



# *Insights into FDA Device Regulation*

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**HMMC**

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# *FDA Mission: Historical Basis*

- **Protect the public from unsafe products**

## *New Hazards New Laws*





PUBLIC HEALTH  
COMMANDMENTS  
Thou shalt not:  
OVERINDULGE IN  
DRUGS, FATTY  
FOODS, ALCOHOL,  
POLLUTION, SALT,  
SUGAR, ETC. ETC. ETC.  
Etc. Etc. Etc.

BEER  
CIGARETTES  
WINE  
CLINIC

1751

SCHOOL

HOSPITAL

CAFE

FOOD STORE

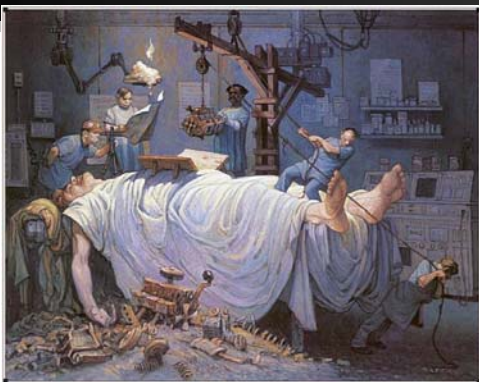


# *FDA Mission Today*





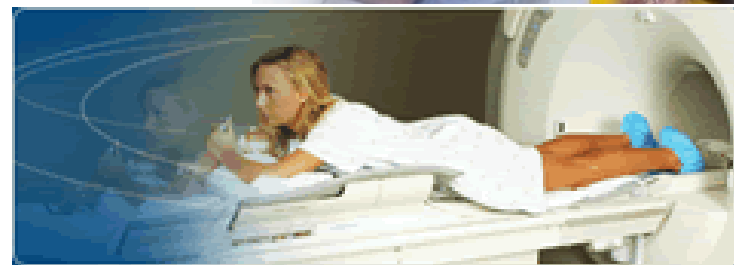
# *Center for Devices and Radiological Health (CDRH) – Our World*



**Yesterday**



**Today**



**Tomorrow...**



# *Medical devices are getting more complex*

- **Computer-related Technology**
- **Molecular Medicine**
- **Minimally Invasive Technologies**
- **Miniaturized Devices Micro & nanotechnologies**
- **Robotics**
- **Organ Replacements and Assists**
- **Wireless Systems**
- **Decentralized Healthcare**
- **Combination Products**



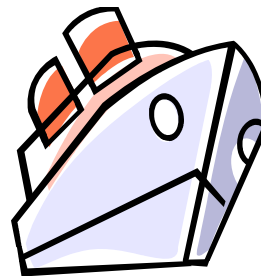
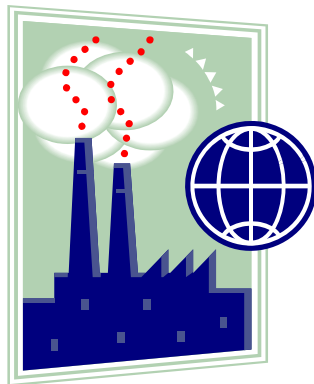
# *This complexity brings change*

- **Change to the nature of medical devices,**
- **Change to how medical care is delivered, and**
- **Change in health outcomes, hopefully for the better.**



*... and even more complexity.*

**This increase in the complexity of technology is compounded by a concurrent increase in the complexity of the external milieu in which medical devices are developed, manufactured, and distributed.**





# *Complexity on a global scale*

Melamine



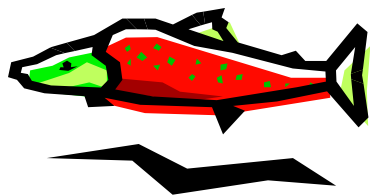
Avian flu

Heparin

Pet food

Counterfeits

Infant formula



Bisphenol A



*As a result of all these changes...*

- We must re-think how we approach the regulation of medical devices.



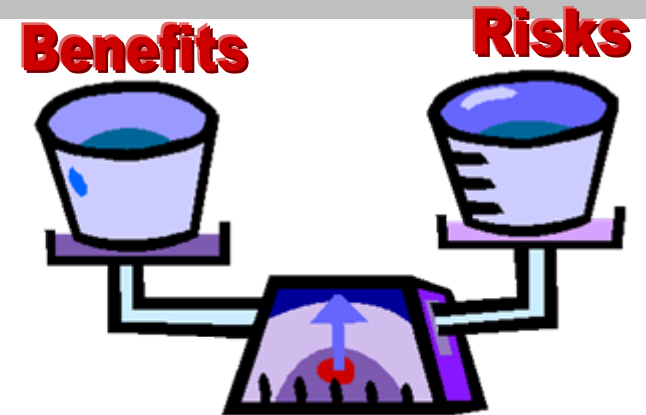


# *CDRH's Mission*

- Get **safe and effective** devices to market as quickly as possible.

- Ensure that devices currently on the market remain **safe and effective**.

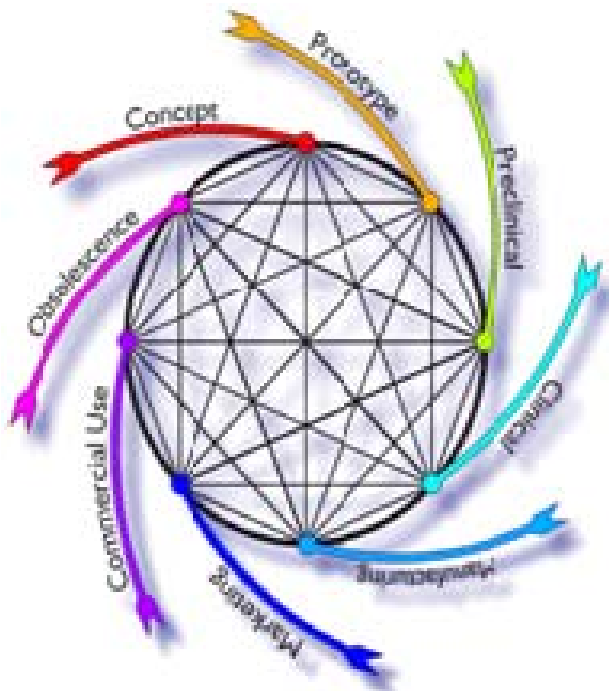
- Help the public get **science-based** accurate information about medical devices and radiological products needed to improve health.





# *CDRH's Total Product Life Cycle Approach*

Efficient,  
Effective,  
and Predictable  
Product  
Development



Ensuring  
the Safety of  
Marketed  
Medical Devices

Enabling  
Technology  
and Innovation



# ***CDRH FY 2009 Priorities***

- 1. Develop and begin implementing a CDRH Import Safety Strategy**
- 2. Continue implementation of postmarket transformation, including successful integration of the Matrix into CDRH daily activities**
- 3. Improve product access through continued implementation of FDAAA**
- 4. Successfully transition all CDRH operations to White Oak Campus**
- 5. Develop and implement a state-of-the-art knowledge management strategy that maximizes the potential of every CDRH employee and advances every aspect of the Center's mission.**



# *CDRH FY 2009 Initiatives*

## ■ Science Board Report

- Collaborate with the Office of the Commissioner to implement recommendations in the 2008 FDA Science Board Report.

## ■ FDA Enterprise Architecture

- Partner with the Agency in the implementation of comprehensive enterprise solutions to ensure that CDRH information management needs are met

## ■ Unique Device Identification (UDI)

- Collaborate with stakeholders to develop a unique device identification system that will improve product safety and complies with the requirements specified under the Food and Drug Administration Amendments Act of 2007

## ■ Sentinel

- Develop device specific projects to advance the FDA mission of creating and implementing a national, integrated, electronic system for monitoring medical product safety



# *1. Import Safety Strategy*



# *FDA's Import Safety Initiative*

## ■ **Prevention**

- Prevent harm in the first place
- Beyond Our Borders Initiative

## ■ **Intervention**

- Risk-based interventions to monitor effectiveness
- Intervene when risks are identified

## ■ **Response**

- Respond rapidly after harm has occurred



# *FDA's Import Safety Initiative*

## **FDA Beyond Our Borders**

- **Increase FDA international presence**
- **Build Regulatory capacity of selected foreign partners**
- **Increase FDA foreign inspections**
- **Utilize foreign competent authority inspections**
- **Employ 3<sup>rd</sup> party certifications**



# *Global Harmonization Task Force (GHTF)*

- **Development guidance documents on basic regulatory practices**
- **Study groups**
  - Group 1: Regulatory & Premarket Requirements (e.g., STED)
  - Group 2: Postmarket Vigilance
  - Group 3: Quality Systems
  - Group 4: Auditing of Quality Systems
  - Group 5: Clinical Evidence



# *Quality System (QS) Regulations*

- **Assure device safety and effectiveness through design and manufacturing controls**
- **Allow tailoring the controls to the type of device being manufactured**
- **Are part of premarket review for Class III and some Class II devices**
- **Are a key element of assuring postmarket safety for all devices**



# *Pilot Multi-Purpose Audit Program (pMAP)*

- **Allow qualified auditing organizations in both programs to perform a single inspection that both FDA and Health Canada can use**
- **The purpose of the pilot is to evaluate the effectiveness of performing a single third party inspection/audit of medical device manufacturers' quality systems that would meet the needs and regulatory requirements of both countries**
- **[www.fda.gov/cdrh/ap-inspection/pmap-letter.html](http://www.fda.gov/cdrh/ap-inspection/pmap-letter.html)**



## *2. Postmarket Transformation*



# *Postmarket Transformation*

## **Goal: Improve patient safety by ensuring effective postmarket oversight**

- Crossing organizational lines
- Increasing pre/postmarket communications
- Expanding review teams
- Creating procedures to improve postmarket decision-making
- Creating new tracking systems – e.g., Post Approval Studies (PAS) tracking
- Increasing communication and outreach
- Ensuring more transparency



# *Postmarket Transformation*



## **Associate Director for Postmarket Operations**

**September 2008 :**

Jonathan Sackner-Bernstein, MD,  
joined CDRH as Associate Director for  
Postmarket Operations

### **Dr. Sackner-Bernstein will:**

- Help to develop overall CDRH postmarket policies and day-to-day strategies
- Head the CDRH Matrix



# *Postmarket Transformation*

## *Matrix System for CDRH*

### Networks

- Cardiac EP
- Cardiac Non-EP
- Infection Control, Dental, General Hospital, Infusion Pumps
- Plastic Surgery, Breast Implants
- Restorative, OB/GYN, General Surgery
- Orthopedics
- Gastroenterology, Urology, Renal
- Neurology, Anesthesia, Respiratory
- Ophthalmics, ENT
- Radiological Products
- Diagnostics
- Science
- Special Issues/Regulatory

*Matrix Kick-Off  
January 9, 2008*





# *MedSun Networks*



**LabNet:** Hospital laboratories



**Tissue and Cell:** Biological products, specifically cells and tissues (CBER)



**HeartNet:** Electrophysiology laboratories



**KidNet:** Neonatal and pediatric intensive care units



**HomeNet:** Medical devices used in the home environment on issues related to labeling, training, and servicing problematic devices



**SightNet:** Ophthalmic medical devices used in providing all levels of eye care



# *Unique Device Identifier (UDI) System for Medical Devices*

- **Needed to improve public health**
- **Essential for timely, accurate identification of medical devices**
- **Mandated by FDAAA**
- **Complex to execute**
- **We are developing rulemaking**

**[www.fda.gov/cdrh/ocd/udi/](http://www.fda.gov/cdrh/ocd/udi/)**



# *Postmarket Monitoring*

## **Detecting Potential Lead Fractures**

- **A software update will help detect fractures of Sprint Fidelis cardiac defibrillator lead.**
  - The new software package will alert both patients and physicians of a potential lead fracture.
- **Will enable early intervention and lower the risk of serious complications.**
- **The company has agreed to actively monitor the performance of the new software feature in actual use, which will allow both the company and FDA to ensure that the device is protecting patients as intended.**



# *3. FDAAA (and premarket review)*



# *FDAAA and Medical Devices*

**FDA Amendments Act (2008): The law includes five named acts and amendments, and six additional titles:**

- Title I. Prescription Drug User Fee Amendments of 2007
- II. Medical Device User Fee Amendments of 2007 (MDUFA)**
- III. Pediatric Medical Device Safety and Improvement Act of 2007**
- IV. Pediatric Research Equity Act of 2007
- V. Best Pharmaceuticals for Children Act of 2007
- VI. Reagan-Udall Foundation
- VII. Conflicts of Interest**
- VIII. Clinical Trials Databases**
- IX. Expanded Authorities Regarding Postmarket Safety of Drugs
- X. Food Safety
- XI. Other Provisions



# *Medical Device User Fee Amendments*

- **Allows for user fees, and will allow FDA to make significant improvements in the medical device review program.**
  - Reauthorizes medical device user fees through FY 2012
  - New performance goals: more focused, more challenging
  - Modifies third-party inspection program to encourage greater participation
  - Extends third-party 510(k) review program through FY 2012
  - Establishment registration fee
  - R&L changes: All electronic, three-month window
  - Requires unique device identification
  - Quarterly summary reporting of malfunctions for some devices
  - MDUFMA I fees reduced; small business discounts are more generous.



# *Pediatric Medical Device Safety and Improvement Act*

- **Continues FDA's authority to require studies in children concerning certain medical products and under other specific circumstances**
  - Requires applicants to provide information on pediatric subpopulations and number of affected pediatric patients
  - Permits pediatric HDEs to be marketed for profit - FDA to set an "annual distribution limit" on those devices sold for profit
  - FDA's Pediatric Advisory Committee - monitors use and makes recommendations for improving availability and safety
  - FDA can order surveillance under section 522 for more than 36 months
  - FDA can order, as a condition of approval under section 522, postmarket surveillance of an adult device in a pediatric population
  - A manufacturer may request review under section 562 of any order or condition requiring postmarket surveillance under section 522



# *Clinical Trials*

- **Applies to drugs and devices. Complex.**
- **Requires information on certain medical device trials to be made available to the public through expanded NIH clinical trials database.**
  - Submitted to NIH by the sponsor or the principal investigator.
- **Applies to new and ongoing trials**
- **510(k) and premarket applications must include a certification that “all applicable requirements of this subsection have been met”**
- **FDA must notify NIH when we approve a device, find a device SE or NSE, or an application is withdrawn**



# *Conflicts of Interest*

- **Provides more effective safeguards against possible distortion of advisory committee recommendations**
- **Recognizes that sometimes a conflict of interest must be tolerated in order for an advisory committee to have access to “essential expertise”**
  - **Waivers - FDA to reduce the by 25% over five years advisory committee meeting slots granted a waiver**
  - **Transparency – FDA to publish COI information**
- **Yearly Report to Congress**
- **Periodic review and update of FDA’s guidance regarding Col waiver determinations**



# *FDAAA: Effects on FDA*

- **Stable, predictable resources for the next five years**
  - 15% of device resources come from user fees
- **More-rational, better-focused performance goals**
- **Statute and FDA commitment letter will require development of many guidance documents**
- **Reports and studies**
  - Annual reports to Congress on collection and use of fees, performance, more.
  - GAO, FDA studies will take some time and effort



# *FDAAA: Benefits to Industry*

- **More-demanding, more-focused performance goals**
- **Quarterly reports on performance**
  - **Including “Gold standard”** - data on total time from receipt to our marketing decision the measure
- **Interactive review; guidance published December 2007**
- **Guidance Development**
  - FDA will develop several guidance documents specifically requested by industry
  - Opportunity to influence FDA's priorities in developing new guidance
  - Opportunity to provide comments and draft language for consideration



# *FDAAA: Effects on Fees*

- **MDUFMA I fees substantially reduced**
- **Small business discounts more generous**
- **Foreign firms can qualify as a small business**
- **New fees**
  - 30-day notice
  - 513(g) request for classification information
  - Annual fee for periodic reporting on a class III device
  - **Key change:** Annual fee for registration of certain types of establishments



# Premarket Submissions Workload

TYPE OF SUBMISSION (received)	FY									
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008*
Original PMAs	64	67	71	49	54	51	49	38	39	30
PMA Supplements	557	546	641	645	666	635	478	629	581	527
Original IDEs	304	311	284	312	242	226	232	262	225	195
IDE Supplements	4,127	4,388	4,811	4,724	4,415	4312	4287	4519	4376	4040
510(k)s	4,458	4,202	4,248	4,320	4,247	3,635	3,650	3853	3680	3448
Original HDE	12	11	5	5	10	9	5	5	6	2
HDE Supplements	4	10	16	16	29	29	11	32	24	39
513(g)s	43	59	82	104	156	270	313	297	408	98
<b>Total</b>	<b>9,569</b>	<b>9,594</b>	<b>10,158</b>	<b>10,175</b>	<b>9,819</b>	<b>9,167</b>	<b>9,025</b>	<b>9,635</b>	<b>9,339</b>	<b>8,379</b>

\* 2008 as of 8/31/08



# *Access to Innovative Products*

## Therapeutics

- The first **heart pump** that provides certain critically ill patients with temporary support for the right side of their heart
- The first replacement **heart valve** from donated human tissue in which the cells have been removed
- A **catheter-based imaging device** that can help assess the chemical make-up of coronary artery plaques
- A **heart assist device** to mechanically support the weakened heart of a small-sized adult man or woman
- The first artificial **cervical (neck) disc** for the treatment of cervical degenerative disc disease
- The first **LASIK** device designed for treating one eye to see far away objects and the other eye for close-up vision
- The first absorbable **polymer suture** made from material isolated from bacteria modified by recombinant DNA technology



# *Access to Innovative Products*

## Diagnostics

- The first nucleic acid test for **hepatitis B virus** (HBV) that measures the amount of viral DNA (viral load) in a patient's blood.
- A test that simultaneously detects and identifies 12 specific **respiratory viruses**; a test that detects four common respiratory viruses, including influenza in about 3 hours
- The first rapid blood test for the drug-resistant staph bacterium known as **MRSA**
- A test to help assess sensitivity to the blood-thinning drug **warfarin** (Coumadin)
- The first quick test for **malaria**
- A test that helps in assessing the risk of tumor recurrence and long-term survival for patients with relatively high-risk **breast cancer**



# *Guidance Development*

## Recently published guidance topics:

- IVD Device Studies: FAQs
- ASRs: FAQs
- Handling Post-Approval Studies Imposed by PMA Order
- In Vitro Diagnostic Multivariate Index Assays
- Writing Dear Doctor Letters for Recalls of ICDs
- Bundling
- Antimicrobial Agents Statistical Guidance on Studies Evaluating Diagnostic Tests
- PMA Supplement Decision-Making Process
- Antimicrobial Susceptibility Test (AST) Systems
- Advisory Committee
- Interactive Review
- DES

## MDUFMA II Qualitative Goal - FY 2009 guidance agenda:

- <http://www.fda.gov/cdrh/mdufma/agenda/fy09.html>
- Comments? Docket FDA-2007-N-0270



# 4. *White Oak*

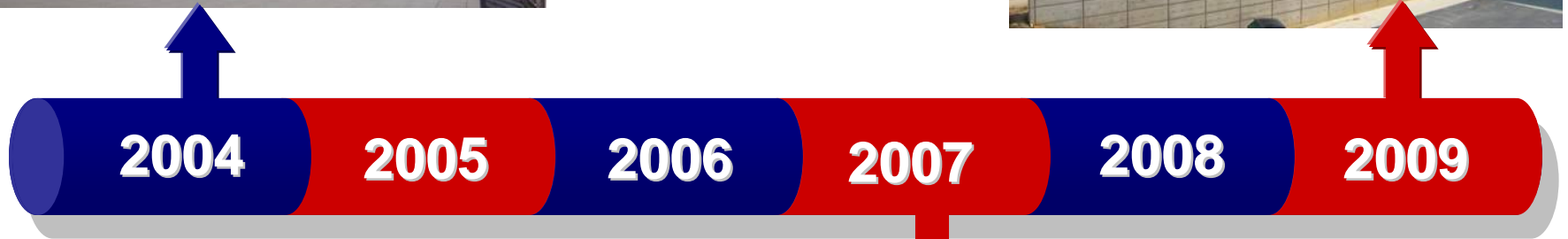


# *White Oak*

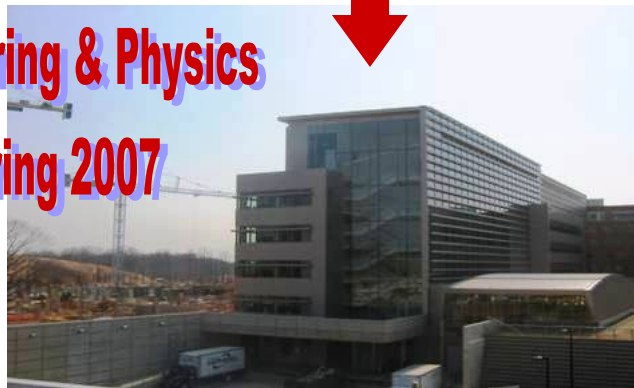
**Life Sciences**  
**Winter 2004**



**Office Building**  
**Spring 2009**



**Engineering & Physics**  
**Spring 2007**

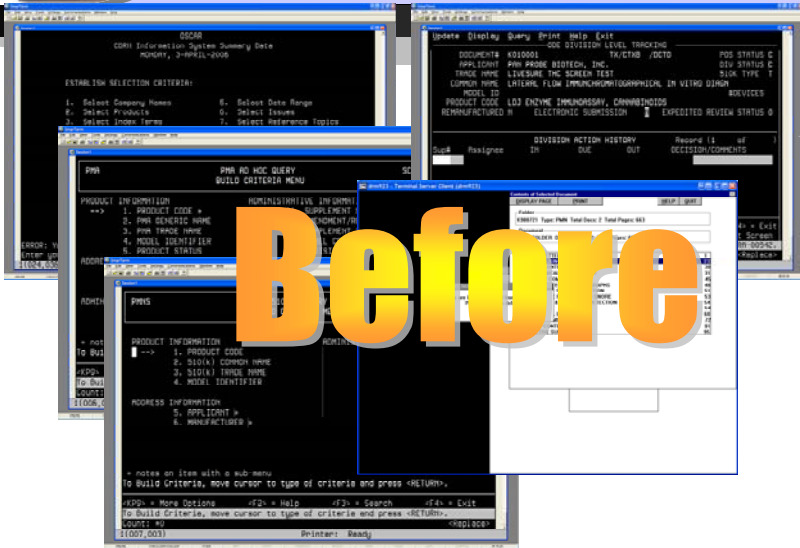




## *5. Knowledge Management*



# Modernizing IT

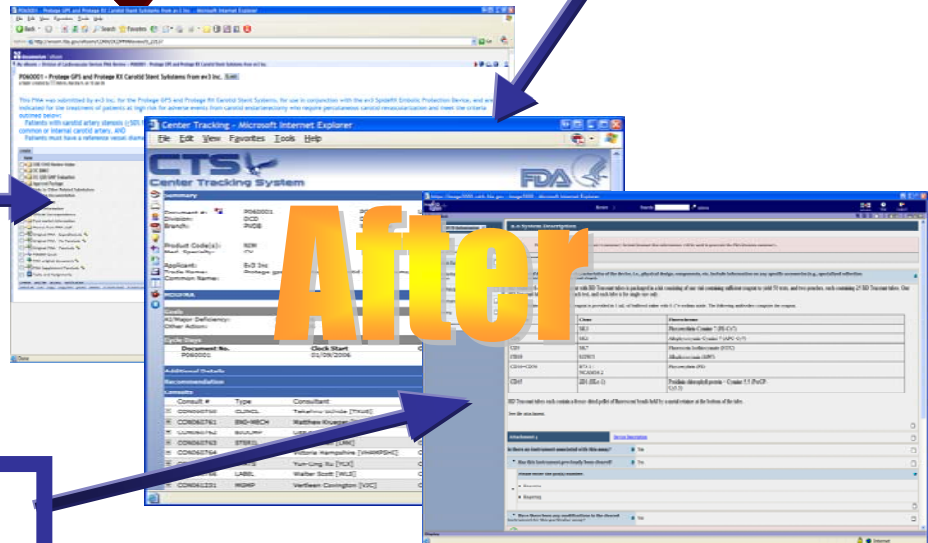


**Before**



eRoom – a collaborative Environment for Reviewers

CTS – DTS, DNMS, COATs and eConsults



**After**

Image2000 and Turbo 510K Electronic Submissions and Review



# eMDR

Contact  
[Indira.Konduri@fda.hhs.gov](mailto:Indira.Konduri@fda.hhs.gov)



Large Volume  
Reporting



Batch

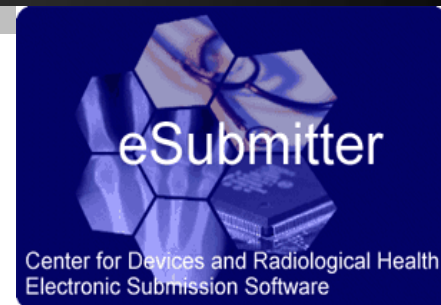


FDA

Gateway



One report  
at a time



eSubmitter

Center for Devices and Radiological Health  
Electronic Submission Software

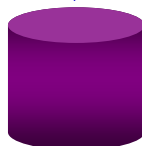
Small Volume  
Reporting



Electronic  
Medical Device Reporting  
(eMDR)



MAUDE  
Database



ASR Database

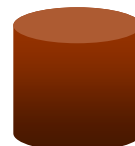


IMAGE 2000



## *eMDR*

- **Essential for monitoring adverse events**
- **Trending analysis and signal detection**
- **Efficient use of FDA resources**
- **Intended rulemaking this year**



# *Collaborative Computing*

- **CDRH is evaluating collaborative computing and expertise identification technologies**
- **These tool have potential to enhance the sharing/exchange of information/knowledge and the productivity of employees across the CDRH (Traction, ConnectBeam)**



# *CDRH's Research*

## **Our science fuels the regulatory engine...**

- **Prioritizing projects according to public health impact, regulatory needs and scientific needs**
- **Conducting scientific research and developing methods to determine safety and efficacy**
- **Developing new test methods to evaluate performance**
- **Generating independent data**
  - For enforcement decisions
  - For premarket and postmarket decisions



# *Emerging Technologies*

## Trend Themes

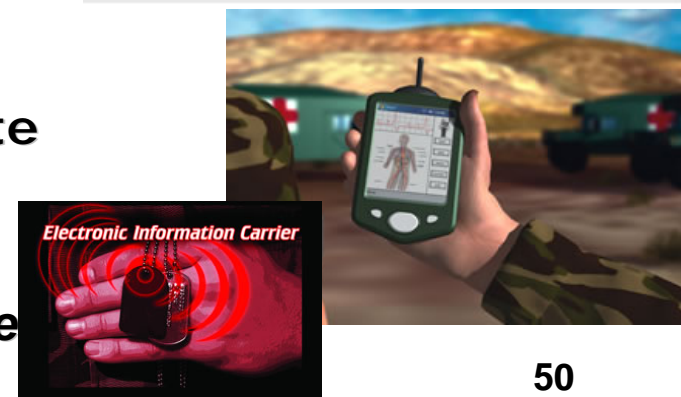
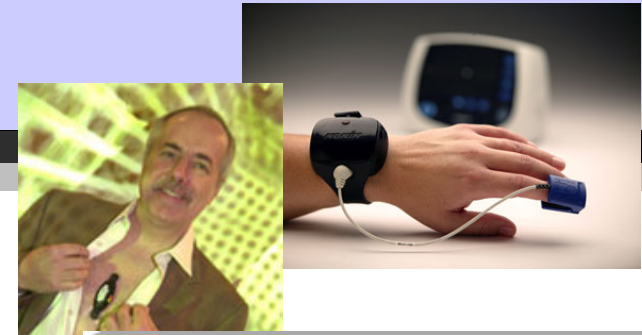
- Electronic technologies
- Synthetic organs/tissues & combination products
- Minimally invasive technologies
- Decentralized care technologies
- Demographic technologies
- Detection, diagnostic, & monitoring technologies



# *Wireless Use in Medical Care*

- Home
- Hospital: subacute care, ambulatory
- Transportation
- Perioperative: ICU, OR, ER
- ER/Trauma
- Rescue
- Ancillary: Renal, Echo, EKG, etc.
- Maternity/OB
- Other: Nursing homes, MD offices, Suite

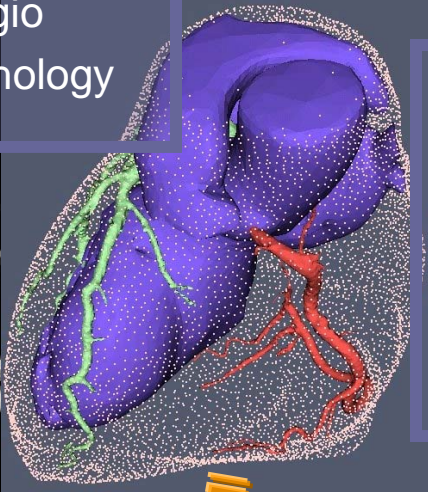
*Newer communications devices such as Bluetooth and Wireless 802.11 devices have the potential of interfering with medical device*



# Clinical trial in-silico

## Input:

- Full body CT
- High res. CT angio
- Probabilistic pathology model



## LAMIS Virtual Cath Lab:

- X-ray physics (Monte Carlo)
- Virtual patient
- Virtual radiologist

Patient Information:  
(Blood work, imaging)

Virtual Cath Lab

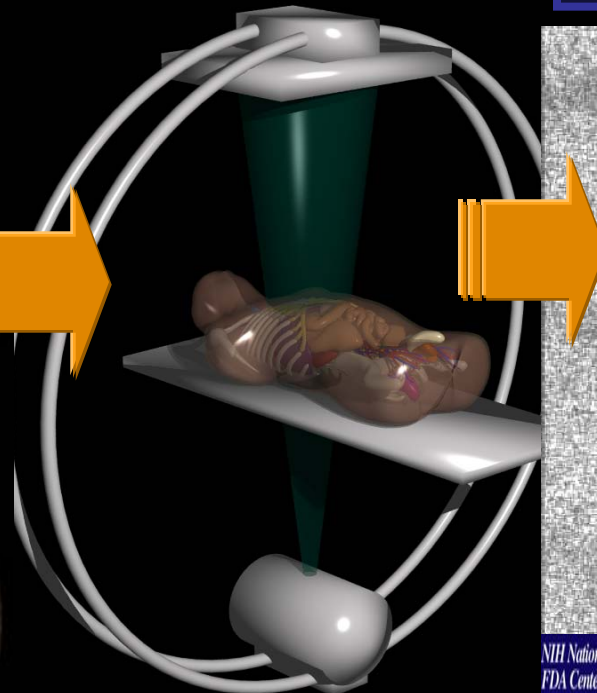
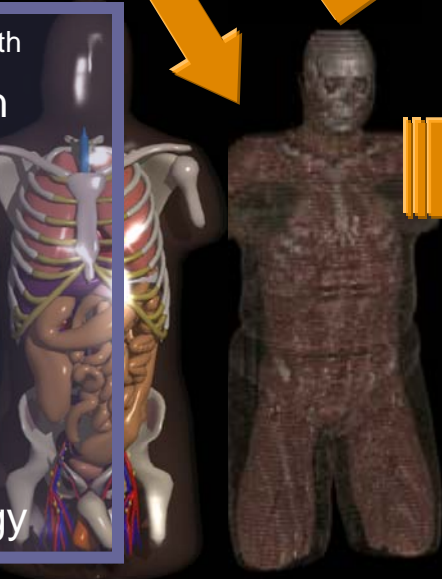
Select optimized  
parameters in real time

Optimized, personalized imaging

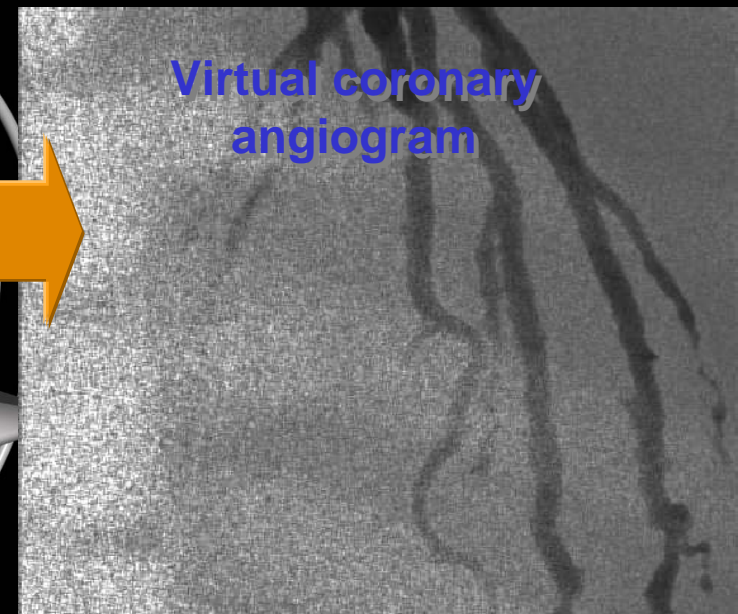
Improved diagnosis and therapy

## Output: 4<sup>th</sup> generation Phantom

- Accurate anatomy
- Realistic coronary pathology
- Physiology



Virtual coronary  
angiogram



NIH National Institute for Biomedical Imaging and Bioengineering  
FDA Center for Devices and Radiological Health

Joint Laboratory for the Assessment of Medical Imaging Systems





# *CDRH's Medical Device Fellowship Program*

- **MDFP helps bring in Fellows of varying scientific and clinical specialties to all the CDRH offices based on priority needs.**
- **MDFP reviews ALL Technology Transfer requests and agreements for CDRH before approval or submission.**
- **MDFP acts as the liaison between CDRH's researchers and FDA's Office of Acquisitions and Grant Services, Office of Chief Counsel, and Office of External Relations.**
- **<http://www.fda.gov/cdrh/mdfp/>**



# *Industry Education – New Online Tool*

## **CDRH Learn**

- **A series of training modules describing many aspects of medical device and radiological health regulation.**
- **An information resource that is comprehensive, easily accessible and a compliment to CDRH's Device Advice**  
<http://www.fda.gov/cdrh/devadvice/>
- **There are two courses available,**
  - **Overview of Regulatory Requirements: Medical Devices**
  - **Quality System Regulation 21 CFR 820 Basic Introduction**
- **The link to the training tool is**  
<http://www.fda.gov/cdrh/cdrhlearn>



# *Final Comments*

- **Medical device technology will:**
  - Fundamentally transform the health care and delivery system
  - Provide new and cutting-edge solutions
  - Challenge existing paradigms
  - Revolutionize the way treatments are administered
- **Medical device regulation must be aligned with the future of medical device technology**
- **It is imperative that we have a regulatory process that is vigilant regarding the directions of medical devices technology changes and capable of keeping pace with those changes**



# Thank you!

[www.fda.gov/CDRH](http://www.fda.gov/CDRH)