Integration of Environmental Biosensor Data with the Secure Access Health Alert System

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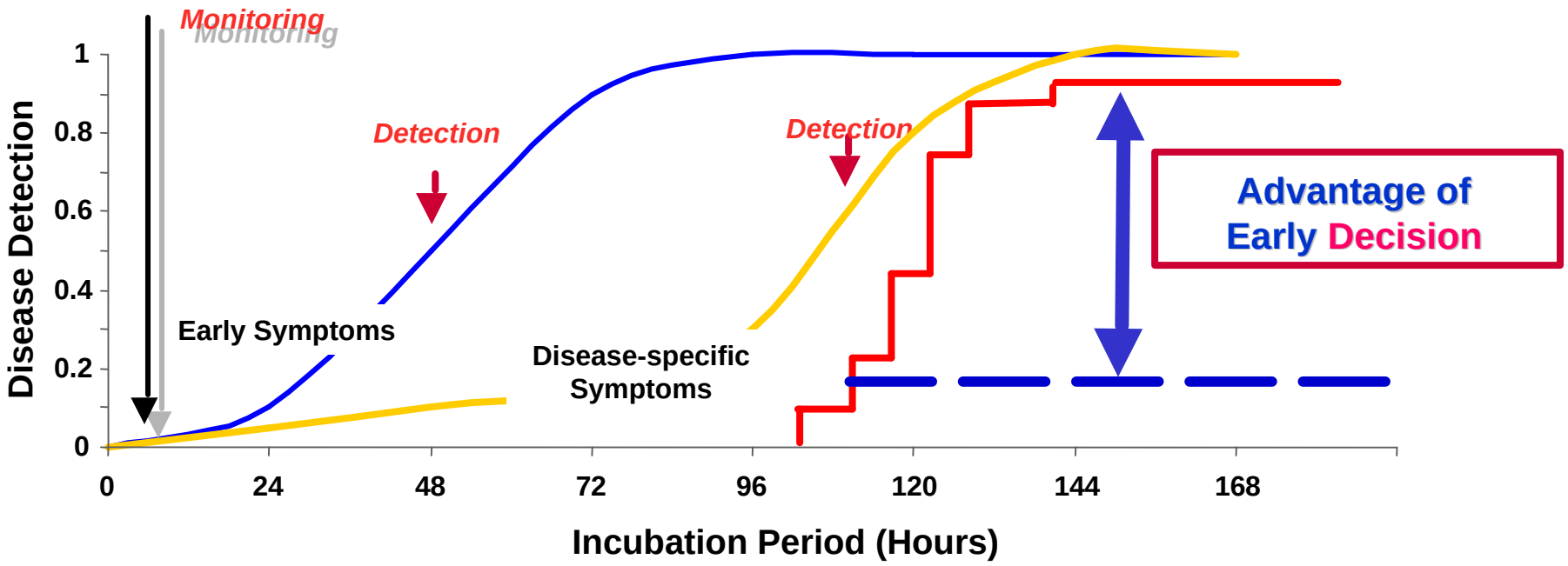
Partnering with Clients to Protect and Enhance Quality of Life

Environmental Monitoring—Emerging Landscape

- Need for early detection/identification of CBRN threat
- Environment—Biodefense relationships
- S&T Base—Emerging as well as existing
- RDT&E process not well defined.
- Technology focus on identification and reporting
- Multiple stakeholders

Consequences of Traditional *versus* Early Detection



* Adopted from Kaufman, AF, et al. 1997. *Emerg. Infect. Dis.* 3: 83-94.

Environmental Monitoring Component Systems

- Biosensor system/suite
- Data capture/analysis
- Reporting and tracking system

Biosensor-Transducer Combinations

Probe	Transducer	Sample	Device
Antibody	Piezoelectric (mass) Electrochemical detection	Environmental media Biological fluids	Portable device attached to Health Alert System with broadcast feature
DNA	Electrochemical detection	Biological fluids	Portable device attached to Health Alert System with broadcast feature
Microbes	Switchable micro laser transducer	Environmental media Biological samples	Portable device attached to Health Alert System with broadcast feature

Sensor Systems-Detection Methods Combinations

Probe	Detection Method	Sample Type	Device Type
Detection (enzyme) ticket	Enzymatic reaction	Ambient and personal swipes	Portable device
Detection tubes	Chemical reaction	Ambient and personal swipes	Portable device
Detection papers	Chemical/ enzymatic reaction	Ambient and personal swipes	Portable device

Sensor Systems-Detection Methods Combinations

Probe	Detection Method	Sample Type	Device Type
Spectroscopic techniques	Ion mobility spectroscopy (IMS) Chemical agent monitor (CAM) Flame photometric Detector (FPD) Infrared (IR)	Ambient and personal samples	Some equipment versions are portable.
Biologic	Biosensor systems (enzyme or receptor based)	Ambient and personal samples	R&D prototypes

Monitoring/Reporting Requirements

Early Incidence Reporting and Tracking Requirements

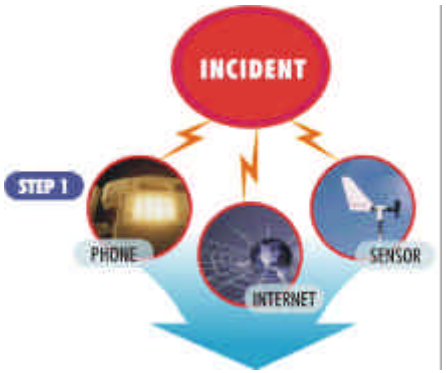
(1) Local Systems supporting EMS and First Response

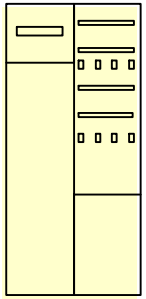
(2) Overarching, Command-level Situational Awareness system

Key Features

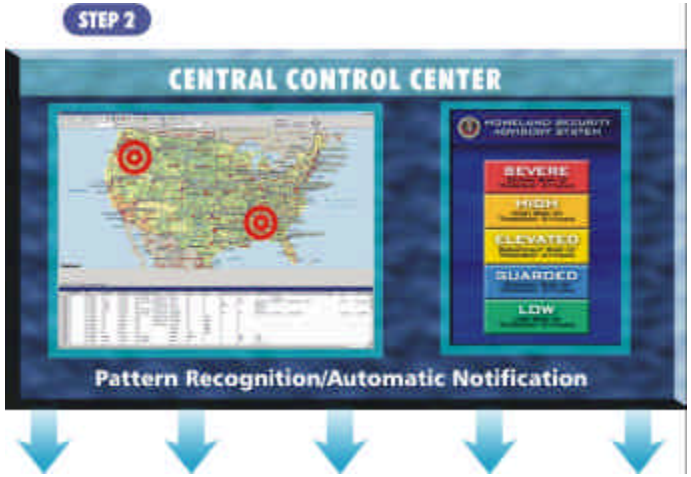
- Sensors/Suites Incidence Reports from Local Systems
- Instant Multiple Notification (local, state, federal)
- GIS
- Response Support
- Active/Passive Environmental monitoring
- Adaptable to medical/public health surveillance

Reporting-Tracking Systems



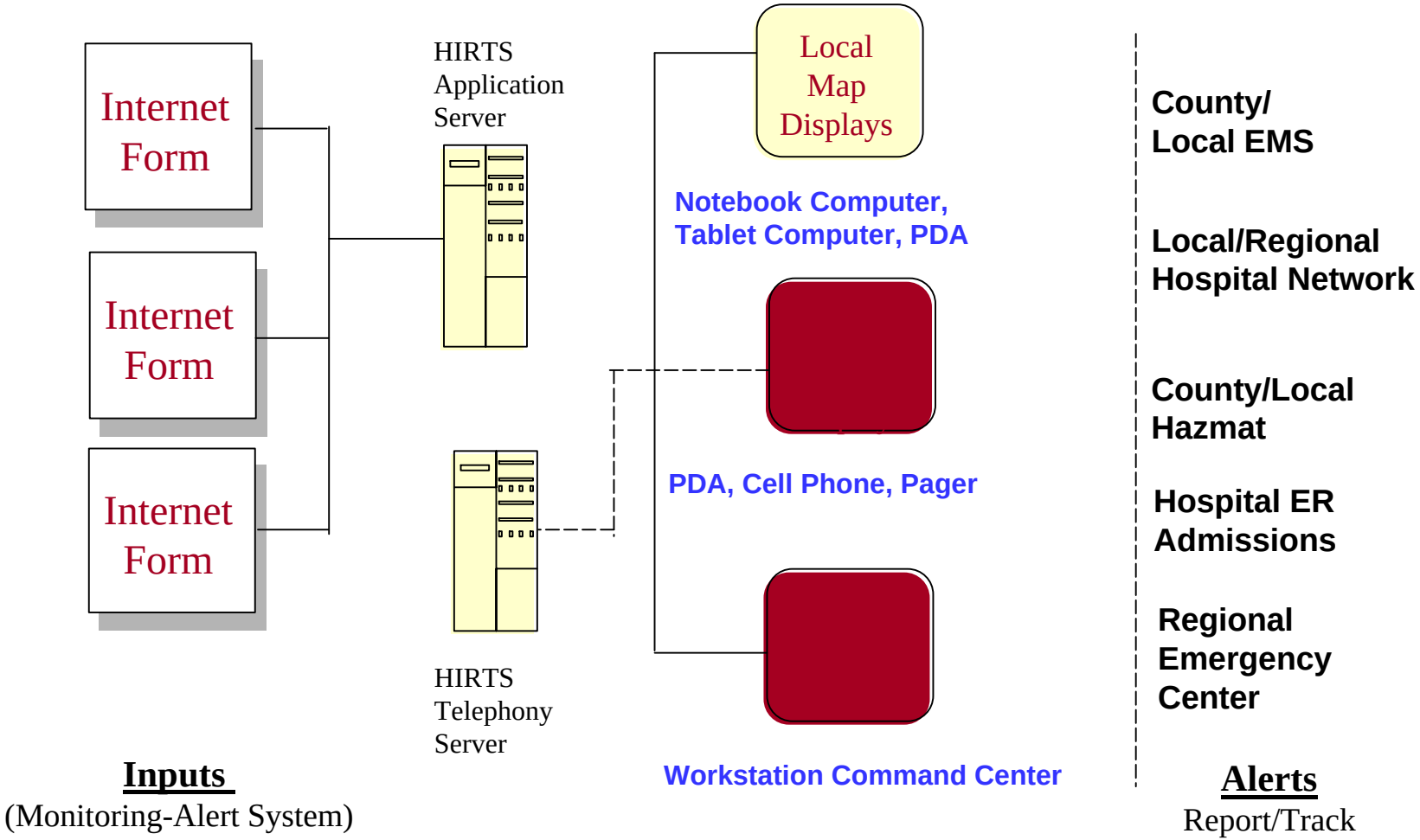


HIRTS*
Virtual
Command
Center

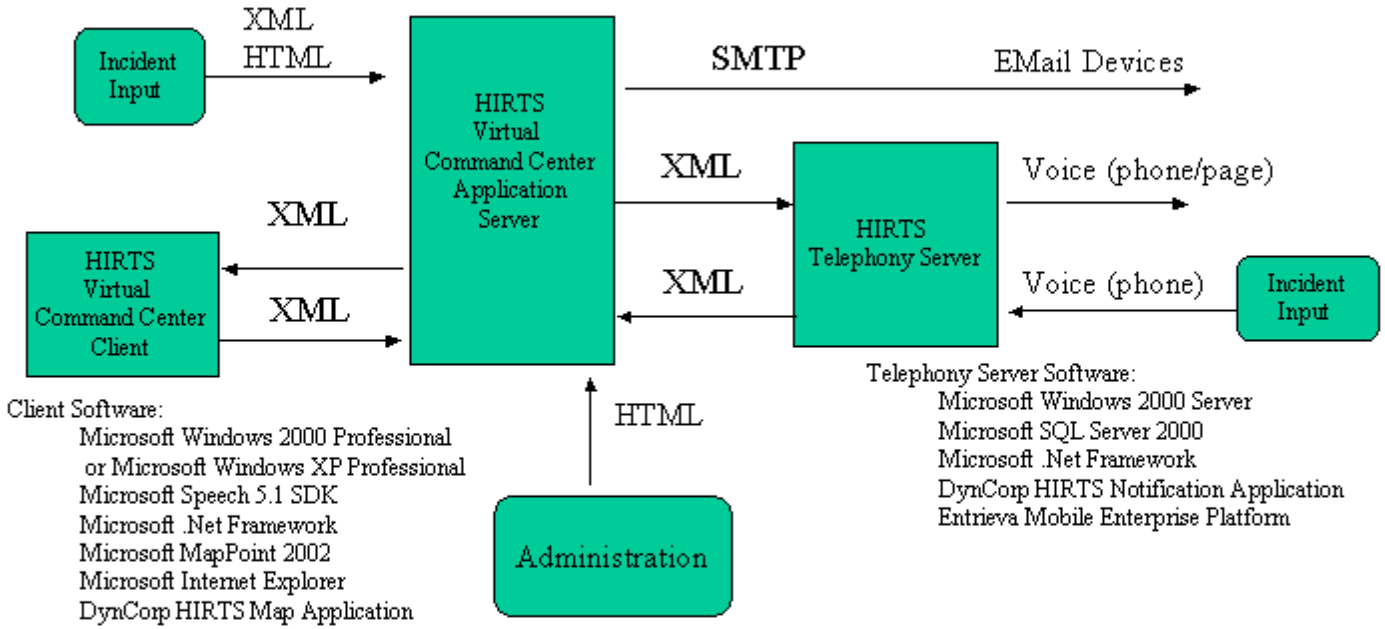


*** CSC's Hazard Incidence Response Tracking System**

Monitoring System: Input/Alert Map



Open Standards Offer Flexibility in Integration



Client Software:
Microsoft Windows 2000 Professional
or Microsoft Windows XP Professional
Microsoft Speech 5.1 SDK
Microsoft .Net Framework
Microsoft MapPoint 2002
Microsoft Internet Explorer
DynCorp HIRTS Map Application

Telephony Server Software:
Microsoft Windows 2000 Server
Microsoft SQL Server 2000
Microsoft .Net Framework
DynCorp HIRTS Notification Application
Entrieva Mobile Enterprise Platform

Application Server Software:
Microsoft Windows 2000 Server
Microsoft SQL Server 2000
Microsoft Internet Information Services
Microsoft .Net Framework
Microsoft MapPoint 2002
DynCorp HIRTS Incident Reporting Application

Evolving Paradigm & Future Challenges

- Ability to generate real-time reporting
- Capacity to incorporate Chem-Bio Detection with clinical surveillance/report
- Flexibility of open standards-based incidence reporting and tracking platform
- Ease to include biosensor modules on existing environmental monitoring networks
- Weakness in expert decision systems
- Ability to integrate GIS in EMS