The Future of Cancer and Public Health Surveillance—A CDC perspective

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Objectives and Acknowledgements

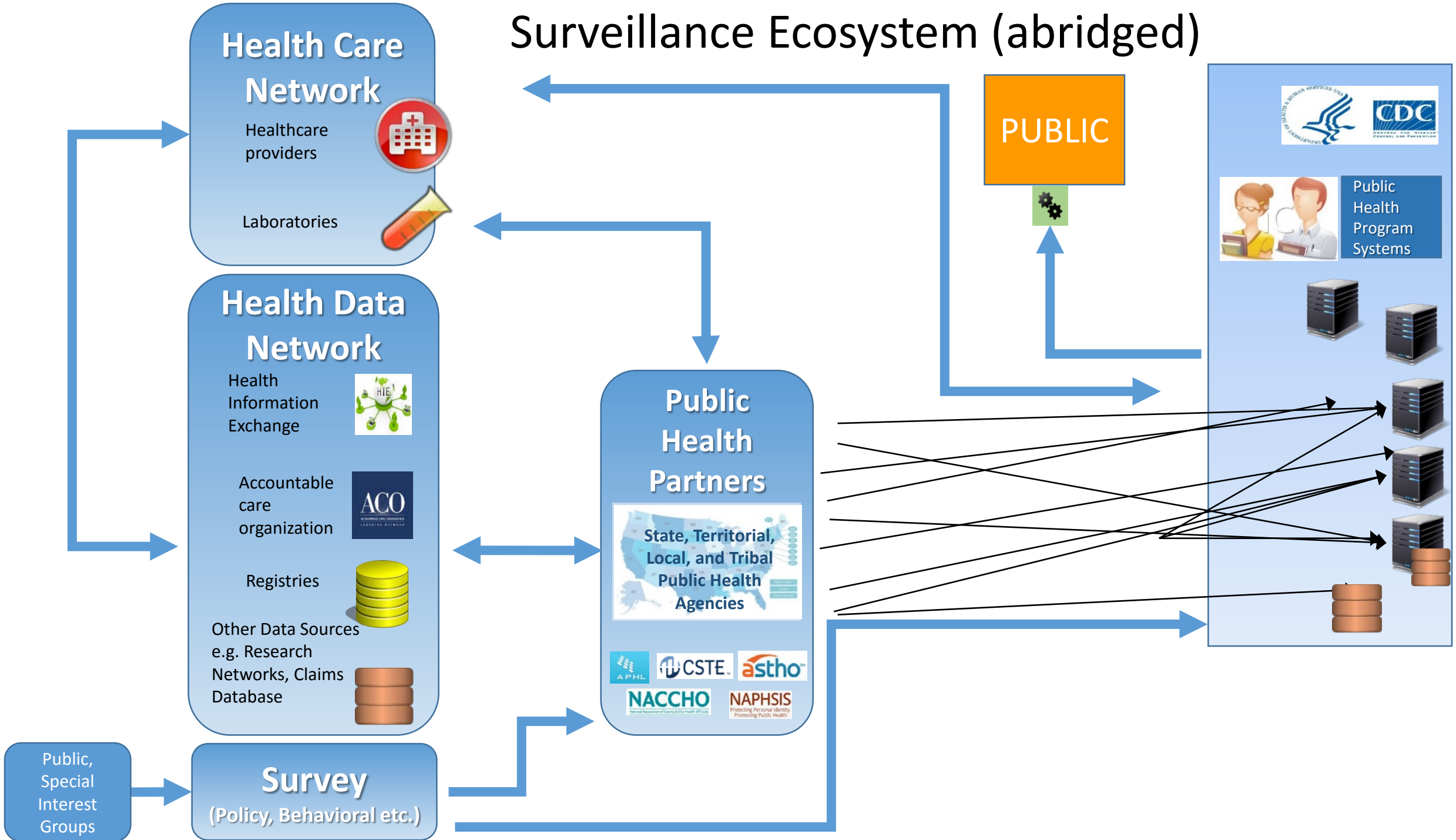
- Objectives
  - Review concept of public health surveillance
  - Identify innovations in cancer surveillance
  - Discuss CDC Surveillance Strategy and Surveillance Data Platform
- Acknowledgements
  - CDC Division of Cancer Prevention and Control
  - OPHSS Staff
  - Center for Surveillance, Epidemiology, and Laboratory Services
  - National Center for Health Statistics
  - CDC Surveillance Data Platform WorkGroup
    - 30+ members from across CDC programs

Public Health Surveillance

- The ongoing systematic collection
- analysis, and interpretation of health data,
- essential to planning, implementation, and evaluation of public health practice,
- closely integrated with dissemination of these data to those who need to know
- linked to prevention and control*

*Thacker SB, Berkelman RL. History of public health surveillance. In Public Health Surveillance, Halperin W, Baker EL (eds): New York;Van Nostrand Reinhold, 1992. Cited from MMWR/July 27,2012/ Vol 61/pp 10.

Surveillance Ecosystem (abridged)



Timely, high quality, actionable data is central to fulfilling the 10 essential functions of public health

Surveillance is a foundational data activity in public health

Cancer surveillance innovations

Improving data completeness, timeliness, value

More Complete Data

Capture of Physician Office Data

Meaningful Use

Meaningful Use Activities

- **CMS and ONC Final Rule for Stage 2 Meaningful Use (2012)**
  - Objectives included Cancer Reporting from Eligible Professionals to State Cancer Registries

- **Test and Demonstrate Operability (2010-2015)**
  - Integrating Healthcare Enterprise (IHE)
  - Healthcare Information Management and Systems Society (HIMSS)
  - American Society for Clinical Oncologists (ASCO)

- **CMS and ONC Notice of Proposed Rule Making published (2015)**
  - Rule includes Cancer Reporting from Eligible Professionals to State Cancer Registries, but placed under Public Health Registry measure

Meaningful Use Stage 2: The Here and Now.

- 35 EHR vendors (106 total products) have been certified for the Stage 2 cancer reporting criteria.
- *At least* 43 state cancer registries are participating in Stage 2
- *At least* 42 states plan to or currently use eMaRC Plus for physician reporting
- 2,165 Medicare Eligible Professionals (EPs) have attested that they performed cancer reporting in 2014 (out of 53,998 Medicare Eligible Professionals who were scheduled for Stage 2)

Faster Data

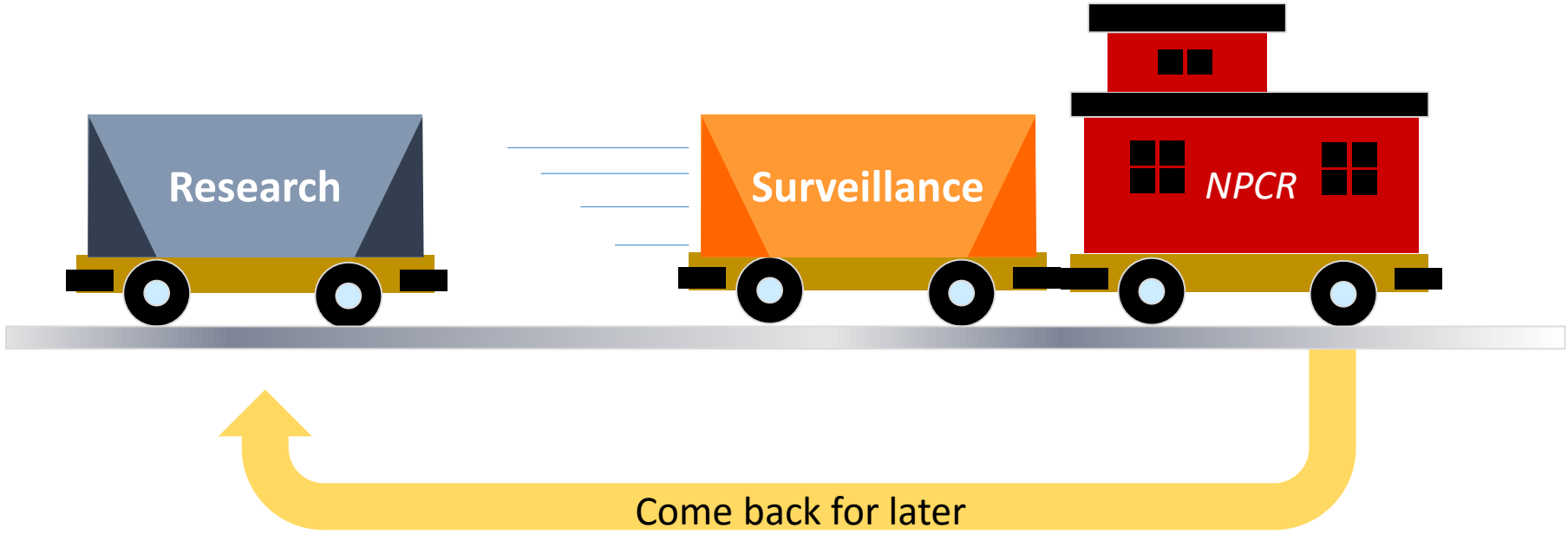
Early Case Capture (ECC)

Targets for Early Case Capture

- Electronic pathology (E-Path) reporting
  - 90% cancers histologically confirmed
- Diagnostic radiology (E-Rad) reporting
  - Cost effective NLP tools for filtering lagging behind E-Path
- Physician EHR reporting
  - Meaningful Use Stage 2
- State Health Information Exchanges (HIEs)
  - Untapped potential

There is a trade-off between timeliness and completeness

One approach: two-stage reporting



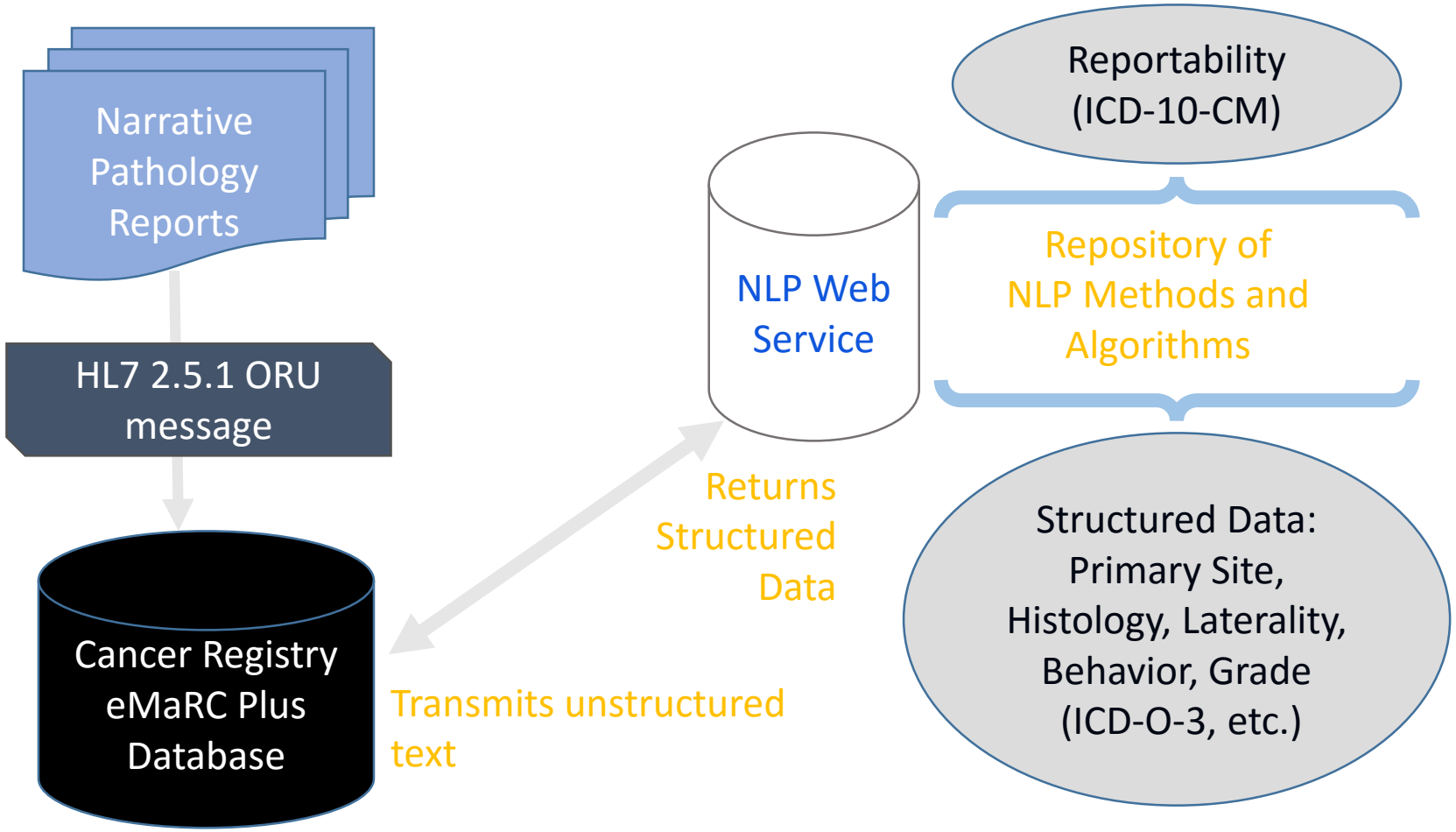
Greater Value from Unstructured Data

Natural Language Processing (NLP)

PCORTF Natural Language Processing (NLP) Web Service: CDC – FDA Collaborative Project

- **Two –Year Project**
- **Complete environmental scan**
- **Develop Technical Report and Architectural Design**
- **Develop plan to host NLP Web Service on the Public Health Community Platform**
- **Develop report on training strategy and generation of datasets**
- **Enhance eMaRC Plus to interface with NLP Web Service**
- **Develop prototype of NLP Web Service and eMaRC Plus**

Natural Language Processing (NLP) Web Service Architecture for Pathology Reports

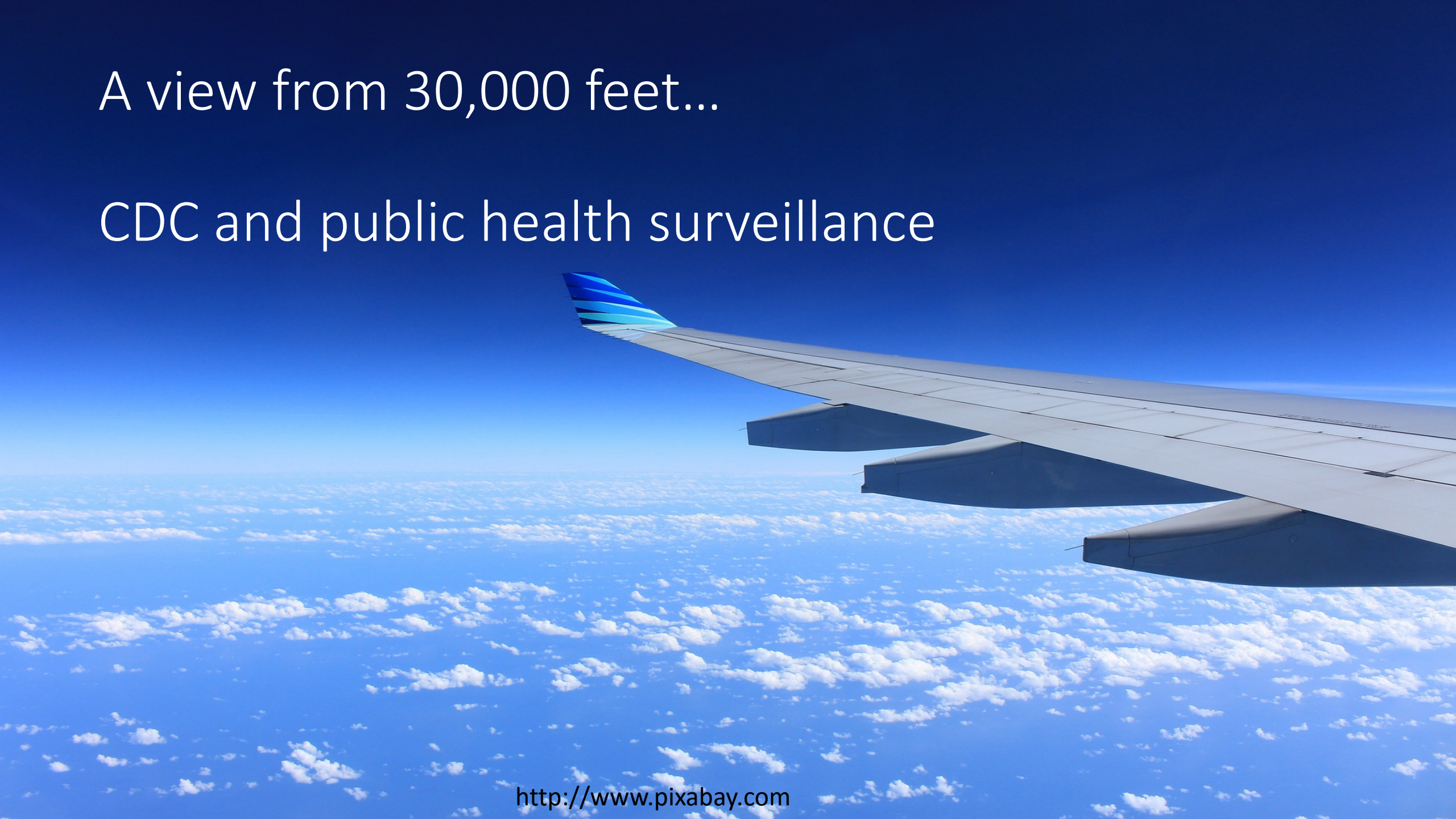


What have been the LEVERS for success in CDC's Cancer Surveillance work?

- Working with electronic health records vendors
- Working with the Office of the National Coordinator (ONC)
- Working within and outside of CDC with similar goals
- Leveraging the work of others (Infectious Diseases) to move forward in a coordinated fashion (might not be the best word)
- Working with the providers who are likely to use the cancer registries module: American Society of Clinical Oncology

A view from 30,000 feet…

CDC and public health surveillance



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CDC Surveillance Challenges

Proliferation

- >120 surveillance systems or activities at CDC

Silos

- Interconnections, interdependencies, efficiencies unrealized
- Local/state health departments: many systems/requirements

Innovation and Resources

- Slow adoption of new technologies
- Insufficient workforce with the right skills in the right places

Emerging Health Information Policies

- Electronic Health Records and Meaningful Use Standards
- Interoperability requirements

CDC Surveillance Enterprise

- 5-11% of active CDC workforce involved in surveillance
- 32-55% of extramural grant funds have surveillance component
- 18-21% of IT system capital planning dollars devoted to surveillance
- There are 120+ surveillance systems at CDC

Calls for Enhancements to CDC Surveillance Systems

- *Congressional FY 2015 budget language* requires CDC to "develop a timeline for a cloud-based and flexible IT public health data reporting platform for CDC programs"

- *Council of State and Territorial Epidemiologists and other partners* have asked CDC to evaluate which data elements are truly needed for surveillance and to coordinate across CDC programs to harmonize and standardize data elements

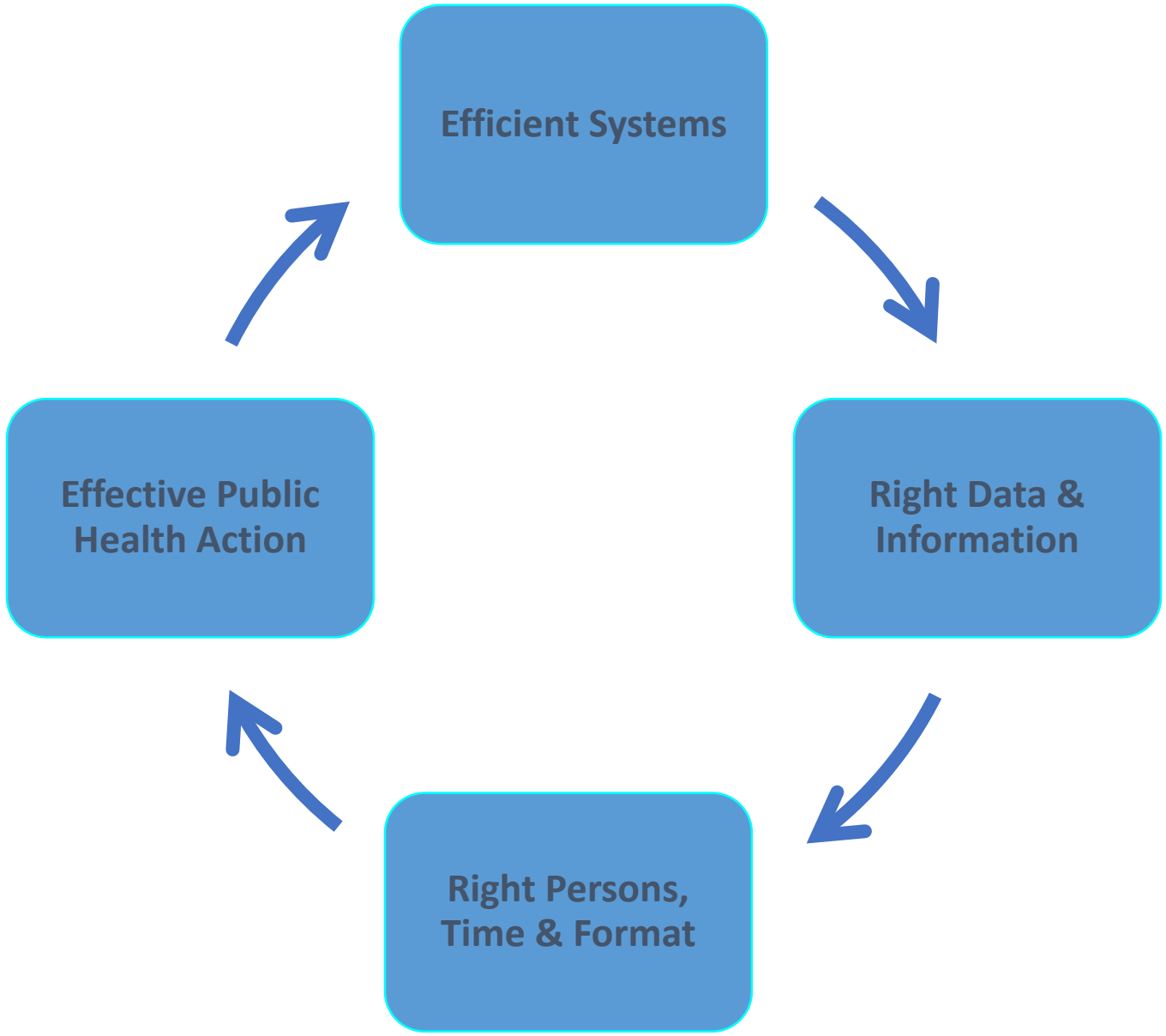
- *CDC Director and Advisory Committee to Director* charged Office of Public Health Scientific Services to lead the CDC surveillance strategy

CSTE
Alaska
Hawaii
Territories
Puerto Rico
U.S. Virgin Islands
Council of State and Territorial Epidemiologists
Leaders in Applied Public Health Epidemiology

CDC Surveillance Strategy

- Improve availability and timeliness of surveillance data
- Advance effective use of emerging information technology
- Identify and amend or retire ineffective or redundant surveillance systems
- Maximize effectiveness of resources, and performance and coordination of surveillance systems

Surveillance Strategy Vision



Surveillance Strategy Activities and Initiatives since 2014

Activities

- Surveillance Leadership Board
- CDC Health Information Innovation Consortium
- HIT Policy Committee (FACA) representation
- Strategic Health IT Vendor Forum

Initiatives

- Mortality statistics—Electronic Death Reporting
- Lab reporting—Electronic Lab Reporting
- Syndromic Surveillance—Visualization and Analytics
- Notifiable Diseases—Electronic Reporting from state health departments to CDC

Reference: http://www.cdc.gov/surveillance

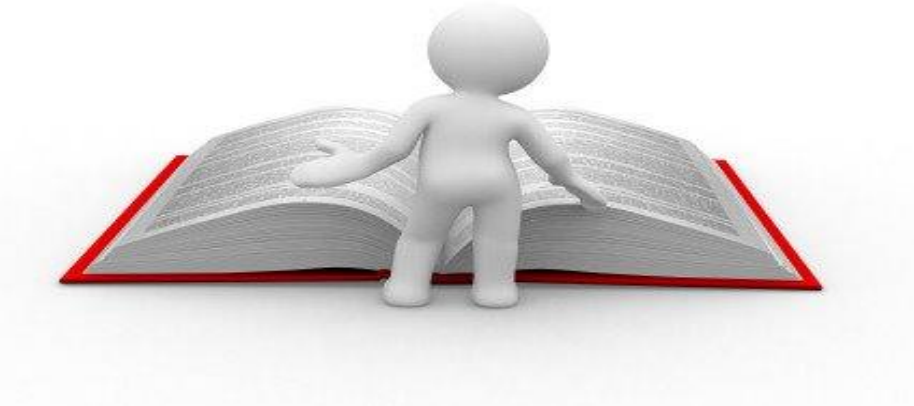
CDC Surveillance Strategy progress

- First ever Agency wide leadership level surveillance governance
- Informatics innovation consortium—moving from silo'ed innovation to enterprise innovation
- Key initiatives—improving efficiency and timeliness of data flows
  - Mortality reports—from 10% to 50% nationally, within 10 days to NCHS
  - Syndromic surveillance—community of practice, moving toward "off the shelf" software solutions, national and local analytics
  - Electronic lab reporting—moving toward true electronic lab reporting system
  - Notifiable diseases—moving from 20 year old software standards to contemporary HL7 compatible standards. First production data this summer
- Many CDC programs have also taken initiative to innovate, but with coordination

Surveillance strategy—new areas to address

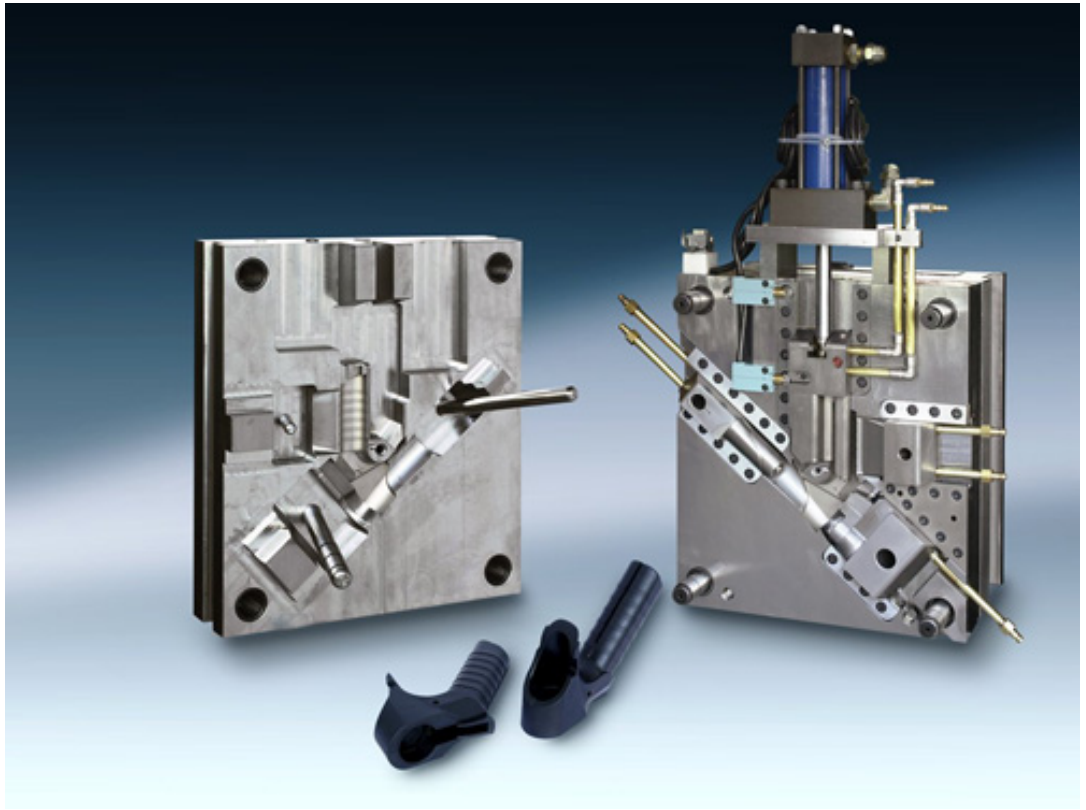
- Electronic Case Reporting for notifiable diseases---from clinical providers to state health departments
  - Framework, basic elements of HL7 message, collaboration with EHR vendors, clinical systems, pilot implementations, broad partnerships
  - Meaningful Use 3 requirement
- Funding for states
  - Alignment, flexibility of informatics investments
  - Workgroup of surveillance leadership board
- Informatics workforce
  - Analysis underway of needs, identification for investments in both categorical training as well as training in place
- Development of a **CDC Surveillance Data Platform** with shared services
  - Cross agency, initial funding $17M

Definitions

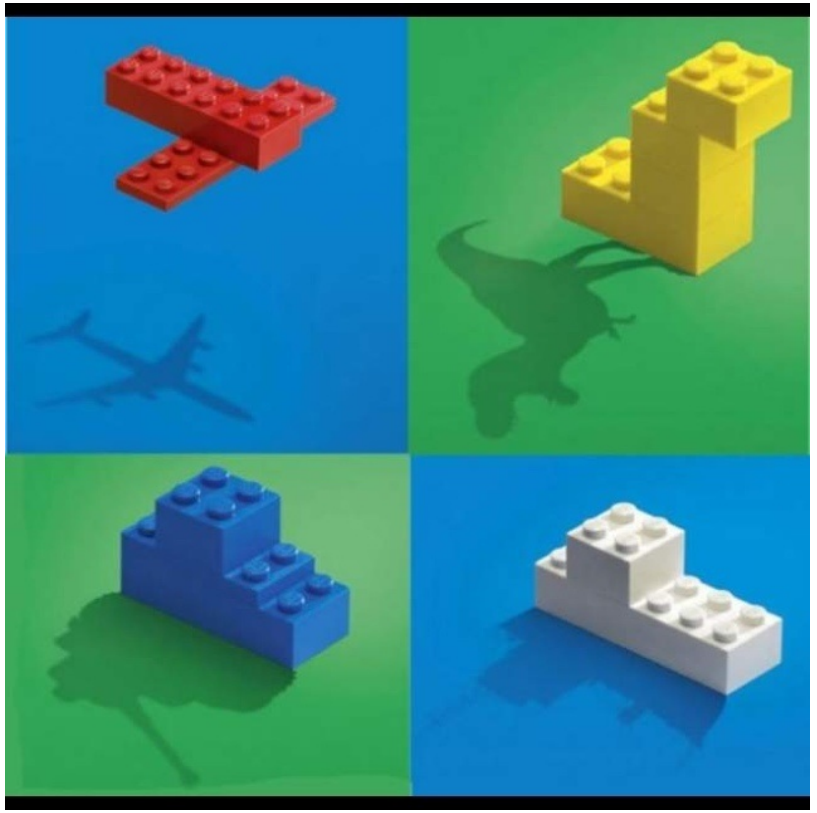


- ***Platform***
  - Virtual environment/entity that makes services available to users.
- ***Services***
  - People, process, or technology that fulfills a need or request that is reusable and measureable.
- ***Shared Services***
  - People, process, or technology that fulfills a common need or request that is used by more than one CDC Program, enabled to be sharable, scalable, and standardized. This includes shared governance of the shared service.

Moving from single purpose systems to shared services

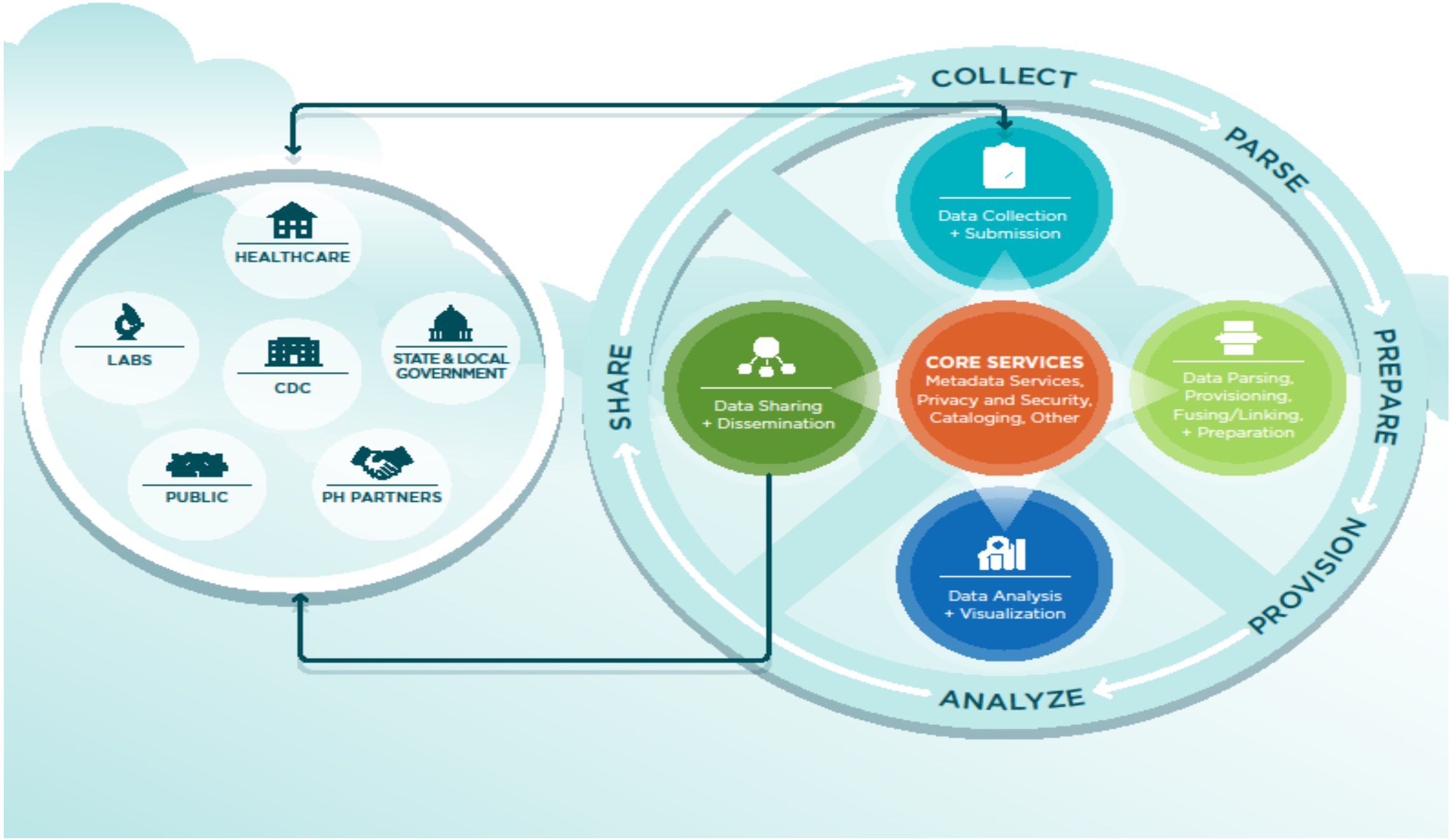


(single purpose system)



(shared services)

CONCEPTUAL MODEL



Future directions that the CDC Data Platform will address

- **Secure:** enhanced cybersecurity, especially with new data sources and approaches
- **Standard:** enhanced use of standards and harmonization of data for routine data transfer and to increase interoperability
- **Automation:** Machine to machine data transfer, with appropriate security
- **New approaches and tools:** advanced analytics, natural language processing, machine learning, cloud computing
- **Systems approaches:** support for and incorporation of Center/Program based innovations to provide greater availability to CDC programs and external stakeholders/partners

Closing thoughts

- Public health surveillance is foundational and action oriented
- Cancer registries are crucial for cancer surveillance and important innovations are occurring to improve
  - completeness and timeliness of case reporting
  - utilization of unstructured data
- The broader CDC and public health surveillance enterprise needs to
  - Work across silos and sectors more effectively, to leverage resources, learning, and efficiencies
  - Embrace standards harmonization and shared services approaches where possible
- Creating effective electronic work flows from clinicians to health departments, CDC and other federal agencies and other surveillance stakeholders require:
  - Multistakeholder collaborations, both internal and between organizations
  - Reusability of IT services
  - Scalability

Potential benefits

- Faster access to information that is essential for public health action
- More complete information for both surveillance and research
- Reduced inefficiencies that cost money, time, and workforce
- New opportunities to leverage data from new sources, new partners, or to combine in ways not done before
- Stronger partnerships and value, for both healthcare and public health stakeholders
- Triple aim: improved quality, decreased costs, improved health


So, the future of cancer, and public health, surveillance is partly cloudy, but bright…
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