



Utah Department of Health Data Fair

Utah Department of Health Data Fair Connecting Researchers with Data

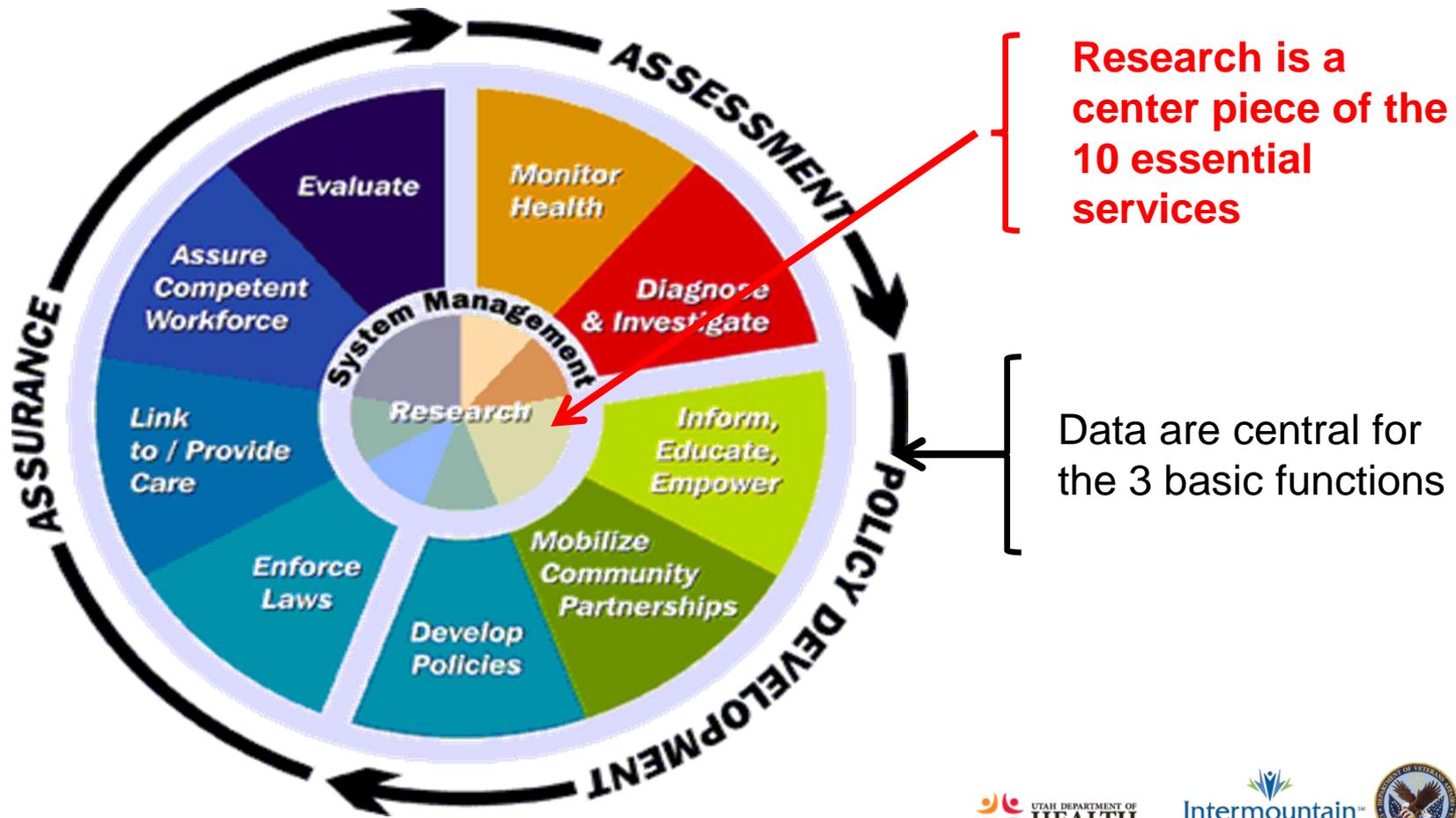
Wu Xu, Ph.D. Director

Center for Health Data and Informatics

Utah Department of Health

November 4, 2014

PUBLIC HEALTH'S 3 BASIC FUNCTIONS & 10 ESSENTIAL SERVICES



Presentations from UDOH Data Representatives

Time	Program
12:35 - 12:50 pm	Maternal and Infant Health Program Laurie Baksh
12:50 - 1:05 pm	Office of Health Care Statistics (Hospital Discharge, HEDIS, APCD) Charles Hawley and Sterling Petersen
1:05 - 1:20 pm	Bureau of Emergency Medical Services Shari Hunsaker and Matthew Christensen
1:20 - 1:35 pm	Violence and Injury Prevention Program (Controlled Substance Database) Anna Fondario
1:35 - 1:50 pm	Office of Public Health and Assessment (BRFSS survey data) Rachel Eddington
1:50 - 2:05 pm	Office of Vital Records and Statistics (Birth and Death Certificate Data) Janice Houston and Mylitta Barrett
2:05 - 2:20 pm	Utah Birth Defect Network Amy Nance
2:20 - 2:35 pm	Utah Environmental Public Health Tracking Network Matt McCord
2:35 - 2:50 pm	Child Health Advanced Records Management (CHARM) Christine Perfili
2:50 - 3:05 pm	Office of Public Health and Assessment (IBIS: Online Resources) Kathryn Marti and Tong Zheng
3:05 - 3:20 pm	Division of Medicaid and Health Financing Blake Anderson and Nicole Neilan

How to Access to UDOH Data

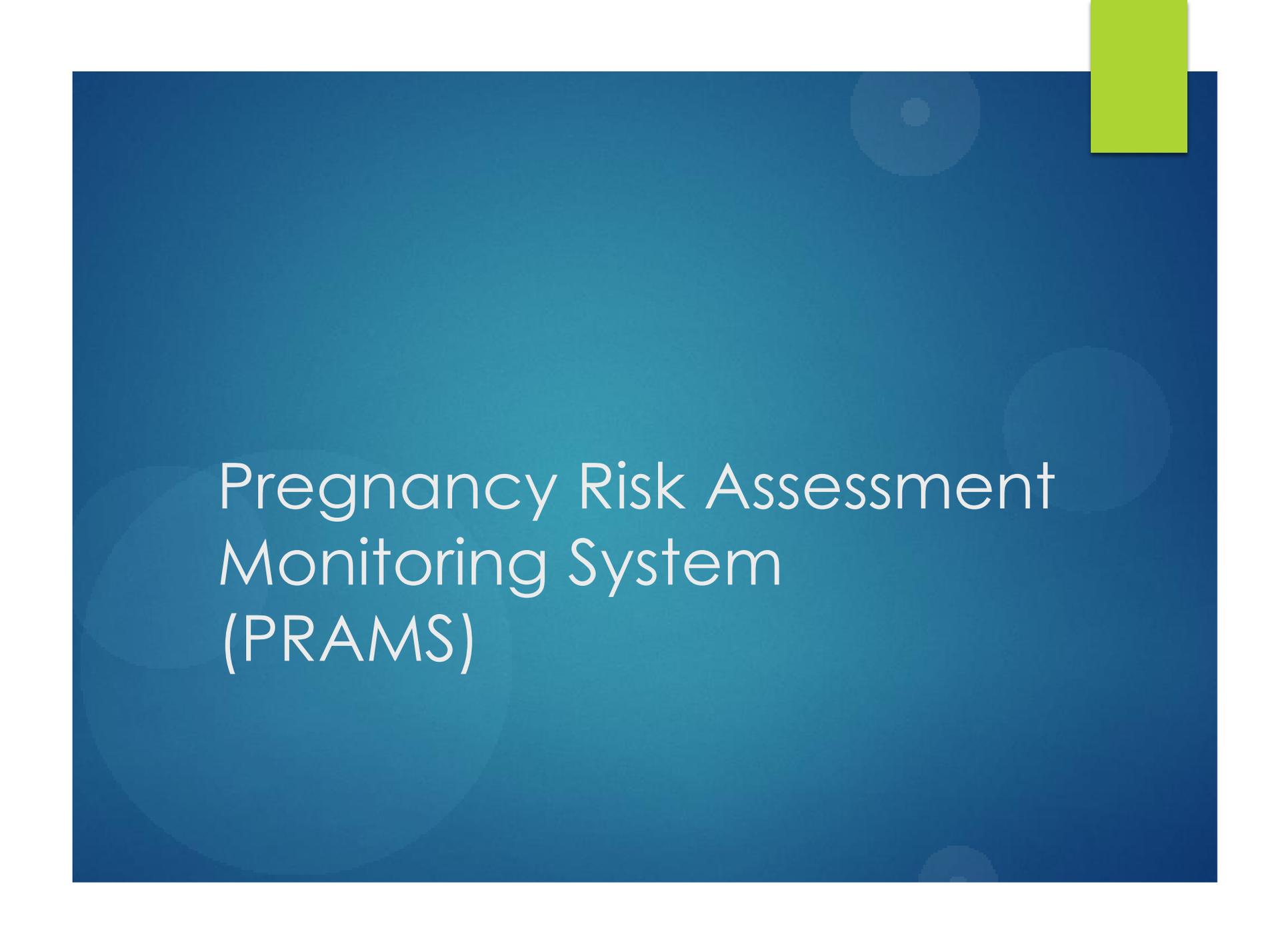
- Contact the data steward/representatives for the interested data
- All UDOH data release has to be approved by the data steward
- To access identifiable data requires
 - Legal authority, or
 - Researcher's IRB approval
 - UDOH IRB approval may be required for some data sets
 - A data sharing agreement with privacy and security requirements

Questions for consideration before a request

- Is there an absolute need to the requested identifiable data?
- Can the objectives of the request be achieved with non-identifiable data?
- What is the minimum data need for this study?
- Can you demonstrate that the need and benefit of using identifiable data outweigh the risk of using identifiable data?
- Can a simulated or test data set meet the need?

Questions?

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Pregnancy Risk Assessment Monitoring System (PRAMS)

PRAMS is...

- ▶ Part of the Centers for Disease Control (CDC) initiative to reduce infant mortality and low birth weight
- ▶ An ongoing, population-based risk factor surveillance system designed to identify and monitor selected maternal experiences that occur before, and during pregnancy and the child's early infancy among a stratified sample of mothers delivering a live birth

Objectives

- ▶ To promote the collection of population-based data of high scientific quality
- ▶ To conduct methodological and content analyses
- ▶ To translate results into useable information
- ▶ To assist states in building capacity

Data Collection in States

- ▶ Multiple mailings each month
 - ▶ Preletter introducing the survey
 - ▶ Mail survey packet including response incentive
 - ▶ Reminder/Thank you letter
 - ▶ 2nd survey packet for nonresponders
 - ▶ 3rd survey packet for nonresponders
- ▶ Telephone follow-up (up to 15 call attempts per mother)
- ▶ Each batch takes Utah PRAMS 91 days to complete

PRAMS Questionnaire

- ▶ 14-pages, booklet format for mail, modified version for phone surveys.
- ▶ English and Spanish versions
- ▶ Core questions common to all states (75%)
- ▶ State specific questions (25%)
 - ▶ Standard topic modules that states can select from
 - ▶ State developed questions

Validating Questions

- ▶ Validity of specific questions is addressed through pretesting.
- ▶ New questions are tested through cognitive interviewing, in which respondents are asked to describe their understanding of the question's meaning and how they arrived at their response.
- ▶ On the basis of the results of the cognitive testing, questions are revised.

Validating Questions (cont.)

- ▶ A second round of testing involves administering the questionnaire to respondents, who are asked to complete it and provide written feedback.
- ▶ Before the next revision cycle, questions are evaluated for item nonresponse, write in responses, and whether respondents correctly followed skip patterns.
- ▶ Questions that fare poorly in these evaluations are revised accordingly and pretested before being included in the questionnaire

Sampling

- ▶ **Target population:** Residents of Utah who have had a recent live birth in the state
- ▶ **Frame:** file of birth certificate records
- ▶ **Stratified samples:**
 - 1999 – 2003: baby's weight and Mom's race
 - 2004 - present: baby's weight and Maternal education
- ▶ **Monthly sample:** drawn 2-6 months after birth of infant

CDC Recommendations

- ▶ States do not select demographic groups comprising less than 2% of the population or fewer than 500 women for stratification
- ▶ States consider the potential bias from response rates below 65% as a representation of a considerable threat to the validity of PRAMS estimates and do not include this data for analysis.

What Happens to the Data?

- ▶ Data is submitted to the CDC monthly.
- ▶ At the end of each year, a file with all births in the state is sent to the CDC.
- ▶ The data is then weighted so that the answers from women who responded to the survey represent the whole birth population for that year.
- ▶ Data weighted to adjust for sampling and non-response.

What's So Great About PRAMS?

- ▶ PRAMS is a wonderful source of unique data for the states. We would not have access to these data from any other data source.
- ▶ Provides a link between mother's experience and medical data.

PRAMS Data

- ▶ Insurance
- ▶ Multivitamin use
- ▶ Preconception behaviors
- ▶ Pregnancy Intent
- ▶ Contraceptive Use
- ▶ Fertility Treatments
- ▶ Prenatal care content
- ▶ HIV Testing
- ▶ Hospital Stays
- ▶ Seatbelt use
- ▶ Postpartum depression
- ▶ Pregnancy Complications
- ▶ Smoking/Alcohol
- ▶ Stressors
- ▶ Physical Violence
- ▶ Breastfeeding
- ▶ Early infancy
- ▶ Elective induction
- ▶ Maternal mental health
- ▶ Oral Health Care
- ▶ Infant sleep (position, bed sharing)

IBIS-PH

- ▶ Selected Utah PRAMS data is available on the IBIS-PH website:
<http://ibis.health.utah.gov/>

Thank You

- ▶ Laurie Baksh: Lbaksh@Utah.gov
- ▶ CDC PRAMS website:
www.cdc.gov/prams
 - ▶ Online data for all states
available via the CPONDER
system

Facilities, and plans, and claims! Oh my!

Data Collected by the Office of Health Care
Statistics



Health Data Committee



OHCS collects data on behalf of the HDC in accordance with 26-33a of the Utah Health Code.

Databases at OHCS

Facilities data

encounter data

Health Plan data

performance data

Claims data

financial data

Facilities Data Collection



All patient encounters at licensed hospitals, ED, and ambulatory surgical centers are submitted

Contains billing information, medical codes, patient characteristics, and services received.

Facilities Data Reporting

MONAHRQ

Hospital Comparison Tool

quality, charges, avoidable stays, and county rates of use

IBIS-PH

Indicators using national standards and custom queries

HI-IQ

Query frequencies by geography and injury type.

Facilities Data Availability

Hospital Discharge (inpatient) 2012

Beginning in 1992

Ambulatory Surgical Center 2011

Beginning in 1996

Emergency Department 2011

Beginning 1996

Health Plan Collection

HEDIS

Required payers submit annual performance data
measures developed by NCQA

CAHPS

Member satisfaction survey conducted annually
measures developed by AHRQ



Health Plan Reporting

HEDIS and CAHPS

Both reported on health.utah.gov/myhealthcare

CAHPS displayed on Insurance Dept's Rate Review
site

Indicators on IBIS-PH

Health Plan Availability



HEDIS 2013

Beginning in 2000

CAHPS 2013

Beginning in 2000

Claims Data Collection

Commercial payers with 2,500+ covered lives
in Utah

3M/Treo Solutions

Collected monthly and processed semiannually

Claims Data Reporting

Maternity Cost

What does it cost to have a baby?

UtahHealthScape.org

geographic analysis

Lower Back Pain with Imaging Procedure

IBIS-PH Indicator showing geographic distribution

Claims Data Availability

De-Identified APCD Data Set (DIADS)

Legacy data from 2011 to mid-2013

medical and Rx claims

BIG Data!

OHCS Contact Information



data requests, additional info, and publications
on our website:

health.utah.gov/hda

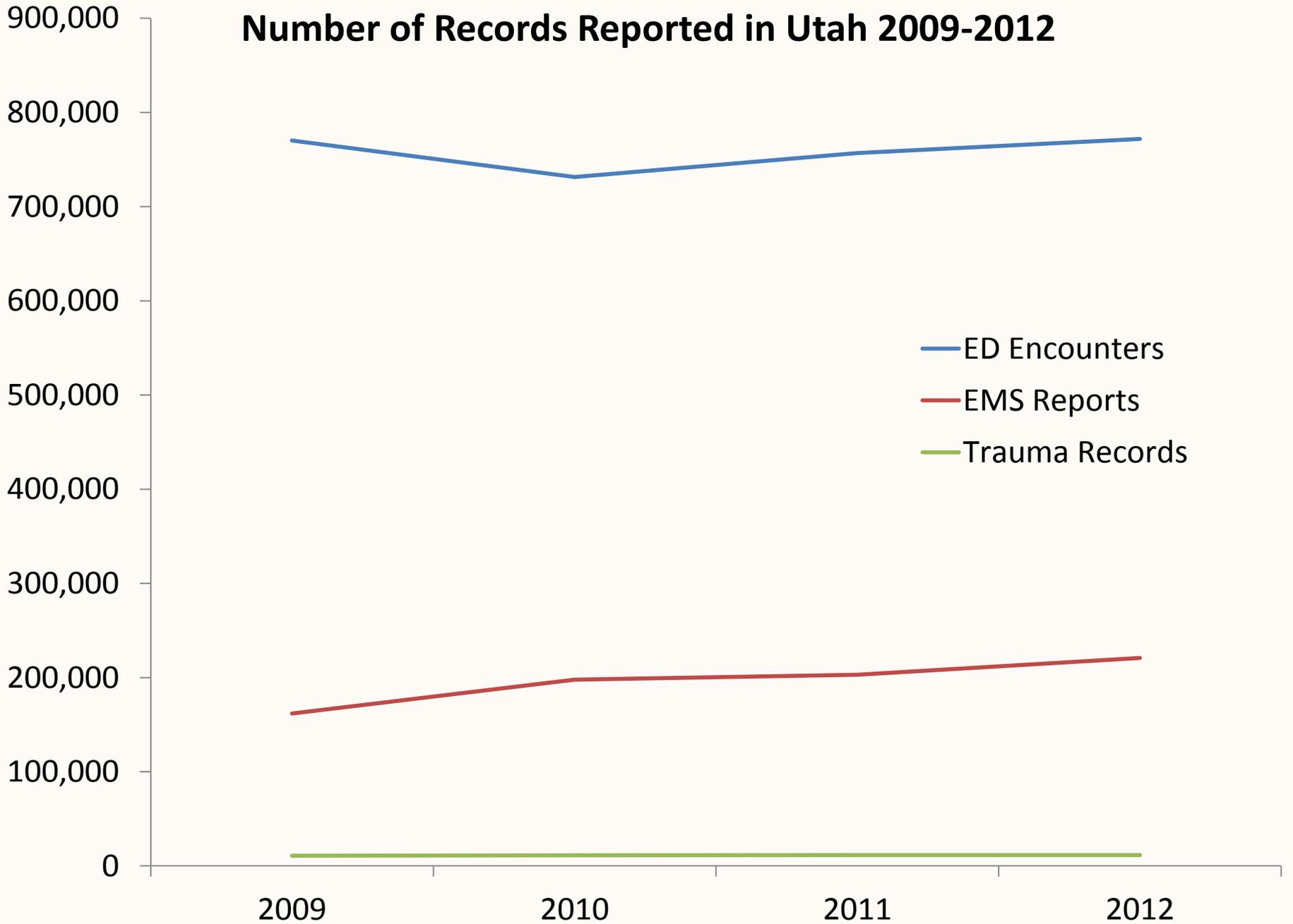
Email: chawley@utah.gov

Three Emergency Medical Care Data Reporting Systems to Support State and National Improvement in Acute Care Population Outcomes

Bureau of Emergency Medical
Services and Preparedness



Number of Records Reported in Utah 2009-2012



Three State and National Acute Care Surveillance Partnerships

1. National Trauma Data Bank (NTDB) supported by the American College of Surgeons (ACS)
2. Nationwide Emergency Department Sample (NEDS) supported by the Agency for Healthcare Research and Quality (AHRQ)
3. National Emergency Medical Services Information System (NEMSIS) supported by the National Highway Traffic Safety Administration (NHTSA)



National Trauma Data Bank



About Quality Programs

ACS NSQIP

ACS NSQIP Pediatric

Bariatrics

Breast Disease

Cancer

Surgeon Specific Registry

Trauma

The National Trauma Data Bank® (NTDB®) is the largest aggregation of U.S. trauma registry data ever assembled. Participation is voluntary and is one of the leading performance improvement tools of trauma care. You will find the operational definitions for the NTDB in the [National Trauma Data Standard \(NTDS\) Data Dictionary](#), which is designed to establish a national standard for the exchange of trauma registry data. Registry data that is collected from the NTDB is compiled annually and disseminated in the forms of hospital benchmark reports, data quality reports, and research data sets.

Research Data Sets >

NTDB Research Data Set and National Sample Program

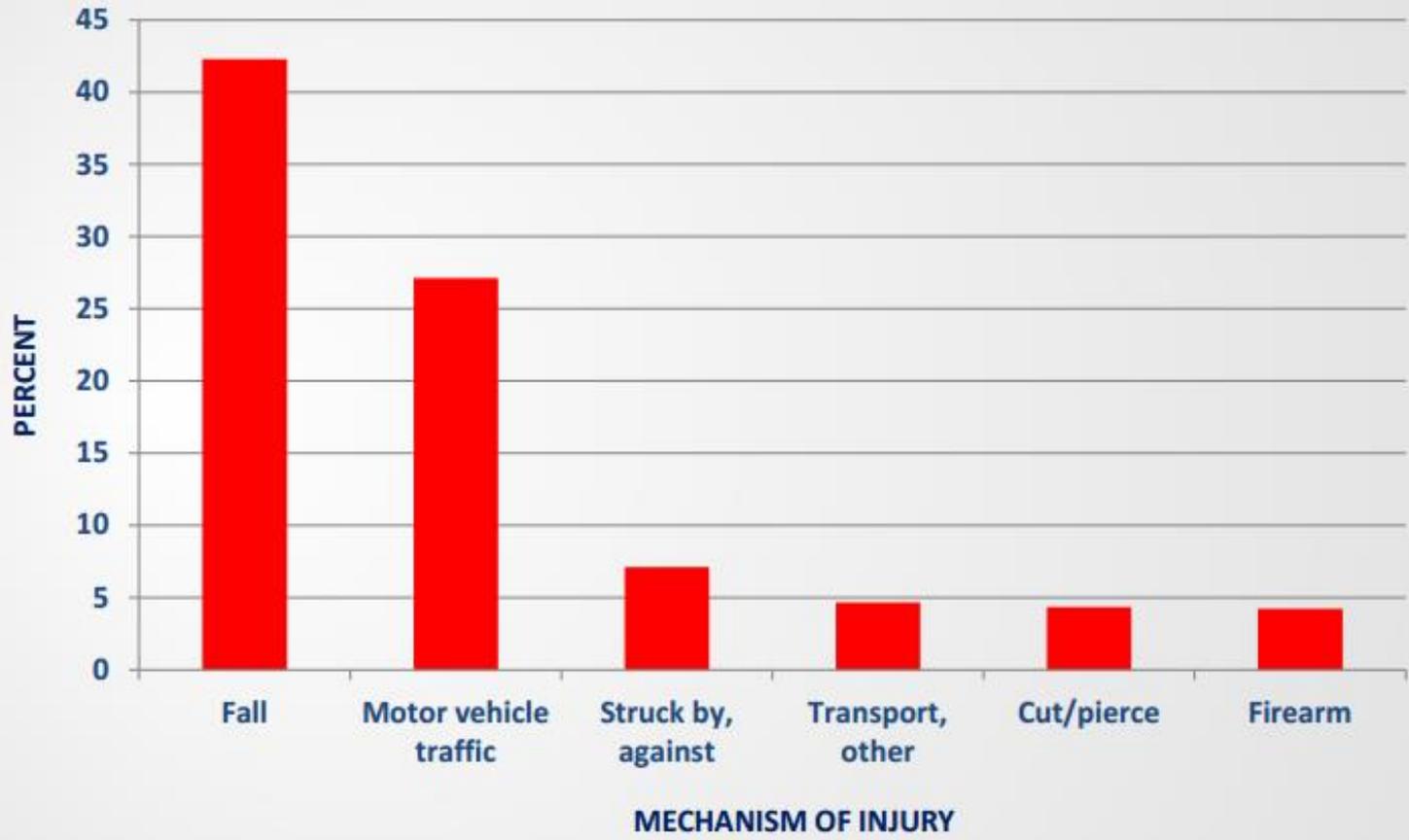
NTDB offers several Research Data Set (RDS) products. The NTDB RDS contains all records sent to NTDB for specified admission years. [The NTDB National Sample Program \(NSP\) RDS](#) are based on the nationally representative sample of NTDB. You may request the NTDB RDS or the NSP RDS for your research purposes. How do you choose NTDB RDS or NSP RDS?

Participate >

NTDB collects trauma registry data from participating trauma centers on an annual basis. Data are aggregated and used to produce annual reports, hospital benchmark reports, and data quality reports.

Figure 15A

Incidents by Selected Mechanism of Injury



Utah Trauma Registry Data

- Review the traumatic injury annual reports, state and national...foundation perspective
- Visit the Utah Trauma Registry website...
 - <https://www.utahtrauma.org>
- Specific inclusion criteria targets patients receiving medical care for major trauma
- Online data request and IRB forms...

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Data Resources

- ▶ [Data Sources Available from AHRQ](#)
- ▶ [Healthcare Cost and Utilization Project \(HCUP\)](#)
- ▶ [Medical Expenditure Panel Survey \(MEPS\)](#)
- ▶ [State Snapshots](#)
- ▶ [Filling the Information Needs for Healthcare Reform](#)
- ▶ [U.S. Health Information Knowledgebase \(USHIK\)](#)

Healthcare Cost and Utilization Project (HCUP)

Sign up: [✉ HCUP Mailing List Email updates](#)

Largest collection of nationwide and State-specific longitudinal hospital care data in the United States enables research on a range of health policy issues.

Find complete program information on the [HCUP-US Web Site](#).

Generate your own health care statistics on [HCUPnet](#).

Overview of HCUP

The [Healthcare Cost and Utilization Project](#) (HCUP, pronounced "H-Cup") is a family of databases and related software tools and products developed through a Federal-State-Industry partnership and sponsored by AHRQ. HCUP databases are derived from administrative data and contain encounter-level, clinical and nonclinical information including all-listed diagnoses and procedures, discharge status, patient demographics, and charges for all patients, regardless of payer (e.g., Medicare, Medicaid, private insurance, uninsured), beginning in 1988. These databases enable research on a broad range of health policy issues, including cost and quality of health services, medical practice patterns, access to health care programs, and outcomes of treatments at the national, State, and local market levels.

The HCUP databases are based on the data collection efforts of organizations in participating States that maintain statewide data systems and are [Partners with AHRQ](#)

HIGHLIGHTS

[Costs for Hospital Stays in the United States, 2012](#)
[HCUP Statistical Brief #181](#)

[2011 National \(Nationwide\) Inpatient Sample \(NIS\)](#)
National estimates of inpatient hospital visits

[2010 Nationwide Emergency Department Sample \(NEDS\)](#)
National estimates of emergency department (ED) visits

[Publications & Products](#)

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STATISTICAL BRIEF #179

September 2014

Trends in Emergency Department Visits, 2006–2011

Halcyon G. Skinner Ph.D., M.P.H., Janice Blanchard M.D., Ph.D., and Anne Elixhauser, Ph.D.

Introduction

There has been an overall increase in emergency department (ED) visits over the past two decades.¹ However, ED visits for specific conditions have shown varying patterns, and visits for some conditions have decreased in recent years.²

There are a number of factors that may affect both positive and negative trends in growth for condition-specific ED visits. Some of those factors are personal, such as an individual's specific health condition. Other factors are related to the community where the individual lives—for example, the availability of health care options.

Changes in health care are reflected in ED use. For example, with improved care coordination some conditions may now be more effectively managed in the outpatient setting, which reduces the need for the acute care provided by EDs.^{3,4} Updated

Highlights

- The rate of ED visits over the 5-year period from 2006 to 2011 increased among patients aged 45–64 years (8 percent increase).
- Across all conditions with at least 100,000 ED visits in 2006, the most rapid increase (74 percent) by 2011 occurred for septicemia, a bloodstream infection. The most rapid decrease (30 percent) occurred for noninfectious gastroenteritis.
- Between 2006 and 2011, the rate of ED visits for substance-related disorders (not including alcohol) increased 48 percent. Over the same time period, ED visits for alcohol-related disorders increased 34 percent.
- Among the most common reasons for ED visits, *sprains*

Utah Emergency Department Data

- Visit the state website and review ED annual report...summarizes ED trends statewide and provides detail about each ED.
- Variables in the dataset include demographics, dates of care, diagnoses, procedures, charges, payers, etc...
- Online data request and IRB forms...

Three State and National Acute Care Surveillance Partnerships

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INITIATIVES

Education

NEMSIS

Advancing EMS Systems

Preparedness

Research

Safety

Workforce

911 System

NEMSIS

The National EMS Information System (NEMSIS) provides the framework for collecting, storing, and sharing standardized EMS data from States nationwide. The new NEMSIS database will empower EMS stakeholders at the local, State, and national levels with the information necessary to accurately assess EMS needs and performance today - and strategically plan for tomorrow.

Using National EMS Information System Data for Syndromic Surveillance

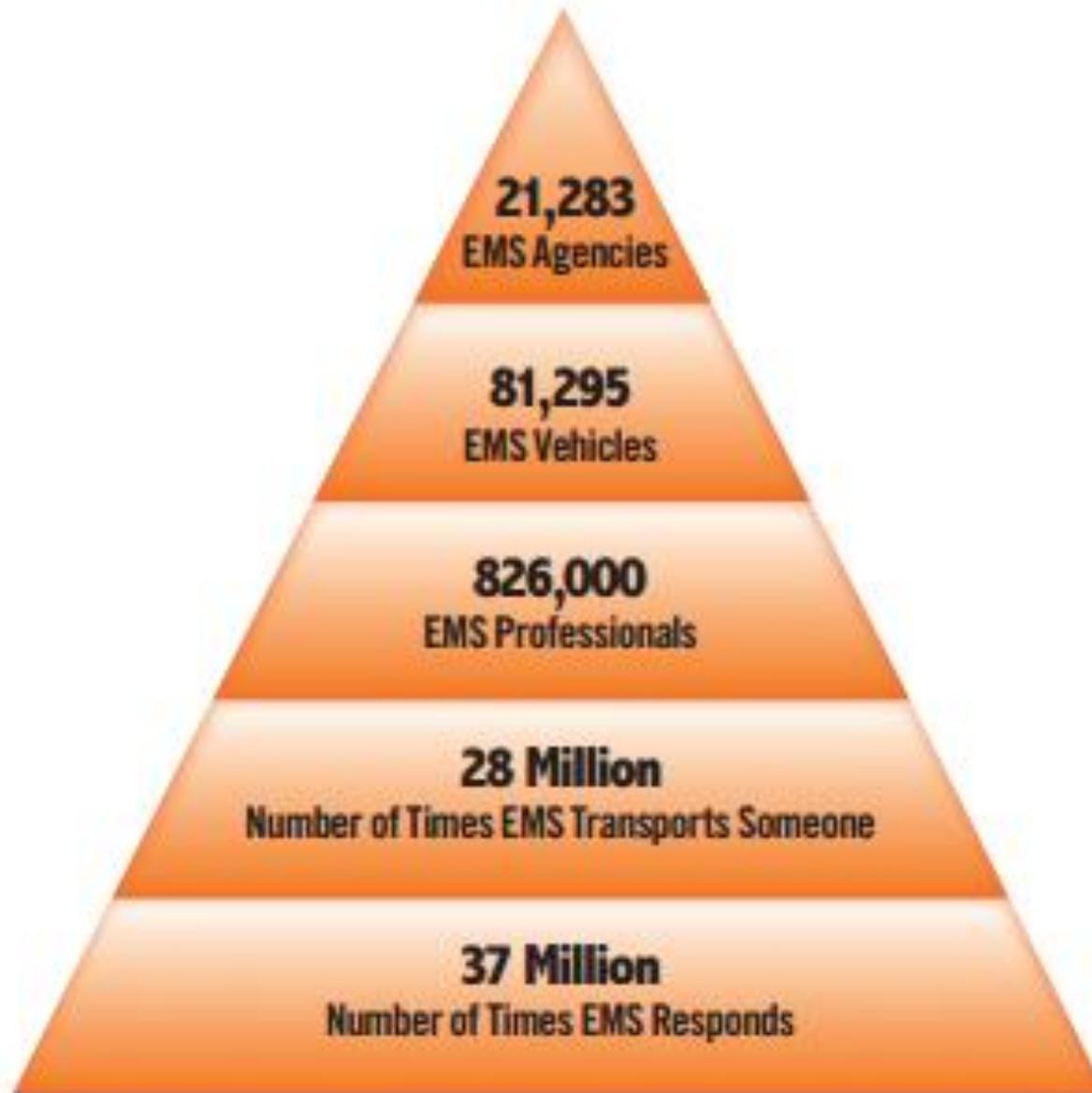
On January 31st, an overview of public health, 9-1-1, the emergency medical services system and the National Emergency Medical Services Information System (NEMSIS) was provided as part of a Webinar entitled, "Introduction to NEMSIS and its Potential Uses in Syndromic Surveillance." During this 90 minute presentation, over 200 participants listened and asked questions as presenters from the NEMSIS Technical Assistance Center and NHTSA's Office of EMS discussed how NEMSIS data can be used in syndromic surveillance. Server hosting was provided by the International Society for Disease Surveillance (ISDS) and a recording of the presentation can be found at the [ISDS website](#).

NEMSIS Technical Assistance Center



The NEMSIS Technical Assistance Center (TAC) offers technical assistance on the implementation and tracking of national EMS data. [Get more information on NEMSIS.](#)

The National EMS System by the Numbers⁵ 2011



Utah EMS Prehospital Data

- Visit the state and national websites...
- <https://health.utah.gov/ems/data/polaris>
- <http://www.nemesis.org/index.html>
- Variables in the dataset include demographics, dates of care, emergency type, diagnoses, procedures, etc...
- Online data request and IRB forms...



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STEMI, Stroke,
Trauma\)](#)

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Data

Prehospital Data

- [Pre-Hospital On-Line Active Reporting Information System \(POLARIS\)](#): POLARIS is Utah's NEMSIS-based prehospital patient care reporting system.
- [Automated Incident System \(AIS\)](#): AIS is the legacy prehospital data system used by the Bureau prior to POLARIS.
- [IBIS-PH Prehospital Query Module](#): Online querying and analysis of publicly available prehospital data.

Emergency Department Data

- [Emergency Department Annual Reports \(EDAR\)](#)
- [Information about Emergency Department data file formats](#)
- [IBIS-PH Emergency Department Query Module](#): Online querying and analysis of publicly available Emergency Department data.

Trauma Registry Data

Information about the Trauma Registry data system, including the data dictionary, is available on the [Trauma Systems](#) section of the Bureau Web site.

Other Data Sources

- [BEMSP Data Release Policy](#)
- [BEMSP Data Release Form](#)
- [Utah's Indicator-Based Information System for Public Health \(IBIS-PH\)](#)
- [EMS Provider Agency List](#)
- [BEMS Certification System](#) for public access to information about upcoming certification courses and current certifications held by EMS personnel

Questions?

Utah Department of Health Data Fair

Anna Fondario, MPH

Cristy Sneddon, RHIT

Violence and Injury Prevention Program

Our mission is to be...

“a trusted and comprehensive resource for data and technical assistance related to violence and injury. With this information, we help promote partnerships and programs to prevent injuries and improve public health.”

Research
shows that
most injuries
are predictable
and
preventable.



VIPP Data

- Traumatic Brain Injury
- Spinal Cord Injury
- Surveillance Quality Improvement
- Student Injuries
- Utah Violent Death Reporting System
 - Domestic Violence-Related Homicides/Suicides
 - Child Fatalities
 - Prescription Drug

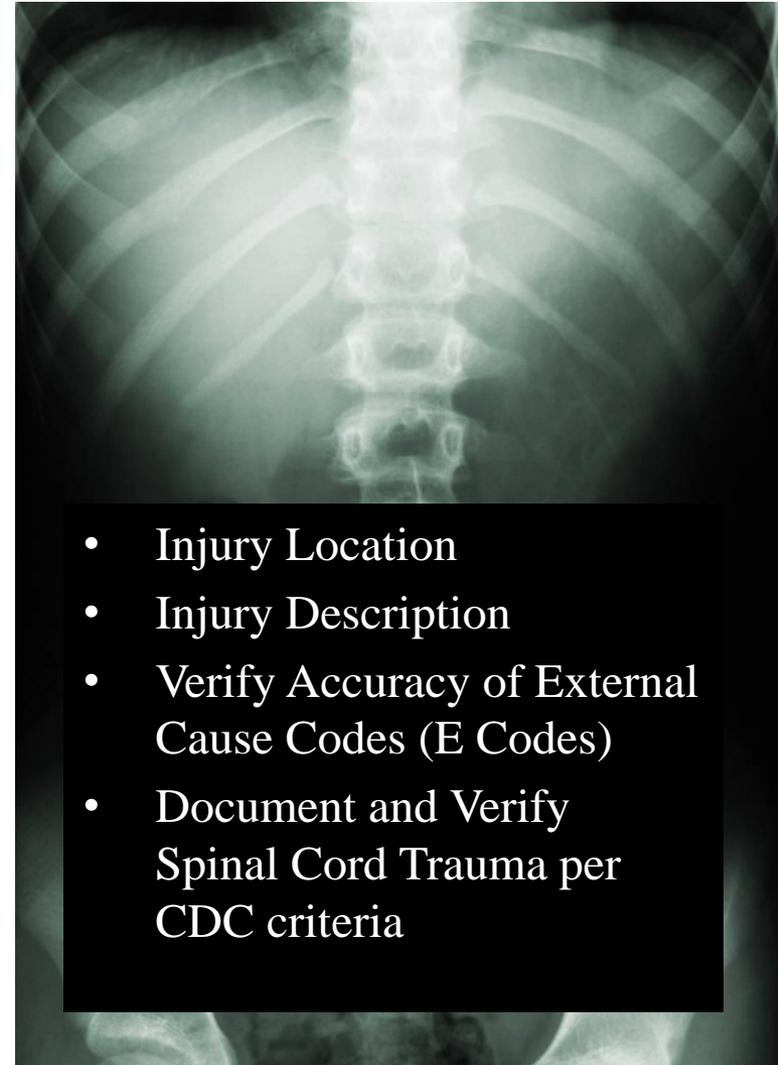


Traumatic Brain Injury

- Vital Records and Hospital Discharge Data
 - Specific set of ICD-9 and ICD-10 death codes determined by CDC
- Criteria
 - New onset acute care
 - Injury within 1 year
- Random Sample of Hospital data
 - Injury Location
 - Injury Description
 - Verify Accuracy of External Cause Codes (E Codes)
 - Head Trauma
 - Injury Severity (AIS)
 - Concussion
 - Amnesia
 - Loss of Consciousness

Spinal Cord Injury

- Hospital Discharge Data
 - Specific set of ICD-9 codes determined by CDC
- Review all cases
- Criteria
 - New onset acute care
 - Injury within 1 year



Surveillance Quality Improvement

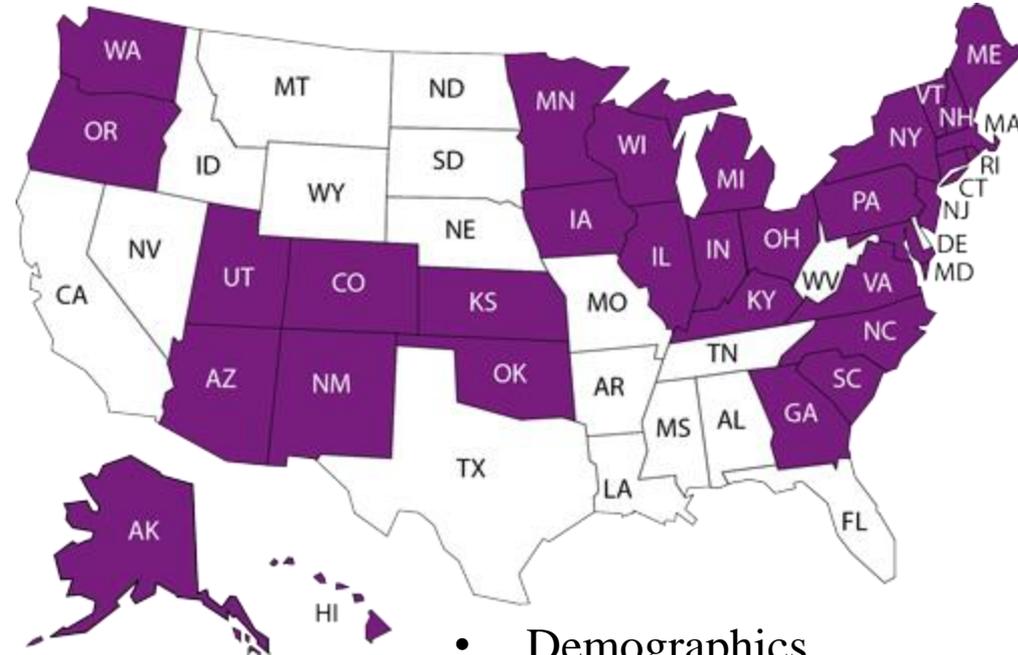
- Core Group
 - CDC, UT, NC, CO, MA
- Project focus changes every year according to emerging public health concerns
 - All Injury, Opioid Overdose, Elderly Falls
- Hospital Discharge Data
 - Project criteria determined by core group
- Random Sample
- Variables determined by project
- Consistently gather and Verify Accuracy of External Cause Codes (E Codes) per hospital documentation
- Injury Information
- Co-Morbid Conditions
- Use of Naloxone

Student Injuries

- Utah public schools
- Criteria
 1. Injury caused the loss of at least one-half day of school and/or
 2. Injury required medical attention and treatment from a school nurse, physician, or other health care provider
- Demographics
- Action taken
- Nature of injury
- Area affected
- Contributing factor
- Period
- Surface
- Location
- Activity
- Equipment
- Description

Utah Violent Death Reporting System

- 32 States
- Four Major Data Sources
 1. Death Certificates
 2. Medical Examiner Data
 3. Law Enforcement Data
 4. Crime Lab



- Demographics
- Circumstances
- Relationship between victim and suspect
- Weapon
- Toxicology
- Location of injury

Utah Violent Death Reporting System

- Homicides
- Suicides
- Deaths of undetermined Intent
- Firearm-related deaths
- Rx drug deaths
- Child fatalities
- Domestic violence-related fatalities



Data Requests

- Contact Violence and Injury Prevention Program
- Data Sharing Agreement
- IRB



Questions?

Thank You

UDOH Health Surveys



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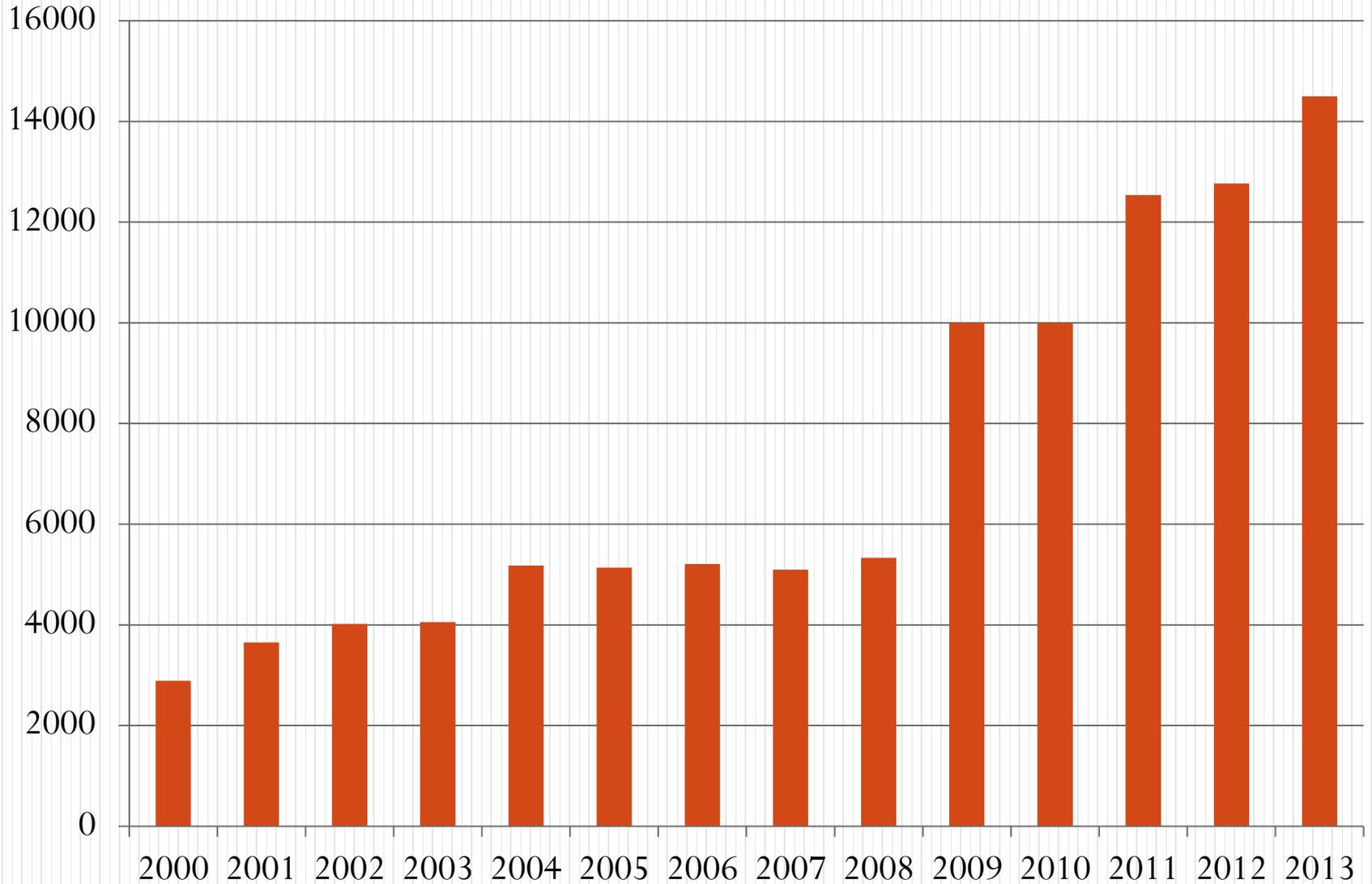
Health Survey Data: Need to Know

- Codebook
- Setting up design statements
- Using correct weights
- Appropriate software
- How do I get the data?
 - Do I want state-added questions?

Behavioral Risk Factor Surveillance System (BRFSS)

- Initiated in 1984 in 15 states
- The BRFSS is a Random Digit Dialed (RDD) survey
- Multistage
 - Household is contacted
 - Randomly selected adult is interviewed
- Disproportionate Stratified Sampling

Utah BRFSS Completes by Year



Fixed Core

- Demographics
 - Height & Weight
 - Zip Code
 - Race/Ethnicity
 - Income and Education
- General Health
 - Health Status
 - Access to Care
 - Disability
- Chronic Conditions
 - Diabetes
 - Asthma
 - Cardiovascular Disease
- Risk Behaviors
 - Tobacco Use
 - Alcohol Consumption

Rotating Cores

- Odd Years

- Fruits & Vegetables
- Hypertension Awareness
- Cholesterol Awareness
- Arthritis Burden
- Physical Activity

- Even Years

- Women's Health
- Prostate Cancer Screening
- Colorectal Cancer Screening
- Oral Health
- Injury

Optional Modules

- Diabetes (2011-2014)
- Heart Attack/Stroke (2009, 2011)
- Arthritis (2009, 2011, 2013, 2015)
- Immunizations (2009, 2010)
- Cancer Survivor (2010)
- Mental Illness & Stigma (2009)
- Cognitive Impairment (2011, 2015)
- Family Planning (2011)
- Social Context (2015)
- Adverse Childhood Experiences (2010)
- Random Child Selection (2011-2015)
- Child Asthma Prevalence (2009-2014)
- Childhood Asthma Prevalence (2009, 2011-2014)
- Child Immunization (2009-2010)

Utah State-added Questions

Examples:

- Fast food consumption
- Reasons for not having cancer screening
- Child screen time
- Prescription drug use
- Family dinners
- Folic acid
- Hypertension and cholesterol
- Health insurance



Data Interpretation: Weighting

- From 1982 to 2010 CDC used post stratification to weight data
- In 2011, iterative proportional fitting (raking).
 - Allows for more demographic variables and integrates cell phones better
 - Possible because of better computers and ACS “gold standard” estimates

Youth Risk Behavior Survey

- Collected nationally and in most states
- Grades 9-12 in odd-numbered years
- National core and state-added questions
- Strong methodology
 - Randomly selected schools
 - Randomly selected classes within school
 - Entire class sampled
 - Active consent
 - Paper and pencil administration
 - Require a 60% response rate

Youth Risk Behavior Survey

- Alcohol and tobacco, drug use
- Asthma
- Safety
- Violence-related behaviors
- Physical activity and nutrition
- Obesity
- Depression, suicide ideation

Ways to Get Data

- Read briefs/publications
 - Ex. CDC Obesity state-by-state comparisons
 - Ex. Reports and summaries from state health departments
- Run queries
 - CDC has mapping and comparison tools
 - Utah has IBIS to do the same
- Get the data set
 - Download from the CDC for core questions
 - We can share data sets with state-added questions
 - Data sharing agreement



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Why Are Vital Statistics so Vital?

Or how Vital Records can inform public
health policy, programs and decision-
making

Vital Records as a Legal Document

1632—Colony of Virginia required reports by clergy every June 1st on events within their jurisdiction

1795—Massachusetts allowed fines on individuals who failed to file births, marriages and deaths timely AND allowed registrars to charge for a “fair copy” of a certificate.

These early laws were enacted to establish legal identity and claims on property and inheritance

Progressive Era and New Deal—Creation of income tax and deductions for dependents, Social Security, Medicare & Medicaid reinforce the need for legal documentation of identity from birth to death

That role continues today and has been strengthened since the creation of the Department of Homeland Security and implementation of the Real ID Act



Vital Records as Legal Records

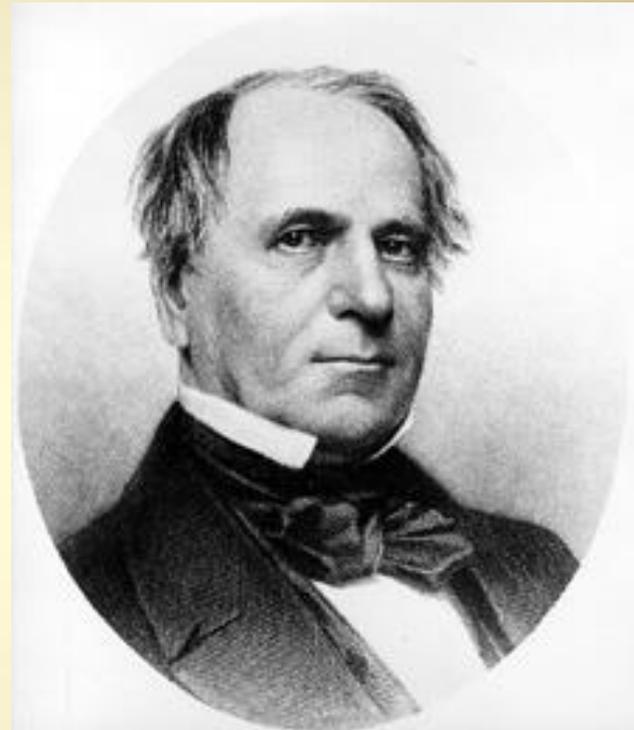
- Social, Cultural and Political resistance to the idea of a “national identity card.”
- Vital Records are seen as the proxy for that national ID
 - Still issued at a state or in some locations, local level
 - 57 registration districts in the US
 - Work together through CDC/NCHS to provide as much congruity across registration districts
- While some citizens live “off-the-grid” and do not register births with Vital Records, it is difficult to navigate the modern world without a birth certificate
- Registration of event provides legal recognition of the individual and the protection of the law

Vital Records as Public Health Information

Taken originally from the idea of “bills of mortality” published since Colonial times, again at a local level

Lemuel Shattuck, founder of the American Statistical Association moved mortality rolls into standardized collection of causes of death. Shattuck was instrumental in founding the first state-level Board of Health in the United States. The Massachusetts Board of Health was founded by legislation in 1869

Shattuck was also a champion of the idea that physicians are to voluntarily provide complete and accurate vital statistical information to vital records offices **without** monetary remuneration to further public health goals



Vital Statistics Goes Viral

- 1880 Census
- Utah's Office of Vital Records and Statistics was created in 1905
- OVRS is the only DOH office mandated to exist by Utah Code
- Statistical information from Vital Records is used at all levels of government for a variety of purposes

Birth Certificate

- Legal Items

- Names (child, mother & father)
- Place of Birth (facility)
- Date and time of birth
- Mother's Residential Address
- Parents Dates of Birth
- Parents' SSNs
- Date Filed

- Statistical & Medical Items

- Parents Race & Ethnicity
- Education level
- Prenatal Care Questions
- Mother's Risk Factors
- Source of Payment (Medicaid, Other Government Insurance, Self-Pay, Private Insurance)

Birth Certificate Continued

- Statistical & Medical Items (Mom con't)
 - Infertility
 - Infection
 - Method and Characteristics of Delivery
 - Maternal Morbidity

- Statistical & Medical Items (Infant)
 - Birth weight
 - Est. of Gestation
 - APGAR scores
 - Plurality/Birth Order
 - Abnormal conditions
 - Congenital Anomalies
 - Infant Transferred
 - Infant Deceased
 - Breastfed at Discharge

Voluntary Reporting

- All information gathered on the birth worksheets is reported voluntarily by the parents and health care providers involved in the birth
- Balance of privacy vs. public health needs
- Our medical and health data is only as good as is recorded on the forms
- Birth clerks do check medical records
- OVRs does have an auditing process in place
- Still dependent on Shattuck's idea of health care providers completing the information in full to further the goals of public health

Death Certificates

- Deaths from infectious diseases were the primary reason mortality rolls were created.
 - Samuel Pepys and the Black Death outbreak in London in 1666
 - Local officials would often alter official rolls
 - Until recently, with the advent of real-time infection disease reporting, death certificates were a primary tool in surveillance

Death Certificates

- Legal Information

- Decedent's name
- Gender
- Date and Time of Death
- Date of Birth and Age
- Birth Place
- SSN
- Place of Death
- Marital Status
- Military Status
- Surviving Spouse
- Parents
- Informant
- Disposition of Remains

- Medical and Statistical Information

- Decedent's Occupation and Industry
- Cause of Death—timeline and etiology
- Other significant factors contributing to the death
- Autopsy performed
- Tobacco Use
- Manner of Death
- Injury information (if applicable)
- If Female, pregnancy information
- Decedent's demographic information

Voluntary Reporting

- All information gathered on the death certificate is reported voluntarily by the informant and physician of record at the time of death
- Balance of privacy vs. public health needs
- Our medical and health data is only as good as is recorded on the forms
- Funeral homes are required by statute to get the physician of record or his/her representative to sign the document
- Local Health Officers have the responsibility of auditing all death records recorded in their area for quality control.
- Still dependent on Shattuck's idea of health care providers completing the information in full to further the goals of public health

Fetal Deaths

- Fetal death certificate is a hybrid of a birth certificate and a regular death certificate
- Only used for still births greater than 16 weeks in gestation who die *en utero* or who are born without signs of life
- Any fetus born with signs of life (regardless of viability) is to have a registered birth and death certificate



**Cradle to Grave, Vital
Records tell us
something**

So Why are Vital Statistics Vital?

- CDC relies on birth and death certificates as the official facts of birth and death
 - This information is used to target DHHS/CDC funding of public health issues
- US Census Bureau relies on birth and death data to build intercensal population estimates
- Academic Studies

Questions and Answers

Janice Houston
State Registrar & Director
Office of Vital Records & Statistics
Utah Department of Health
jlhouston@utah.gov

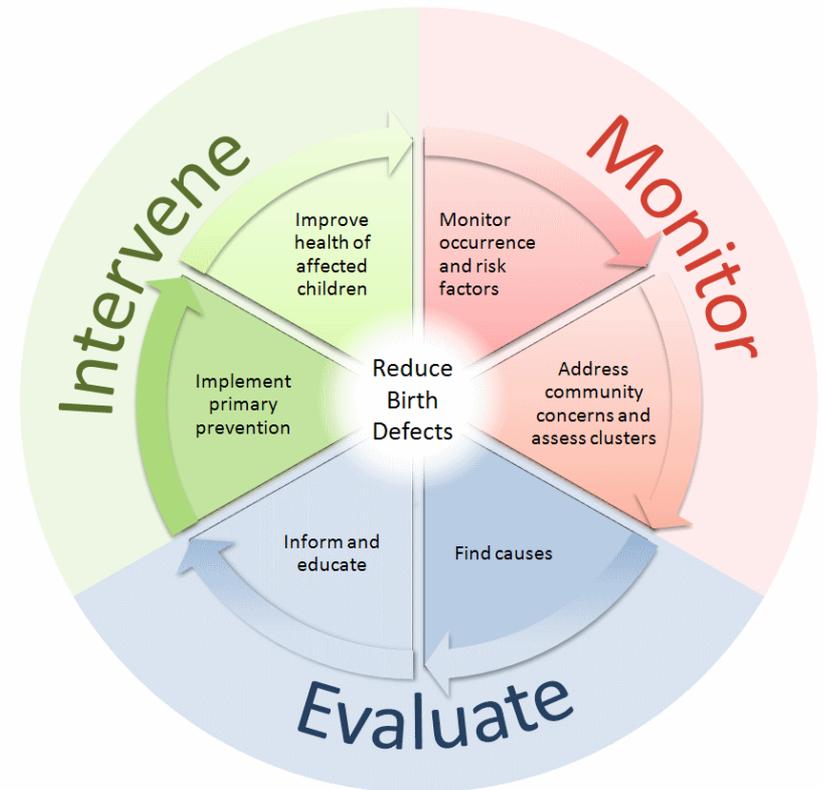


Utah Birth Defect Network (UBDN)

Amy Nance, MPH
Program Manager

UBDN

- 3 Components:
 - Surveillance
 - Research
 - Prevention



Surveillance



Goals: Timely, Accurate, Complete Data

- Children with Special Health Care Needs Bureau, Division of Family Health and Preparedness
- CDC and National Birth Defects Prevention Network
 - ✓ Standards and recommendations
- Data calls for CDC, NBDPN, ICBD, Birth Defects Research publication; multi state research projects; cluster studies

UBDN Surveillance

- Track all major structural birth defects
- Statewide surveillance system
- Active/Passive surveillance
- Sources: Birth Defect Reporting Rule 398-5
 - Hospital Discharge data
 - Labs, clinics and birthing facilities
 - Birth and Fetal Death Certificates
 - Medical records abstraction

Significance in Utah



- Utah: 1,200 children are born with serious birth defects every year
 - the reportable birth defect rate for Utah is 22.6 cases per 1,000 live births.
- Birth defects are a leading cause of death for infants (>28 days; < 365 days)
 - 30% of all infant deaths
 - Each year, more infant deaths are attributed to birth defects than prematurity and SIDS/SUIDS combined

Utah



- The most common type of anomalies are congenital heart defects (CHDs).
- The most common *specific* anomalies observed are Down syndrome, and orofacial clefts.
- UT has higher than average rate of orofacial cleft defects, as high as 1 in 482 births

<http://ibis.health.utah.gov/indicator/index/Alphabetical.html#B>

Associations

- CHDs
 - ~30% are not diagnosed prenatally
 - May not present for several days or even months
 - Pulse oximetry screening
- Down Syndrome
 - Higher rates of heart defects
- Oral Clefts
 - Midline defect
 - Syndromes
 - Feeding issues

Prevention

- **Primary** – Prevent Birth Defects
- **Secondary** – Prevent Morbidity & Quality of Life Issues
- **Tertiary** – Preventing Birth Defect Related Deaths

Secondary and Tertiary Prevention



- Newborn Screening
 - Heel Stick Screening
 - Hearing Screening
 - Pulse Oximetry Screening
- Secondary Issues/ Associations
 - standard screenings
 - genetics

Primary Prevention



The causes of 82.2% of birth defects are unknown.

Known causes include:

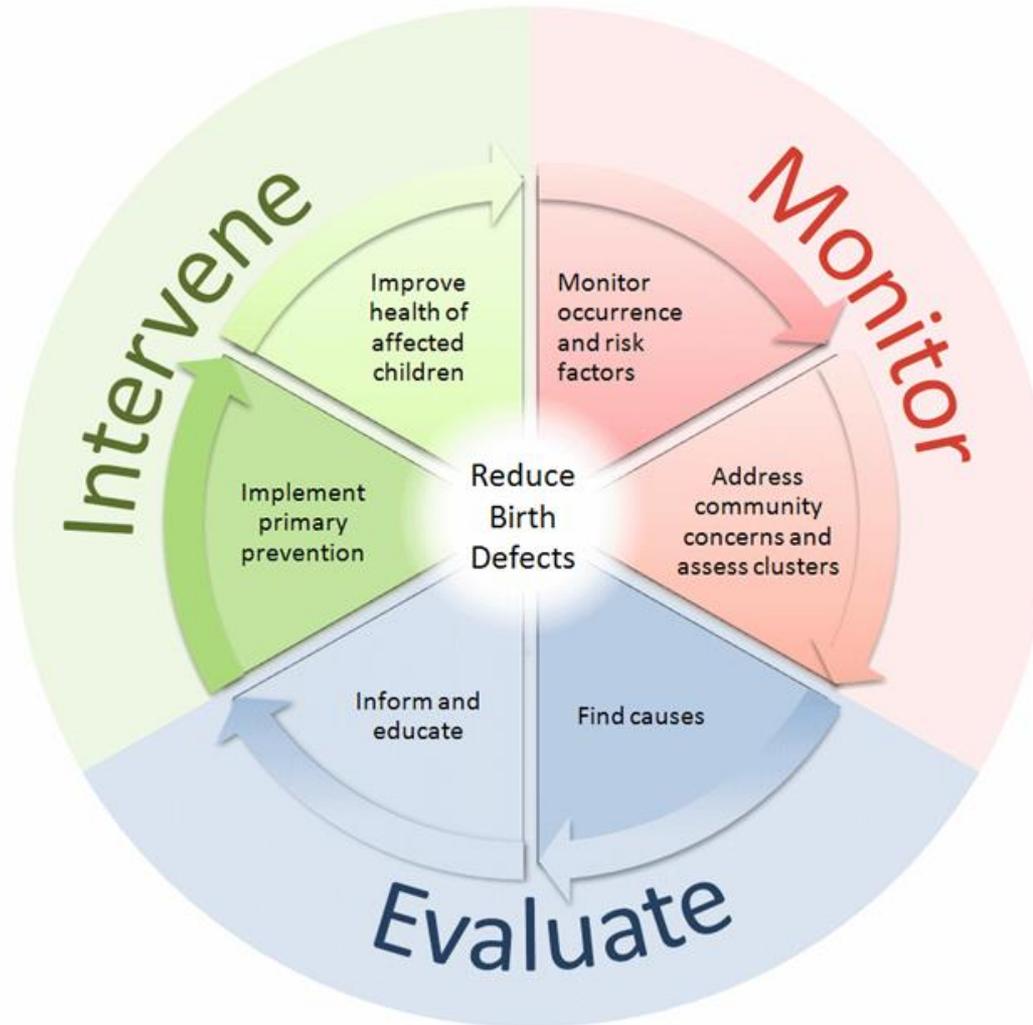
Chromosomal 13.9%

Genetic 3.2%

Twinning 0.3%

Teratogen 0.4%

Research



Recent Studies



- Utah Study to Identify Genes that Play a Role in Birth Defects
- Utah Cleft Lip and Cleft Palate Study
- Utah Center for Birth Defects Research and Prevention
- Medical costs and quality of life of children with craniofacial anomalies and their families in Utah

Other Data Sources

- Children with Special Health Care Needs
 - Newborn Screening
 - Heel Stick
 - Hearing
 - CCHD
 - Pregnancy Riskline
 - Utah Registry of Austin
 - National survey CSHCN data

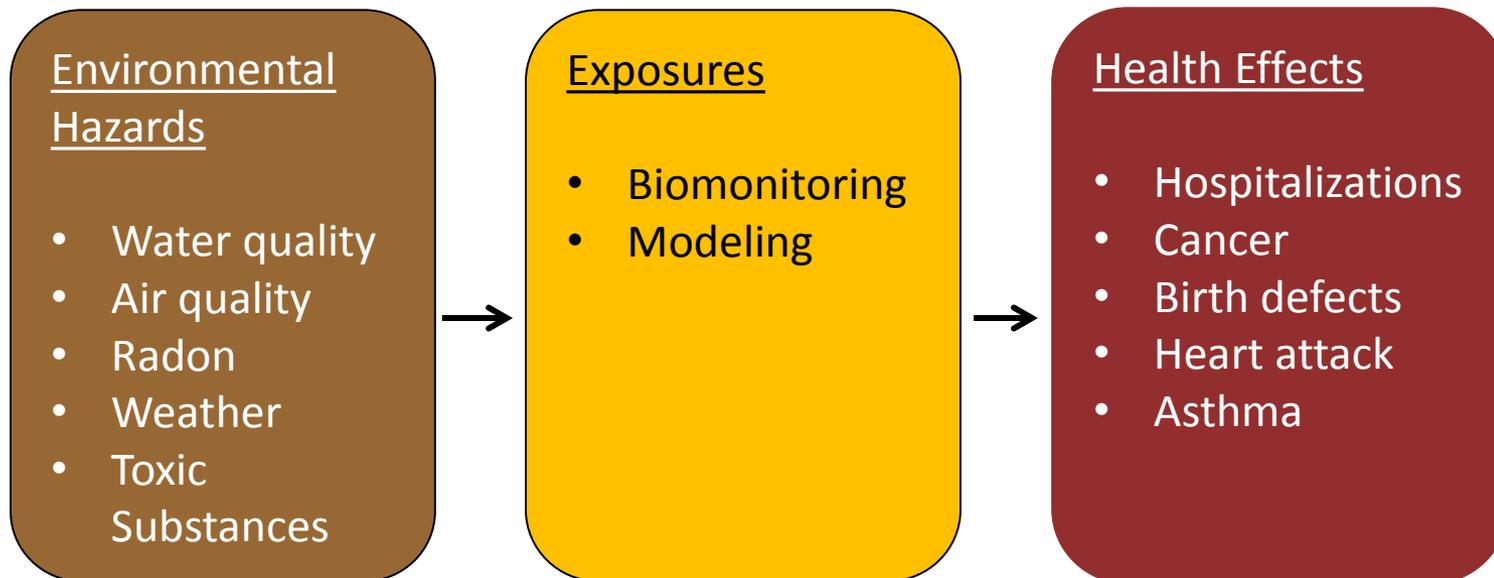
<http://www.childhealthdata.org/learn/NS-CSHCN>



**Utah Environmental Public Health
Tracking Network
&
Utah Blood Lead Registry**

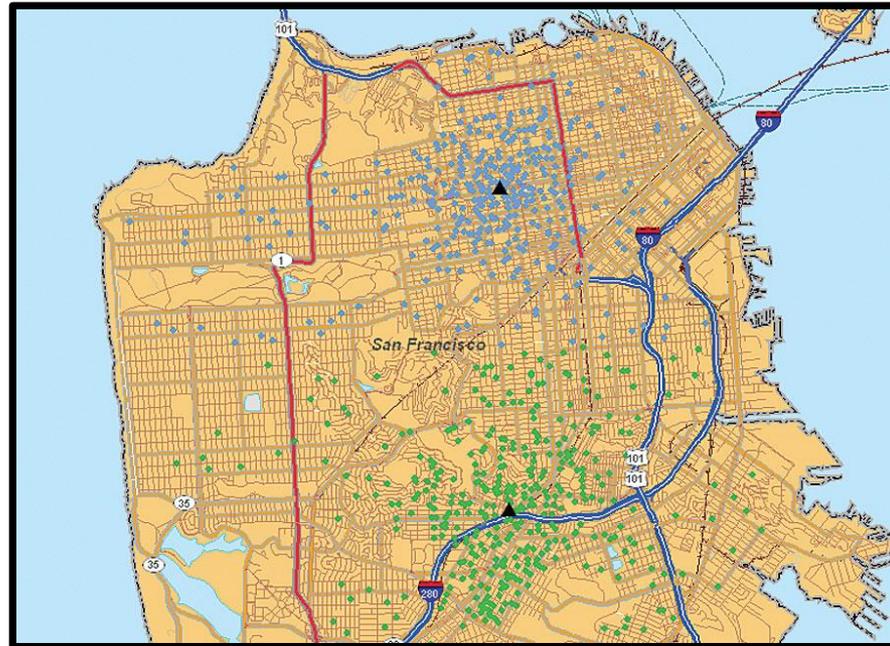
What We Do

- Better understand relationship between environment and health
- Integrate environmental and health data



What We Do

- Enhance existing data (standardization and geocoding)



Source: <http://www.esri.com/news/arcnews/winter0708articles/winter0708gifs/p13p1-lg.jpg>

What We Do

- Provide tools to ease access to data stewards' data sets

Secure Partner Dataset Metadata Index



Cancer

Queryable summary information about the rates and patterns of various cancers in the state of Utah from the Utah Cancer Registry dataset. This includes crude rates for cancers over single, three, and five year intervals. Also includes age-adjusted rates for cancers over single, three, and five year intervals. Can be queried by census tract data, or by Utah Small Areas.

[View the Metadata for the Cancer Dataset](#)



Inpatient Hospital Discharge

Queryable dataset that includes hospital discharge health condition (myocardial infarction, carbon monoxide poisoning, or asthma), visits, visit length, charges, and in-hospital deaths. Can be queried by ZIP code.

[View the Metadata for the Inpatient Hospital Discharge Dataset](#)



Emergency Department Encounters

This dataset contains count, length of stay, and charges for ED treat and release encounters; total, median, and average.

[View the Metadata for the Emergency Department Encounters Dataset](#)



Blood Lead

This query contains the count of elevated blood lead level cases by ZIP code.

[View the Metadata for the Blood Lead Dataset](#)



Mortality

This query contains mortality counts by ZIP code.

[View the Metadata for the Mortality Dataset](#)



Births

This query contains count and percentage of births with prenatal care in the first trimester, third trimester, no prenatal care. Count and percentage of adequate, above Kotelchuk prenatal care. Number of prenatal visits, percentage of normal birth weight infants, low birth weight infants (less than 2500 grams & less than 1500), extremely low birth weight infants (less than 1000 grams & less than 500 grams), average and percentage of birth weight of infants, all pre-term births (less than 37 weeks), very pre-term births (less than 32 weeks), percentage of all moderately pre-term births (32-33 weeks), percentage of all late pre-term births (34-36 weeks).

[View the Metadata for the Births Dataset](#)



Birth Defects

This query dataset contains the following measures: count of birth defects by county and count of birth defects by small areas.

[View the Metadata for the Birth Defects Dataset](#)

Our Partners



- Office of Health Care Statistics
- Bureau of Emergency Medical Services
- Office of Vital Records and Statistics
- Utah Birth Defect Network
- Utah Blood Lead Registry
- Utah Division of Medicaid and Health Financing

- Division of Drinking Water
- Division of Water Quality
- Utah Radon Program
- Division of Air Quality
- Division of Environmental Response and Remediation

Utah Blood Lead Registry

- Collected for blood lead surveillance
 - Targeted ZIP codes
 - Medicaid
 - Adults in certain occupations
- Injury reporting rules mandates any test level $\geq 10^*$ mcg/dL be reported to UDOH

Utah Blood Lead Registry

Dataset Variables:

- Age
- Sex
- Race/ethnicity
- ZIP code
- Occupation
- Blood lead level (mcg/dL)
- Test date
- Type of test (capillary; venous)



Source: <http://www.abc.net.au/news/image/4937408-3x2-940x627.jpg>, 31 October 2014

Projects

- Leukemia incidence and benzene exposure model
- Asthma emergency department visits and temperature inversion and PM2.5 levels
- Smoking rate prediction model
- Link radon geologic potential and lung cancer incidence
- Air quality (PM2.5) and cardiovascular effects
- Biomonitoring surveillance

Contact Us

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THE UTAH ENVIRONMENTAL
PUBLIC HEALTH
TRACKING NETWORK



Health Data Fair

CHARM Overview

November 4, 2014

Christine Perfili, MBA, B.S.
CHARM Program Manager



CHARM

Child Health Advanced Records Management

CHARM is a system that connects child health-care databases, primarily within the UDOH

A Look Back

- **Laying the Foundation 1997-1999**
 - ◆ UDOH adopts an Information System Vision
 - ◆ Leadership make long-term commitment to systems integration
 - ◆ CHARM is born as one of five strategies
- **Building Consensus, Collaboration, and Technology 2000-2003**
 - ◆ Program Meetings and System Analysis Activities
 - ◆ Data integration master plan established
 - ◆ Developed and designed three prototypes
 - ◆ Version 1.0 completed

A Look Back, (Cont.)

- **Making Data Sharing a Reality 2004-2007**
 - ◆ OVRS signs first data sharing agreement
 - ◆ USIIS and EHDI sign data sharing agreement
- **Expansion 2008-2014**
 - ◆ First non-UDOH Program integrated
 - ◆ EI Program Integrated
 - ◆ Web Interface Developed

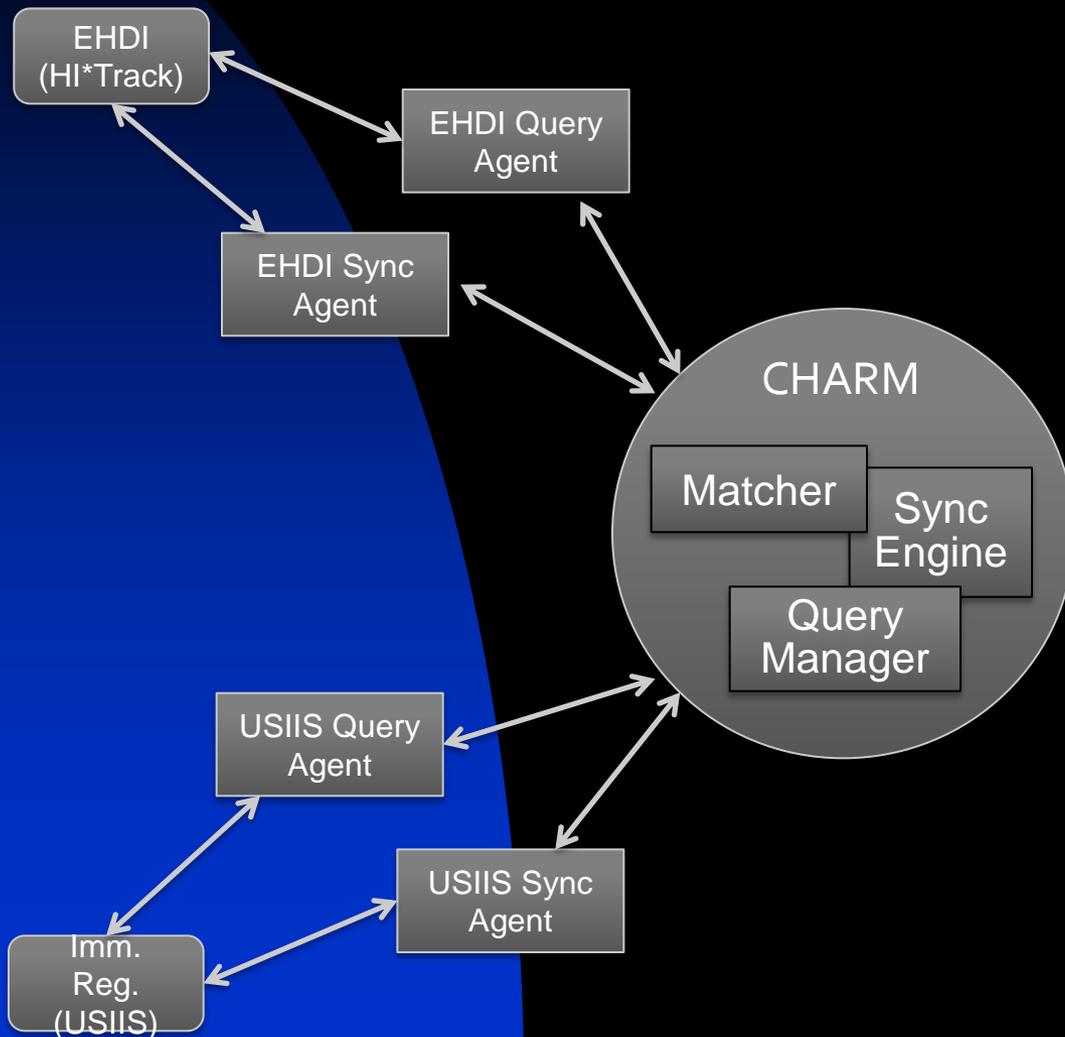
CHARM Features

- Facilitates data sharing among appropriate health care programs, partners, state agencies, and clinicians
- Provides a method to query one or more programs' databases to link and present information about a child for the purpose of improving patient care
- Provides an electronic public health record for children in Utah
- Alerts users of exceptional conditions
- Ensures that participating programs retain stewardship over their own data

CHARM Data Integration

- **Programs/systems integrated with CHARM**
 - ◆ OVRS (OLIVER)
 - ◆ Newborn Hearing Screening (HiTrack)
 - ◆ Newborn Screening Heel-Stick (LIMS)
 - ◆ Immunization Information System (USIIS)
 - ◆ Baby Watch/Early Intervention (BTOTS)
 - ◆ Office of Recovery Services
 - ◆ cHIE - clinical Health Information Exchange

A Closer Look At CHARM



UDOH CHARM USE CASES

- Newborn Hearing Screening Program can access information through CHARM links in Hi*Track
 - ◆ Birth Records High Risk Information
 - ◆ Newborn Screening (Heel Stick) Results
 - ◆ Immunization Results
 - ◆ Early Intervention/Parent Infant Program Information

Provides:

- ★ Better patient follow up and care

UDOH CHARM USE CASES (cont.)

- **OVRs receives hearing screening alerts**
 - ◆ Parent requests Birth Certificate
 - ◆ If the child needs a hearing screening or follow-up, a hearing screening alert is generated
 - ◆ When the hearing alert fires, a pop-up box notifies the birth certificate clerk that a hearing screening letter has been generated for the child.
 - ◆ The clerk prints a letter and provides it to the parent/guardian
 - ◆ CHARM generates a report of alerts to Hearing Program for follow-up
 - ◆ Recently expanded to local health departments
 - ★ 20 of 26 sites participating

UDOH CHARM USE CASES (cont.)

- OVRS continued

Provides:

- ★ More timely intervention and follow-up for patient care
- ★ Study: Follow-up increased from 30% to 64%; 3 children were identified with permanent hearing loss that had not completed the hearing screening, but were prompted to complete testing by the hearing alert

UDOH CHARM USE CASES (cont.)

- **Baby Watch/Early Intervention Program**
 - ◆ Hearing Screening Results
 - ◆ Immunization Information – status and history

Provides:

★ More comprehensive service/treatment plans

- **UDOH cHIE = clinical Health Information Exchange**
 - ◆ Newborn screening hearing results (on hold)
 - ◆ Newborn screening (heel stick) results (on hold)

External CHARM USE Cases

- **Office of Recovery Services**
 - ◆ Paternity Information from Vital Records through CHARM

Provides:

- ★ Improved child support services and support for children in care

External CHARM Use Cases (cont.)

- **CHARM link in USIIS for all Intermountain Healthcare users**
 - ◆ Newborn hearing screening results
 - ◆ 1,140 users have access

Provides:

- ★ More timely intervention and follow-up for patient care

External CHARM Use Cases (cont.)

■ CHARM Web Interface for Programs and Clinics

- ◆ Newborn screening hearing results
- ◆ Newborn screening (heel stick) results
- ◆ Immunization history

Programs/clinics utilizing:

- ★ Fostering Healthy Children
- ★ Newborn Screening (Heel Stick) Program
- ★ University of Utah Pediatric Clinic
- ★ North Ogden Pediatric Clinic



CHARM Web Interface



health.utah.gov/charm/UMD

Please Login

If you don't have an account

[Register Here](#)

Forgot your password?

[Recover Account](#)

Email or UserName:

Password:

Remember Me?

[Privacy Policy](#) | [Ask for Help](#)



CHARM Electronic Confidentiality Agreement

Utah Dept of Health

CHARM Electronic Confidentiality Agreement

CHARM is a confidential and secure data system that supports the sharing of health information to authorized health care providers for treatment purposes and clinical care coordination services. Program integrity requires CHARM users to respect the privacy of individuals whose records are maintained in and obtained or accessed through CHARM. Access to and use of the confidential health information from the UDOH program databases obtained through CHARM is conditioned on compliance with this Agreement, including applicable state and federal laws. Violation of this Confidentiality Agreement is grounds for loss of privilege to use CHARM, civil or criminal prosecution, or a combination of any of these sanctions if this Agreement is violated.

I accept the terms of this Agreement and will maintain the privacy and confidentiality of all the records I access through CHARM. (Please check "I agree" below, then click "Continue".)

I do not accept the terms of this Agreement. I understand I shall not be granted access to health records of children through CHARM. (Please leave "I

I agree

Continue

Search for a Child

Data integrated by CHARM, UDOH.

[Logout](#)

Basic Search Criteria

Child's First Name *

Child's Last Name *

Child's Middle Name *

Date of Birth * / / (mm/dd/yyyy)

Gender

Mother's First Name

Mother's Last Name *

Mother's Maiden Name *

Mother's Middle Name

Child's Newborn Screen #

* These fields are recommended for initial search

Additional Child Search Criteria

Mother Search Criteria

Father Search Criteria

Guardian Search Criteria

Status of search:

+ CHARM Minimum Search Combinations

Search Child Information

Guardian:

Select Results to View

State Newborn Screening

- Hearing Screening Results
- NS (Heelstick) Results

Utah Statewide Immunization Information System

- Immunization History

[View Results](#)

Alert Details

There is no Alert Information available for this child.

Hearing Screening Results

Date (mm/dd/yyyy)	Test	Ear	Stage	Result	Facility
01/30/2009	OAE	LEFT	Inpatient	Pass	LDS HOSPITAL ~ULD
01/30/2009	OAE	LEFT	Inpatient	Pass	LDS HOSPITAL ~ULD
01/30/2009	OAE	RIGHT	Inpatient	Pass	LDS HOSPITAL ~ULD
01/30/2009	OAE	RIGHT	Inpatient	Refer	LDS HOSPITAL ~ULD
01/30/2009	OAE	RIGHT	Inpatient	Refer	LDS HOSPITAL ~ULD
01/30/2009	OAE	RIGHT	Inpatient	Pass	LDS HOSPITAL ~ULD

Immunization History

Series Name	Vaccine	Vaccination Date	Reaction
FLU	INFLUENZA, UNSPECIFIED	2010-09-27	O
PNEUMO PCV	(PCV13) Pneumococcal conjugate, 13 valent	2010-07-19	No
DTP	DTaP	2010-07-19	No
HEP-A	HEPATITIS A - PEDIATRIC, UNSPECIFIED	2010-07-19	No
MMR	MMR	2010-01-18	No
HEP-A	HEPATITIS A - PEDIATRIC, UNSPECIFIED	2010-01-18	No
HIB	HIB - PRP -T	2010-01-18	No
CHICKENPOX	VARICELLA	2010-01-18	No
PNEUMO PCV	(PCV7) PNEUMOCOCCAL CONJUGATE	2010-01-18	No
H1N109	Novel Influenza-H1N1-09, preservative-free	2010-01-07	No
FLU	INFLUENZA, UNSPECIFIED	2010-01-07	O
FLU	INFLUENZA, UNSPECIFIED	2009-10-21	O
HIB	HIB - PRP -T	2009-07-20	No
ROTAVIRUS	Rotavirus, monovalent (Rotarix)	2009-07-20	No
PNEUMO PCV	(PCV7) PNEUMOCOCCAL CONJUGATE	2009-07-20	No
POLIO	DTaP-HEP B-IPV	2009-07-20	No
HEP-B	DTaP-HEP B-IPV	2009-07-20	No
DTP	DTaP-HEP B-IPV	2009-07-20	No
PNEUMO PCV	(PCV7) PNEUMOCOCCAL CONJUGATE	2009-05-20	No
HIB	HIB - PRP -T	2009-05-20	No
ROTAVIRUS	Rotavirus, monovalent (Rotarix)	2009-05-20	No
POLIO	DTaP-HEP B-IPV	2009-05-20	No
HEP-B	DTaP-HEP B-IPV	2009-05-20	No
DTP	DTaP-HEP B-IPV	2009-05-20	No
HEP-B	DTaP-HEP B-IPV	2009-03-26	No
HIB	HIB - PRP -T	2009-03-26	No
PNEUMO PCV	(PCV7) PNEUMOCOCCAL CONJUGATE	2009-03-26	No
ROTAVIRUS	Rotavirus , pentavalent (RotaTeq)	2009-03-26	No
DTP	DTaP-HEP B-IPV	2009-03-26	No
POLIO	DTaP-HEP B-IPV	2009-03-26	No
HEP-B	HEPATITIS B - PEDIATRIC OR ADOLESCENT	2009-01-16	No

Patient record includes Contraindication(s) to CHICKENPOX

Date of Birth: 02/16/2006 (yyyy/mm/dd)

Alert Details

Originating Program	Alert Date	Message	Severity
EHDI	11/08/2006	Child has confirmed hearing loss in the left ear	Moderate
EHDI	09/08/2007	Child needs to complete hearing screening/sudiological testing. Contact UDOH at 801-584-8215.	Moderate

Hearing Screening Results

Date (mm/dd/yyyy)	Test	Ear	Stage	Result	Facility
15/2005/11	OAE	LEFT	Inpatient	Refer	LOGAN REGINAL HOSPITAL ULR
11/2005/11	OA	LEFT	patient	Refer	LOGAN REGINAL HOSPITAL,logan,ny

Immunization History

Series Name	Vaccine	Vaccination Date	Reaction
FLU	INFLUENZA - SPLIT	10/26/2007	No
CHIKENPOX	CHIKENPOX SPLIT	11/25/2007	T

FIRST Specimen

Collected at : UNIVERSITY OF UTAH HSC

Birth Record # : 351A588

Hospital MR # : 017252578

Asc# Number : F0380024200734

Newborn Screening Results

Enzyme activity	Date Tested	Results	Full enzyme activity
Congenital Adrenal Hyperplasia(*) 17-OHP ELISA	02/08/2007	19.8 ng/dL	Normal Based on baby's birth weight
Galactosemia G-1-P uridytransferase activity	02/08/2007	9.6U/gHb	Normal > 3.0 U/gHb
Hemoglobinopathies Isoelectric Focusing	02/08/2007	Normal - FA	Normal FA (Fetal Adult)
Congenital Hypothyroidism T4	02/08/2007	19.7 µg/dL	Normal > 4.0 µg/dL
Acylcarnitine Disorders MS/MS Tandem Mass screening	02/08/2007	Normal	Normal Based on baby's birth weight
Amino Acid Disorders MS/MS Tandem Mass screening	02/08/2007	Normal	Normal Based on baby's birth weight

* Caution should be used in interpreting the Congenital Adrenal Hyperplasia result if glucocorticoids have been given to infant or mother.

SECOND Specimen

Birth Record # : 351A588

Hospital MR # : 017252578

Asc# Number : S0540376200791

Date Collected : 02/20/2007

Date Received : 02/23/2007

Date Reported : 02/27/2007

DISORDER/TEST	DATE TESTED	RESULTS	DETERMINATION/NORMAL RANGE
Biotinidase Deficiency Enzyme activity	02/26/2007	Normal	Normal Full enzyme activity
Congenital Adrenal Hyperplasia(*) 17-OHP ELISA	02/26/2007	8.1 ng/dL	Normal Based on baby's birth weight
Congenital Hypothyroidism T4	02/26/2007	7.6 µg/dL	Normal > 4.0 µg/dL
Congenital Hypothyroidism TSH	02/27/2007	1.1 µU/mL	Normal < 20 µU/mL

CHARM Web Interface Pilot Study

- University of Utah Pediatric Clinic
(Fall 2012)

CHARM Web Interface Study Findings

- Changed Hearing Screening Reporting Requirement from monthly to weekly
- Eliminated duplication of hearing screening services at U of U Pediatric Clinic
- U of U Pediatric Clinic changed practice work flow for patients

CHARM Web Interface Study Findings (cont.)

- CHARM improved matching rules
- CHARM defined Minimum Search Criteria – combination of fields for a user to search
- CHARM developed more targeted messages to users

Overall Findings

- Effective data sharing helps:
 - ◆ reduce duplicate tests
 - ◆ expedite appropriate referrals/services/follow-up

Questions?

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CHARM Program Manager
801-584-8275
cperfili@utah.gov

FIRST Specimen

Collected at : UNIVERSITY OF UTAH HSC

Birth Record # : 351A588

Hospital MR # : 017252578

Asc# Number : F0380024200734

Date Collected : 02/05/2007

Date Received : 02/07/2007

Date Reported : 02/08/2007

DISORDER/TEST	DATE TESTED	RESULTS	DETERMINATION/NORMAL RANGE
Biotinidase Deficiency <i>Enzyme activity</i>	02/08/2007	Normal	Normal <i>Full enzyme activity</i>
Congenital Adrenal Hyperplasia(*) <i>17-OHP ELISA</i>	02/08/2007	19.8 ng/dL	Normal <i>Based on baby's birth weight</i>
Galactosemia <i>G-1-P uridyltransferase activity</i>	02/08/2007	9.6U/gHb	Normal <i>> 3.0 U/gHb</i>
Hemoglobinopathies <i>Isoelectric Focusing</i>	02/08/2007	Normal - FA	Normal <i>FA (Fetal Adult)</i>
Congenital Hypothyroidism <i>T4</i>	02/08/2007	19.7 µg/dL	Normal <i>> 4.0 µg/dL</i>
Acylcarnitine Disorders <i>MS/MS Tandem Mass screening</i>	02/08/2007	Normal	Normal <i>Based on baby's birth weight</i>
Amino Acid Disorders <i>MS/MS Tandem Mass screening</i>	02/08/2007	Normal	Normal <i>Based on baby's birth weight</i>

* Caution should be used in interpreting the Congenital Adrenal Hyperplasia result if glucocorticoids have been given to infant or mother.

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DISORDER/TEST	DATE TESTED	RESULTS	DETERMINATION/NORMAL RANGE
Biotinidase Deficiency <i>Enzyme activity</i>	02/26/2007	Normal	Normal <i>Full enzyme activity</i>
Congenital Adrenal Hyperplasia(*) <i>17-OHP ELISA</i>	02/26/2007	8.1 ng/dL	Normal <i>Based on baby's birth weight</i>
Congenital Hypothyroidism <i>T4</i>	02/26/2007	7.6 µg/dL	Normal <i>> 4.0 µg/dL</i>
Congenital Hypothyroidism <i>TSH</i>	02/27/2007	1.1 µU/mL	Normal <i>< 25 µU/mL</i>

Configuration for Three CHARM Programs

