# Integrating Population Sciences into Cancer Center Research

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# Population Sciences in Cancer Center Research

- OVERVIEW OF NATIONAL CANCER INSTITUTE COMPREHENSIVE CANCER CENTERS
- THE NEED FOR POPULATION SCIENCE IN THE RESARCH FOR CANCER PREVENTION AND CONTROL?
  - CAN WE PREVENT AND CONTROL CANCER (TREATMENT INCLUSIVE) WITH LKNOWLEDGE GAINED FROM MOLECULAR-CELL-BASED RESEARCH ALONE?
  - DOES CANCER OCCUR BY CHANCE ALONE OR THERE IS ALWAYS A CAUSE?
  - ARE CANCER RESEARCH CENTERS ISOLATED FROM THE HEALTH CARE SYSTEM?
  - WHAT ARE THE LEADING DRIVERS FOR RESEARCH FUNDING NOW?

# National Cancer Institute (NCI)-Designated Cancer Centers

- Institutions dedicated to research in the development of more effective approaches to prevent, diagnose and treat cancer
- 67 centers: most affiliated with university medical centers; some are freestanding centers; some conduct research only
- Entrée to greater federal funding:
  - P30 range $720,000 - $13.6 million in FY11 (1 year)
- Recognition of scientific excellence and outstanding leadership

Source: National Association of Cancer Center Development Officers

# National Cancer Institute

**Overview** (www.cancer.gov)

- Part of the NIH, one of 11 agencies of Department of Health and Human Services
- Established under the National Cancer Institute Act of 1937
- The fed's principal agency for cancer research and training
- Director: Harold Varmus, MD, Co-recipient of Nobel Prize in 1989 for studies of the genetic basis of cancer

**Mission**

"…..conducts and supports research, training, health information dissemination, and other programs with respect to the cause, diagnosis, prevention, and treatment of cancer, rehabilitation from cancer, and the continuing care of cancer patients and the families of cancer patients."

Source: National Association of Cancer Center Development Officers

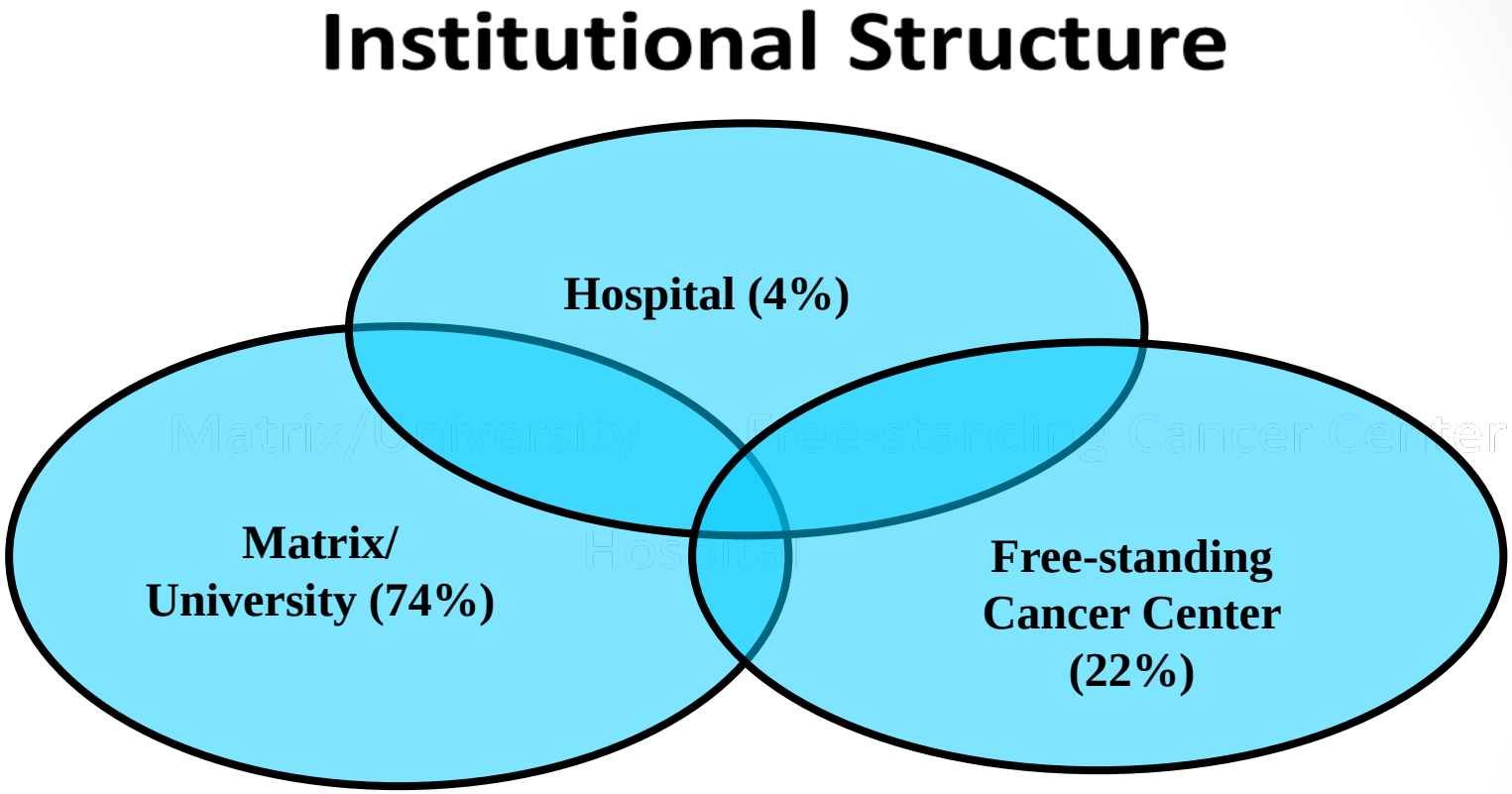
# Two Levels of NCI-Designated Centers

1. **Comprehensive Cancer Centers (41 nationally)**
   1. Scientific leadership in each of three areas: laboratory, clinical and population-based research
   2. Substantial transdisciplinary research that bridges these areas
   3. Professional and public education and outreach, including dissemination of clinical and public health advances

2. **Cancer Centers (26 nationally)**
   1. Scientific leadership, resources and capabilities in laboratory, clinical or population science, or some combination of these three
   2. Reasonable depth and breadth of research in the scientific areas it chooses and transdisciplinary research across these areas

Source: National Association of Cancer Center Development Officers

# What infrastructure?




Benefits & Challenges

Similarities & Differences

# Funding Supports What Strategies and Actions?

- Formal, interactive **scientific research** programs
- Centralized shared resources (technologies, services, consultation)
- Strategic planning and evaluation
- Developmental funding to pursue newly identified priorities
- Centralized Cancer Center administration
- Centralized scientific oversight of cancer clinical trials

# Population Sciences in Cancer Center Research

- WHY DO WE NEED POPULATION SCIENCE IN THE RESARCH FOR CANCER PREVENTION AND CONTROL?
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CAN WE PREVENT AND CONTROL CANCER (TREATMENT INCLUSIVE) WITH KNOWLEDGE GAINED FROM MOLECULAR OR CELL-BASED RESEARCH ALONE?

DOES DISEASE OCCUR BY CHANCE ALONE OR THERE IS ALWAYS A CAUSE?

AN OPPORTUNITY FOR POPULATION SCIENCES

# What other research?

- EPIDEMIOLOGY – the fundamental population science in health
- Biostatistics
- Behavioral science
- Biomedical informatics research
- Translational research
- Implementation research
- Dissemination research

# WHAT CHANGES?
# HOW?

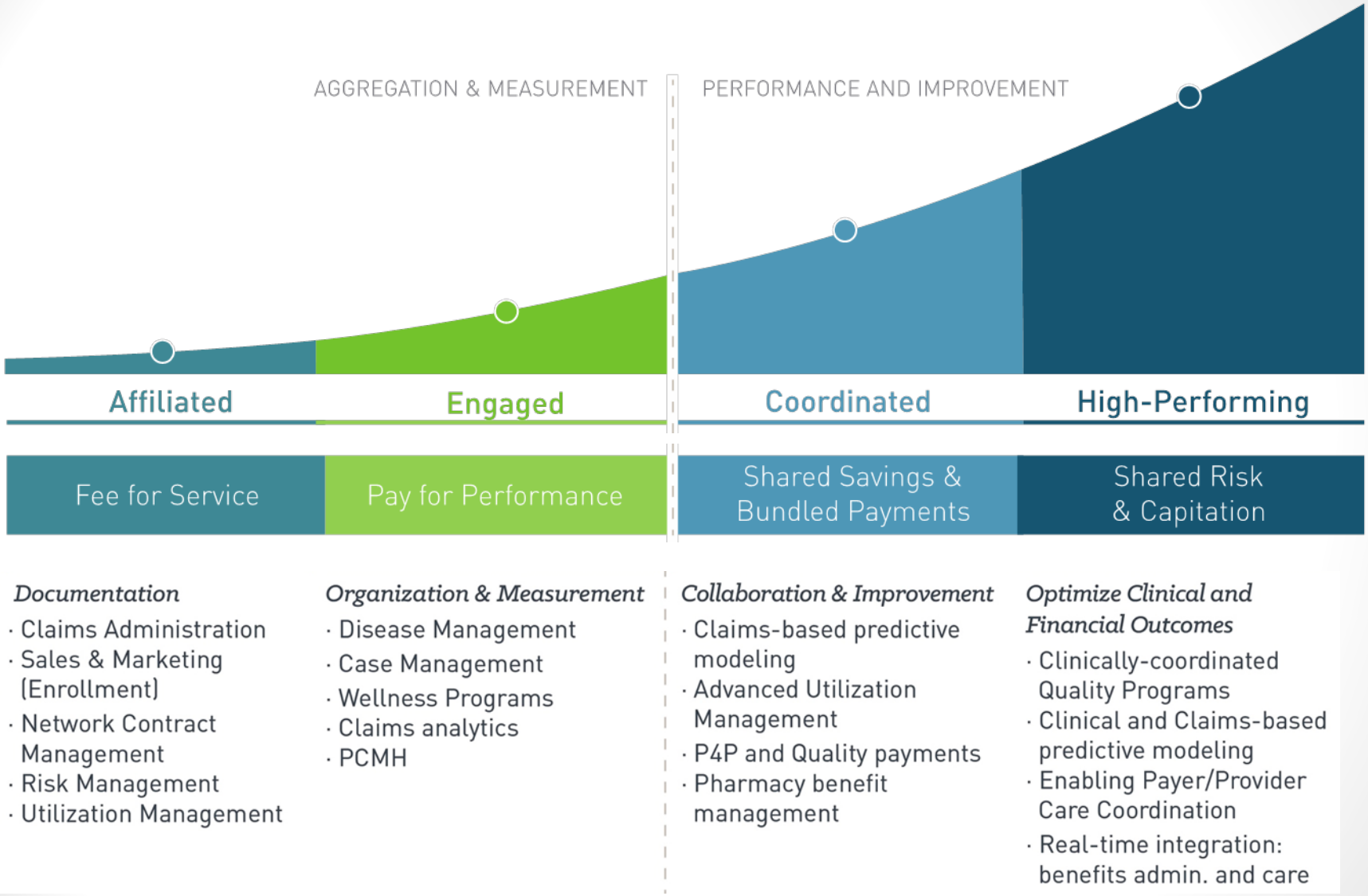
CURRENT LEGAL AND FISCAL CHANGES IN US HEALTH CARE HAS INCRFEASINGLY FORCED HEALTH CARE SYSTEMS TO MOVE AWAY FROM MEASURING AND MONITORING THE PATIENT TO FOCUSING MORE ON THE POPULATION WHICH GIVEN RISE TO PATIENTS

OPPORTUNITY FOR POPULATION HEALTH SCIENCE FOR PREVENTION AND CONTROL OF CANCER

# Health care changing

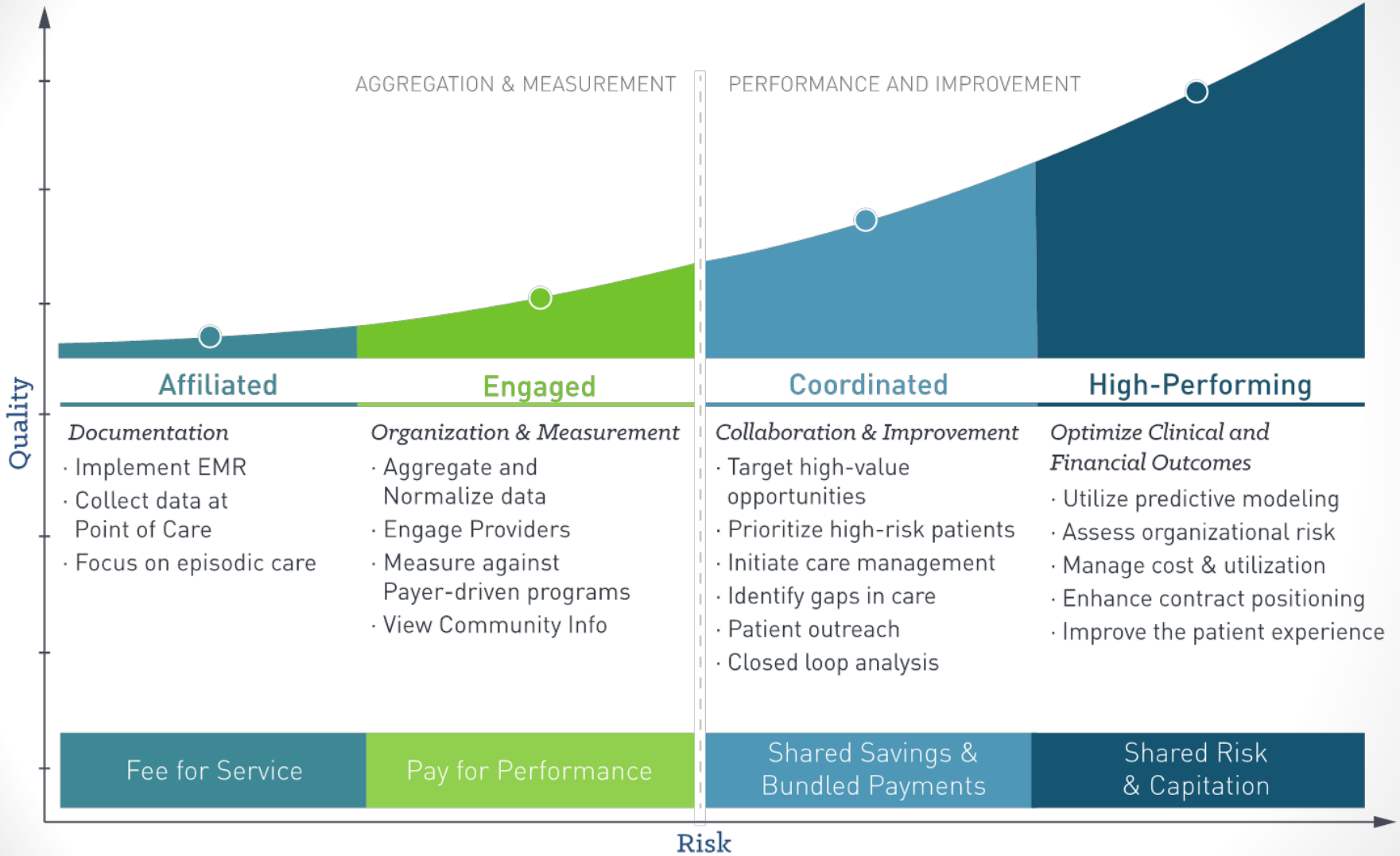
- From Fee-for Service to Value-based
- Payers want value, not volume
- Value Based Purchasing is transforming health care, by demanding;
  - Increased Quality
  - Increased Satisfaction
  - Lower Preventable outcomes
  - Lower per capita cost
  - Use Evidence-Based interventions
  - Use Population health indicators as units of measurement

# More High-Performing Payer Organization



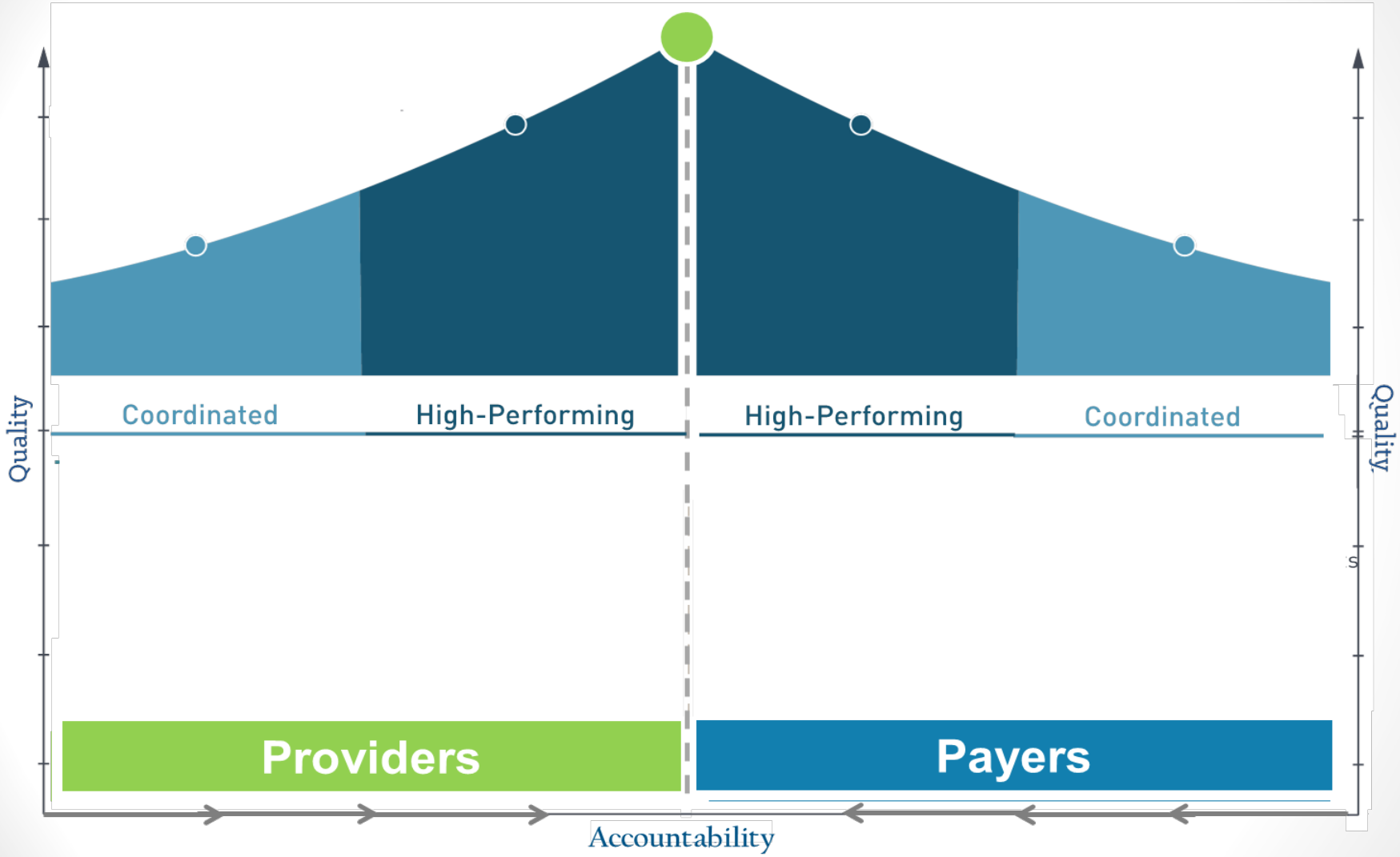

SOURCE: TriZetto

# More High-Performing Provider Organization




SOURCE: TriZetto

# Collaborative Care

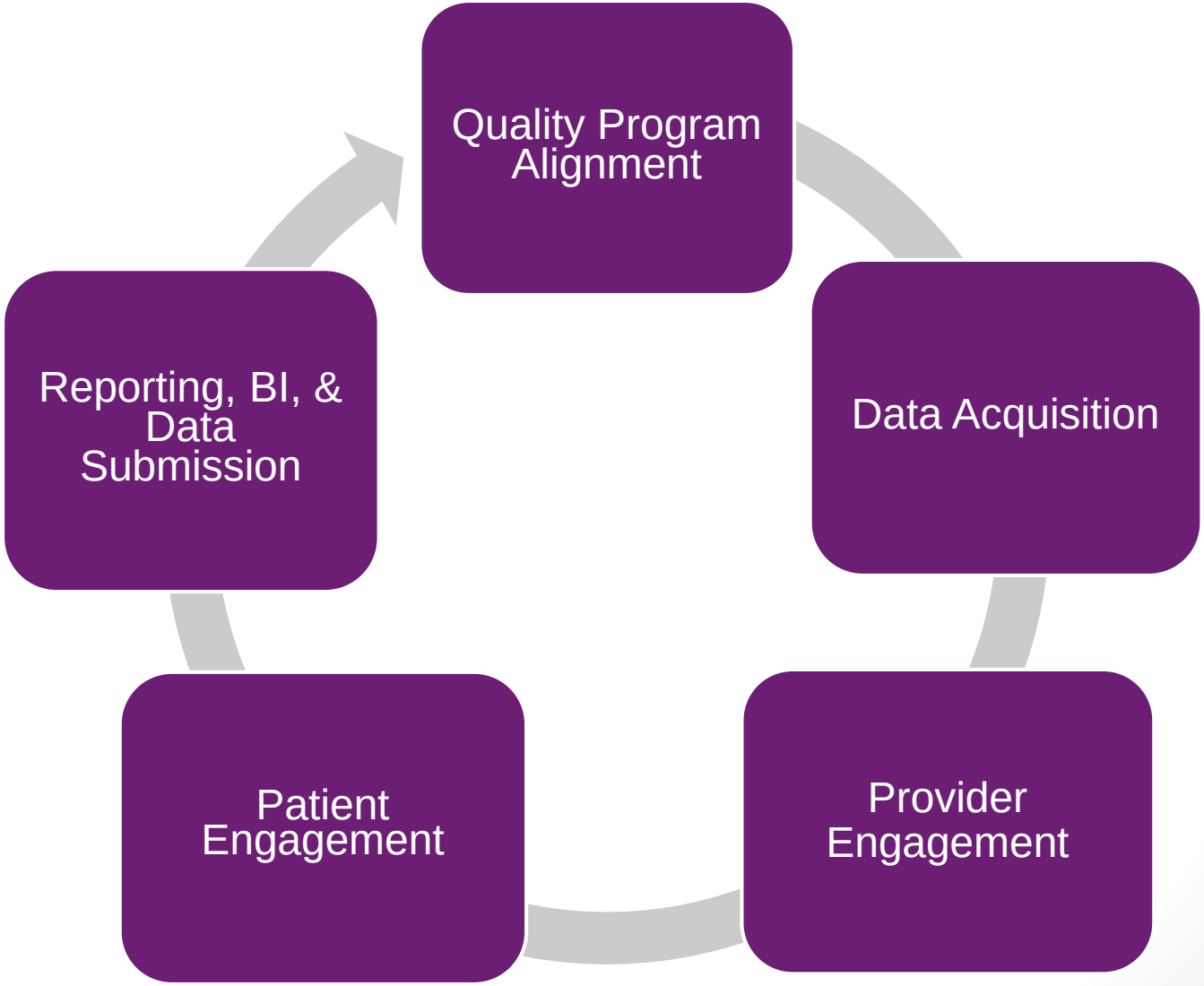



SOURCE: TriZetto

# Changes Leading to Population health

- Accountability, quality, value and efficiency are leading to creation of highly interconnected systems of care with need to:
  - integrate both the delivery of care and information on impactors of care;
  - manage service population in ways similar to the concept of public health: population health management

# Objective is to Create a Comprehensive Population Health Management Workflow




SOURCE: TriZetto

# Population Health

- Historically, the term “population health” has been more commonly used elsewhere than in the United States
- Definition: “the health outcomes of a group of individuals, including the distribution of the outcomes within the group”*
- The Triple Aim - defines 3 inter-dependent aspects:**

  - Improving the health of a population

  - Improving the patients’ experience of care

  - Reducing the per capita costs of care for populations

* David Kindig, MD, PhD, and Greg Stoddart, PhD- Models for Population Health, AJPH 2003

**Don Berwick, Health Affairs – The Triple Aim: Care, Health and Cost, May 2008, vol. 27

# Now Recall what Public Health is

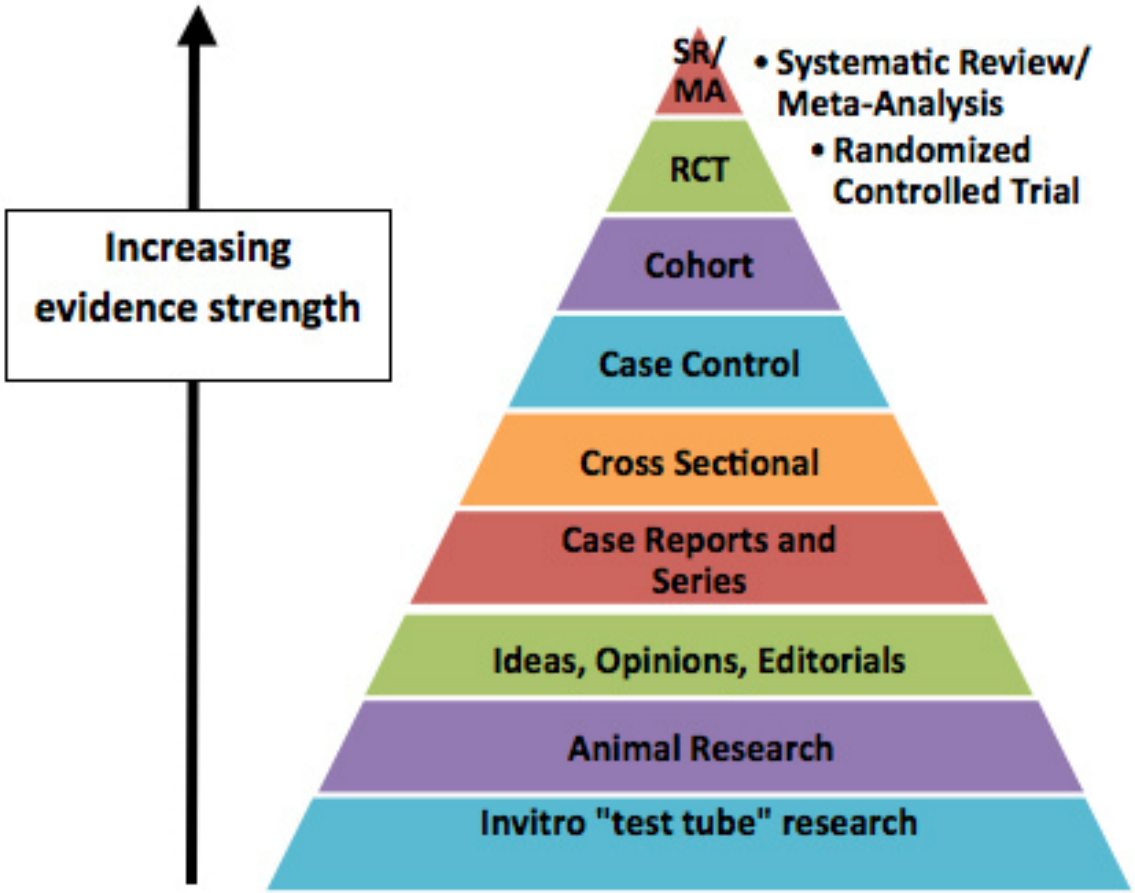
- Public health promotes and protects the health of people and the communities where they live, learn, work and play.

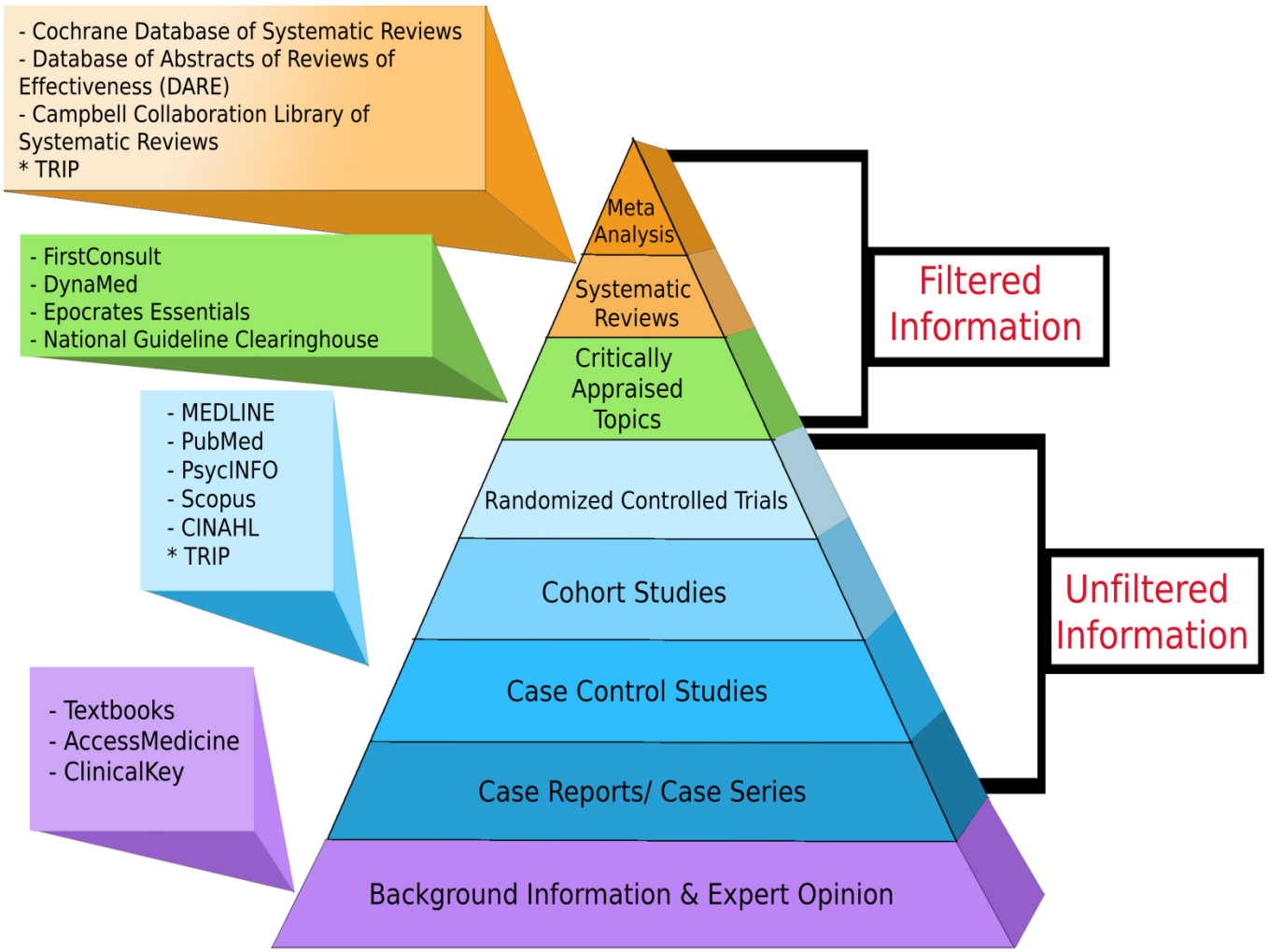
- *prevent* disease and injury in *communities* and *populations*
- Identify the *causes* of disease and disability
- implement large-scale *solutions*.

# Now Recall How Cancer Centers are Structured and Funded

- Cancer centers are **integral parts of the hospitals or health systems** delivering this new model of care
- It can no longer think only about treatment for one patient at a time – everything matters:
  - Cell – Molecular, precision medicine, genomics, etc.,
  - Person – genomics, behavioral, socio-determinants
  - **Population** – risk, outcomes, management, cost
  - Context – funding, partnerships, patient engagement

# Evidence from one population sciences integrated in delivery of care: EPIDEMIOLOGICAL EVIDENCE


Increasing evidence strength
SR/ MA
• Systematic Review/ Meta-Analysis
RCT
• Randomized Controlled Trial
Cohort
Case Control
Cross Sectional
Case Reports and Series
Ideas, Opinions, Editorials
Animal Research
Invitro "test tube" research




*TRIP searches filtered AND unfiltered information simultaneously.

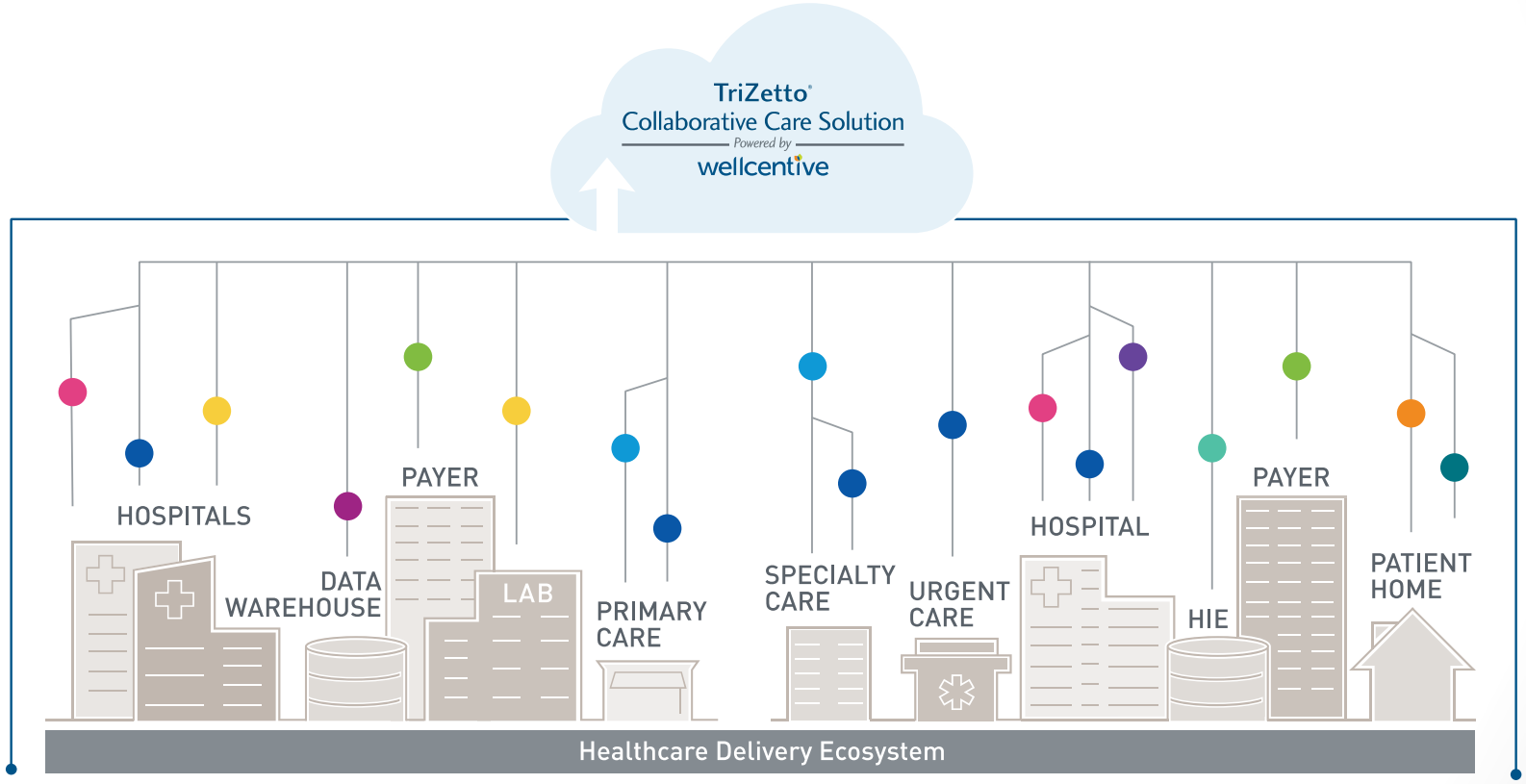
# WHAT DATA?

Do epidemiological studies need to change as type and volume of data changes?

# HEALTH CARE SYSTEMS ARE RE-CREATING POPULATION HEALTH MONITORING:

Adding new data sources, type of data while exponentially increasing data size

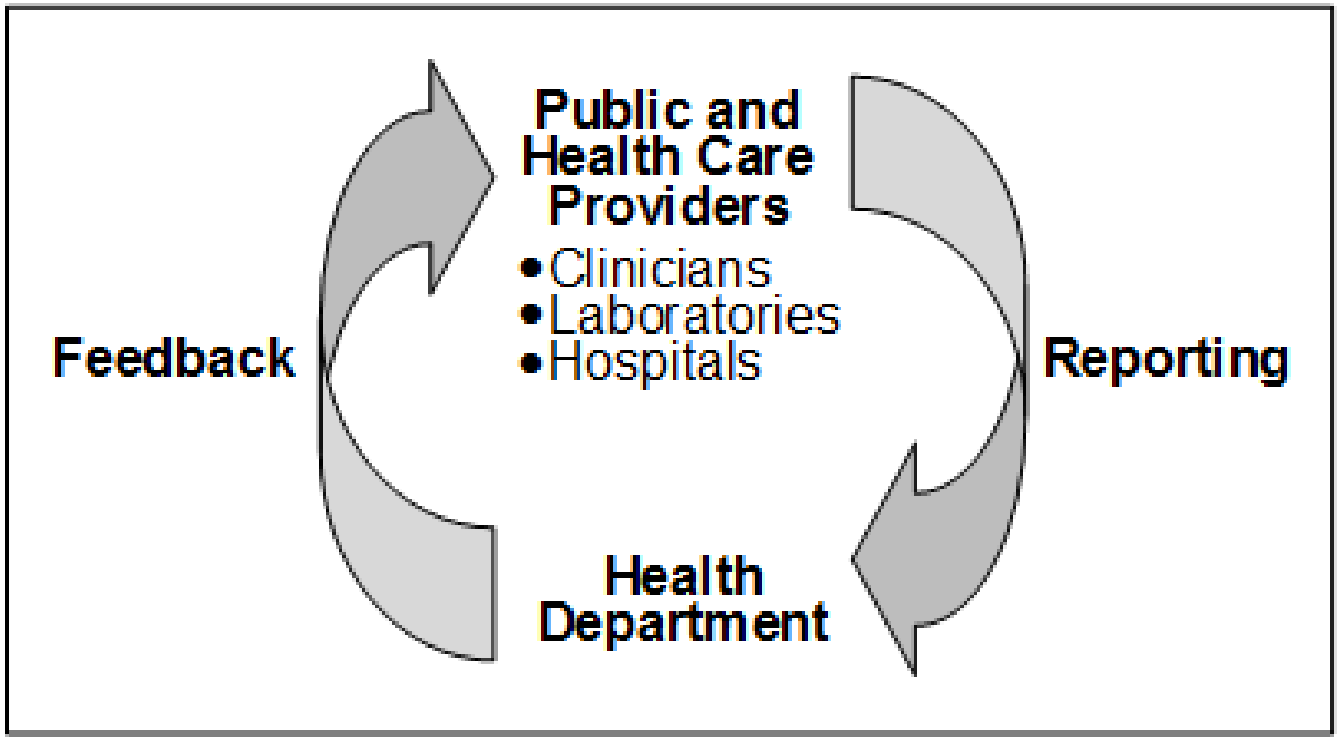
# Example of A Collaborative Solution Aggregating Data Across The Entire Healthcare Ecosystem - TriZetto




LEGEND

- Health Information Exchange **(HIE)**
- Lab Information System **(LIS)**
- Payer
- Practice Management **(PM)**
- Patient Portal
- Data Warehouse
- Home Monitoring Devices
- EPrescribing **(eRx)**
- Hospital Information System **(HIS)**
- Electronic Health/Medical Records **(EHR/EMR)**

# WHATE OTHER DATA: THE FORGOTTEN PARTNER OR ELEPHANT IN THE ROOM*: PUBLIC HEALTH ORGANIZATIONS MONITORING OF **POPULATION HEALTH**




* English metaphorical idiom for an obvious truth that is going unaddressed.

# Public Health Surveillance Data Sources

- Vital Statistics
- Notifiable Diseases
- **Registries**
- Sentinel Surveillance
- Syndromic Surveillance
- Surveys
- Administrative Data

# Data Source: Registries

- Information from multiple sources is linked for each individual over time.
  - Diverse sources of information. E.g., hospitals (sometimes >1), pathology, death certificates.
- Used for cancer, congenital anomalies, trauma, etc.
- Most are passive but resource intensive.
- More lag in data availability due to complexity of data collection process.

# Populations Covered by Registries

- Hospital-based
- Population-based
- Exposure registries
  - World Trade Center Health Registry
  - Three Mile Island

# CDC- Division of Cancer Prevention and Control

- Public Health
  - All cancer and all people - Population health inclusive
  - Practice, research and capacity building
- Health promotion
- Primary prevention
- Secondary prevention
- Tertiary prevention

# NCI-Division of Cancer Control and Prevention

- Program Areas
  - Behavioral Research
  - Epidemiology + Genomics
  - Healthcare Delivery Research
  - Implementation Science
  - Surveillance
  - Survivorship