PART IV

The Impact of Medical Device Regulation on Patients and Markets

Introduction

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What do we know about the products we put in our bodies? It is hard enough to determine the safety and efficacy of drugs, which go through a premarket approval process. In contrast, many medical devices are not subject to premarket approval, and even those that are approved tend to undergo iterative changes during their lifecycle, such that the versions now being used may be quite different designs than the versions originally proposed to, and reviewed by, the FDA. Or the same designs may be used for an altogether new purpose or a new patient population.

Unfortunately, the evidence is not very good. To peek into just one part of the medical device ecosystem, consider panel-track supplements. Of the six different pathways for reviewing modification to approved devices, the "panel track" is the only one that always requires submission of clinical data, because the manufacturer is proposing a "significant change in design or performance of the device, or a new indication for use of the device." In 2017, JAMA published a report by Sarah Zheng, Sanket Dhruva, and Rita Redberg reviewing the clinical studies used by the US Food and Drug Administration to approve such modifications to high-risk medical devices over nearly a decade.[1] Of the eighty-three clinical studies for all seventy-eight panel-track supplements approved between 2006 and 2015, less than half (45 percent) were randomized clinical trials, less than a third were at least somewhat blinded, and all but a fifth (19 percent) used surrogates rather than mortality and morbidity as primary endpoints. And most disconcertingly, all but 38 percent lacked control groups, which is typically a necessity for causal inference. If we cannot isolate the effects caused by the device, what is the point?

On the basis of this relatively weak data, it is hard to know if these devices are actually safe and effective for their intended purposes. Without that information, it is hard for patients and their doctors to know whether the devices are right for them, and it is hard for payors to determine whether the products are worth their prices.[2]

[1] Sarah Y. Zheng et al., Characteristics of Clinical Studies Used for US Food and Drug Administration Approval of High-Risk Medical Device Supplements, 318 JAMA 619 (2017).

[2] Sarah Fontenay et al., Quality of Economic Evaluations of Ventricular Assist Devices: A Systematic Review, 36 Int'l J. Tech. Assessment in Health Care 380 (2020).

Frankly, that is exactly the situation that rational purveyors of these devices desire, trading on hope and conjecture, while they selectively release whatever information is favorable to their product. The chapters in this section pick up this theme around proof and value.

In their chapter, Jody Lyneé Madeira and colleagues are worried about the relationship of the drug and device industry with specialized drug courts, in the era of opioid abuse. Here the primary medical device is called "the Bridge" and it provides neurostimulation as a preliminary step to reduce cravings in the treatment of substance use disorder. A 2020 review of the literature on such devices yielded only five studies meeting inclusion criteria, with a combined total subjects of N=150 across all five studies.[3] The review authors conclude that, "the studies that have been performed have suffered from small sample sizes and poor characterization of the study population and their substance use patterns, as well as inadequate attempts at participant masking and controlling sources of bias. As such, there is a paucity of high-quality, rigorously-conducted research."[4] Only one of these studies focused on the Bridge device itself, and it was coauthored by the patent holder for the device, who also serves as consultant for the company marketing it. The Bridge is a great example of how the FDA is a weak gatekeeper for medical devices, and how weak regulation begets weak evidence.

Kate Kraschel is also concerned with unproven medical products, specifically those used for fertility services. Preimplantation genetic screening is one such service, which can be used to select embryos that are more likely to yield healthy babies, but it has a false-negative problem, often screening out healthy embryos. In this domain, the FDA has been largely silent, due to complicated political questions and the fact that the devices themselves are secondary to clinicians' decisions about whether and how to use them. Accordingly, since no regulator requires proof of safety and efficacy, no such reliable evidence is produced. In this regulatory gap, money flows in to exploit the hopes of patients who are eager to become parents of healthy babies.

Preeti Mehrotra and colleagues take on the problem of dirty devices. Specifically, how should duodenoscopes be disinfected, and what role should the FDA have in setting those standards? This chapter exposes the problems with a binary approach to regulatory approval, where the device itself may be safe and effective, but only if downstream users properly sterilize it. This chapter also reflects a fragmentation of entities providing guidance in this space, including hospital policymakers, professional associations, and governmental regulators.

Wendy Netter Epstein focuses on the safety/innovation tradeoff for the FDA's policy setting. Not unlike driving a car, the faster one goes, the greater the risk. For medical products, the faster we move to bring new medical products to market, the

[3] H.B. Ward et al., A Systematic Review of Noninvasive Brain Stimulation for Opioid Use Disorder, 23 Neuromodulation: Technology at the Neural Interface 301 (2020).

[4] Id. at 307.

less information regulators will have and the greater the risk that some of those products will turn out to be bad. This risk can arise on the efficacy front, where approved products can come on the market, displacing the standard of care and sucking billions of dollars out of the health care system, only to turn out to be useless. Epstein focuses on the more worrisome problem that a product comes onto the market, but ultimately does more harm than good.

Together these chapters contribute to our understanding of how the regulation of medical devices, or the lack thereof, shapes what we do or do not know about them. In the race to help patients, it is necessary to make sure that our new medical products actually help them. As I have written before, it cannot simply be presumed.[5]

[5] Christopher T. Robertson, The FDCA as the Test for the Truth of Promotional Claims, in FDA in the 21st Century: The Challenges of Regulating Drugs and New Technologies (I. Glenn Cohen & Holly Fernandez Lynch eds., 2015).