



Active Surveillance: a Regulatory Perspective

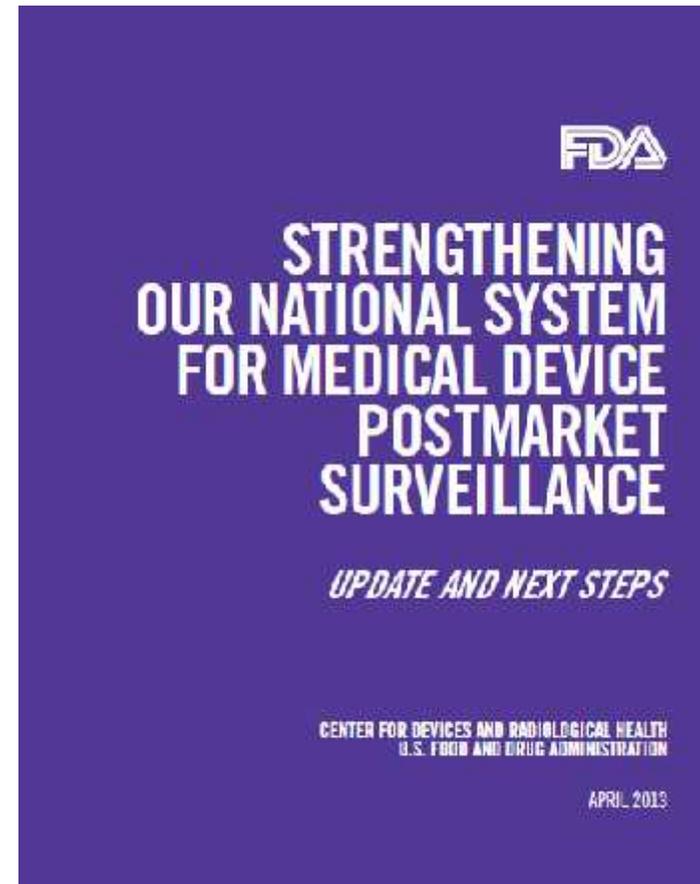
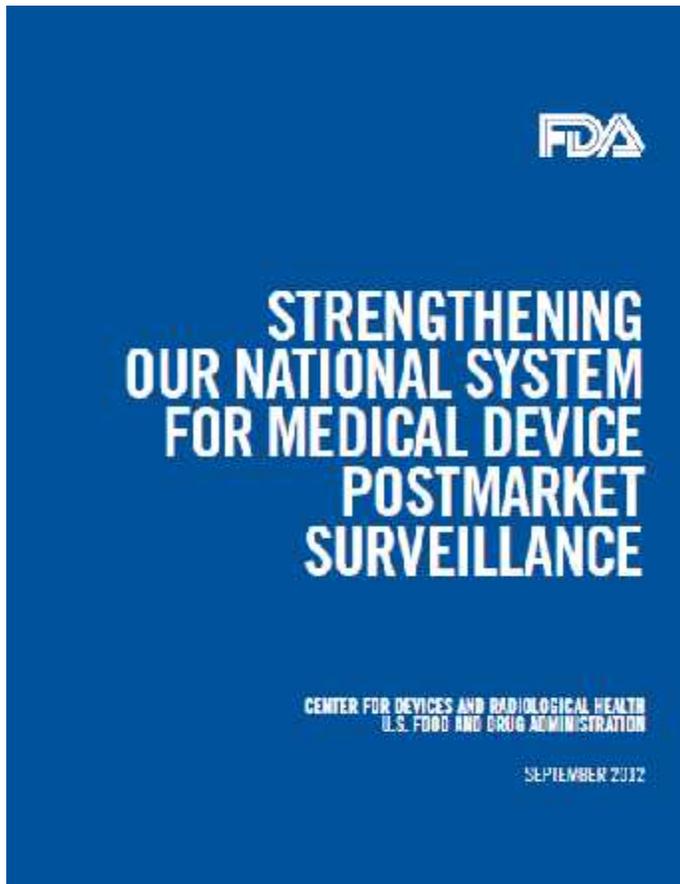
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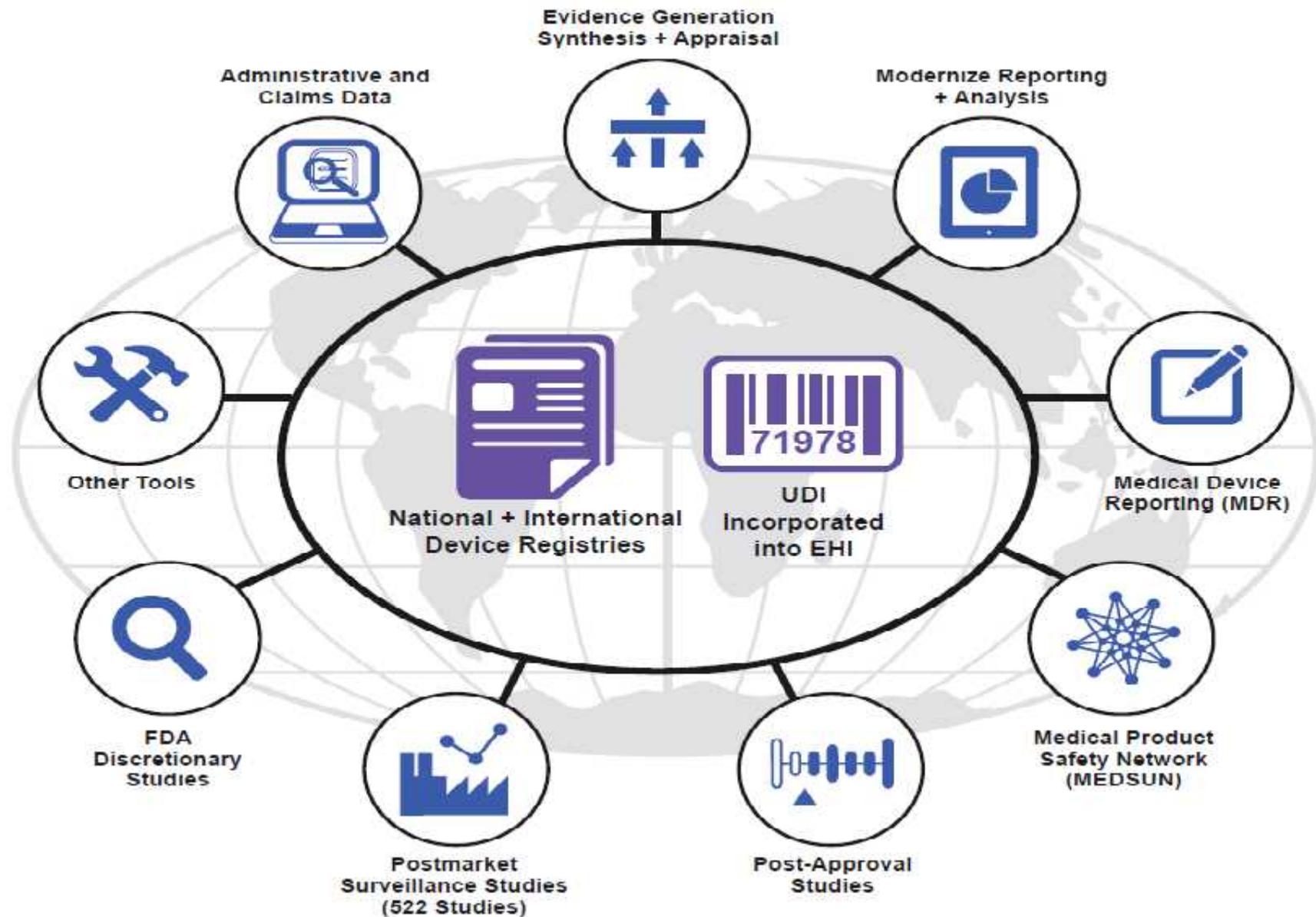
Active Surveillance Think Tank
June 1, 2016



Strengthening Our National System

Taking the Next Steps





Surveillance: Epidemiology Perspective

➤ Surveillance

- Continuous and systematic collection, analysis, interpretation and dissemination of information for monitoring health problems.

➤ Surveillance System

- Network of people and activities that maintain this process and may function at a range of levels from local to national or international

➤ Public Health Surveillance

- Most surveillance systems are operated by public health agencies that use surveillance to guide disease prevention and control activities.



Beyond Passive Surveillance

- Efforts from Passive to Active
 - Passive: reporter initiated (Medical Device Reporting System)
 - Enhanced/Stimulated Passive: target devices/events of interest amid passive reporting (Medical Product Safety Network, MedSun)
- Active Surveillance
 - Prospective, near real-time, pre-specified, rate-based
 - Active case finding
 - Not datamining, not research
 - Can embed studies in surveillance apparatus/system

Purposes for Surveillance

- 
- Detect new or potential health problems
 - Identify potential factors in disease occurrence
 - Facilitate epidemiologic research
 - Provide details about patterns of health problems
 - Detect critical change in health practice
 - Assess prevention and control activities

CDRH SIGNAL MANAGEMENT

The logo for CDRH Signal Management is enclosed in a blue rectangular border. The word "CDRH" is in a smaller, blue, serif font at the top left. Below it, the word "SIGNAL" is written in a large, blue, serif font. To the right of "SIGNAL", the word "MANAGEMENT" is written in a smaller, blue, serif font. A blue heartbeat line (ECG) is positioned below the text, starting under "SIGNAL" and extending to the right. The background of the logo area features faint, light blue technical diagrams, including a circuit board and a gear.

➤ What is a Signal?

- Information that may come from one or more sources; and
- Suggests a new potentially causal association, or a new aspect of a known association, between a medical device and an event or set of related events; and
- Might justify or require further evaluation and/or action by the Center

➤ What is Signal Management?

- A set of activities to determine whether a safety signal represents a risk which may warrant further Center: 1) assessment; 2) communication; and /or 3) other risk mitigation actions and the actions undertaken accordingly.
- An avenue for sharing knowledge and information about the performance of the products we regulate
- Feedback to improve premarket review
- Identification of science research needs



Important Differences Between Devices and Drugs: Implications for Postmarket Surveillance

Devices

- Heterogeneous
- Complex components
- Iterative changes
- Malfunctions
- Design error
- Packaging/Labeling error
- Human Factors
- Learning curve
- Unique Device Identifier

Drugs

- Homogeneous
- Pure molecules
- No changes
- Drug quality problems
- No equivalent
- Similar
- No equivalent
- Straightforward use
- NDC codes

Towards Active Surveillance

Define exposures, outcomes, key covariates

Choose analysis approach (design?, comparators?, confounders?)

Active case finding (stimulated?, automated?, multi-modal?)

Estimate the risk (models; crude, refined)

Aggregate results over time (continuous, periodic)

Apply alerting rules

Report to FDA



Automated Enhanced Surveillance

ASTER-D (Adverse Event Spontaneous Triggered Electronic Reporting for Devices)

Reed et. al.: *J Clin Eng* 2016;41(2):83-89

- Device safety report triggered from within EHR or Incident Reporting System
- Data from HL7 Continuity of Care document to pre-populate safety report form
- Pre-specify event(s) of interest (more active approach)

Detection of Ventilator-Associated Adverse Events

Stockwell et. al. (unpublished)

- Ventilator change out during patient care as a flag for potential device issues





Ventilator Surveillance

- iView section of EHR: automatic flag for change in ventilator ID
- Respiratory Therapist documents reason for the change in ventilator ID and sent to biomedical engineering
- Transmission to CDRH of evaluated event

The screenshot displays an EHR interface. On the left, a sidebar lists various assessment categories under 'Acute Ongoing Assessment' and 'Respiratory Therapy'. The 'Respiratory Therapy' section is expanded, showing options like 'Asthma Scoring', 'Chest Physiotherapy RT', and 'Ventilator Problem', which is highlighted in yellow. The main window shows a table with columns for 'Result', 'Comments', 'Flag', and 'Date'. A table entry is visible for '12/17/2011' with the event type 'Trauma/Code Blue/Medical Alert/CAT'. Below the table, there is a form for documenting the event, including fields for 'Event', 'Trauma Time', 'Code Blue Time', 'Medical Alert Time', 'CAT Time', and 'Was an ambu bag used?'. A section titled 'Ventilator Problem' contains questions: 'How were you notified of the problem?', 'How did you fix the problem?', and 'What is possibly wrong with ventilator?'.

Hospital-Based Active Surveillance

Emergency Department (ED) Device-Associated Events

Hefflin et. al.: *Am J Prev Med* 2004;27(3):246-253

- Explored ED records using CPSC's National Electronic Injury Surveillance System (national stratified probability sample)
- FDA trained NEISS staff in coding and case ascertainment
- National estimates vary by age, gender, device type: overall-- 454K (1999) and 489K (2004)



Multi-Modal Event Surveillance in Tertiary Care Facility

Samore et. al.: *JAMA* 2004;291:325-334

- Reliability of e-surveillance in detecting device events
- Rates (per 1000 admissions) varied by method
 - From Incidence reports (1.6) to Computer Flags (27.7) to ICD-9 Discharge Codes (64.6) with Overall Estimate (83.7)

Registry-Based Surveillance: Crude to Refined

Proposed BO-PIE Model within ICOR-USA

General System Principles

Capacity to employ layers of Infrastructure and Methodologies

Flexibility for utilization of all or a subset of registries

Linkages

Clinical and/or Patient Reported Outcomes

Short- or long- term

General Registry Requirements

Completeness

Quality

Adjudication

Access

Linkages

Transparency

Monitoring

Minimum Registry Data Requirements

BO Surveillance Platform

B-Baseline

0-None

1-Device + Demographics

2-Device +Demographics + Risk Adjustment

O-Clinical Outcomes

0-None

1-Revision

2-Revision + Reason for Revision

3- Revision + reason for Revision + Mortality

PIE Studies Platform

P-PRO

0-None

1-Any Recognized PROM Instrument

I- Imaging

0-None

1-X-Ray

2-MRI or CT

3-X-Ray and (MRI or CT)

E-Explants

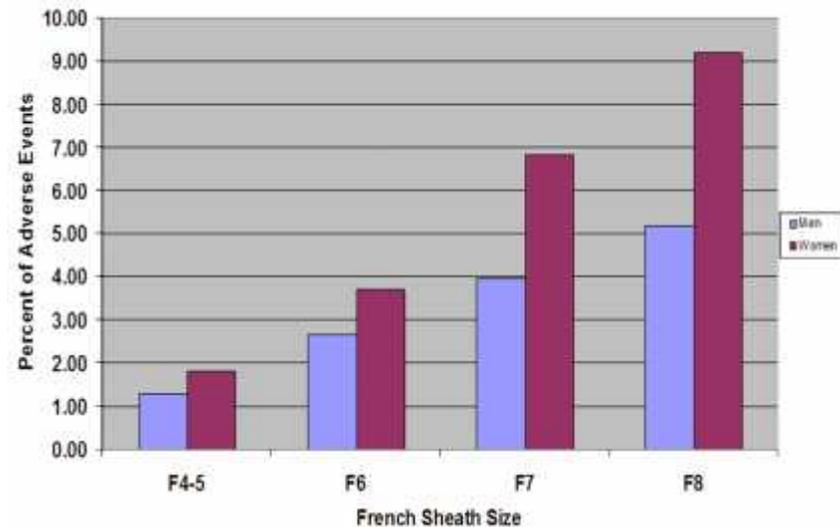
0-None

1-Access to Explants

Registry-Based Surveillance: Flexibility

- Primary study in cathPCI registry (>200 sites)
- Results suggested significant gender-related differences
- Second study done using additional data collection
 - Device brand
 - Sheath size
- Demonstrates flexibility in potential surveillance model

Relative Risk of Any Vascular Complications Following Cardiac Catheterization by Gender



Tavris et. al., *Pharmacoepidemiol Drug Safety* 2007;16:125-131

Automated Active Surveillance

FEDERAL REGISTER

Automated Surveillance to Detect Postprocedure Safety Signals of Approved Cardiovascular Devices

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Abstract: The purpose of this article is to describe the development and implementation of an automated surveillance system for cardiovascular devices. The system is designed to detect postprocedure safety signals of approved cardiovascular devices. The system is based on a review of medical device adverse events and is designed to detect safety signals that are not detected by the current surveillance system. The system is designed to detect safety signals that are not detected by the current surveillance system. The system is designed to detect safety signals that are not detected by the current surveillance system.

Keywords: Cardiovascular devices, Automated surveillance, Postprocedure safety signals, Cardiovascular devices.

Introduction: The purpose of this article is to describe the development and implementation of an automated surveillance system for cardiovascular devices. The system is designed to detect postprocedure safety signals of approved cardiovascular devices. The system is based on a review of medical device adverse events and is designed to detect safety signals that are not detected by the current surveillance system. The system is designed to detect safety signals that are not detected by the current surveillance system.

Methods: The purpose of this article is to describe the development and implementation of an automated surveillance system for cardiovascular devices. The system is designed to detect postprocedure safety signals of approved cardiovascular devices. The system is based on a review of medical device adverse events and is designed to detect safety signals that are not detected by the current surveillance system. The system is designed to detect safety signals that are not detected by the current surveillance system.

Results: The purpose of this article is to describe the development and implementation of an automated surveillance system for cardiovascular devices. The system is designed to detect postprocedure safety signals of approved cardiovascular devices. The system is based on a review of medical device adverse events and is designed to detect safety signals that are not detected by the current surveillance system. The system is designed to detect safety signals that are not detected by the current surveillance system.

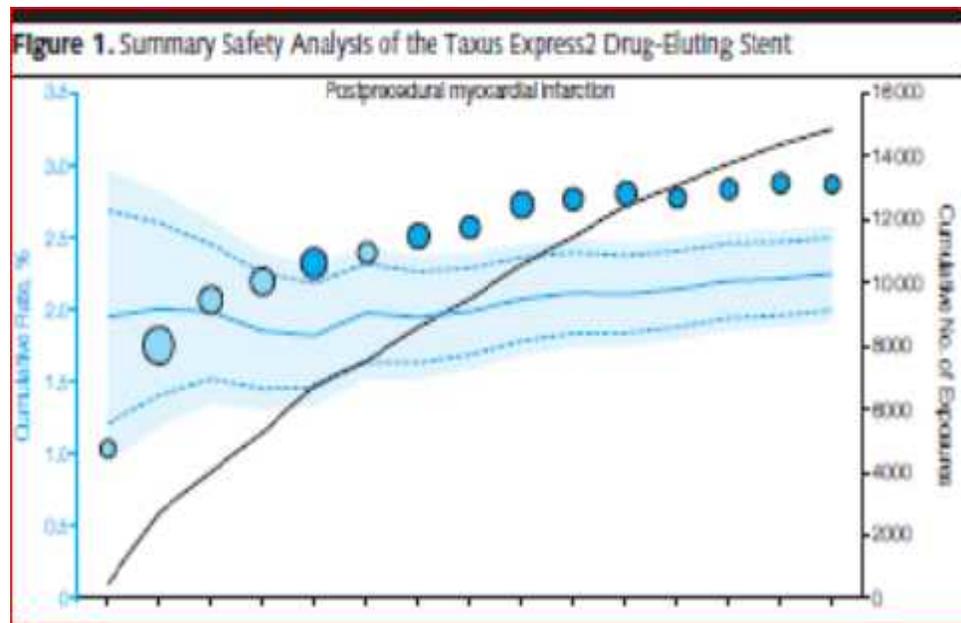
Conclusion: The purpose of this article is to describe the development and implementation of an automated surveillance system for cardiovascular devices. The system is designed to detect postprocedure safety signals of approved cardiovascular devices. The system is based on a review of medical device adverse events and is designed to detect safety signals that are not detected by the current surveillance system. The system is designed to detect safety signals that are not detected by the current surveillance system.

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Additional Information: The purpose of this article is to describe the development and implementation of an automated surveillance system for cardiovascular devices. The system is designed to detect postprocedure safety signals of approved cardiovascular devices. The system is based on a review of medical device adverse events and is designed to detect safety signals that are not detected by the current surveillance system. The system is designed to detect safety signals that are not detected by the current surveillance system.

For additional information see p. 2015.

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Issues to Consider

Appropriate data source (relevant/reliable)

Device complexity, heterogeneity, identification

Means of case ascertainment and validation

Timeliness of surveillance and data lags

Diffusion rate, person-years of follow-up, effect estimates

Crude versus refined models

Methods issues (analytic approach, multiple comparisons)



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