarket review, and the FDA should require some practical evidence in its risk-benefit analysis before enacting all emergency guidance. IOM and other groups recommend overhauling the current 510(k) process in favor of a new regulatory framework that emphasizes evidentiary review and a risk-based approach.[299] IOM specifically focuses on the potential benefits of a modified de novo process, using a risk-based approach to assess practical evidence of safety and efficacy without the high evidentiary burdens of the PMA process.[300] EUAs are already subject to a risk-based approach, yet the FDA often requires no evidence or skips the review process entirely. As with LDTs, premarket validation of testing and other medical devices is necessary for a consistent regulatory approach. A standard that takes into account the potential risks of a device and the underlying circumstances is appropriate for EUA assessment to allow for an adaptive emergency response. Simply requiring some type of evidentiary review of devices before market should be the bare minimum, including in emergency situations.

The IOM also recommends implementing a more comprehensive strategy for postmarket surveillance, a particularly weak area of 510(k) regulation.[301] Postmarket surveillance allows regulators to better manage a device's risk-benefit ratio over time and provides a control for correcting mistaken determinations on safety and efficacy.[302] Postmarket surveillance can be an especially important tool in managing and evaluating EUAs, and device developers are already required to report adverse events and maintain accessible records.[303] The FDA can use these reporting requirements to continuously assess low-risk devices that are granted an EUA under little evidentiary proof of efficacy

[298] *See supra* Part IV, Section C.
[299] *See* INST. OF MED., *supra* note 62, at 8.
[300] *See id.*, at 11.
[301] *See* INST. OF MED., *supra* note 62, at 10.
[302] *See id.*
[303] *See* FDCA, § 564(e)(1)(A)(iii)-(iv), 21 U.S.C. § 360bbb-3(e)(1)(A)(iii)-(iv) (2018).

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and safety because they are ultimately needed for the emergency response. Postmarket review could be particularly appropriate in a circumstance where a new device is granted an EUA on a limited scale in order to collect information on its efficacy, similar in concept to the investigational device exemption. There may also be cases where an adaptive approach is needed, such as that of the testing guidance allowing LDTs with validation data to enter the market without submitting an EUA request for fifteen days. Of course, postmarket surveillance should not replace the initial premarket review[304] but rather serve as a supplement to balance the competing interests in speed and well-supported review in emergency situations.

The major takeaway in these recommendations is that FDA emergency response needs a more hands-on approach than was utilized in the first months of the pandemic. Particularly, the decisions to allow respirators and serology tests on the market without EUA review or postmarket surveillance showed the consequences of failing to conduct both premarket and postmarket review.[305] The hands-off approach to these devices is reminiscent of the 510(k)'s low standard for premarket review and weak postmarket surveillance mechanisms. Implementing recommendations to improve premarket and postmarket review, along with legislation to confer regulatory authority over LDTs, could provide consistency in the regulatory response to the next public health emergency. Most importantly, these recommendations seek to correct the witnessed imbalance between rapid response and ensuring safety and effectiveness.

VII. Conclusion

The pandemic tested the United States and the FDA in unprecedented ways, and reflection on the initial response is due. "While law is an essential tool of public health … . it should be subject to ongoing revision and reform, based on careful assessment, post disaster, of its application to given events."[306] The pandemic response highlighted the shortcomings of medical device regulation, and this will certainly not be the last pandemic or public health emergency where the FDA will have to balance the need for timely availability with necessary control measures for safety, efficacy, and accuracy.[307] The FDA has sought to find this balance in its medical device emergencies policies, but many of its initial decisions failed to do so and rather reflected an attitude prioritizing innovation and speed, an attitude prevalent in current medical device regulation.

It would not be off base to say that the failings of some of the FDA's policies and use of EUAs are unsurprising given the FDA's relaxed approach to, and the lack of industry confidence in, medical device regulation. The 510(k) process and the debate surrounding LDT regulation are major controversies attributing to poor outcomes, confusion, and general lack of confidence. The policies involving four types of medical devices demonstrated how the initial emergency medical device response suffered from the same problems seen in the 510(k) and LDT regulatory landscapes. Though these

[304]For example, the CDC testing debacle was a failure in premarket review that postmarket surveillance measures quickly detected. Replacing premarket review measures with postmarket review would have had the same unfortunate results.

[305]CDC data on many of the respirators on the market due to the FDA's guidance ultimately provided a form of postmarket surveillance that allowed the FDA to step in. The serology tests allowed on the market without review, on the other hand, were barely monitored. The FDA had such little data on the serology tests already on the market that it could not validate their accuracy during the congressional investigation.

[306]Blum & Paradise, *supra* note 77, at 21.

[307]*See* Evans & Clayton, *supra* note 99, at 79.

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policies were speedily reversed and replaced with working solutions, the consequences for the overall spread of COVID-19 are serious.[308]

Recognizing how the relaxed and fix-it-later nature of the FDA's initial pandemic policies is exemplified in both the attitude of the 510(k) program and the push for LDT oversight, and allows us to identify the overriding concerns and develop starting points for reform. The FDA is not inherently wrong in wanting to foster development and speed innovation,[309] but these priorities must ultimately be balanced with safety and efficacy controls. As such, medical device regulation reform must focus on balancing the competing interests in innovation, speed, and flexibility with safety, effectiveness, and accuracy. Introduction of legislation, such as the VALID Act, is one immediate action, while further development of a more evidentiary and risk-based approach to premarket and postmarket review will require more diligence over time. These reforms could prevent negative outcomes and reinvigorate confidence in medical devices.

[308]The most disastrous was the initial failure to conduct appropriate review of the first authorized diagnostic test, coupled with stalled LDT authorization. These events resulted in a disastrous delay in crucial identification and containment measures.

[309]*See What We Do*, *supra* note 33.

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