Impact of the Regulatory Framework on Medical Device Development and Innovation

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One of Rube Goldberg’s Medical Devices

An Automatic Back Scratcher
New Therapeutic Technology

What Consumer Protections are required to bring innovative new medical technology to market?
FDA: 100 Years of Consumer Protection

Public Health Goals

- Safe Human Experimentation
- Marketing Products with demonstrated Effectiveness
- Manufacturing Quality
- Truthful Claims
- Prompt response to hazards
- Prompt response to unmet need
# Safe Therapeutic Products

## Drugs
- Pure molecules
- Toxicology
- Short half-life
- Long market life
- Drug interactions
- Wrong Drug / Dose
- Clinically studied
- Good Manufacturing Practices (cGMP)

## Devices
- Complex components
- Biocompatibility
- Durable Equipment
- Rapid product cycles
- Malfunction
- User Error
- Bench studied
- Quality Systems (ISO 13485)
Device Regulatory Path

510(k) Predicates

Class I
Substantially Equivalent

Class II
Reclassification

Class III
De novo Classification
PMA

“Safe and Effective”

Pre Amendment Marked Devices

New Products based on Old Products

New Novel Products

1976
Consumer Protection

Premarket

Safe experimentation
Premarket safety
Premarket effectiveness
Research Inspection

Postmarket

Truthful promotion
Adverse Event Reporting
Postmarket studies
Manufacturing Inspection
Product Life Cycle

Premarket

Postmarket

Evidence
Life Cycle of a New Infection

- Index Case
- Clustered Cases
- Specimens
Life Cycle of a New Infection
Life Cycle of a New Infection
Diagnostic Device Life-Cycle
Diagnostic Device Life-Cycle
Diagnostic Device Life-Cycle
IVD and Disease – Linked Cycles
Product Development Lifecycle
Product Development Lifecycle
Product Development Lifecycle

The Pipeline
Regulatory Cycle

- Request for Designation
- Device Advice
- Early Planning Meetings
- Concept
- Prototype
- Preclinical
- Clinical
- IDEs
- Agreement & Determination Meetings
- Commercial Use
- Manufacturing
- PMA’s, 510(k)s
- Guidance
- Safety Alerts
- Recalls
- Warning Letters
- Post-Marketing Studies
- MDR’s
- Advisory Panels
Risk Classification

- Regulatory Principles:
  - Regulatory requirements are proportional to risk
  - Regulatory review cycle length should be proportional to risk

- Innovation Inhibitors
  - Regulatory burden
  - Long review cycles

- FDA’s Challenge: Fifteen new 510(k)s to clear every day
Class II Regulation and Innovation

Device Classification

- Regulatory Principles:
  - One set of regulatory requirements do not fit all
  - Requirements depend on the technology and the claim
  - Requirements should be science-based

- Innovation Inhibitors
  - Requirement uncertainty
  - Changing requirements

- FDA’s Challenges:
  - A thousand different classification groups
  - Rapidly Changing Science
Class II Regulation and Innovation

Evidence Requirement

- Regulatory Principles:
  - Evidence requirements are proportional to risk
  - Comparison to a previously approved product allows incremental improvements

- Innovation Inhibitors
  - Unpredictable requirements
  - Rising requirements

- FDA’s Challenge: “tool claims” vs. “clinical benefit”
Class II Regulation and Innovation

Standards

- Regulatory Principles:
  - Evidence can be based on objective non-clinical performance criteria
  - Agreed upon standards simplifies the review process

- Innovation Inhibitors
  - Incomplete set of Standards & FDA Guidances

- FDA’s Challenge: Keeping up
Class II Regulation and Innovation

Clinical Evidence

- Regulatory Principles:
  - Substantial equivalence for some products can only be evaluated in the clinic
  - Human Factors are key to the performance of some devices

- Innovation Inhibitors
  - Clinical evidence takes longer to obtain

- FDA’s Challenge: Collecting evidence across the life-cycle for class II products
Class II Regulation and Innovation

Regulatory Incentives

- Regulatory Principles:
  - Drug-like exclusivity is ill suited for the rapidly changes and complexity of medical devices
  - Transparency promotes innovation and adoption of safe and effective products

- Innovation Inhibitors
  - Becoming a competitor’s predicate
  - Disclosure of trade secrets

- FDA’s Challenge: Transparency Resources
Class II Regulation and Innovation

Regulation of Biomaterials and Components

- Regulatory Principles:
  - The final manufacturer is responsible for the whole device
  - Biomaterials and component parts must be fit for use

- Innovation Inhibitors
  - Difficulty qualifying new biomaterials
  - Supply chain regulatory problems

- FDA’s Challenge: Prioritizing FDA oversight
Class II Regulation and Innovation

Class II Labeling

- Regulatory Principles:
  - Products approved based on substantial equivalence should have the same labeling
  - Labeling review requirements should be less for lower risk products (Class II vs. Class III labels)

- Innovation Inhibitors
  - Limitations to new Class II labeling

- FDA’s Challenges:
  - Keeping claims up to date with new science
  - Oversight after approval
Class II Changes to Consider

Create an approval path for class II

- Not cobbled together out of the Registration and Listing requirements in 510(k)
- Approval action which includes the basis for approval:
  - Objective Performance standards
  - Clinical safety and effectiveness
  - Based on predicates which meet appropriate standards
    - Lose references to 1976
    - Predicates are allowed but not required
- Harmonize manufacturing Quality System requirements (ISO 13485)
FDA can Foster Innovation

Opportunities

- A streamlined and responsive risk reclassification process to keep up with science
- Provide guidance for all product classifications
- Utilize evidence across the total product life-cycle
- Build strong science-based regulatory decisions
- Peer review regulatory decisions to enhance consistency and quality
- Fix the transparency lag (FOI) and improve class II transparency
Summary & Conclusions

- Risk-based regulation tailored to the specific nature of different class II devices appropriately protects the health of the public while encouraging innovation.

- Changes to the 510(k) process should strive to better foster innovation and assure confidence that the process has integrity and brings the tools and technology that bring benefit with well understood risks.
510(k) Reform