



Clinical Decision Support System to Diagnose Bioterrorism or Epidemic Events

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Conflict of Interest

- Art Papier, MD is Chief Scientific Officer of Logical Images, Inc. the developer of the CDSS discussed in this presentation



Alternative Title

- “Reaching the Clinician: Beyond email and fax public health alerts and pocket reminder cards”



Learning Objectives

- Learn how clinical decision support systems (CDSS) can enhance surveillance, alerting and reporting
- Learn how a “dual use” public health information strategy can bolster physician awareness



Surveillance Systems

- Systems monitor hospital, laboratory and pharmaceutical data for early warning signs of infectious disease outbreaks, terrorism or epidemics



Surveillance Problems

- Patients may not present in close temporal relation thereby eluding surveillance systems
- The disease may occur in a very small number of patients and not be detectable
- The disease is acute, severe and needs to be diagnosed early e.g., anthrax, smallpox, etc.



The Physician Gap

- From a DOH perspective physicians have been traditionally perceived as unreliable sources for reportable disease data
- Yet many communicable diseases need to be diagnosed by clinical presentation and treatment delivered without laboratory testing

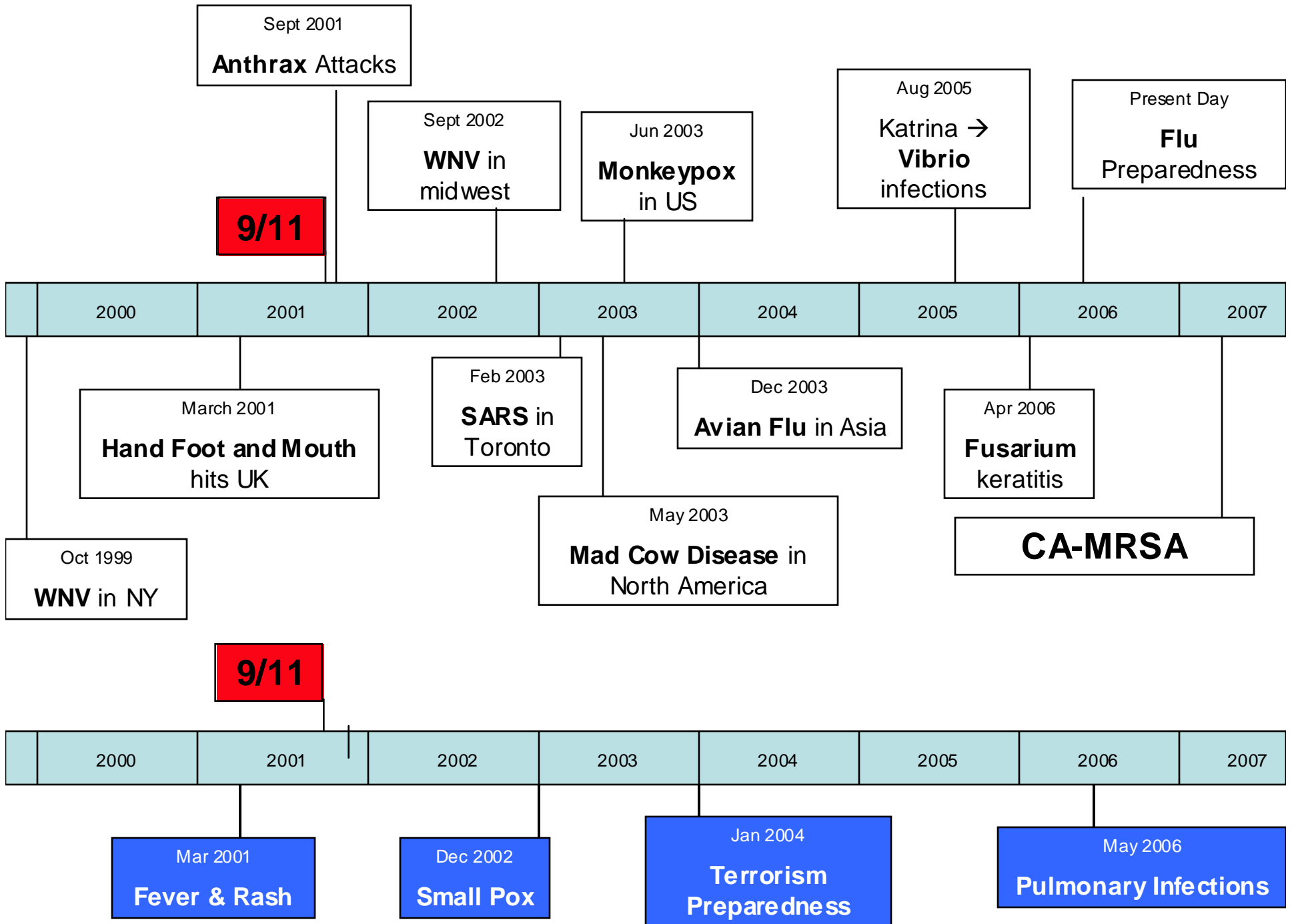


The Physician Gap - Example

- Anthrax by mail

*Anthrax Victims' Fate Varied by What Hospital,
Which Doctor They Saw*

-Wall Street Journal, November 27, 2001





How does the DOH reach the cornerstones of care?

- Methods to date have included CME seminars, fax alerts, emails, mailings
- New methods must evolve to connect the physician directly into the public health mission
- Editorial Comment: This will take time but cannot be ignored



Provide the physician with valuable “Dual Use” clinical tools

- Improve alerting and reporting
- Increase likelihood of early diagnosis
- Reduce false positives
- Address multiple public health issues with a “dual use” strategy



Visual Informatics

- Matching to the patient presentation
- User does not know the diagnosis, searches by patient findings



Fundamental Need

- Assist MD's to recognize diseases and patterns they have never seen before. Bring infectious disease and dermatologic diagnosis skills to the non-expert
- As important: Assist MD's to recognize variations of common diseases



VisualDx a success story of CDC/HRSA Grants

- South Carolina has licensed and deployed VisualDx to every emergency department in the state
- DHEC inserts health alerts and reporting info 24x7

VisualDx

Getting Started About VisualDx Exit

Look up a diagnosis

VisualDx
Visual Clinical Decision Support System

Help me select a module

Select a module

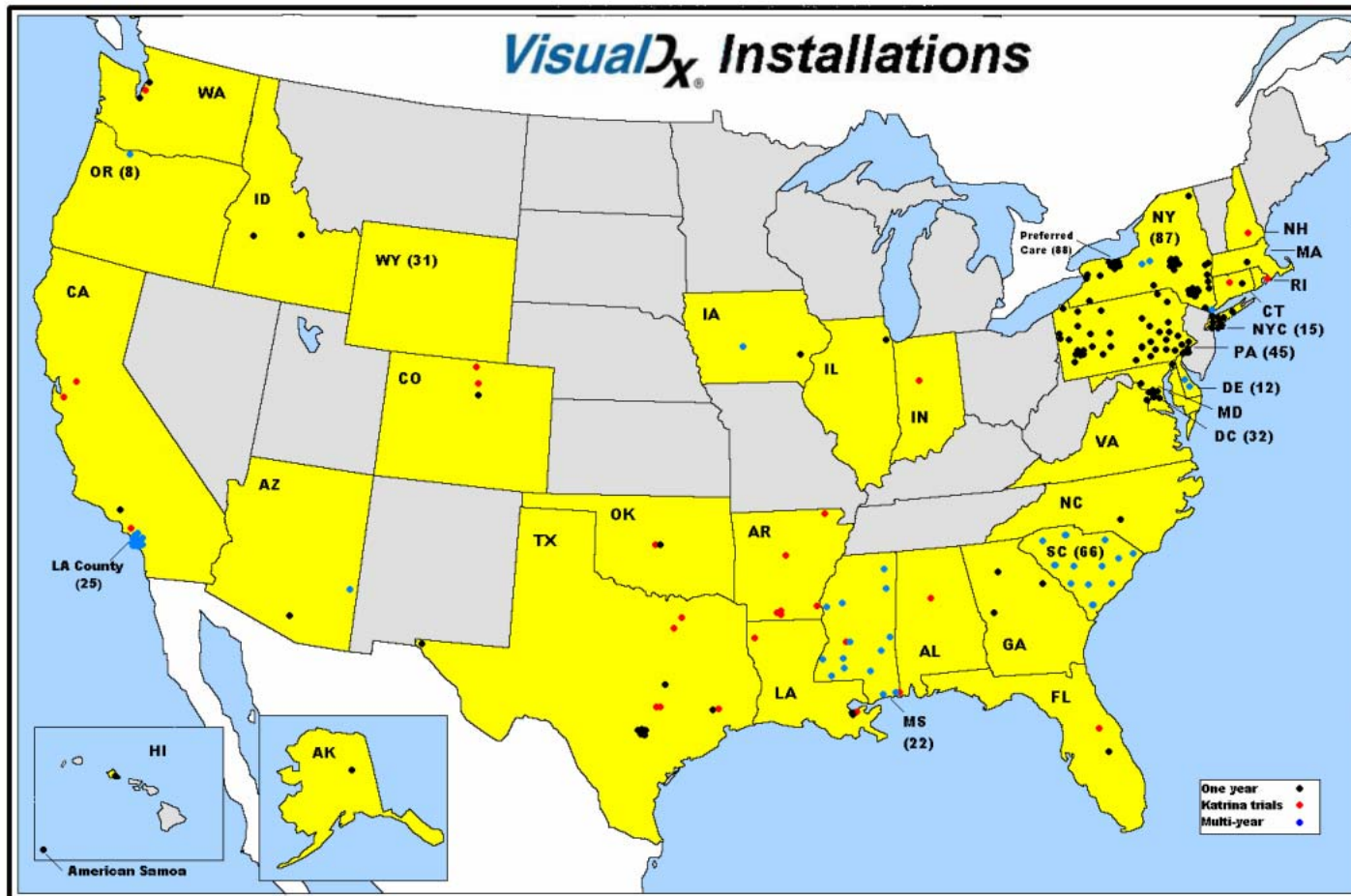
- Neonate/Infant**
 - › Rash
 - › Growth or Lesion
- Child**
 - › Rash
 - › Growth or Lesion
- Adult**
 - › Rash
 - › Dark Skin Rash
 - › Growth or Lesion
 - › Dark Skin Growth or Lesion
- Elder Adult**
 - › Rash
 - › Growth or Lesion
- Problem Oriented**
 - › Fever and Rash
 - › Immunocompromised, HIV or AIDS
 - › International Travel
 - › Drug Eruption
- Body Location**
 - › Oral Mucosal Lesion
 - › Nail and Distal Digit
 - › Female Genital Rash, Growth or Lesion
 - › Male Genital Rash, Growth or Lesion
- Respiratory**
 - › Acute Pulmonary Infection
- Preparedness**
 - › Smallpox Vaccination
 - › Terrorism Recognition

D H E C
PROMOTE PROTECT PROSPER
South Carolina Department of Health and Environmental Control

ALERT
[South Carolina Health Alert Network](#)



Hospital Sites Using Visual Decision Support





Implications of VisualDx Preparedness

- Daily use in “normal” practice provides training on the tool for emergency CBRN events
- Reduces False Positives which can exacerbate already challenging situations
- Allows non-physician first responders or surge-based temporary med facilities access to specialist level information

The screenshot displays the VisualDx software interface. At the top, the title bar reads "VisualDx" and the main header includes the "VisualDx" logo, the text "Drug Eruptions" by Michael D. Tharp MD, Neil Shear MD, and the "logical images" logo. Below the header is a navigation menu with options: "Lesion Type", "Distribution", "Findings", "Reset", "Help", "Home", and "Exit".

The main content area is titled "Diagnoses 1 - 12 of 12" and features a grid of 12 image panels. Each panel shows a clinical photograph of a skin condition and a list of diagnoses. The diagnoses listed are:

- 1 - Acne Vulgaris
- 1 - Angioedema
- 1 - Dermatitis, Exfoliative
- 1 - Drug Eruption, Exanthematous
- 1 - Drug Eruption, Fixed
- 1 - Drug Hypersensitivity Syndrome
- 1 - Drug Induced Systemic Contact Dermatitis
- 1 - Erythema Multiforme, Minor
- 1 - Psoriasis
- 1 - Stevens-Johnson Syndrome
- 1 - Toxic Epidermal Necrolysis
- 1 - Vasculitis, Leukocytoclastic

On the left side of the interface, there is an "Enter Findings:" field, "Match View" and "Select View" buttons, a "Your Patient" section with the name "Allopurinol", and a "Diagnoses" list that matches the grid. At the bottom, there are "Sort by Matches" and "Sort by Emergency" buttons.



VisualDx is comprehensive

- Over 10 years of development
- 80+ physician editors
- Peer reviewed
- Standards based
- Surveillance
- Alerting
- Reporting

VisualDx **Acute Pulmonary Infections** Susan Vvori MD, Sumanth Rajagopal MD, William Bonnez MD **logical images**

Lesion Type Distribution Findings Reset Help Home Exit

Enter Findings:

Match View Select View

Your Patient
Interstitial Opacity

Diagnoses

- 1 - Avian Influenza H5N1
- 1 - Burns, Ammonia, Sulfur
- 1 - Burns, Hydrogen Fluoride
- 1 - Cryptococcosis
- 1 - Haemophilus Influenzae
- 1 - Hantavirus Pulmonary
- 1 - Herpes Simplex Pneumonia
- 1 - Influenza
- 1 - Mycoplasma Pneumonia
- 1 - Pneumocystis Jirovecii (C)
- 1 - Psittacosis
- 1 - Pulmonary Agent Poisons
- 1 - Ricin Poisoning

Sort by Matches Sort by Emergency

Diagnoses 1 - 4 of 4

- 1 - Avian Influenza H5N1 (1 of 8)
- 1 - Haemophilus Influenzae Pneumonia (1 of 4)
- 1 - Hantavirus Pulmonary Syndrome (1 of 4)
- 1 - SARS (1 of 25)



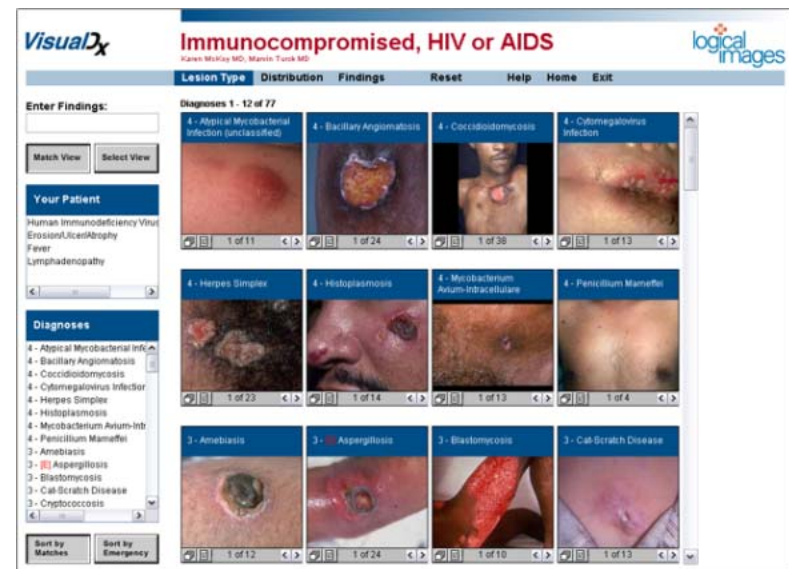
VisualDx is “All Hazards”

- Category A, B, and C agents
- SARS
- Avian influenza
- MRSA



CA-MRSA and examples of “Dual Use”

- Accuracy in diagnosis of common skin conditions will lead to the use of less antibiotics. Non-dermatologists prescribe antibiotics for many skin presentations that are not infectious!
- Katrina
- Lyme
- West Nile





Alerting and Reporting

- Push technology - clinicians can receive alerts directly within the CDSS
- Reporting links can be placed within the CDSS
- Potential for integration with NEDSS



Reporting

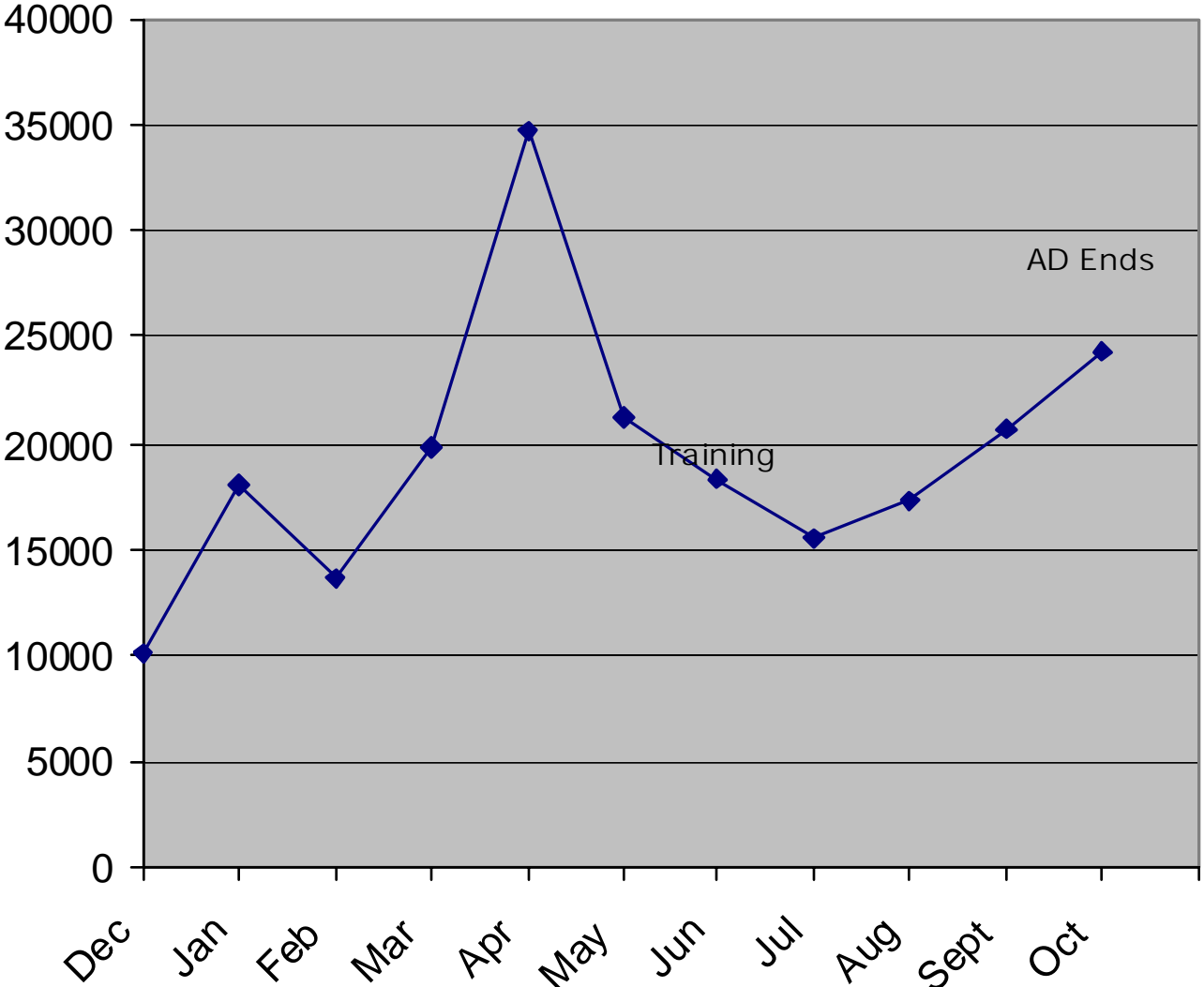
- Reporting function can improve the under-reporting of infectious disease, providing a more accurate estimate of the burden of disease



SCDHEC Experience

- VisualDx deployed in 65 hospital EDs and the state DOH
- Trainings conducted by nurse educators on site or via WebEx

SC DHEC Usage Statistics



Series1



24x7x365 DOH Can Insert URL's



Diagnosis Reporting Tool - set the reporting parameters for a given diagnosis and location

Search for a Diagnosis by name:

Search through existing dynamic links:

Diagnosis *

Country

State

County

Locale

URL

Prompt *

Notes:

- Required fields are marked with a '*'
- URLs must be absolute (start with 'http://', 'https://', etc). Use the 'Verify URL' button to confirm that the URL is valid.



Demonstration

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