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Thank you Chair Cassidy, Ranking Member Sanders and Members of the Committee for this opportunity to testify. My name is Dr. Josh Makower and for over 36 years, I have passionately devoted my life to developing therapies and technologies to improve patient care. Over this time, I've founded 11 independent medical device companies which collectively have improved the lives of millions and created thousands of jobs here in the United States. It has been the privilege of my career to see the transformative impact that these innovations have had on patients, as well as their loved ones. This impact is what drives my passion to continue working to improve our healthcare innovation ecosystem and why I am so honored to be here today. In addition to being a physician-inventor and entrepreneur, at Stanford University I am a Professor of Medicine and Bioengineering, and the co-founder and Director of the Stanford Mussallem Center for Biodesign. My focus there is to educate the next generation of innovators, so that they can learn to solve critically important clinical needs, innovate solutions and pioneer new therapies which advance patient care, reduce costs, and improve health outcomes. The opinions in my testimony today are my own and do not represent the opinions of any of the organizations I am affiliated with.

The promise of innovation to impact human health

Biotechnologies and medical technologies alleviate suffering and save lives. Biotechnology innovation has given us CRISPR gene editing, a revolutionary technology that allows scientists to precisely edit genes by "cutting and pasting" DNA into cells. Technologies like these have the potential to cure cancer, repair or replace damaged tissues and organs, treat spinal cord injuries or grow new skin for burn victims. Medical devices also have lifechanging and lifesaving medical impacts on patients. These devices help the deaf to hear for the first time, the paralyzed to learn to walk again, the blind having their vision restored, or the debilitating symptoms of inflammatory diseases like rheumatoid arthritis to be alleviated. The profound and lasting impact these innovations can have on patients and their families is simply astounding.

My message to the Committee today is simple: the potential for healthcare technologies of the future – both biotech and medtech – to cure diseases, improve people's quality of life, and lower healthcare costs has never been more within our reach. The United States can still lead the world in this important field BUT ONLY with the proper policies in place to support and nurture this incredible fragile ecosystem.

A brief summary of my recommendations are:

1. Address challenges with FDA review for cell and gene therapies by strengthening staffing stability, retaining scientific and clinical expertise, and improving transparency, predictability and reasonableness to the review process to eliminate the "first-mover disadvantage."

2. Protect premarket review staff positions at FDA that are funded by user fees so that when there are vacancies, allow for them to be backfilled "one for one," and for all user-fee supported positions, make those positions exempt from cuts.

3. Ensure that CDRH fully leverages Predetermined Change Control Plans (PCCP) that Congress enacted in 2022 by eliminating unnecessary restrictions on the type and number of changes allowed, to ensure faster patient access to medical devices utilizing AI/ML.

4. Encourage CDRH to engage in interactive review with applicants with minor requests without requiring a majority of those interactions to go through the formal pre-submission process.

5. Expand the 3rd Party Review program to allow CDRH staff to focus time and resources on more complex submissions. For submissions reviewed by 3rd parties, codify that FDA's role is primarily administrative and that it is not appropriate for FDA to engage in a re-review of the submission.

6. Increase the utilization of Real World Evidence to reduce the cost, time and complexity of premarket review and accelerate innovation.

7. Support efforts towards Global Regulatory Harmonization to maintain US competitiveness and turn away from policies which are giving China a distinct advantage against the United States.

8. Congress should pass bipartisan legislation that provides four years of transitional coverage for breakthrough medical devices. My research has shown an average delay of 5.7 years AFTER FDA market authorization before

adequate reimbursement is established. This “valley of death” harms small innovators, investors and most importantly, Medicare beneficiaries.

The heath technology innovation ecosystem

We all rely on a predictable, reasonable, transparent and optimized FDA, to maintain the United States’ leadership position. Without it, truly, global innovation and our US health technology ecosystem would be at risk. When barriers to innovation are created, investment declines, and this directly leads to American patients being denied timely access to innovative safe and effective new medical products. In such a climate, a generation of innovation and businesses will be lost, along with the jobs they would have created and the lives they would have saved or improved. I know there is broad bipartisan agreement that we must prevent this from happening.

In order to help ensure that the biotechnology and medical technology ecosystems can continue to address the critical needs of patients and providers, I believe there are certain policies and steps that our leaders can take. As a fellow physician, Chair Cassidy, you know better than anyone that science and data should guide us in determining what the problems are, as well as what solutions could be considered. And so, for several times in my career, I worked with my colleagues to do just that – identify what problems are impacting the innovation ecosystem, and share some suggestions on how to overcome them.

Cell and gene therapies – challenges with FDA review and the "first mover disadvantage"

Cell and gene therapies (CGTs) is a sector of biotechnology that has been transforming patient care, and has so much more potential. Back in 2024, my colleagues at Stanford and I wanted to examine the perspectives of innovators and investors currently navigating the US regulatory pathway for cell and gene therapies to understand what barriers they might be facing as they try to advance these therapies into patient care.

Innovators and investors have indicated that prolonged regulatory timelines are substantially impacting investment and research and development for a range of extremely important disease states. In our study, a majority of biotech innovators indicated the typical time for a new cell or gene therapy to advance through the FDA process is 6 to 10 years[i]. When we followed up to ask what were the main factors driving this extended regulatory timeline, 50% of respondents cited issues such as "reviewer or key staff turnover" and "lack of transparency of the approval process." Unfortunately, a majority of investors indicated that these factors will likely decrease their investments in cell or gene therapies in the future. I know my colleagues who are facing this challenge now and they are being forced to lay off scientists and slow progress to allow their ventures to survive. But it's not just jobs in the US that will suffer, of course, it is the patients awaiting access to these therapies. This is somewhat of a common theme that innovators like myself call the first mover "disadvantage" as our own FDA, presented with a new technological

paradigm, struggles to determine how to regulate it properly as other competitors from other countries like China gain runway to catch up.

It's somewhat remarkable that the conditions in this space are similar to the challenges we faced for medical device innovation some 15 years ago. This is actually what propelled my engagement in policy and led me to deliver a similar study, then focused on some of the challenges the FDA were presenting to the medtech innovation ecosystem. At the time, CDRH lacked the reasonableness and transparency that is so critical to innovation, and I along with some of my colleagues, examined what this meant for patients in this country[ii]. We conducted a survey of over 200 medical technology companies to generate data on their specific experience and found that on average, innovative new medical devices – created by US companies - were available to U.S. citizens two full years later than patients in other countries. In some cases, American patients waited up to six years longer than patients elsewhere for American-made technologies. These factors were hurting patient care and U.S. competitiveness, and as a result of our work and many others, Congress made the necessary investments and reforms to allow the FDA to correct these troubling dynamics through the Food and Drug Innovation and Safety Act. Since that time, the leadership at CDRH has done an amazing job implementing Congress' reforms, and most, if not all, of those particular issues are behind us. The breakthrough devices program, which Congress established under the overwhelmingly bipartisan, 21st Century Cures Law of 2016, provided more timely interactions with senior review teams. In addition, CDRH continues to reiterate that the threshold for authorization is probable benefits outweigh probable risks, NOT probable

benefits versus any potential risks. To see this transformation at CDRH has encouraged me to believe that change can happen and that the power of data, even in politics, can change the course of medicine and innovation in favor of patient care.

I believe it is not happenstance that the solutions to both of these challenges are almost identical. The factors that are now driving long regulatory timelines for cell and gene therapies, such as staff turnover, lack of transparency, and regulatory inefficiencies for cell and gene therapies, can be addressed through thoughtful policies and an innovation-oriented, patient-need-centric mindset. For biotechnologies, FDA is currently attempting to address some of these challenges through the START Pilot Program, but we could do much more. In the future, we need to improve pathways for career development within CBER, prioritize and stabilize support for their staff and leadership, and strengthen their expertise in cell and gene therapies to ensure knowledgeable, science-driven and consistent personnel are assigned to NDA review. Collaboration among innovators and regulators once again is crucial to ensuring that life-saving technologies reach patients in a timely manner.

Staffing stability, organizational alignment and cross-training are key needs across the FDA

This need for staffing stability at the FDA is really something important across the organization and impacts every Center. FDA Centers need to have a stable and experienced staff to reasonably and predictably implement the regulatory pathways with the resources they are provided, including those

from user fees paid by manufacturers innovators. The FDA recently shared that there was a loss of 1,093 employees for CDER and 224 for CBER[iii]. The data also show that the pace of hiring at both centers has dramatically stalled. CDER hired just 10 new staff in Q3 and Q4, and CBER just five. CDRH has hundreds fewer employees today than they did a year ago, and had budgetary issues that constrained hiring since early 2024. We appreciate the efforts of this Committee with RIFs earlier in the year to help stabilize staffing levels, but with restructuring and other reforms, there remains a number of critical premarket review vacancies. To FDA's credit thus far, the agency continues to meet their user fee goals, but whether this can be sustained is an open question. With the current hiring freeze, and the policy of "four for one" where for every four employees that left, the agency can hire one new employee, these divisions are likely to experience significant rates of attrition if staff retirements and departures aren't backfilled. I believe it is very important that any premarket review staff for biotechnologies and medical technologies that are funded by user fees should be backfilled in order to help ensure a robust and responsive FDA. In addition, I would suggest that policy should be "one for one" where any user fee funded employee that was lost should be replaced, and that moving forward, any user fee funded positions should exempt to cuts from the federal government due to budgetary constraints.

To properly evaluate emerging biotechnologies and medical technologies, the FDA needs experts in data science, bioengineering, clinical medicine and AI to truly leverage technology in the regulatory pathways. This would strengthen internal expertise to help ensure that regulatory decisions are based on the

latest science and technology and the greatest efficiency, safety and speed of review can be achieved.

Focused process reform will make it easier to achieve efficiency targets with fewer staff - PCCP

Leveraging the latest information technology can enable the agency to handle large datasets and complex algorithms, which are increasingly common in next-generation innovations. At the same time, we do not want to abdicate a reviewers' ability to make determinations. CDRH, for example, has successfully handled the growing integration of machine learning for over 30 years, and there are currently over 1,200 AI-enabled medical technologies that are authorized[iv]. However, CDRH could take some steps to better leverage existing authorities to regulate AI/ML when it is within or part of a device system. Just to be clear, I am not recommending that FDA regulate AI used to deliver healthcare decisions, but to the situation where AI is used within the scope of a medical device.

Specifically, I believe that FDA's current implementation of the Predetermined Change Control Plan (PCCP) framework for AI-enabled medical devices could be better aligned with statutory authority, Congressional intent, and least burdensome principles. A PCCP is a plan proposed by a medical device manufacturer that outlines specific, planned modifications to a device and details how those changes will be implemented and validated. The main purpose of a PCCP is to allow for certain device updates—particularly to machine learning-enabled devices (AI/ML)—to be made after initial market

authorization without requiring a new regulatory submission for each change. Current and draft guidance at FDA impose unnecessary restrictions on both the types and number of changes allowed in a PCCP, which we believe should be broadened. FDA should also update its guidance to allow PCCPs to be established through any appropriate premarket pathway, including Special 510(k)s, in accordance with the statutory language in Section 515C of the FD&C Act.

FDA guidance also currently recommends extensive documentation for all PCCPs, regardless of the risk level of the device or the proposed modifications. For low-risk devices or changes, these requirements can be very excessive and could result in longer review times and unnecessary delays. Consistent with FDA's established risk-based approach to premarket review and its commitment to least burdensome principles, documentation requirements should be proportional to the risk profile of the device and the specific modifications being proposed. Adapting this proposed approach will help ensure that FDA's review resources are appropriately focused based on the unique risks of each device.

The primary intent of Congress in creating the PCCP framework was to reduce, not increase, regulatory burden on manufacturers. FDA should actively share PCCP best practices, insights, and emerging trends with all stakeholders to promote a shared understanding of the PCCP framework and help further reduce regulatory burden. Together, these steps will support transparent, predictable, and efficient PCCP processes for both regulators and innovators.

Focused process reform will make it easier to achieve efficiency targets with fewer staff - Pre-sub

It is very important that innovators and regulators look for ways to optimize interactions and engagement to prevent any adverse impact on patient care. I would like to briefly note some concerns that innovators are having with what is known as the "pre-submission" – or "presubs" -- program. This program is designed to provide medical technology innovators with the opportunity to engage in discussions with FDA review teams during the product development process. This proactive approach can clarify requirements, anticipate potential issues, and smooth the path towards the goal of premarket authorization. While the program has noble goals, over the years the numbers of "presubs" has increased dramatically, leading to a strain on resources, and defeating the intended goal of the program.

When the program was initially started there were approximately 1,500 pre-subs a year, but that risen to annually over 4,000 pre-subs today[v]. I was encouraged to hear CDRH Director Tarver share her recognition over the summer at the MDUFA VI public meeting that the center aims to enhance the efficiency and clarity through a more standardized, tiered approach to pre-submissions. If the answer to a question can be easily delivered, it really should not require a pre-sub to get the answer.

Focused process reform will make it easier to achieve efficiency targets with fewer staff - Third-party Review Program

Another area where there could be improvements are CDRH's Third-Party Review Program which has been in place for over 25 years and allows manufacturers to voluntarily submit 510(k) premarket notifications for certain eligible medical devices to accredited third-party review organizations. In fact, during President Biden's administration, the FDA was looking at ways to utilize this program more robustly to save time and resources. The goal is to make the review process for lower-to-moderate risk devices more efficient, freeing up FDA resources to focus on higher-risk devices. The third-party organizations perform the primary review using the same criteria as the FDA, and then sends the submission and a recommendation to the FDA for a final decision. In order to truly maximize the benefits of this program, I believe the guidance should make clear that the FDA's review of the 3rd parties' work is primarily administrative and not to engage in a re-review of the submission. I personally experienced a situation with one of my own companies for a relatively low risk device where the 3rd party review was almost completely set aside, causing substantial delays in patient access and draining this small company's limited resources. Again, I think the aligned objective of this program is to make more resources available for the agency to review more complex technologies and leverage 3rd parties for the simpler submissions. Keeping FDA within the guidelines of the intent of this program would benefit all parties involved in this ecosystem, including the agency.

Focused process reform will make it easier to achieve efficiency targets with fewer staff – Real World Evidence

Another area of opportunity to drive greater efficiency and effectiveness in the premarket review process involves FDA better leveraging real world data. While FDA has increasingly expressed interest in utilizing real world data for the review process, adoption is still slow. With the cost of evidence generation increasing for innovators, FDA, CMS and all stakeholders should be thinking more creatively about how to tap into this critical data source to accelerate patient access and coverage decisions. Such an approach could lower the demands, delays and costs of pre-market review, and allow technologies and clinical insights to evolve more rapidly, allowing innovation in patient care to advance more efficiently.

FDA doesn't work in a vacuum – International partners and CMS should be key partners

Finally, as international competition is increasing, especially from the EU and China, the FDA should actively participate in efforts that build efficiencies across organizations. This could take two forms: global regulatory harmonization and increased FDA partnership with CMS.

Global regulatory harmonization efforts would ensure that U.S.-approved biotechnologies and medical technologies are globally competitive. Harmonized standards reduce duplication, speed up international market entry, and strengthen the appeal of the U.S. as a base for innovation. Medical device and biotechnology companies are net exporters. The products we

create should be available to Americans first, and then commercialized across the globe but we face substantial challenges now in doing so. Today China is truly threatening the US's leadership, but some of our policies have done more to enable China's aggressive advance than deter them.

Turning lastly to CMS, while the medical technology sector has seen many improvements over the past 15 years regarding the FDA, there unfortunately remains substantial inefficiencies at CMS that is unique to this sector. Increasingly, medical technology innovators are confronting a "valley of death" where their technologies have received FDA authorization, but often no CMS or insurance coverage is in place to allow patients to gain access to them. My colleagues and I at the Stanford Biodesign Policy Program studied just how difficult the environment has become. Our research found that Medicare patients often wait many years to get access to novel FDA-authorized technologies. Our group used publicly available data and discovered that only 44% of novel technologies authorized by the FDA between 2016 and 2019 achieved even the most nominal amount of Medicare coverage by the end of 2022, and the median time to achieve this nominal coverage was 5.7 years[vi]. This is too long for American seniors to wait, and it is breaking the investment model in this country that has historically led the world in these innovations. Thankfully I believe there remains strong bipartisan support in the Senate and House of Representatives to address this problem and there are proposals now under consideration to establish a new coverage pathway at CMS to accelerate seniors' access to these technologies. While I recognize that CMS is largely not within this Committee's jurisdiction, I did want to highlight this troubling reality. Initial efforts at CDRH to enable

FDA staff to support CMS in their coverage determinations have been hopeful, but not effective enough and Congressional support for this could be very effective in making sure this collaboration happens. I do think it is in scope for this Committee to support advancing this inter-agency collaboration, enabling FDA scientists, physicians and engineers to support CMS in their coverage evaluations and provide a resource to the teams there to accelerate and advance these therapies to American seniors.

In closing, I and my fellow innovators remain committed to working closely with you to reach our shared goal of expediting access to safe and effective biotechnologies and medical technologies to patients and providers in a timely manner, and ensuring that the United States remains the global leader in these important fields well into the future.

Thank you once again Chair Cassidy and Ranking Member Sanders for the opportunity to testify today, and I look forward to answering any questions that you and the Committee Members might have.

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[i] Cheyenne Ariana Erika Modina, Sandra Waugh Ruggles, and Josh Makower. 2024. Regulatory Pathway for Cell and Gene Therapies in the United States: Perspectives from Innovators and Investors. Health Management, Policy and Innovation (www.HMPI.org). Volume 9, Issue 3.

[ii] Makower J, Meer A, Denend L (2010) FDA impact on U.S. medical technology innovation: a survey of over 200 medical technology companies. November 2010 [Google Scholar]

[iii] https://www.fda.gov/industry/fda-user-fee-programs/center-drug-evaluation-and-research-center-biologics-evaluation-and-research-net-hiring-data-fy-2023)

[iv] https://www.thefdalawblog.com/2025/07/fdas-latest-lists-for-digital-health-technologies/#:~:text=There%20are%201%2C247%20AI%2Denabled,of%20AI%2Denabled%20device%20applications

[v] https://www.bioworld.com/articles/721807-fdas-mdufa-report-suggests-pre-sub-interactions-increasing

[vi] Sexton ZA, Perl JR, Saul HR, et al. Time From Authorization by the US Food and Drug Administration to Medicare Coverage for Novel Technologies. *JAMA Health Forum*. 2023;4(8):e232260. doi:10.1001/jamahealthforum.2023.2260