FDA's Medical Device Framework

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What does CDRH do?

Patients are at the Heart of What We Do

- CDRH is FDA's Center for Devices and Radiological Health
- CDRH is responsible for regulating firms that manufacture, repackage, relabel, and/or import medical devices or radiation-emitting electronic products sold in the United States.

CDRH By the Numbers

2,230 Dedicated CDRHers

257,400 Different types of regulated devices listed

21,500 Registered device manufacturing firms

19,100 Submissions received

71 New and updated guidances

CDRH Safety-Related Communications

14	Safety communications	**3**	Public meetings	**71**	Facebook posts
14	Letters to health care providers	**6**	Advisory Committee meetings	**207**	LinkedIn posts
59	Class I recall amplifications	**553**	External emails	**536**	X posts

Device Innovation

15	STeP requests enrolled	**29**	Submissions designated as Breakthrough Devices received marketing authorization
124	Novel devices received marketing authorization	**167**	Submissions designated as Breakthrough Devices

21 Total number of devices that transitioned from EUA to traditional marketing authorization

Joined **3** Collaborative Communities

★★★★★★★★★★

90% Customer Service Rating

What is a medical device?

- "Device" is defined in sec. 201(h)(1) of the FD&C Act as "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, or in the cure, mitigation, treatment, or prevention of disease…" and is not a drug.
- FDA-regulated devices range from toothbrushes to ventilators and everything in between, such as:
  - Simple – bandages and thermometers
  - Complex – robotic surgery devices, hip and knee implants
  - Diagnostics – pregnancy tests, COVID-19 tests
  - Surgical tools – endoscopes, staplers
  - Therapeutics – kidney dialysis equipment, defibrillators
  - Software – artificial intelligence and machine learning (AI/ML) algorithms

How does FDA regulate medical devices?

- FDA takes a risk-based approach to regulating medical devices across the total product life cycle (TPLC)
- Device classification:
  - **Class I** – Lowest risk → General Controls (e.g. GMPs, adverse event reporting)
  - **Class II** - Moderate risk → General Controls and Special Controls (e.g. performance standards, patient registries)
    - Premarket Notification ("510(k)")
  - **Class III** - Highest risk → General Controls
    - Premarket Approval (PMA)
- Unclassified devices: default is Class III

What does “risk-based approach” really mean?

What is the level of regulatory control that will provide a reasonable assurance of safety and effectiveness?

- Relative to person for whose use device is intended
- Relative to conditions of use in the labeling
- Balancing the probable benefit to health against any probable risk of injury or illness

Factors to Consider When Making Benefit-Risk Determinations for Medical Device Investigational Device Exemptions

Guidance for Investigational Device Exemption Sponsors, Sponsor-Investigators and Food and Drug Administration Staff

Document issued on January 13, 2017.

Benefit-Risk Factors to Consider When Determining Substantial Equivalence in Premarket Notifications (510(k)) with Different Technological Characteristics

Guidance for Industry and Food and Drug Administration Staff

Document issued on September 25, 2018.

The draft of this document was issued on July 15, 2014.

Factors to Consider Regarding Benefit-Risk in Medical Device Product Availability, Compliance, and Enforcement Decisions

Guidance for Industry and Food and Drug Administration Staff

Document issued on December 27, 2016.

Factors to Consider When Making Benefit-Risk Determinations in Medical Device Premarket Approval and De Novo Classifications

Guidance for Industry and Food and Drug Administration Staff

Document issued on August 30, 2019.

Document originally issued on March 28, 2012.

Consideration of Uncertainty in Making Benefit-Risk Determinations in Medical Device Premarket Approvals, De Novo Classifications, and Humanitarian Device Exemptions

Guidance for Industry and Food and Drug Administration Staff

Document issued on August 30, 2019.

The draft of this document was issued on September 6, 2018.

For questions about this document, contact the Office of Policy at 301-796-5641.

Patient preference included in all device benefit-risk guidances

510(k)

- A “premarket notification” under sec. 510(k) of the FD&C Act
- Introduce a new device to market
- Change a device’s indication
- Modify a device in a way that could significantly affect—either way—its safety or effectiveness

The purpose is to demonstrate “substantial equivalence” (SE) to a lawfully marketed device

- SE does not mean identical

De Novo Classification

- Low to moderate risk
- Recommend classification → if Class II, include special controls
- Implantable or life sustaining/ supporting devices only upon finding Class III is not necessary

Premarket Approval (PMA)

- For devices cannot be classified as Class I or II
  - Insufficient information exists to assure safety and effectiveness through general & special controls; AND
  - Are used in supporting or sustaining human life, OR
  - For a use which is of substantial importance in preventing impairment of human health, OR
  - Presents a potential unreasonable risk of injury.
- Application must include sufficient “valid scientific evidence”
- To demonstrate a reasonable assurance of safety & effectiveness (RASE) for intended use(s)

Typical Approval Process:

From Pre-Clinical to IDE to PMA

1. Perform nonclinical testing
2. Develop clinical study protocol
3. Pre-investigation meeting
4. Agreement and/or determination meetings
5. Submit investigational device exemption (IDE) application
6. Reply to FDA questions, requests
7. Receive IDE approval
8. Conduct pilot studies, if necessary
9. Conduct pivotal study
10. Analyze clinical results
11. Full compliance with QSRs
12. Pre-PMA meeting
13. Submit PMA
14. FDA reviews PMA
15. Day-100 meeting with FDA
16. Respond to deficiencies, if any
17. Panel meeting (if required)
18. Post-panel issues; negotiate labeling
19. Preapproval inspections for Quality System compliance and Bioresearch Monitoring (BiMo)
20. Decision concerning approval

Investigational Device Exemption (IDE)

- Permits lawful interstate shipment of investigational devices
- Significant risk
  - Inst. Review Board (IRB) approval
  - Informed consent
  - FDA review and approval of IDE
- Nonsignificant risk
  - IRB approval
  - Informed consent
  - No IDE required
- Exempted studies
  - E.g., patient preference studies

Humanitarian Device Exemption (HDE)

- For disease or condition that affect not more than 8,000 people in United States
- Exemption from PMA *effectiveness* standard
- Device must receive Humanitarian Use designation
- Limitations on device use and requirements for IRB oversight
- Prohibitions on selling for profit*

- Well-controlled investigations
- Partially controlled studies
- Studies and objective trials
- Well-documented case histories
- Reports of significant experience

- ~~Isolated case reports~~
- ~~Random experience~~
- ~~Insufficiently detailed reports~~
- ~~Unsubstantiated opinions~~

Valid Scientific Evidence

Clinical Data & PMA

- Must contain sufficient valid scientific evidence to provide RASE
- PMA application almost always accompanied by clinical data
  - Typically requires the conduct of at least one clinical trial
- Postapproval studies may be applied as a condition of approval
- Annual reporting requirements

Clinical Data & 510(k)

- The vast majority of devices authorized for marketing by FDA come to market through the 510(k) pathway
- The vast majority of 510(k)-cleared devices do not rely on clinical data from clinical trials
- FDA only requests clinical data for a 510(k) submission to address issues that cannot be adequately addressed using other, non-clinical test methods

The “Least Burdensome” Principle

- When FDA requests information to demonstrate that devices are substantially equivalent, we:
  - May “only request information that is necessary,” and
  - Must “consider the least burdensome means of demonstrating substantial equivalence and request information accordingly.”

Breakthrough Devices

- Purpose: To apply efficient and flexible approaches to expedite the development of breakthrough device technologies
- Device provides more effective treatment or diagnosis of life-threatening or irreversibly debilitating human disease or condition; and
- Criteria:
  - Breakthrough technology;
  - No cleared or approved alternatives
  - Significant advantages over cleared/approved alternatives; or
  - Otherwise in best interest of patients
- TPLC Advisory Program (TAP): new voluntary pilot within CDRH to help ensure that U.S. patients have access to safe, effective, high-quality, and innovative medical devices by promoting early, frequent, and strategic communications between FDA, device sponsors, and other stakeholders including payors, providers, and patients


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