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Validation of Acute Myocardial Infarction (AMI) in the FDA’s Mini-Sentinel Distributed Database

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Background
The Food and Drug Administration’s (FDA) Mini-Sentinel is a pilot program that aims to conduct active surveillance to detect and refine safety signals that emerge for marketed medical products.

The purpose of this Mini-Sentinel AMI Validation project was to:
(a) develop and design an abstraction and adjudication process to use when full text medical record review is required to confirm a coded diagnosis; and
(b) to test this approach by validating a code algorithm for acute myocardial infarction (AMI).

Design
(1) AMI Case Identification
Goal: Establish ICD-9-CM-based algorithm to identify patients hospitalized for AMI within the Mini-Sentinel Distributed Database
Approach: Reviewed previous validation studies. Considered using a broad algorithm (incorporating acute coronary syndrome codes, or codes to capture death after ER discharge).
Algorithm: Include ICD-9 hospital discharge codes (a principal or primary discharge code only) of 410.x0 and 410.x1.

(2) AMI Case Retrieval
Goal: Establish and carry out procedure for chart retrieval and extraction, creating patient privacy, collecting and transferring the minimal amount of de-identified information needed to validate potential cases of AMI.
Approach: (1) Identify required chart components (examples: EKG’s, cardiac biomarkers, dictated doctor notes).
(2) Determine whether chart abstraction would take place centrally or in a locally distributed fashion. (Centralized approach was chosen).
(3) Establish protocols for ensuring the privacy and security of data and for explaining the status of this effort as a public health surveillance activity not under the oversight of IRBs.

(3) Abstraction
Goal: Design abstraction form and train 2 nurse abstractors to gather key data for AMI validation.
Approach: 36-item abstraction form included demographic information, intent, medical history, biomarker data, EKG copies, cardiac test results and disposition at discharge.

(4) Adjudication
Goal: Design protocol-driven Adjudication process
Approach: Protocol developed based on American Heart Association Universal Definition of MI. Two UMass Cardiologists independently reviewed each case and classified as (1) Definite MI; (2) Probable MI; (3) No MI; or (4) Unable to Determine. Cardiologists met to reach consensus in cases where they differed.

(5) Calculation of PPV (Positive Predictive Value)
Goal: Calculate PPV of algorithm (ratio of confirmed AMI cases to all identified cases)
Approach: PPV = Definite + Probable MI / All retrieved cases

RESULTS
Percent of Requested Charts that were Obtained (93% overall)
Availability of Critical Chart Components

Average Size of Chart (Pages)
Availability of Cardiac-Specific Chart Components

Conclusions
A PPV of 86% may be considered adequate for some surveillance activities relevant to medication and device safety, but not for others.

Further research may be merited examining between-age group and between-gender differences in the positive predictive value of this AMI identification algorithm.