Accelerating Medical Device Innovation in the U.S.

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It’s About the Patients
FDA & US Medical Device Innovation

**CDRH Mission**
- Facilitate medical device innovation by providing industry with predictable, consistent, transparent and efficient regulatory pathways
- Provide stakeholders with understandable and accessible science-based information about medical devices

**CDRH Vision**
- **Patients** in the US have access to high-quality, safe, and effective medical devices of public health importance first in the world
- US is the world’s leader in medical device innovation
Makower Report (2010):
FDA Impact on US Medical Technology Innovation

United States

$10M
Apply for IDE

$8M
Safety study

$40M
Pivotal study

$13M
FDA submission

FDA approval
Initial reimbursement

Europe

$8M
CE mark submission

$1M
CE mark approval

~ 4 years longer to regulatory approval in US versus Europe

Same starting point: Clinical Development

Adapted from: Josh Makower white paper, “FDA Impact on US Medical Technology Innovation”, November 2010
U.S. Medical Device Manufacturing Companies by Number of Employees

Number of Employees
- <10: 69%
- 10 to 19: 14%
- 20 to 99: 10%
- 100 to 499: 2%
- >500: 5%

Source: Dun and Bradstreet, Inc.
The *Crisis* in Medical Device Innovation

Start-Up investment down >35% since 2007 peak
US Medical Device Industry:

**Innovation Challenges**

Factors cited as having the highest impact on decisions to move medical device investment outside of U.S.*

- **Regulatory Challenges** - 38%
- **Reimbursement Concerns** - 18%
- **Clinical Trial Issues** - 14%

* from National Venture Capital Association/Medical Innovation & Competitiveness Coalition survey of 259 NVCA member firms investing in the healthcare sectors; 60% (156 firms responding) October, 2011
## Time is Money

### Estimated Cost of FDA Decisions on a 30 Employee Company

<table>
<thead>
<tr>
<th>Cost Description</th>
<th>Expense to Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 Week Delay in Scheduling a Meeting</td>
<td>$1.8 M</td>
</tr>
<tr>
<td>Additional 20 Animal Study (6 months)</td>
<td>$5.5 M</td>
</tr>
<tr>
<td>Extra Year in Negotiating an IDE</td>
<td>$10.8 M</td>
</tr>
<tr>
<td>Additional 100 patient study with 1 year Follow-up (24 months)</td>
<td>$24.1 M</td>
</tr>
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Versant Ventures
FDA acknowledges real or perceived issues:

- Early clinical study of novel devices moved/moving OUS
- Device innovation may follow OUS
- Devices are being exclusively developed for non-US markets
- FDA’s requirements can be an impediment to timely clinical study of novel early-stage devices

Growing concern regarding the time lag in the availability of beneficial medical devices for US patients
Case Study: Trans-Aortic Valve Replacement (TAVR)

- Initial devices were developed by start-up companies outside of U.S.
- It was 9 years from first-in-man (in France) to US regulatory approval
- It took 4 years from CE Mark to FDA approval
- U.S. was the 43rd country in the world to receive approval (Brazil 42nd, Albania 44th)
- 20-30,000 patients received TAVR worldwide before US approval
- Edwards and Medtronic have spent ~ $2 Billion combined bringing devices to US market
Climate Change at FDA

How can the FDA innovate itself?

How can the FDA spur innovation in the regulated industry?

What is FDA’s role in strengthening the U.S. Medical Device Ecosystem?
FDA recognizes:

- A need for a cultural change to emphasize the role of promoting public health while maintaining our standards in protecting public health
- Human costs associated with delaying access to new technology, in the context of the limitations of current treatment alternatives
- Advantages for the device development process with US clinical studies (including FIH and early feasibility studies)
  - Opportunity for close contact between developers and investigators
  - Early access to promising novel technology
The core principles in meeting these priorities are the application of specific guidelines throughout the regulatory decision-making process:

- **Benefit/Risk Principles**
  - Identifies the factors to make benefit/risk determinations during premarket review

- **Early Feasibility Studies**
  - Application of benefit/risk principles to justify study initiation

- **The Innovation Pathway**
  - Pilot program for innovative devices with promising and potentially far reaching benefits

- **CDRH 2014-2015 Strategic Priorities**

http://www.fda.gov/AboutFDA/CentersOffices/OfficeofMedicalProductsandTobacco/CDRH/CDRHInnovation/InnovationPathway/default.htm
Benefit-Risk Principles

Allow regulators to:

- Consider the **totality** of the benefit/risk profile for the device, for example:
  - Disease condition (e.g., life-limiting, life-threatening)
  - Limitations of and risks associated with currently available therapies

- Consider **patient tolerance** for risk and **perspective** on benefits
  - Severity and chronicity of disease
  - Availability of alternative treatments/diagnostic modalities

- Take into account **risk mitigation** strategies when balancing risks and benefits

http://www.fda.gov/MedicalDevices/DeviceRegulationandGuidance/GuidanceDocuments/ucm267829.htm
Early Feasibility Studies

• Intended to facilitate the earliest clinical evaluation of medical devices in the US under the Investigational Device Exemptions (IDE) regulations

• Elements that define an early feasibility study:
  – Device intended for a specific indication that may be early in development, typically before the device design has been finalized
  – When exhaustive nonclinical testing would not likely provide the information needed to further device development
  – Small number of subjects mitigate risks
  – EFS IDE approval may be based on less non-clinical data

The Innovation Pathway

- Pilot program launched February 2011
- Targeted for pioneering technologies that address unmet clinical needs and have the potential to revolutionize patient care or health care delivery
  - Breakthrough technology that provides a clinically meaningful advantage over existing technology
  - No approved alternative treatment or means of diagnosis exists
  - Significant, clinically meaningful advantages over existing approved alternative treatments
1) When the goals are understood, the methods to achieve them can be improvised.

2) We value improvisation, experimentation, risk-taking, and problem-solving over process-following and standardization (uniformity of approach).

3) Okay to fail.

Edison: “Hell, we ain’t got no rules around here. We’re trying to accomplish something!”
Innovation Program Goals

• Shorten the time from concept to commercialization
  – Early and continuous interaction between FDA and sponsors to facilitate innovation; apply B/R principles

• Transform the user experience
  – Create shared “one team” view of success
  – Collaboration is the key

• Make decisions that create forward momentum
  – Understand costs (time) of different regulatory choices
  – Trade-offs; uncertainty; mitigations
HemoAccess Valve System
- A mechanical valve system allowing blood flow into AV graft only during dialysis

Wearable Artificial Kidney
- A miniaturized wearable dialysis machine to provide hemodialysis

Implantable Bio-Artificial Kidney
(Univ. California, San Francisco)
- Filters toxins from blood, and provide other biological functions giving patients 24/7 dialysis

- 32 Device applicants; 3 selected
- Collaboration Phase – Summer 2012
ENTREPRENEURS-IN-RESIDENCE (EIR) PROGRAM

- Goal: Transformational change by combining the internal and external talent applying lean engineering and Innovation Pathway principles

- Supported by the White House Office of Science and Technology Policy

EIR 2011-2012

Time-limited recruitment of world-class innovators entrepreneurs and visionaries from a variety of medical-device related fields to join highly-qualified FDA staff in the development of solutions in areas that impact innovation.
Three New Projects (EIR groups):

- **Streamlining clinical trials:** Find ways to reduce the time and cost of clinical trials in support of FDA approval or clearance of medical devices.

- **Striking the right balance between pre- and post-market evidentiary requirements:** Find ways to allow efficient use of pre-market studies to allow for timely approvals, with greater emphasis on capturing informative real-world data in post-market studies.

- **Streamlining approval to reimbursement:** Find ways to reduce the inefficiencies and delays in data collection to support FDA approval and CMS coverage.
Strengthen the Clinical Trial Enterprise in the US

Strike the Right Balance Between Premarket and Postmarket Data Collection

Provide Excellent Customer Service
Strengthen the Clinical Trial Enterprise

IDE CYCLES
Reduce the number of IDEs requiring more than two cycles to an appropriate full approval decision
Sept. 30, 2014 – 25%
June 30, 2015 – 50%

IDE APPROVAL TIME
Reduce the overall median time to appropriate full IDE approval by Sept. 30, 2014 – 25%*

Increase the number of early feasibility/FIH IDE studies submitted to FDA and conducted in the U.S.

 Implemented FDASIA Benefit-Risk Determinations

*Compared to FY 2013 performance
Strengthen the Clinical Trial Enterprise

CDRH FY 2015 Target: Reduce overall median time to full appropriate IDE approval to 30 days

Median Time to Full Appropriate IDE Approval

- FY 2011: 450 days
- FY 2013: 150 days
- FY 2015: 20 days
Strike the Right Balance Between Premarket and Postmarket Data Collection

Assure the appropriate balance between pre- and postmarket data requirements to facilitate and expedite the development and review of medical devices.

Device types subject to a PMA that have been on the market:
- By 12/31/14 review 50%
- By 6/30/15 review 75%
- By 12/31/15 review 100%

to determine whether or not to shift some premarket data requirements to the postmarket setting or to pursue down classification, and communicate those decisions to the public.

Develop and seek public comment on a framework for when it is appropriate to shift premarket data collection to the postmarket setting.

Develop and seek public comment on a new pathway to market for devices subject to a PMA that address an unmet public health need by shifting appropriate premarket data needs to the postmarket setting and incorporating features of the Innovation Pathway pilots.
Provide Excellent Customer Service

Implement Customer Service Standards

By 12/31/14, achieve at least 70 percent customer satisfaction.
• By 6/30/15, achieve at least 80 percent customer satisfaction.
• By 6/31/15, achieve at least 90 percent customer satisfaction.

Assess customer satisfaction using a standardized survey tools

Implement the principles and practices outlined in the CDRH Quality Management Framework to improve the quality and performance of CDRH processes and services.
Keys to Patient Access

- Evidence
- Value
- Reimbursement
- Market
Medical Device Reimbursement Task Force

“Winning coverage and payment has become a steeper challenge than gaining FDA approval for small device firms in recent years”  Mike Carusi on behalf of NVCA, AdvaMed and MDMA

Mission

Streamline the pathway from regulatory clearance or approval to reimbursement to support patient access to innovative medical devices

Plan

Develop a voluntary process that facilitates earlier interactions with payers, including private 3rd party payers about evidence to support coverage and reimbursement

Staff

OCD / ODE / OIR with support from CMS
What are we proposing?

FDA Review Team
Manufacturer
Payer

Provide a process to enable manufacturers to include and engage payers during meetings with FDA using the Pre-Submission program.
EXPEDITED ACCESS PMA

• Based on Innovation Pathway pilots

• Focus is to expedite patient assess for:
  – High risk medical devices
  – Treatment or diagnosis of a life-threatening or irreversibly debilitating disease or condition
  – Addresses an unmet medical need that
    • Has no alternative treatment or means of diagnosis
    • Represents breakthrough technology
    • Provides a clinically meaningful advantage over existing technology

Draft guidance issued April 23, 2014
http://www.fda.gov/MedicalDevices/DeviceRegulationandGuidance/GuidanceDocuments/ucm393879.htm
Based on 2014-15 Strategic Priority #2

- Supports expedited patient access pathway for PMA devices
- Determined by Benefit-Risk Profile
- Supported by FD&C Act, section 513(a)(3)(c)
- Allows for approval with greater degree of uncertainty for devices that serve an unmet need
- Supported by the National Medical Device Postmarket Surveillance system

Draft guidance issued April 23, 2014

http://www.fda.gov/MedicalDevices/DeviceRegulationandGuidance/GuidanceDocuments/ucm393882.htm
THANK YOU

CDRH

INNOVATION