Objectives

- Define injury surveillance and its critical components
- Describe sources for data that can be used for public health surveillance of suicide-related issues
The Public Health Approach to Prevention

Assess the Problem
What's the problem?

Identify the Causes
Why did it happen?

Develop & Evaluate Programs & Policies
What works?

Implementation & Dissemination
How do you do it?

Why Is Surveillance Important?

- Collecting data is merely one step
- Critical goal is to control and/or prevent diseases or adverse health conditions
  - Any data collected must be organized and carefully examined
  - Any results need to be communicated to public health and medical communities
Why Is Surveillance Important?

- Vital to communicate results
  - During potential outbreak so public health and medical communities can help with disease prevention and control efforts
  - During non-outbreak times to provide information about baseline levels of disease
    - Baseline provides information to public health officials monitoring health at community level, serves as reference in future outbreaks

The Core Public Health Functions

- Assessment
- Policy Development
- Assurance

Source: Institute of Medicine 1988
## Why do we need surveillance systems

- What’s the problem and how big is it?
- Who is at risk?
- How do we design research to find out how to prevent the problem and test it in a community?
- Assess the result of programs (e.g., changes in deaths, injuries, impairments, disabilities, lost work days, loss of ability to perform daily activities, or behaviors)?

## Why do surveillance?

- Provides data for the decision makers
  - monitor health events
  - set priorities
  - assist in planning, implementation and evaluation of public health programs
- Assists in making rational public health decisions
## Problem Description/Surveillance

- **Deaths**
  - Death Certificates
    - National, State, County
  - National Violent Death Reporting System
    - 42 awardees (40 states, Wash., D.C., and Puerto Rico)

## Suicide Variables*

<table>
<thead>
<tr>
<th>Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current depressed mood</td>
</tr>
<tr>
<td>Current mental health problem</td>
</tr>
<tr>
<td>Other mental health diagnosis</td>
</tr>
<tr>
<td>Current treatment for mental illness</td>
</tr>
<tr>
<td>Ever treated for mental illness</td>
</tr>
<tr>
<td>Alcohol problem</td>
</tr>
<tr>
<td>Other substance problem</td>
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<tr>
<td>Other addiction</td>
</tr>
<tr>
<td>Job problem</td>
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<tr>
<td>School problem</td>
</tr>
<tr>
<td>Financial problem</td>
</tr>
<tr>
<td>Anniversary of a traumatic event</td>
</tr>
<tr>
<td>Person left a suicide note</td>
</tr>
<tr>
<td>Disclosed intent to commit suicide</td>
</tr>
<tr>
<td>History of suicide attempts</td>
</tr>
<tr>
<td>Crisis in past 2 wks</td>
</tr>
<tr>
<td>Physical health problem</td>
</tr>
<tr>
<td>Intimate partner problem</td>
</tr>
<tr>
<td>Other relationship problem</td>
</tr>
<tr>
<td>Suicide of friend or family in past 5 years</td>
</tr>
<tr>
<td>Other death of friend or family in past 5 years</td>
</tr>
<tr>
<td>Recent criminal legal problem</td>
</tr>
<tr>
<td>Eviction/loss of home</td>
</tr>
</tbody>
</table>

*Source: Nat’l Violent Death Reporting System*
Military and Veteran Suicide Surveillance

- **Findings and Impacts**
  - Intimate partner problems are just as important as mental health problems
    - **Impact:** Submitted DoD proposal to evaluate "Strength at Home" program re suicide-related outcomes
  - Military/Veteran suicides mostly involve firearms and are highly concentrated in small % of counties
    - **Impact:** Informed 2017 DoD Safe Firearm Storage Policy

Health/Behavior information for suicide decedents by race/ethnicity^ - 18 states, 2003-14

- **Intimate Partner Problems (54%)**
- **Mental Health Problems (53%)**
- **Both Problems (29%)**

- Break up/divorce = 33%
- Recent argument = 32%
- Abandonment = 28%
- Infidelity = 28%
- IPV = 14%

- **Intimate Partner Problem***
- **Victim in Custody***
- **Financial problem***
- **Job problem***
- **Suicide of Friend/family***
- **Crisis in past 2 wks***
- **Current mental Hlth Problem***

<table>
<thead>
<tr>
<th>Health or behavior category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intimate partner problem</td>
<td>Bar chart</td>
</tr>
<tr>
<td>Victim in Custody</td>
<td>Bar chart</td>
</tr>
<tr>
<td>Financial problem</td>
<td>Bar chart</td>
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<td>Job problem</td>
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<tr>
<td>Current mental Hlth Problem</td>
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^Categories are not mutually exclusive
*statistically significant difference
**Percentage of suicide decedents with Blood Alcohol Concentration (BAC) ≥ 0.08%, by Race/Ethnicity and Age Group* -- 17 States, U.S.**

![Graph showing percentage of suicide decedents with BAC ≥ 0.08% by race/ethnicity and age group.](image)

*Among those tested


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**Problem Description/Surveillance**

- **Nonfatals injuries – official records**
  - Hospital emergency department (ED) records
    - Check with state hospital association or local hospital or trauma center
  - National Electronic Injury Surveillance System – All Injury Program (NEISS-AIP)
National Electronic Injury Surveillance System (NEISS)

- Operated by the U.S. Consumer Product Safety Commission (CPSC)
  - CDC/CPSC interagency agreement
- Started October, 1978
- Nationally representative sample of U.S. hospitals with ≥ 6 beds and an emergency department (ED)
- First time, injury-related visits
- Approx. 500,000 cases per year
- Annualized estimates and rates of nonfatal injuries treated in U.S. hospital EDs

NEISS All Injury Program

- Core variables
  - age
  - sex
  - race/ethnicity
  - two-product codes
  - primary body part affected
  - principal diagnosis
  - locale of injury incident
  - Disposition
  - Narrative

- Additional variables
  - intent of injury
  - major mechanism of injury groupings
    - coded using guidelines consistent with ICD-9-CM coding rules for external causes of injury
Self-inflicted injury among all persons by age and sex--United States, 2014

Source: CDC WISQARS NEISS

CDC’s National Syndromic Surveillance Program (ESSENCE)

- Electronic Surveillance System for the Early Notification of Community-based Epidemics
- Started in 2003 as BioSense, converted to ESSENCE platform in 2012
- ~65% of U.S. EDs submit data
- 49 sites (local + state health departments)
- 3500 facilities, 87% of which are EDs
- Participating sites submit data every 24-48 hours
- Updated as often as hourly
- Exploring utility of ESSENCE syndromic surveillance (SyS) data to monitor nonfatal self-harm
Identifying Nonfatal Suicidal Behavior Cases in ESSENCE

- Personal history of self-harm
- Unspecified anorexia, uncomplicated
- Unspecified psychosis not due to a substance or known physiological condition
- Type 2 diabetes mellitus without complications
- Unspecified substance abuse, site not specified
- Homicidal ideations
- Tobacco use
- Cocaine abuse, uncomplicated
- Other stimulant abuse, uncomplicated
- Heroin abuse, uncomplicated
- Homelessness
- Suicide attempt
- Post-traumatic stress disorder, unspecified
- Schizophrenia, unspecified
- Alcohol abuse with intoxication, unspecified
- Other long-term (current) drug therapy
- Other psychoactive substance abuse, uncomplicated
- Major depressive disorder, recurrent severe without psychotic features
- Bipolar disorder, unspecified
- Essential hypertension
- Anxiety disorder, unspecified
- Major depressive disorder, single episode, unspecified

Top 40 Phrases for Suicide-Related Text in ESSENCE
Suicide Attempts among 10-19 Year Olds Treated in U.S. EDs, Jan 1 – Sept 1, 2017

Google Trends Results for “13 Reasons Why”, Jan 1 – Sept 1, 2017
### Problem Description/Surveillance

- **Nonfatal injuries - surveys**
  - Youth Risk Behavior Surveillance System (CDC)
    - High school students
    - 4 items on suicidal thoughts and behavior
    - National, 43 states, and 21 large urban school districts
  - Adverse Childhood Experiences Survey (ACEs)
  - Violence Against Children Survey (VACS)

### Population-based Surveys

- **Youth Risk Behavior Survey**
  - Biennial survey (every other year)
  - Administered in school computer-assisted
  - Provides national, state, and sub-state representative estimates on a variety of health risk behaviors
  - Suicide-related information covers a 12 month period
Suicidal ideation and behavior among high school students by category and sex* -- United States, 2015

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage of all students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seriously consider suicide</td>
<td>Female: 25% Male: 15% Total: 20%</td>
</tr>
<tr>
<td>Suicide plan</td>
<td>Female: 20% Male: 10% Total: 15%</td>
</tr>
<tr>
<td>Attempted suicide*</td>
<td>Female: 10% Male: 5% Total: 7.5%</td>
</tr>
<tr>
<td>Suicide attempt with medical</td>
<td>Female: 5% Male: 2.5% Total: 3.75%</td>
</tr>
</tbody>
</table>

Source: CDC Youth Risk Behavior Survey
* During the 12 months preceding the survey
*One or more times

Suicidal behavior*^ among high school students by sexual identity# and sexual contact – U.S., 2015

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage of all students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sexual identity</td>
<td>Heterosexual/opposite sex only: 30% LGB/same sex only or both sexes: 25% Unsure/no sexual contact: 10%</td>
</tr>
<tr>
<td>Sex of sexual contacts</td>
<td>Heterosexual/opposite sex only: 25% LGB/same sex only or both sexes: 20% Unsure/no sexual contact: 5%</td>
</tr>
</tbody>
</table>

* During the 12 months before the survey.
^ One or more times.
# Among students who ever had sexual contact
Source: Youth Risk Behavior Survey
Number and ratio of persons affected by suicidal thoughts and behavior among adults aged ≥18 years — United States, 2014

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deaths*</td>
<td>41,425</td>
<td>1</td>
</tr>
<tr>
<td>Hospitalizations†</td>
<td>111,410</td>
<td>2.7</td>
</tr>
<tr>
<td>Emergency Department visits§</td>
<td>375,530</td>
<td>9.1</td>
</tr>
<tr>
<td>Suicide attempts¶</td>
<td>1,120,000</td>
<td>27.0</td>
</tr>
<tr>
<td>Seriously considered suicide**</td>
<td>9,436,000</td>
<td>227.8</td>
</tr>
</tbody>
</table>

*Source: CDC’s National Vital Statistics System, †Source: Agency for Healthcare Research and Quality’s Healthcare Cost and Utilization Project - Nationwide Inpatient Sample (HCUP-NIS), §Source: CDC’s National Electronic Injury Surveillance System - All Injury Program, ¶Source: SAMHSA’s National Survey on Drug Use and Health

Number in parentheses represent the ratio of deaths to other categories

Web-Based Statistics

- [www.cdc.gov/ncipc/wisqars/default.htm](http://www.cdc.gov/ncipc/wisqars/default.htm)
- Injury mortality and leading cause of death statistics available by:
  - Intent, Method
  - Year
  - State
  - Demographics
    - Age, Sex, Race
- Injury morbidity
  - Hospital emergency dept events
<table>
<thead>
<tr>
<th>WISQARS features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online query system for injuries</td>
</tr>
<tr>
<td>Includes fatal and nonfatal data</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Fatal</td>
</tr>
<tr>
<td>National Vital Statistics System</td>
</tr>
<tr>
<td>National Violent Death Reporting System</td>
</tr>
<tr>
<td>Non-fatal</td>
</tr>
<tr>
<td>National Electronic Injury Surveillance System (hospital emergency department)</td>
</tr>
</tbody>
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<table>
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<tr>
<td>Users can create reports based on:</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Intent (unintentional, violence)</td>
</tr>
<tr>
<td>Mechanism/cause (e.g., fall, fire, firearm, motor vehicle)</td>
</tr>
<tr>
<td>Sex, race/ethnicity, and age</td>
</tr>
<tr>
<td>Geographic location (fatal only)</td>
</tr>
<tr>
<td>Costs of injury</td>
</tr>
</tbody>
</table>
WISQARS

- Used by researchers, teachers, policy makers, media, and the public for injury prevention program planning, awareness, and policy decisions
- Available as a mobile application in the iTunes store for iPhone and iPad

Analysis of Surveillance Data

- Time
- Place
- Person
  - Age
  - Sex
  - Race and ethnic group
- Risk factors
Interpreting the Data

- You have a change
  - Is it a disease category you are concerned about?
  - What is the count?
  - What is the ratio?
  - Look at available information in the system
    - Age
    - Clinic type

Interpreting cont’d

- Consider other factors which may have contributed to the spike
  - A change in coding
  - A change in denominators for example the recruit depot
  - Was there a holiday or a weekend?
Interpreting cont’d

- Look at other surveillance systems or data sources to see what is happening.
- Ask providers for corroborating information.

Don’t be color biased
- Just because there is not a spike does not mean there couldn’t be an event.
- Consider factors which may camouflage an event
  - Ex: A recent outbreak
Interpretation

- Not all apparent increases in disease occurrence represent true increases
  - increase in population size,
  - improved diagnostic procedures,
  - enhanced reporting,
  - duplicate reporting,
- Should consider an apparent increase real until proven otherwise.

Conclusion

- Assessment is a foundation for public health action
- Existing systems for assessing injury are useful but have limitations
- Need exists for improved and expanded surveillance systems regarding injury

For more information please contact Centers for Disease Control and Prevention
1600 Clifton Road NE, Atlanta, GA 30333
Telephone, 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348
E-mail: cdcinfo@cdc.gov Web: www.cdc.gov/injury
Questions and Comments