Designing and Implementing Injury Surveillance Systems in Indian Country

INSTRUCTOR GUIDE

CDC
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The *Injury Surveillance Training Manual* is a joint publication of the National Center for Injury Prevention and Control, part of the Centers for Disease Control and Prevention, and the Indian Health Service Injury Prevention Program.

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CREATING AND IMPLEMENTING INJURY SURVEILLANCE SYSTEMS IN INDIAN COUNTRY

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Course Evaluation

Date:
Location:

Please help us make this course better. Please take the time to fill out this evaluation after each section and at the end of the course. It will assist us in improving the content and delivery of this course. Return this evaluation to your instructor at the end of the course.

A. Course Objectives. Please rate the degree to which the following objectives of this series/lecture were met (1=not at all; 2=minimally; 3=moderately; 4=to a high degree)

Section 1 Objectives

Upon completion of this program, I will be able to:

1. Understand the concepts and classification of injury
   
<table>
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   This objective was covered:
   In too little depth_____ In the right amount of depth_____ In too much depth_____  

2. Know the difference between unintentional and intentional injury
   
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   This objective was covered:
   In too little depth_____ In the right amount of depth_____ In too much depth_____  

3. Describe the burden of injury
   
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   This objective was covered:
   In too little depth_____ In the right amount of depth_____ In too much depth_____  

4. Use models for understanding and preventing injury
   
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</table>

   This objective was covered:
   In too little depth_____ In the right amount of depth_____ In too much depth_____
5. Know the steps necessary for developing injury surveillance systems  
   1 _______  2 ______  3 ______  4 ______

   This objective was covered:
   In too little depth____  In the right amount of depth______  In too much depth_____

6. Understand ethical considerations when creating an injury surveillance system  
   1 _______  2 ______  3 _____  4 ______

   This objective was covered:
   In too little depth____  In the right amount of depth______  In too much depth_____

**Section 2 Objectives**

7. Identify the injury data sources strengths and weaknesses  
   1 _______  2 ______  3 ______  4 ______

   This objective was covered:
   In too little depth____  In the right amount of depth______  In too much depth_____

8. Identify the available data sources that can provide information to the surveillance system  
   1 _______  2 ______  3 ______  4 ______

   This objective was covered:
   In too little depth____  In the right amount of depth______  In too much depth_____

9. Describe the size of the injury problem  
   1 _______  2 ______  3 ______  4 ______

   This objective was covered:
   In too little depth_____  In the right amount of depth______  In too much depth_____  

10. Compare the frequency of injury calculated from different data sources  
    1 _______  2 ______  3 ______  4 ______
This objective was covered:
In too little depth______  In the right amount of depth______  In too much depth______

Section 3 Objectives

11. Identify partners to include in the system and develop recruiting strategies to include them
   1________  2_____  3____  4____

   This objective was covered:
   In too little depth_____  In the right amount of depth_____  In too much depth_____  

12. Identify local, regional and national organizations working on injury prevention in your area
   1________  2______  3____  4____

   This objective was covered:
   In too little depth_____  In the right amount of depth_____  In too much depth_____  

13. Define the existing social, legal and political framework in which an injury surveillance system
    and prevention activities may be established.
   1________  2______  3____  4____

   This objective was covered:
   In too little depth_____  In the right amount of depth_____  In too much depth_____  

Section 4 Objectives

14. Define the injury events and data elements to include in the system
    1________  2______  3____  4____

    This objective was covered:
    In too little depth_____  In the right amount of depth_____  In too much depth_____  

15. Develop the data collection instrument and determine the data collection frequency
    1________  2______  3____  4____
This objective was covered:
In too little depth____  In the right amount of depth____  In too much depth____

16. Plan for systemization maintenance and data security

1_______  2_______  3_______  4_______

This objective was covered:
In too little depth____  In the right amount of depth____  In too much depth____

17. Define staff and key positions for an injury surveillance system

1_______  2_______  3_______  4_______

This objective was covered:
In too little depth____  In the right amount of depth____  In too much depth____

Section 5 Objectives

18. Calculate injury indicators such as frequency, percentages and crude, specific and adjusted rates

1_______  2_______  3_______  4_______

This objective was covered:
In too little depth____  In the right amount of depth____  In too much depth____

19. Calculate years of Potential Life Lost

1_______  2_______  3_______  4_______

This objective was covered:
In too little depth____  In the right amount of depth____  In too much depth____

20. Describe the geographical analysis of the data

1_______  2_______  3_______  4_______

This objective was covered:
In too little depth____  In the right amount of depth____  In too much depth____
21. Define a plan to disseminate and communicate the data

1 ______  2 _____  3 ____  4 _____

This objective was covered:
In too little depth_____  In the right amount of depth______  In too much depth_____  

Section 6 Objectives

22. Using surveillance data to identify priority injuries in your region

1 ______  2 _____  3 ____  4 _____

This objective was covered:
In too little depth_____  In the right amount of depth______  In too much depth_____  

23. Use the models that can help identify risk factors and intervention strategies

1 ______  2 _____  3 ____  4 _____

This objective was covered:
In too little depth_____  In the right amount of depth______  In too much depth_____  

24. Tie Surveillance to Action and Funding

1 ____  2  3  4

This objective was covered:
In too little depth_____  In the right amount of depth______  In too much depth_____  

Section 7 Objectives

25. Know the steps to evaluating an injury surveillance system

1 ____  2  3  4

This objective was covered:
In too little depth_____  In the right amount of depth______  In too much depth_____
26. Use surveillance data to monitor prevention activities

1  ___  2  3  4

This objective was covered:
In too little depth____  In the right amount of depth____  In too much depth____

28. What additional comments or suggestions do you have?
_________________________________________________________________________________
_________________________________________________________________________________
_________________________________________________________________________________
_________________________________________________________________________________
_________________________________________________________________________________
_________________________________________________________________________________
_________________________________________________________________________________
_________________________________________________________________________________
B. Course Design (Circle the number to indicate your level of agreement/disagreement with each of the aspects of course design.)

1. The program content has real-world applications for me    1  2  3   4

Comments:___________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________

2. The program content met my needs     1  2  3  4

Comments:___________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________

3. Length of the course was appropriate    1  2  3   4

Comments:___________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________

4. PowerPoint presentation was effective    1  2  3   4

Comments:___________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________

5. Course manual was useful       1  2  3   4

Comments:___________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________
6. In-class activities were effective 1 2 3 4

Comments:___________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________

7. What did you like most about the course?

Comments:___________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________

8. What specific things did you like least about the course?

Comments:___________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________

9. If the course was repeated, what should be left out or changed?

Comments:___________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________

## Introduction: Designing and Implementing Injury Surveillance Systems in Indian Country

### Course at a Glance

**Approximate Time Frame:** 3 days with 6 hours of instruction each day

<table>
<thead>
<tr>
<th>Sections</th>
<th>Time</th>
</tr>
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<tbody>
<tr>
<td>Introduction</td>
<td>1 hour</td>
</tr>
<tr>
<td>Section 1: Understand the Concepts and Framework of Injury Prevention</td>
<td>1.5 hours</td>
</tr>
<tr>
<td>Section 2: Assess Injury Data Sources and Describe Injury Problem</td>
<td>1 hour</td>
</tr>
<tr>
<td>- Includes 1 exercise</td>
<td></td>
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<tr>
<td>Section 3: Build Partnership or Coalition to Support the Injury Surveillance System and Prevention Activities</td>
<td>1 hour</td>
</tr>
<tr>
<td>Section 4: Determine the Appropriate Methodology for Your Surveillance System – Includes 4 exercises</td>
<td>4.5 hours</td>
</tr>
<tr>
<td>Section 5: Define and Develop an Analysis Plan; Develop a Plan for Disseminating Results – Includes 1 exercise</td>
<td>4.5 hours</td>
</tr>
<tr>
<td>Section 6: Use Surveillance Data to Inform Injury Prevention</td>
<td>1 hour</td>
</tr>
<tr>
<td>Section 7: Define an Evaluation Plan for Your Surveillance System and Monitor Prevention Activities – Includes 1 exercise which wraps up the concepts in the course</td>
<td>1 hour</td>
</tr>
<tr>
<td>Final Activity: Create a Surveillance System</td>
<td>2-3 hours</td>
</tr>
</tbody>
</table>

### Exercise/Activities in this Section

- Introductions
- Discussion: What is an Injury Surveillance System?
- Introduce Final Exercise and Handout Worksheet

### Materials Checklist For Course

- LCD Projector & Screen
- Computer
- ICD-10 Code Books or Access to ICD-10 Codes for Exercise in Section 4 (Class can share)
- Whiteboard or Flipchart
- Markers for Whiteboard or Flipchart
- Some calculators (In case some people don’t have calculators on their phone)
- Paper and pens for Participants

### Handouts for this Course – Make Copies for Each Member of the Class

- Handout 1 Worksheet for Final Exercise (Copy Single-sided) (Introduction)
- Handout 2 - ICD-9 Summary of Codes (Section 4)
- Handout 3 - ICD-10 Summary of Codes (Section 4)
Welcome:
Welcome the class. Introduce yourself and tell them about your background in Injury Surveillance.

Explain that this course is the culmination of many months of discussion and collaboration among injury prevention specialists working in Indian Country, the Indian Health Service and the Centers for Disease Control and Prevention. This course is designed for tribal injury prevention specialist, environmental health officers, and others who are working on injury prevention in Indian Country.

Allow each member of the class to introduce themselves, talk about their background and explain why they are interested in the course and what they hope to get out of it.

After introductions, pose this question:
What is an injury surveillance system?

Ask the class to offer their thoughts.

Injury surveillance has been defined as:

... *the ongoing systematic collection, analysis, and interpretation of injury data, for use in planning, implementation and evaluation of prevention activities. Injury prevention programs use surveillance data to assess the need for new policies or programs and to evaluate the effectiveness of those that already exist."


Share some examples from the Appendix of injury surveillance systems that are in place in Indian Country.

Ask why they want to develop a surveillance system.

What do they plan to do with the data they collect?

Over the next three days they will cover the steps to implementing an injury surveillance system for their community.

**Key Points to Stress:**

- This course offers some steps and advice that may or may not be practical for their situation.
- It may not be possible to implement every step as it is presented in this course, but they shouldn’t let that stop them from getting a surveillance system started.
- They can implement as much as they can, as well as they can. Improvements can always be made along the way as funding and personnel become available.

**Introduce Final Exercise and Handout Worksheet**

At the end of this course, the class will be asked to create an injury surveillance system based on a scenario that you provide. Make single-sided photo copies for each member of the class of Handout 1 - Worksheet for Final Exercise.

1. Divide the class into groups of 3 or 4 people (no more than 2 groups if it’s a small class). Assign a scenario to each group. Choose one intentional injury and one unintentional injury.
2. Explain that at the end of the course, they will be asked to create an injury surveillance system based on the knowledge they’ve gained throughout the course.
3. Handout the worksheets and explain that the worksheet will assist them in planning their system. They should fill it out individually as each topic is covered, and compare notes when they gather as a group to design the system at the end of the course.
### Suggested Program Agenda

<table>
<thead>
<tr>
<th>CLASS IN SESSION 8:30 – 10:30</th>
<th>CLASS IN SESSION 8:30 – 10:30</th>
<th>CLASS IN SESSION 8:30 – 10:30</th>
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</thead>
<tbody>
<tr>
<td><strong>Introduction</strong></td>
<td>Develop the appropriate</td>
<td>Define and develop an analysis</td>
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<tr>
<td></td>
<td>Methodology for your surveillance system (cont.)</td>
<td>Plan: Develop a Plan for</td>
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<tr>
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<td></td>
<td>Disseminating Results (cont.)</td>
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<tr>
<td><strong>Morning Break 10:30 – 10:45</strong></td>
<td></td>
<td>Use Surveillance Data to Inform</td>
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<td>Injury Prevention</td>
</tr>
<tr>
<td><strong>CLASS IN SESSION 10:45 – 12:00</strong></td>
<td>Define and develop an analysis</td>
<td>Define an Evaluation Plan for</td>
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<tr>
<td>Assess Injury Data Sources and</td>
<td>Plan: Develop a Plan for</td>
<td>System and monitor Prevention</td>
</tr>
<tr>
<td>Describe Injury Problem</td>
<td>Disseminating Results</td>
<td>Activities</td>
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<tr>
<td><strong>Lunch Break 12:00 – 1:00</strong></td>
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<tr>
<td><strong>CLASS IN SESSION 1:00 – 2:30</strong></td>
<td>Define and develop an analysis</td>
<td>Exercise: Create a Surveillance</td>
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<tr>
<td>Build Partnerships or a Coalition to</td>
<td>Plan: Develop a Plan for</td>
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<tr>
<td>Support the Injury Surveillance</td>
<td>Disseminating Results (cont.)</td>
<td>System</td>
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<td>System</td>
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<tr>
<td><strong>Afternoon Break 2:30 – 2:45</strong></td>
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<td>Evaluation Forms</td>
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<tr>
<td><strong>CLASS IN SESSION 2:45 – 4:00</strong></td>
<td>Define and develop an analysis</td>
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</tr>
<tr>
<td>Develop the appropriate</td>
<td>Plan: Develop a Plan for</td>
<td></td>
</tr>
<tr>
<td>Methodology for your surveillance system (cont.)</td>
<td>Disseminating Results (cont.)</td>
<td></td>
</tr>
</tbody>
</table>

*Agenda is subject to change and times may vary.*
Notes:
Design a Surveillance System

Scenarios:

1. Preliminary analysis of data gathered from death and hospitalization records indicates that assault is the number one cause of hospitalization and death on your reservation. You want to undertake a study to learn more about the victims of assault and determine the nature of the assaults that are taking place.

2. Data analysis reveals that American Indians in your region of your state are twice as likely to die from intentional gunshot wounds as the rest of the population. You undertake a surveillance effort to learn more about the nature of this injury event and identify the risk factors in the hopes of developing an intervention.

3. Death certificates and hospitalization records indicate that in 2009, there were 3 deaths in your community attributed to unintentional poisoning; in 2010 there were 7; in 2011 there were 15 and last year there were 24. Alarmed by the upward trend, you undertake surveillance efforts to find out more about this injury event and the circumstances surrounding it.

4. Motor vehicle crashes are the leading cause of death among teenagers on your reservation. You undertake surveillance efforts in the hopes of preventing more deaths.

Instructions

Your instructor will assign you one of the scenarios above. Circle it. As the final exercise for this course, you will be asked to design a surveillance protocol/system that addresses the injury problem in the scenario. Use this worksheet throughout the course to write down your thoughts regarding the components and steps for creating a surveillance system. At the end of the course, you will divide into groups and collaborate on what should be included in the surveillance system and how it might be organized to achieve the objectives. Please use the space on the front and back of this handout if you need more room to write.

1. What is your objective?

2. What are some possible data sources to assist you in your study?

3. How will you gain access to the data?
4. What political considerations might there be and how will they be addressed?

5. Are there other people or organizations that can assist you in your efforts? Who are they? What will their role be in your surveillance efforts?

6. Define your case:

7. What variables or information will you need to collect – what will be on your data collection form? Will you need a supplemental form?

8. How often will you collect the data?

9. Is this an ongoing surveillance effort or is it limited to a specific timeframe?

10. What crucial information will you include in a report to stakeholders?

11. Who will receive the report?
Designing and Implementing Surveillance Systems in Indian Country

Introduction

Welcome the class. Introduce yourself and tell them about your background in Injury Surveillance.
About This Course

• Created by injury prevention specialists working in Indian Country, Indian Health Service and Centers for Disease Control and Prevention
• Created for injury prevention specialists and others working on injury prevention in Indian Country

Explain that this course is the culmination of many months of discussion and collaboration among injury prevention specialists working in Indian Country, the Indian Health Service and the Centers for Disease Control and Prevention.
Allow class members to introduce themselves and explain why they are interested in the course.
Learning Objectives

- Review the concepts and framework of injury prevention
- Learn to assess injury data sources and describe the injury problem
- Learn how to build partnerships or a coalition to support the injury surveillance system
- Learn how to determine the appropriate methodology for the surveillance system
- Learn how to define and develop an analysis plan for the surveillance data
- Learn to use injury surveillance data to inform injury prevention
- Learn how to define an evaluation plan for the surveillance system and monitor prevention activities

Explain learning objectives
Ask this question. Ask members of the class to share their thoughts on the subject. Refer to quote:

Injury surveillance has been defined as

... the ongoing systematic collection, analysis, and interpretation of injury data, for use in planning, implementation and evaluation of prevention activities. Injury prevention programs use surveillance data to assess the need for new policies or programs and to evaluate the effectiveness of those that already exist.”

Share some examples from the Appendix of injury surveillance systems that are in place in Indian Country. For example – The Bristol Bay Surveillance System has been operating for close to 20 years, has 5,332 individual entries, including 290 deaths. Surveillance efforts there have resulted in funding for suicide prevention efforts and the implementation of injury prevention efforts.

Questions for the class:
Why do you want to develop a surveillance system?
What do you plan to do with the data collected?
Introduce Final Exercise and Handout Worksheet
At the end of this course, the class will be asked to create an injury surveillance system based on a scenario that you assign from the worksheets. Make single-sided photo copies of the worksheet for each member of the class.

Divide the class into groups of 3 or 4 people (no more than 2 groups if it’s a small class). Assign one of the scenarios to each group. Choose one intentional injury and one unintentional injury if you have two groups.

Explain that at the end of the course, they will be asked to create an injury surveillance system based on the knowledge they’ve gained throughout the course.

Handout the worksheets and explain that the worksheet will assist them in planning their system. They should fill it out individually as each topic is covered, and compare notes when they gather as a group to design the system at the end of the course.
Introduction

Welcome to Designing and Implementing Injury Surveillance Systems in Indian Country. This course is the culmination of many months of discussion and collaboration among injury prevention specialists working in Indian Country, the Indian Health Service and the Centers for Disease Control and Prevention. This course is designed for tribal injury prevention specialist, environmental health officers, and others who are working on injury prevention in Indian Country.

Over the next three days, you will learn the steps to creating an injury surveillance system, beginning with a review of some of the concepts you learned in IHS Level 2 Injury Prevention Training, followed by a discussion of the six steps to creating a surveillance system.

By the end of this course you should be able to:

1. Understand the conceptual framework of injury prevention;
2. Assess injury data sources and describe the injury problem;
3. Build a coalition to support the injury surveillance system;
4. Determine the appropriate methodology for the surveillance systems;
5. Define and develop an analysis plan for the surveillance data;
6. Use injury surveillance data to inform injury prevention;
7. Define an evaluation plan for the surveillance system and monitor prevention activities.

Let's start by asking:

What is an Injury Surveillance System?

One definition is provided below.

... the ongoing systematic collection, analysis, and interpretation of injury data, for use in planning, implementation and evaluation of prevention activities. Injury prevention programs use surveillance data to assess the need for new policies or programs and to evaluate the effectiveness of those that already exist.”


There are many ways of creating a surveillance system. Not everyone will be able to implement every step as it is outlined in this course. The important thing is to get started. Implement what you can, as best you can and make improvements when you can.
Notes
Section 1: Understand the Concepts and Framework of Injury Prevention

Section 1 at a Glance

Approximate Time Frame: 1.5 hours

<table>
<thead>
<tr>
<th>Topics Covered</th>
<th>Slide #</th>
<th>Manual Page #</th>
<th>Time Frame</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury Problem in Indian Country</td>
<td>2</td>
<td>1-1</td>
<td></td>
</tr>
<tr>
<td>Injury Definition</td>
<td>3</td>
<td>1-2</td>
<td></td>
</tr>
<tr>
<td>Injury Classification</td>
<td>4</td>
<td>1-2 – 1-4</td>
<td></td>
</tr>
<tr>
<td>The Burden of Injury in Indian Country</td>
<td>5</td>
<td>1-4 – 1-6</td>
<td></td>
</tr>
<tr>
<td>Financial Benefits of Injury Prevention</td>
<td>6 &amp; 7</td>
<td>1-6 – 1-7</td>
<td></td>
</tr>
<tr>
<td>Conceptual Models for Understanding Injury Prevention</td>
<td>8, 9 &amp; 10</td>
<td>1-7 – 1-9</td>
<td></td>
</tr>
<tr>
<td>Steps to Develop an Injury Surveillance System</td>
<td>11</td>
<td>1-10 – 1-12</td>
<td></td>
</tr>
<tr>
<td>Ethical and Cultural Considerations</td>
<td>12</td>
<td>1-13</td>
<td></td>
</tr>
</tbody>
</table>

Exercise/Activities in this Section

None

Materials Checklist

No extra materials needed for this section

General Information

Most of this section is a review of materials that were covered in IHS Level 2 Injury Prevention Training.

Appendix 1 contains examples of successful surveillance systems in Indian Country. These can be used to illustrate various points throughout the course, so please read and become familiar with the examples. You may substitute local examples wherever you can.

Point people to Appendix 2 for more detailed information on Conceptual Models for Understanding Injury Prevention.
### Text, charts and tables that may need updating

<table>
<thead>
<tr>
<th>Page No.</th>
<th>Section</th>
<th>Possible Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-4</td>
<td>Highlighted text</td>
<td>CDC WISQARS</td>
</tr>
<tr>
<td>1-6</td>
<td>Table 3: Lifetime Cost of AI/AN Injuries</td>
<td>Information from the September 2007 issue of The IHS Provider, research has not been updated</td>
</tr>
<tr>
<td>1-8</td>
<td>Figure 2: Public Health Approach Medicine Wheel</td>
<td>On PowerPoint consider using colors that are relevant to Indian communities in your area</td>
</tr>
</tbody>
</table>

### Notes:

- Text, charts, and tables may need updating for accuracy and relevance.
- Highlighted text refers to sections that might need emphasis or additional information.
- Injury Severity Pyramid and Injury Prevention sections require specific data sources.
- Table 3 and Table 4 need updated information from the relevant sources.
- Figure 2 suggests using culturally relevant colors for presentations.
Understand the Concepts and Framework of Injury Prevention

Section 1
Objectives for Section 1

• Review the concepts, definitions and classification of injuries

• Know the difference between violence-related injury and unintentional injury

• Be able to describe the burden and the cost of injury

• Understand the conceptual models for understanding and preventing injuries

• Know the steps to developing an injury surveillance system

• Understand the ethical considerations associated with surveillance activity
Injury Problem in the United States

- Unintentional injuries in 2010
  - 5th leading cause of death
  - Leading cause of death in ages 1-44
  - Cost an estimated $403 Billion annually in medical expenses and lost productivity

Statistics were obtained from the Centers for Disease Control and Prevention

SOURCES: WISQARS™ http://WISQARS.cdc.gov
Centers for Disease Control and Prevention, National Center for Injury Prevention;

WISQARS™ http://WISQARS.cdc.gov
Centers for Disease Control and Prevention, National Center for Injury Prevention;
Injury Problem in Indian Country

- Unintentional injuries in 2010
  - 3rd Leading Cause of Death
  - Leading cause of death in ages 1-44

Sources: WISQARS™ http://WISQARS.cdc.gov
Centers for Disease Control and Prevention, National Center for Injury Prevention;

WISQARS™ http://WISQARS.cdc.gov
Centers for Disease Control and Prevention, National Center for Injury Prevention;
Injury Definition

- **Injury vs. Disease** – Explain why it’s important to distinguish between injury and disease when conducting injury surveillance.
- **Injury vs. Accident** – Stress that accidents are something unpredictable or something that happens by chance. But events that injure people have identifiable risk factors which can be modified. Injury surveillance an aid in identifying risk factors.
Injury Classification

Unintentional

Intentional

p.1-2–1-4

Ask the class for examples of each – unintentional injuries and intentional injuries
In 2010, nationwide, there were 180,811 deaths attributed to injuries. But injury deaths are just the tip of the iceberg as the pyramid illustrates (Note: this depicts data for the general U.S. population). The majority of injuries do not result in death, but they may require costly treatment or result in permanent disability.

Ibid.
In 2010, more than 3000 deaths in Indian Country were attributed to injuries; 66,612 years of potential life were lost, and according to some estimates injuries cost Indian Country more than $2 billion a year in medical care and rehabilitation costs, lost wages and productivity. The burden of injury is particularly acute in Indian Country because health care funding is severely limited.

Ask the class to share examples of the physical, financial and emotional burden of injuries.
Financial Benefits of Injury Prevention

Interventions that Save Money in Indian Country

- DUI Laws
- Personal Flotation Devices
- Smoke Detectors
- Gun Locks
- Bike Helmets
- Primary Seat Belt Laws
- Street Lights & Guard Rails
- Livestock Control
- Child Car Seat Program

Injury prevention can save lives and spare people needless suffering. It can also save money not just for individuals but for the community. Even if injury prevention efforts do not reduce all injuries, they can reduce the severity of injuries resulting in lower overall treatment costs. Fewer injuries or less severe injuries result in less money being spent on emergency medical treatment and more money available for other activities, such as economic development. In areas where medical facilities and doctors are in short supply, lowering the need for emergency treatment means that resources are available for elective and preventative health care.

These are some injury prevention programs that have achieved results in Indian Country. They began with surveillance efforts.

Read the slide, ask the class for other examples
Cost Outcome Analysis:

Another way to judge the value of injury prevention efforts is to compare the cost of the intervention with the savings that result for the community because the number of injuries is reduced. Most tribal government officials will want to know that a program is producing the desired results and that it is cost effective.

Public Health Approach: The public health model for injury prevention is concerned with the public in general as well as the health of the individuals that make up the community. The public health approach is a repeating four-step process. Note each of the sections on the Medicine Wheel, beginning with the white section on top.
Epidemiology considers the interaction of three factors in the development of disease: the host, the agent and the environment. Haddon maintained that the same concept could be applied when examining the cause of injuries. Haddon applied the epidemiological principal to unintentional injuries, and particularly to injuries from motor vehicle crashes.

In the Epi Model of injury prevention, the host is the injured person, the environment refers to the characteristics of the physical and social environment in which the injury occurred and the agent is the energy that is transferred to the body at a rate sufficient to cause injury. The Epi Model is a useful way of approaching injury prevention, because it gives the injury prevention specialist three different opportunities for intervention.
the Haddon Matrix:
Haddon went even further and added a time element to the model, developing the Haddon Matrix. Haddon maintained that this model could be used when examining the cause of injuries. Haddon applied it to unintentional injuries, and particularly to injuries from motor vehicle crashes.

The Haddon Matrix, examines each of the three factors considered in the Epi Triad at three different intervals of an injury event – pre-event, event and post-event. The Haddon Matrix helps chart the course of an injury and allows the injury prevention specialist to plan interventions at each interval.
P. 1-9 – 1-10

**Ecological Model for Understanding Violence:**
The Ecological Model proposes that health and well-being are affected by dynamic interaction among biology, behavior and the environment and that this interaction changes over the life course. The ecological model considers the following factors:
- **individual Factors** -- Characteristics of the individual that increase the likelihood of being a victim or a perpetrator of violence
- **Relationship Factors** – Proximal social relationships that increase a person’s risk for being a victim or perpetrator of violence
- **Community Factors** -- Characteristics of a community that might increase the likelihood of violence
- **Societal Factors** – Factors that create an acceptable climate for violence, reduce inhibitions against violence and create or sustain gaps or tensions among different segments of society.
These steps incorporate and in some cases expand on the 10 steps that were discussed in the IHS Level 2 Injury prevention training. Each of these steps will be discussed in more detail over the next three days.

It’s important to stress:

*Not every step will be achievable or feasible for everyone’s situation. For example, it may not be possible to form a coalition, or obtain all the data they would want. Stress that should implement each step or as much of each step they can. Modify steps as need be to fit their situation and seek help from an expert when needed.*

They are about to complete step 1 and now will be learning more about the other 6 steps.
A successful surveillance system depends on a trusting relationship between the people who gather data and the community. Every consideration must be given to protecting people’s privacy when collecting data and publicizing the results. Privacy refers to the right of an individual to withhold or control the use of information about her or himself. Confidentiality refers to the obligation one has to protect information about someone. Small communities, such as many Alaska villages or Indian reservations make it difficult to ensure confidentiality. It’s sometimes possible to identify people even when precautions have been taken. It’s important to have clear policies in place to ensure confidentiality and privacy considerations are met.

The Privacy Act of 1974, a precursor to HIPAA, addresses how government agencies handle and maintain records about individuals. HIPAA requires HHS to address the security and privacy of health information, especially individually identifiable health information in all forms. Information about HIPAA training is in Appendix 3.

In addition to federal laws, the IHS and some Tribes have Institutional Review Boards (IRB). An IRB reviews and approves or disapproves research activities that use medical facilities, data, staff or, for the IHS, funding. The IRB will examine the informed consent process between the researcher and the volunteers, and the negotiations between the researcher and the Tribal community to verify that the research is safe, of benefit and respectful to participants.

It’s important to be aware of the community standards for your activities. The process of collecting data and the procedure for using data from tribes may be different from other governments or organizations. And the process may differ from Tribe to Tribe. In addition, each Tribe in your area has a unique culture, which may impact your ability to collect data and publicize your results. It’s important to be aware of and respect Tribal cultural concerns.
Summary of Section 1

- Understand the concepts, definitions and classification of injuries
- Know the difference between violence-related injury and unintentional injury
- Be able to describe the burden and the cost of injury
- Understand the conceptual models for understanding and preventing injuries
- Know the steps to developing an injury surveillance system
- Understand the ethical considerations associated with surveillance activity
Section 1: Understand the Concepts and Models for Injury Prevention

Learning Objectives

- Understand the concepts, definitions and classifications of injuries
- Know the difference between violence related injuries and unintentional injuries
- Describe the burden and cost of injury
- Know the conceptual models for understanding and preventing injuries
- Know the steps to develop an injury surveillance system
- Know the ethical consideration for injury surveillance

Introduction

Injuries, both intentional and unintentional, are a leading cause of death and disability in American Indian and Alaska Native (AI/AN) communities. As a nation, unintentional and intentional injuries cost an estimated $403 billion annually in medical treatment and lost productivity. It is no wonder that injury prevention is a priority in the United States and particularly in Indian Country.

The first step in effectively preventing injuries is to conduct injury surveillance to identify the frequency and types of injuries that are occurring in a community. Injury surveillance can:

- Help determine the cause and costs of injuries in your community
- Focus efforts on those injuries that are most detrimental
- Gain community support and money needed to conduct an effective injury prevention program.

This course will guide you through the steps of developing and maintaining an injury surveillance system for your community. In some cases, this course will present an ideal process of how injury surveillance could be conducted, but throughout there is broad recognition that in Indian Country you may not have access to the resources, personnel or data to achieve the ideal. The goal is not to create the perfect surveillance system, but to create the best system possible, knowing that it can be expanded or improved upon later.

In this section, we will review some of the concepts and terms of injury prevention that were covered in the IHS Level II Injury Prevention Course; review the magnitude of the injury problem in Indian Country and the United States; and introduce the steps for developing and maintaining an injury surveillance system. Each of the other steps will be discussed in detail in subsequent sections of this manual.
Injury Definition

An injury is caused by exposure to an outside force, such as mechanical energy, electricity, heat or chemicals. In some cases, injury can be caused by a lack of something essential, such as air, as in drowning, or by exposure to something, such as extreme cold, as in frostbite. About three-fourths of all injuries are caused by the uncontrolled release of mechanical energy. ³

Injury vs. Disease

Some experts think that an injury is defined by immediate damage to the body from an external force. Some believe that the interval between the exposure and the damage can be relatively long, such as in poisoning from carbon monoxide, alcohol abuse or lead poisoning. The distinction between injury and disease is an important issue to consider when conducting injury surveillance. Table 1 below shows some examples of how exposure to similar elements can result in injury or disease.⁴

<table>
<thead>
<tr>
<th>Injury</th>
<th>Disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>A construction worker breaks his toe while using a jackhammer on the job</td>
<td>A construction worker is diagnosed with tendonitis of the elbow from years of exposure to the vibration of a jackhammer</td>
</tr>
<tr>
<td>A child is bitten by a dog and requires ten stitches to his leg</td>
<td>A child contracts rabies after a dog bite</td>
</tr>
<tr>
<td>A person dies in a car crash as the result of drunk driving</td>
<td>A person dies from sclerosis of the liver as the result of years of alcohol abuse</td>
</tr>
<tr>
<td>A firefighter suffers smoke inhalation while fighting a wildfire</td>
<td>A former uranium miner contracts lung cancer from years of exposure to uranium dust</td>
</tr>
</tbody>
</table>

In each of the examples above, you would say the first victim suffered from an injury, while the second victim suffered from a disease. Acuteness is a factor. The shorter the time from the exposure to a hazard to the impact on the body, the more likely it is to be classified as an injury rather than a disease. ⁵

Injury vs. Accident

Injuries are not the result of accidents. For many people, accidents are something unpredictable or something that happens by chance. But events that injure people have identifiable risk factors which can be modified. Many experts believe that the use of the word “accident” when referring to injury events creates confusion and inhibits prevention efforts. ⁶

Injury Classification

Injuries can be broadly classified into two groups – unintentional injuries or violence-related injuries (also called intentional injuries). Unintentional injuries relate to traffic crashes, events in the home or the workplace, in public places or as the result of natural disasters. Intentional injuries are related to interpersonal, collective or self-directed violence.
**Unintentional Injuries**

Unintentional injuries -- such as falls, car crashes, burns or drowning -- occur without the intent of anyone involved. According to information obtained from the Centers for Disease Control WISQARS site, in 2010 unintentional injuries were the fifth leading cause of death for all ages in the United States. In Indian Country, unintentional injuries were the third leading cause of death for all ages and the leading cause of death for people under the age of 44.  

An unintentional injury can be described as follows:

- Physical damage to the body
- Damage that results from excessive force to the body; exposure to external agents, such as poison; or deprivation of an essential element such as air or warmth
- The damage is not done deliberately

Unintentional injuries can be inflicted by a number of mechanisms, including:

- Mechanical (impact with a moving or stationary object)
- Radiant (ultraviolet radiation)
- Thermal (air or water that is too hot or too cold)
- Electrical (lightning strike, electrical shock)
- Chemical

Table 2 shows the mechanism of injury for common injuries and the place where the injury occurs most often.

**Table 2. Unintentional Injuries**

<table>
<thead>
<tr>
<th>Mechanism of Injury</th>
<th>Place of Occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Home</td>
</tr>
<tr>
<td>Burns/Scalds</td>
<td></td>
</tr>
<tr>
<td>Cuts/Lacerations</td>
<td></td>
</tr>
<tr>
<td>Drowning</td>
<td></td>
</tr>
<tr>
<td>Impact Injury</td>
<td>Falls from rooftops, windows or furniture. Falls related to agriculture, construction, recreation, sports, or transportation (automobiles, bicycles, pedestrians, motorcycles.)</td>
</tr>
<tr>
<td>Electric Shock</td>
<td>From household gadgets, toys, and substandard or hazardous wiring; improper use of and substandard electrical gadgets</td>
</tr>
<tr>
<td>Poisoning</td>
<td>From medicines, household chemicals, cooking fuels, seeds</td>
</tr>
<tr>
<td>Suffocation/Asphyxia</td>
<td>From infant and toddler furniture, clothes and toys, plastic bags, swallowing of seeds or toys</td>
</tr>
<tr>
<td>Firearms</td>
<td>Unintentional use</td>
</tr>
</tbody>
</table>
Section 1: Understand the Concepts and Models for Injury Prevention

### Insect and Animal Bites

<table>
<thead>
<tr>
<th>Insect and Animal Bites</th>
</tr>
</thead>
<tbody>
<tr>
<td>From dogs, snakes, scorpions, etc.</td>
</tr>
</tbody>
</table>


### Intentional Injuries

Intentional or violence-related injuries occur because of a person’s deliberate intent to harm another or oneself. Intentional injuries can be the result of a number of things, including domestic violence, child or elder abuse or suicide attempts.

The World Health Organization divides violence-related injuries into three broad categories:

- Self-directed, which includes suicidal behavior and self-abuse
- Interpersonal, which includes violence between family members and intimate partners, and community violence between individuals who are unrelated
- Collective, which includes violence inflicted by large groups such as the government, mobs or terrorists.

A violent act can also be classified by its nature. The four categories are:

- Physical violence
- Sexual violence
- Psychological violence
- Violence involving depravation or neglect

According to the Centers for Disease Control and Prevention, in 2010, 28 percent of all injuries in Indian Country were the result of violence. Among 15-24-year-olds, violence accounted for 37 percent of all injury deaths in Indian Country. More than half of these deaths were suicides. Suicide is the second leading cause of death for ages 15-24, behind unintentional injuries.

### The Burden of Injury in Indian Country

In 2010, more than 3,000 deaths in Indian Country were attributed to injuries. Nationwide, there were 180,811 deaths attributed to injuries. But injury deaths are just the tip of the iceberg as the pyramid in Figure 1 on the next page illustrates (Note: this depicts data for the general U.S. population). The majority of injuries do not result in death, but they may require costly treatment or result in permanent disability.

**Physical**

Injuries take their heaviest toll on youth. Unintentional injuries are the leading cause of death for American Indians/Alaska Natives ages 1-44. In some cases, deaths from injuries among this group are two to three times higher than that of the general population. In 2010, 66,612 years of potential life were lost due to intentional and unintentional injuries. Add to that the unmeasured years of productivity lost due to injuries that are debilitating but not fatal.
Financial
Injuries cost Indian Country more than $2 billion a year in medical care and rehabilitation costs, lost wages and productivity and administrative costs (see Table 3, p. 6). In addition there are numerous additional costs, such as pre hospital care, dental care, mental health costs, long-term care, value of lifetime earnings lost, etc., that are not factored into the figure above. The economic burden of injuries is particularly acute in Indian Country because health care funding is severely limited.

*Includes care administered for adverse effects of medical treatment
Source: Centers for Disease Control and Prevention, FastStats
Based on Surveys from 2009-2011 http://www.cdc.gov/nchs/fastats/injury.htm
### Emotional

The impact of injuries on individuals, families and communities can be devastating. The loss of mobility and income can put severe stress on an individual and his or her family. Not to mention the grief felt by family, friends and the community when injuries result in death.

### Financial Benefits of Injury Prevention

Injury prevention can save lives and spare people needless suffering. It can also save money not just for individuals but for the community. Even if injury prevention efforts do not reduce all injuries, they can reduce the severity of injuries resulting in lower overall treatment costs. Fewer injuries or less severe injuries result in less money being spent on emergency medical treatment and more money available for other activities, such as economic development. In areas where medical facilities and doctors are in short supply, lowering the need for emergency treatment means that resources are available for elective and preventative health care.

Below is a list of some injury prevention efforts that have saved lives and money in AI/AN communities.

#### Interventions that Save Money in Indian Country
- DUI Laws
- Personal Flotation Devices
- Smoke Detectors
- Gun Locks
- Bike Helmets
- Primary Seat Belt Laws
- Street lights and guardrails
- Livestock Control
- Child Car Seat programs
Cost Outcome Analysis of Injury Prevention

Another way to judge the value of injury prevention efforts is to compare the cost of the intervention with the savings that result for the community because the number of injuries is reduced. Most tribal government officials will want to know that a program is producing the desired results and that it is cost effective. Table 4 below shows the average cost and the average cost savings realized by some common injury prevention programs that have been implemented in the United States.

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Cost per Unit</th>
<th>Cost Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sobriety Checkpoints</td>
<td>$12,500 per checkpoint</td>
<td>$82,000 per checkpoint</td>
</tr>
<tr>
<td>Battery-Operated Smoke Alarms</td>
<td>$46 per alarm</td>
<td>$770 per alarm</td>
</tr>
<tr>
<td>Poison Control Centers</td>
<td>$43 per call</td>
<td>$320 per call</td>
</tr>
<tr>
<td>Bicycle Helmets, ages 3-14</td>
<td>$13 per helmet</td>
<td>$580 per helmet</td>
</tr>
<tr>
<td>Child Safety Seat Distribution, Ages 0-4</td>
<td>$55 per seat</td>
<td>$2,200 per seat</td>
</tr>
</tbody>
</table>


Conceptual Models for Understanding and Preventing Injury

Injury events can involve a number of factors. A car crash, for example, may be related to speed or weather conditions or the ability of the driver or all of those things. Any approach to injury prevention should investigate and address the underlying factors that contribute to the injury. A number of models have been developed for the purpose of systematically investigating the cause and prevention of injury. You should be familiar with these models from the Indian Health Service Injury Prevention training, so they are only briefly reviewed here. More information on these models can be found in Appendix 2.

Public Health Approach

The public health model for injury prevention is concerned with the public in general as well as the health of individuals. The public health approach is a repeating four-step process and so the Indian Health Service depicts it with a Medicine Wheel (see Figure 2 next page).

In the public health model you:
1. Define the problem through surveillance
2. Identify the risk factors – who and/or what
3. Find out what works to prevent the problem
4. Implement and evaluate prevention programs
Epidemiological Triad and the Haddon Matrix
Dr. William Haddon, the former director of the U.S. National Highway Traffic Safety Administration and the Insurance Institute for Highway Safety, introduced the application of epidemiological principals to the injury research and intervention programs. Epidemiology considers the interaction of three factors in the development of disease: the host, the agent and the environment (see Figure 3 below). Haddon maintained that the same concept could be applied when examining the cause of injuries. Haddon applied the epidemiological principle to unintentional injuries, and particularly to injuries from motor vehicle crashes.  

Figure 2.

Figure 3 – Epi Triad

Public Health Approach

Define the Problem -Surveillance
Implement & Evaluate Programs -Prevention
Find what Prevents the Problem -What Works?
Identify Risk Factors -Who, What?

Adapted from National Center for Injury Prevention and Control, CDC
Section 1: Understand the Concepts and Models for Injury Prevention

In the Epi Model of injury prevention, the host is the injured person, the environment refers to the characteristics of the physical and social environment in which the injury occurred and the agent is the energy that is transferred to the body at a rate sufficient to cause injury. The Epi Model is a useful way of approaching injury prevention, because it gives the injury prevention specialist three different opportunities for intervention.

Haddon took the Epidemiological Model even further by adding a time element. The Haddon Matrix, as this model is called, examines each of the three factors considered in the Epi Triad at three different intervals of an injury event – pre-event, event and post-event. The Haddon Matrix helps chart the course of an injury and allows the injury prevention specialist to plan interventions at each interval.

Figure 4.

The Haddon Matrix

Factors

<table>
<thead>
<tr>
<th>Phase</th>
<th>Host</th>
<th>Agent</th>
<th>Physical Environment</th>
<th>Social Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Event</td>
<td></td>
<td></td>
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<tr>
<td>Event</td>
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<tr>
<td>Post-Event</td>
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</table>

Figure 4 above illustrates the Haddon Matrix. If you were to apply the matrix to a car crash injury, for example, the pre-event phase would be the time before the crash takes place, the event phase would be during the crash, and the post event phase would be the time after the crash. You would then assess each of the factors that could have contributed to each phase of the crash – the condition or ability of the host/driver, the condition of the agent/vehicle, the condition of the physical environment/roads, weather, etc. and the conditions of the social elements, such as the enforcement of seat belt laws. In Section 6, we will review how the Haddon Matrix is used to identify potential interventions.

Ecological Model for Understanding Violence

Just as the Haddon Matrix assists in the understanding of unintentional injuries, the Ecological Model (see Figure 5 on next page) is helpful in understanding the cause and prevention of violence. The Ecological Model examines the interplay of the complex factors that increase or decrease the incidence of violence. It is useful in designing programs to address different types of violence and in identifying multiple points of intervention.  

The Ecological Model proposes that health and well-being are affected by dynamic interaction among biology, behavior and the environment and that this interaction changes over the life course. The ecological model considers the following factors:
Section 1: Understand the Concepts and Models for Injury Prevention

- Individual Factors – Characteristics of the individual that increase the likelihood of being a victim or a perpetrator of violence
- Relationship Factors – Proximal social relationships that increase a person’s risk for being a victim or perpetrator of violence
- Community Factors – Characteristics of a community that might increase the likelihood of violence
- Societal Factors – Factors that create an acceptable climate for violence, reduce inhibitions against violence and create or sustain gaps or tensions among different segments of society.

Developing an Injury Surveillance System

Injuries are a significant health burden in the United States and particularly in Indian Country. Injury prevention efforts have been and will continue to be instrumental in reducing the health and financial impact of injuries. By continuously providing decision makers at the Tribal and Federal level with surveillance data that has been thoughtfully collected, analyzed and interpreted, you can help assure that injury prevention remains a priority for AI/AN communities.

The goal of this course is to show you how to develop a system of continuously collecting data, analyzing and interpreting it and then presenting the results to the people who need to know, including decision makers who can authorize funding and implement public policy to aid prevention efforts. Injury surveillance data is also used to assess the effectiveness of prevention efforts.

This manual explains a seven-step process for developing an Injury Surveillance System that is drawn from documents, such as the Injury Surveillance Guidelines from the World Health Organization. Previously in the IHS Level II Injury Prevention Program you may have learned a 10-step process. Those 10 steps are incorporated into this process. The process is cyclical because when you reach the last step – evaluating the system – you’ll want to review and revise other steps to continuously improve the quality of the system. Some of the steps may occur simultaneously or in a different order than given.
Section 1: Understand the Concepts and Models for Injury Prevention

here. Not every step will be achievable or feasible for your situation. For example, it may not be possible to form a coalition, or obtain all the data you would want. Implement each step or as much of each step as you can. Modify steps as need be to fit your situation and seek help from an expert when needed.

Steps to Develop and Maintain an Injury Surveillance System
Below are the seven steps for developing and maintaining an injury surveillance system, along with the activities or elements of each step. Step 1 was explained in this section. The other six steps will be discussed in each of the next six sections.

1. Understand the concepts and models for injury prevention
   - Understand the concepts, definitions and classification of injuries
   - Know the difference between violence related injuries and unintentional injuries
   - Describe the burden and cost of injuries
   - Know the conceptual models for understanding and preventing injury
   - Know the steps to develop an injury surveillance system
   - Understand the ethical considerations

2. Assess injury data sources and describe the injury problem
   - Identify the available data sources that can provide information to the surveillance system
   - Identify the injury data source strength and weakness
   - Describe the size of the injury problem
   - Compare the frequency of injuries calculated with the data from different sources

3. Build a partnership or coalition to support the injury surveillance system and prevention activities
   - Identify partners to include in the coalition
   - Identify local and national organizations working on injury prevention in the region
   - Define the existing social, legal and political framework in which an injury surveillance system and prevention activities may be established

4. Determine the appropriate methodology for the surveillance system
   - Define the injury events and data elements to be included in the system
   - Develop the data collection instrument and determine the data collection frequency
   - Plan for systemization, maintenance and data security
   - Define key positions

5. Define and develop an analysis plan for the surveillance data
   - Calculate injury indicators such as frequency, percentage, and crude, specific and adjusted rates
   - Calculate years of potential life lost
   - Describe the geographical analysis of the data
   - Define a plan to disseminate and communicate data

6. Use injury surveillance data to inform injury prevention
   - Understand the use of surveillance data to identify priority injuries in your region
   - Understand the models that can help identify risk factors and intervention strategies
   - Tie surveillance to action and funding

7. Define an evaluation plan for the surveillance system and monitor prevention activities
   - Know the steps to evaluating an injury surveillance system
• Use surveillance data to monitor prevention activities

Figure 5. Seven Steps to Develop and Maintain an Injury Surveillance System

1. Understand the concepts and models for injury prevention
   - Definition and typology of unintentional and intentional injuries

2. Assess injury data sources and define the injury problem
   - Identifying strengths and weaknesses of injury data sources and the size of the problem

3. Build a partnership or coalition to support the injury surveillance system and prevention activities
   - Identify the partners to include in a coalition to support the injury surveillance system

4. Determine the appropriate methodology for the surveillance system
   - Determine events, data elements, type of surveillance and data

5. Define and develop an analysis plan for the surveillance data
   - Calculate indicators, demographics and environmental characteristics

6. Use injury surveillance data to inform injury prevention
   - Use data to identify preventable injuries, high-risk groups and most appropriate interventions

7. Define an evaluation plan for the surveillance system and monitor prevention activities
   - Apply the criteria to evaluate the surveillance system and monitor strategies
Ethical Considerations and Cultural Awareness

A successful surveillance system depends on a trusting relationship between the people who gather data and the community. Every consideration must be given to protecting people’s privacy when collecting data and publicizing the results. Privacy refers to the right of an individual to withhold or control the use of information about her or himself. Confidentiality refers to the obligation one has to protect information about someone. Small communities, such as many Alaska villages or Indian reservations make it difficult to ensure confidentiality. It’s sometimes possible to identify people even when precautions have been taken. It’s important to have clear policies in place to ensure confidentiality and privacy considerations are met.

The Privacy Act of 1974, a precursor to HIPAA, addresses how government agencies handle and maintain records about individuals. HIPAA requires HHS to address the security and privacy of health information, especially individually identifiable health information in all forms. You should be familiar with these laws from previous training. If you need a review, you will find information on further training in Appendix 3.

In addition to federal laws, the IHS and some Tribes have Institutional Review Boards (IRB). An IRB reviews and approves or disapproves research activities that use medical facilities, data, staff or, for the IHS, funding. The IRB will examine the informed consent process between the researcher and the volunteers, and the negotiations between the researcher and the Tribal community to verify that the research is safe, of benefit and respectful to participants.

It’s important to be aware of the community standards for your activities. The process of collecting data and the procedure for using data from tribes may be different from other governments or organizations. And the process may differ from Tribe to Tribe. In addition, each Tribe in your area has a unique culture, which may impact your ability to collect data and publicize your results. It’s important to be aware of and respect Tribal cultural concerns.

Summary

Now that you have completed this section you should:

- Understand the concepts, definitions and classification of injuries
- Know the difference between violence-related injury and unintentional injury
- Be able to describe the burden and the cost of injury
- Understand the conceptual models for understanding and preventing injuries
- Know the steps to developing an injury surveillance system
- Understand the ethical considerations associated with surveillance activity
Notes
Resources & References

Resources

Centers for Disease Control and Prevention, National Center for Health Statistics. FastStats
Available from URL: http://www.cdc.gov/nchs/fastats/injury.htm


References


2 Ibid.


7 CDC WISQARS. Cited 2013 May 3.


9 CDC WISQARS. Cited 2013 May 3.

10 Ibid.

11 Ibid.


14 Krug, Et al.

15 Holder, Et al.
## Section 2 at a Glance

**Approximate Time Frame** 1 hours

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<th>Manual Page #</th>
<th>Time Frame</th>
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<tr>
<td>Common Data Sources for Investigating an Injury in Indian Country</td>
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<tr>
<td>Determining the Strength and Weaknesses of Each Data Source</td>
<td>2-3 – 2-4</td>
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<td>Data Assessment Exercise</td>
<td>2-4</td>
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<td>15 min.</td>
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<td>Identify Data Sources to Include in the System</td>
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<td>Linkage with Other Data Sources</td>
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<td>Preliminary Data Analysis</td>
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<td>Using Data to Define the Injury Problem</td>
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<td>Determining the Leading Cause of Injury Deaths</td>
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<tr>
<td>Compare Frequency of Injuries with Data from Different Sources</td>
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</table>

**Exercise/Activities in this Section**

Data Assessment Exercise – described in the book, page 2-4 and in notes on slide

**Materials Checklist**

Flip board or white board

Appropriate markers

**General Information**

Some information here was also covered in IHS Level 2 course.

When talking about data sources and discussing the strengths and weaknesses include examples of local data sources or data sources that may be familiar to the class.
Debrief the Data Assessment Exercise: there are some general things to look at when assessing data and there some specific questions that can be asked when assessing a data source. You can write the questions down on a white board or flip chart and discuss. How do the questions from the class compare with those in Appendix 4.

<table>
<thead>
<tr>
<th>Text, charts or tables that may need updating</th>
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<tbody>
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<td><strong>Page No.</strong></td>
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<td>2-7</td>
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</table>

**Notes:**
Assess Injury Data Sources and Describe Injury Problem

Section 2
Objectives for Section 2

• Identify injury data sources and the strengths and weaknesses of each
• Identify available data sources that can provide information to your surveillance system
• Describe the size of the injury problem
Overview of Common Data Sources

- Death Certificates
- Hospitalization Records
- Outpatient Visits Records
- Police Reports
- Records of Occupational Injuries
- National Data Sources
- WISQARS
- Local Newspaper Accounts

Note the value and/or limitations of each source.

**Death Certificates**
Pros: inexpensive source of information for fatal injuries. Information readily accessible from state and central data bases. Cons: may not contain enough information about the circumstances surrounding an injury, the victim or, in the event of violence, the perpetrator; not all Tribal or IHS healthcare facilities report to the states, so state data may not reflect the complete number of deaths; not a good guide to determining the overall injury problem or the medical consequences, such as long term-disability.

**Hospitalization**
Pros: When combined with mortality data, hospitalization records can provide a much better picture of the injury problem and assist in describing the disability and healthcare costs associated with injuries. Cons: Access to such data is more difficult because of privacy issues; the coding of causation is not consistent; it may be difficult or impossible to determine the ethnicity of the victim and it may require a manual review of records which can consume a great deal of time.

**Outpatient Visits**
Pro: For those with access to hospital or emergency department data, outpatient records may provide some good supplemental information on specific injuries such as sports injuries or eye injuries. However, many tribes only have an outpatient clinic for care where injuries requiring
hospitalization are treated at non-tribal and non-IHS facilities and later billed for services through contract health. In this case, combined outpatient visits with contract health records can provide a better picture of the injury problem. Con: Access to these records may prove difficult as practitioners are highly protective of their records. In addition, AI/AN patients may receive hospitalized care at non-tribal or non-IHS facilities without services paid by the IHS.

**Police Reports**
Police reports can also be an important source of information about injuries, particularly road traffic or violence related injuries. Police records can be very useful for determining the details surrounding an injury event, including, road conditions or the condition of the driver in the event of a crash or the condition of the perpetrator in the event of violence.

**Records of Occupational Injuries**
Information on injuries that occur in an occupational setting is sometimes available from the Department of Labor or organizations that monitor the industry.

**State Data Sources**
Some states keep registries of injury data, particularly traffic injury data, which can be accessed.

**National Data Sources**
The National Highway Traffic Safety Administration, Occupational Safety and Health Administration and other agencies within the federal government maintain a number of databases that might prove useful in your injury surveillance.

**WISQARS**
CDC’s WISQARS™ (Web-based Injury Statistics Query and Reporting System) is an interactive, online database that provides fatal and nonfatal injury, violent death, and cost of injury data from a variety of trusted sources. Researchers, the media, public health professionals, and the public can use WISQARS™ data to learn more about the public health and economic burden associated with unintentional and violence-related injury in the United States. Users can search, sort, and view the injury data and create reports, charts, and maps based on a number of criteria, including race, sex, or age.

**Local or Tribal Newspaper Accounts**
Newspaper accounts can sometimes offer a great deal of information about the victims of injury, including the age of the victim, the circumstances surrounding the injury event and the address of the victim.
P. 2-3
Ask the class to share their experience using these data sources. Were records accessible, timely, accurate, etc.
If they’ve used more than one of the data sources on the slide, how did they differ?
Each institution collects data for different purposes based on their mission. Health institutions, for example, may focus more on the injury and less on the circumstances under which the injury occurred. Police may have a different view of what constitutes an injury and that may impact traffic injury data. There is no perfect data source that will serve all the needs of your surveillance system. That is why it is important to judge the strengths and weaknesses of your potential data sources and determine which ones will best suit your needs.

The slide shows things to consider when determining the strengths and weaknesses of a data source.
Data Assessment Exercise – Allow 15 minutes
Ask the group to imagine that they have just been offered access to a new locally run data base on youth activities in their region. Keeping the above considerations in mind, ask them what specific questions they would ask to determine the strengths and weaknesses of the data bases. Write the questions down on whiteboard or flip chart and discuss.
Refer them to the appendix for questions that have been suggested by others.
When you are evaluating the strengths and weaknesses of a data source, it’s important to understand the mission of each entity collecting data, the method they use to collect the data and the way data is received. In an injury surveillance system using different sources, each source may report different information about the injury event depending on their point of intervention.

Ask the class to consider how many potential data sources would be involved in a road traffic fatality on Tribal land. EMS, Tribal police, hospital, coroner. If there’s time you can ask them what types of information each source would collect. Each would be collecting information, but for different reasons. Each would have a different focus that would impact the information they collect.
P. 2-4

Describe Data Collection Method and Data Flow
Data collection methods vary with institutions because each uses its own forms to collect information at the scene. This information is entered into databases and analyzed to produce reports.

The process for investigating an injury death in Indian Country may vary greatly from Tribe to Tribe. Some Tribes do not have a Coroner or Medical Examiner. Some tribes do not believe in autopsies, so the cause of death may be unknown or inaccurate. Sometimes outside Medical Examiners are called in. Sometimes, in the event of a homicide, the FBI will have jurisdiction. All of these different institutions are a source of data.
Identify Data Sources to Include in the System

- Depend on Injury You’re Tracking
- Quality
- Use Existing Sources

P.2-5

Identify Data Sources to Include in a Surveillance System
The injury events to be included in a surveillance system will determine which data sources are necessary to provide information to the system. The availability of quality data is an important criteria when selecting data sources. Take advantage of existing data sources. There may be some limitations depending on the intent of the data collection, but almost all data sources have some limitations. Using existing data sources will save you time.
Linkage with Other Data Sources

**Advantages**
- It offers supplemental data
- You might obtain more comprehensive descriptions of an injury event
- Highlights the completeness of data available from each source
- It may improve data quality

**Disadvantages**
- May be personal identifiers
- Interagency politics
- Different storage media may create technological problems
- Data quality may not be better

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p. 2-6
Linkage can be in the form of electronically linking databases or it could mean combining data from different sources. Though it would be ideal, it may not be practical. The slide shows advantages and disadvantages. You can ask the class for others.
Preliminary Data Analysis

• Start with the analysis of a broad category, such as interpersonal violence
• Then go more in depth if possible

Develop a strategy or a method to ensure cases are not counted more than once. The goal is to eliminate duplicate cases to ensure the data is accurate.

To understand the nuances of a data source and gauge its completeness and adequacy it is important to conduct preliminary data analysis. Start with the analysis of a broad category, such as interpersonal violence. Then go more in depth if possible, for example, domestic violence against women. Epidemiologists can be useful in this step. Seek them out from such places as state health departments, epidemiology centers, academic institutions and among graduate students. You will find a list of Tribal Epidemiology Centers (TECs) and contact information in Appendix 6 of the manual.
Using Data to Define the Injury Problem

- Determining the Frequency of the Leading Causes of Death
- Determine the Frequency of Injury Deaths

Deaths are commonly used to describe and compare public health problems in part because deaths are well defined and detailed mortality data is often available. Data on fatalities and on motor vehicle and other unintentional injuries can provide an indication of the extent of an injury problem in a community or state. These data can also be useful for monitoring changes in injury rates over time, identifying high risk groups or communities and making comparison among groups. These data are also useful for motivating stakeholders to support injury prevention and in building a partnership or coalition.
### Why Determine the Leading Cause of Injury Deaths

- Monitor trends
- Identify high risk groups or communities
- Make comparison among groups.
- Motivate stakeholders to support injury prevention
- Help in building a coalition

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Leading cause of death data can also be useful for monitoring changes in injury rates over time, identifying high risk groups or communities and making comparison among groups. These data are also useful for motivating stakeholders to support injury prevention and in building a partnership or coalition.
Compare Frequency with Data from Different Sources

- You may find discrepancies
- Identify the mission/goal of the institution collecting the data
- Compare it with the goal of the surveillance system

P. 2-9
Once the leading causes of death are known, the next step is to determine the leading causes of injury deaths. Table 2, on page 2-8, compares the ten leading causes of death in the United States with the ten leading causes of death in Indian Country. As you can see, unintentional injuries rank 5th for the general U.S. population and 3rd for Indian Country. Table 3, on page 2-8, shows the 10 leading causes of injury deaths in Indian Country. As you can see in that table, motor vehicle crashes are the leading cause of injury deaths in Indian Country.
Summary of Section 2

- Identify injury data sources and the strengths and weaknesses of each
- Identify available data sources that can provide information to your surveillance system
- Describe the size of the injury problem

P. 2-9

Now that this section is complete they should be able to ...

Read from slide
Section 2: Assess Injury Data Sources and Describe Injury Problem

Learning Objectives

- Identify the injury data sources strengths and weaknesses
- Identify the available data sources that can provide information to the surveillance system
- Describe the size of the injury problem
- Compare the frequency of injury calculated from different data sources

Introduction

Data for an injury surveillance system can come from many sources, including the health sector, law enforcement, and the Tribal government. No data source is perfect. In Indian Country, data collection can be complicated by racial misclassifications, incomplete or missing patient charts, missing or incorrect codes for injuries, limited access to data on the Tribal level and the decentralized nature of the Indian Health Service data system, which is facility based. It’s important to know the strengths and weaknesses of your data source so you can determine how it may impact your objective. This section reviews some common data sources and shows how data can be used to identify the scope of the injury problem.

Overview of Common Data Sources

Below are descriptions of some common data sources.

Death Certificates

Death certificates are an important and inexpensive source of information for fatal injuries. Information from death certificates is readily accessible from state and central databases. In some cases, however, death certificates may not contain enough information about the circumstances surrounding an injury, the victim or, in the event of violence, the perpetrator. Not all Tribal or IHS healthcare facilities report to the states, so state data may not reflect the complete number of deaths. Death certificates are not a good guide to determining the overall injury problem or the medical consequences, such as long term-disability.

Hospitalization

When combined with mortality data, hospitalization records can provide a much better picture of the injury problem and assist in describing the disability and healthcare costs associated with injuries. However, access to such data is more difficult because of privacy issues; the coding of causation is not consistent; it may be difficult or impossible to determine the ethnicity of the victim and it may require a manual review of records which can consume a great deal of time.
Outpatient Visits
For those with access to hospital or emergency department data, outpatient records may provide some good supplemental information on specific injuries such as sports injuries or eye injuries. However, many tribes only have an outpatient clinic for care where injuries requiring hospitalization are treated at non-tribal and non-IHS facilities and later billed for services through contract health. In this case, combined outpatient visits with contract health records can provide a better picture of the injury problem. Access to these records may prove difficult as practitioners are highly protective of their records. In addition, AI/AN patients may receive hospitalized care at non-tribal or non-IHS facilities without services paid by the IHS.

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Police reports can also be an important source of information about injuries, particularly road traffic or violence related injuries. Police records can be very useful for determining the details surrounding an injury event, including, road conditions or the condition of the driver in the event of a crash or the condition of the perpetrator in the event of violence.

Records of Occupational Injuries
Information on injuries that occur in an occupational setting is sometimes available from the Department of Labor or organizations that monitor the industry.

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Users can search, sort, and view the injury data and create reports, charts, and maps based on the following:

- Intent of injury (unintentional injury, violence-related, homicide/assault, legal intervention, suicide/intentional self-harm)
- Mechanism (cause) of injury (e.g., fall, fire, firearm, motor vehicle crash, poisoning, suffocation)
- Body region (e.g., traumatic brain injury, spinal cord, torso, upper and lower extremities)
- Nature (type) of injury (e.g., fracture, dislocation, internal injury, open wound, amputation, and burn)
- Geographic location (national, regional, state) where the injury occurred
- Sex, race/ethnicity, and age of the injured person
Local or Tribal Newspaper Accounts
Newspaper accounts can sometimes offer a great deal of information about the victims of injury, including the age of the victim, the circumstances surrounding the injury event and the address of the victim.

Figure 1, below shows some common sources that could be used when investigating an injury death in Indian Country.

![Figure 1](image)

Determining the Strengths and Weaknesses of Each Data Source
Each institution collects data for different purposes based on its mission. Health institutions, for example, may focus more on the injury and less on the circumstances under which the injury occurred. Police may have a different view of what constitutes an injury and that may impact their traffic injury data. There is no perfect data source that will serve all the needs of your surveillance system. That is why it is important to judge the strengths and weaknesses of your potential data sources and determine which ones will best suit your needs.

When determining the strengths and weaknesses of a data source consider the following issues:
- Its usefulness for injury surveillance, research and practices.
- Estimates of its accuracy, completeness and representativeness
- Timeliness of the data
- Resource requirements (How long will it take you to collect the data? How much will it cost?)
- Simplicity
Determine the Jurisdiction of Each Data Source
When you are evaluating the strengths and weaknesses of a data source, it’s important to understand the mission of each entity collecting data, the method they use to collect the data and the way data is received and flows from one level to the next. In an injury surveillance system using different sources, each source may report different information about the injury event depending on their point of intervention.

In a road traffic fatality, for example, the victim could die at the site, on the way to the hospital or in the hospital. At the hospital, the victim could die on the same day as the event or many days later. At the hospital, where the major concern is treating the victim, there may not be any information about the circumstances of the injury event. Police may gather information about the victim if he or she died at the scene, but not always. On the other hand, police reports may have more details about the circumstances surrounding the crash. Each data source may record a different time for the occurrence of the event.

At the hospital, there may be a discrepancy between the initial and final diagnosis. If a victim dies at the scene of a crash and doesn’t make it to the hospital, the death will not be registered by the hospital.

Vital statistics offices collect information from the death certificates. If the death certificates are incomplete or inaccurate the data will be unreliable.

Determine Data Collection Method and Data Flow of Each Source
Data collection methods vary with institutions because each uses its own forms to collect information. This information is entered into databases and analyzed to produce reports. Police produce reports based on the information they collect at the scene of an injury event. Forensic medicine and public health officials prepare reports of cases they treat. Data collection and data flow can vary also among institutions depending on the technology available in each place.

For instance, when a death occurs, the funeral director obtains information from the family about the deceased person’s education, occupation, birthplace, racial identity, etc. The local Coroner/Medical Examiner supplies cause-of-death information and basic information about the context of the death. The certificate is then filed with the local or state health department. In most states, the health department assigns the ICD cause of death code, usually with software assistance.

There are three types of death certificate data:
- Death Certificate is usually available within 30 days after the death. It includes cause of death and nature of injury, but not necessarily in coded format.
- Preliminary electronic data, either in electronic form or hard copy printout, are sometimes available within weeks of a death certificate being filed.
• Final death certificate data – cleaned and coded – may not be available for a year or more

The process for investigating an injury death in Indian Country may vary greatly from Tribe to Tribe. Some Tribes do not have a Coroner or Medical Examiner. Some Tribes do not believe in autopsies, so the cause of death may be unknown or inaccurate. Sometimes outside Medical Examiners are called in. Sometimes, in the event of a homicide, the FBI will have jurisdiction. All of these different institutions are a source of data.

Identify Data Sources to Include in a Surveillance System
The injury events to be included in a surveillance system will determine which data sources are necessary to provide information to the system. The availability of quality data is important when selecting data sources. Take advantage of existing data sources. There may be some limitations depending on the intent of the data collection, but almost all data sources have some limitations. Using existing data sources will save you time.

Table 1 below shows the possible data sources based on the injury event and the availability of data. The shaded boxes indicate that the data source is the best for the given event. The entities listed may have data from the national, state or local level. This is only an example and availability of data and sources may vary from one community to the next. You will find a more complete list of data sources in Appendix 5 of this manual.

<table>
<thead>
<tr>
<th>Table 1. Possible Data Sources by Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Police (Tribal, BIA, County, State)]</td>
</tr>
<tr>
<td>Fatal Events</td>
</tr>
<tr>
<td>Homicide</td>
</tr>
<tr>
<td>Suicide</td>
</tr>
<tr>
<td>Transportation Related Death</td>
</tr>
<tr>
<td>Other Unintentional Death</td>
</tr>
<tr>
<td>Non-fatal Events</td>
</tr>
<tr>
<td>Homicide attempt</td>
</tr>
<tr>
<td>Suicide Attempt</td>
</tr>
<tr>
<td>Transportation Related Injury</td>
</tr>
<tr>
<td>Other Unintentional Injuries</td>
</tr>
<tr>
<td>Domestic Violence</td>
</tr>
<tr>
<td>Child Abuse</td>
</tr>
<tr>
<td>Elder Abuse</td>
</tr>
</tbody>
</table>
Section 2: Assess Injury Data Sources and Describe Injury Problem

**Linkage with Other Data Sources**
A single database may not provide all the information you need for your surveillance system. You might consider using data from more than one source – either by combining data from different sources, such as supplementing police crash data with state crash data, or by electronically linking data sets.

It would be ideal to be able to compare data sources, but for most of Indian Country it is not practical. Some of the advantages and disadvantages of data linkage are noted below. It is good to weigh both when you’re considering this strategy.

**Advantages**
- It offers supplemental data
- You might obtain more comprehensive descriptions of an injury event
- Highlights the completeness of data available from each source
- It may improve data quality

**Disadvantages**
- Personal identifiers may compromise confidentiality
- Interagency politics
- Different storage media may create technological problems that eat up time
- Data quality may not be better
- There may be duplicate cases when combining two databases

**Conduct Preliminary Data Analysis**
Develop a strategy or a method to ensure cases are not counted more than once. The goal is to eliminate duplicate cases to ensure the data is accurate.

To understand the nuances of a data source and gauge its completeness and adequacy it is important to conduct preliminary data analysis. Start with the analysis of a broad category, such as interpersonal violence. Then go more in depth if possible, for example, domestic violence against women. Epidemiologists can be useful in this step. Seek them out from such places as state health departments, epidemiology centers, academic institutions and among graduate students. You will find a list of Tribal Epidemiology Centers (TECs) and contact information in Appendix 6 of this manual.

**Using Data to Define the Injury Problem**
The collection of data is vital to defining the injury problem and identifying a solution. Data will allow you to identify who is being injured and how, and better identify the cause and severity of injury. This will be discussed in more detail in Section 4. The purpose of this section is to help you review mortality data, such as the frequency of the 20 leading cause of death and the leading causes of injury death, to define the injury problem. If morbidity data are available, such as hospital discharge data, they can be used to broaden the understanding of the problem.

**Determining the Frequency of the Leading Causes of Death and of Injury Deaths**
Deaths are commonly used to describe and compare public health problems in part because deaths are well defined and detailed mortality data is often available. Data on fatalities and on motor vehicle and other unintentional injuries can provide an indication of the extent of an injury problem in a community or state. These data can also be useful for monitoring changes in injury rates over time, identifying high
risk groups or communities and making comparison among groups. These data are also useful for motivating stakeholders to support injury prevention and in building a partnership or coalition. Once the leading causes of death are known, the next step is to determine the leading causes of injury deaths. Table 2, below, compares the ten leading causes of death in the United States with the ten leading causes of death in Indian Country. As you can see, unintentional injuries rank 5th for the general U.S. population and 3rd for Indian Country. Table 3, below, shows the 10 leading causes of injury deaths in Indian Country. As you can see in that table, motor vehicle crashes are the leading cause of injury deaths in Indian Country.

Table 2

<table>
<thead>
<tr>
<th>Rank</th>
<th>Cause of Death</th>
<th>Number</th>
<th>Rank</th>
<th>Cause of Death</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Heart Disease</td>
<td>597689</td>
<td>1</td>
<td>Malignant Neoplasms</td>
<td>2962</td>
</tr>
<tr>
<td>2</td>
<td>Malignant Neoplasms</td>
<td>574743</td>
<td>2</td>
<td>Heart Disease</td>
<td>2793</td>
</tr>
<tr>
<td>3</td>
<td>Chronic Low. Respiratory Disease</td>
<td>138080</td>
<td>3</td>
<td>Unintentional Injury</td>
<td>1701</td>
</tr>
<tr>
<td>4</td>
<td>Cerebrovascular</td>
<td>129476</td>
<td>4</td>
<td>Diabetes Mellitus</td>
<td>857</td>
</tr>
<tr>
<td>5</td>
<td>Unintentional Injury</td>
<td>120859</td>
<td>5</td>
<td>Liver Disease</td>
<td>787</td>
</tr>
<tr>
<td>6</td>
<td>Alzheimer's Disease</td>
<td>83494</td>
<td>6</td>
<td>Chronic Low. Respiratory Disease</td>
<td>702</td>
</tr>
<tr>
<td>7</td>
<td>Diabetes Mellitus</td>
<td>69071</td>
<td>7</td>
<td>Cerebrovascular</td>
<td>559</td>
</tr>
<tr>
<td>8</td>
<td>Nephritis</td>
<td>50476</td>
<td>8</td>
<td>Suicide</td>
<td>469</td>
</tr>
<tr>
<td>9</td>
<td>Influenza &amp; Pneumonia</td>
<td>50097</td>
<td>9</td>
<td>Nephritis</td>
<td>339</td>
</tr>
<tr>
<td>10</td>
<td>Suicide</td>
<td>38364</td>
<td>10</td>
<td>Influenza &amp; Pneumonia</td>
<td>326</td>
</tr>
</tbody>
</table>


Table 3

<table>
<thead>
<tr>
<th>Rank</th>
<th>Cause of Death</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Unintentional MV Traffic</td>
<td>610</td>
</tr>
<tr>
<td>2</td>
<td>Unintentional Poisoning</td>
<td>521</td>
</tr>
<tr>
<td>3</td>
<td>Suicide Suffocation</td>
<td>206</td>
</tr>
<tr>
<td>4</td>
<td>Suicide Firearm</td>
<td>178</td>
</tr>
<tr>
<td>5</td>
<td>Unintentional Fall</td>
<td>161</td>
</tr>
<tr>
<td>6</td>
<td>Homicide Firearm</td>
<td>113</td>
</tr>
<tr>
<td>7</td>
<td>Unintentional Suffocation</td>
<td>69</td>
</tr>
<tr>
<td>8</td>
<td>Unintentional Drowning</td>
<td>68</td>
</tr>
<tr>
<td>9</td>
<td>Suicide Poisoning</td>
<td>64</td>
</tr>
<tr>
<td>10</td>
<td>Unintentional Natural/ Environment</td>
<td>62</td>
</tr>
</tbody>
</table>

Section 2: Assess Injury Data Sources and Describe Injury Problem

**Compare Frequency of Injuries Calculated with Data from Different Sources**

Injury data are commonly collected for different reasons depending on the mission of the institution collecting the data. Identifying the goal behind each and comparing their goals with the objectives of a surveillance system will help explain the differences in the numbers. In Indian Country, there may be a high proportion of patients who are transported from tribal or IHS facilities to other facilities for treatment. Be aware that data collected by institutions outside Indian Country may contain racial misclassifications, which will skew the numbers.

Table 4 below shows the discrepancies in the number of motor vehicle crash victims in the data collected by different institutions within an IHS service unit.

<table>
<thead>
<tr>
<th></th>
<th>(1) IHS Severe Injury Surveillance System = Emergency Room log + IHS medical records</th>
<th>(2) Tribal Police reports + IHS medical records</th>
<th>(3) Tribal EMS + IHS medical records + discharge planning records</th>
<th>(4) State's Health Department Data</th>
<th>(5) IHS Contract Health Service</th>
<th>Total unduplicated cases from all data sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>IHS ER visits – no record of emergency transport to another hospital</td>
<td>0</td>
<td>24</td>
<td>25</td>
<td>0</td>
<td>0</td>
<td>29</td>
</tr>
<tr>
<td>Transport to IHS ER, subsequent transport to another hospital</td>
<td>21</td>
<td>5</td>
<td>9</td>
<td>0</td>
<td>0</td>
<td>21</td>
</tr>
<tr>
<td>Direct transports from the scene to other hospitals, disposition unknown</td>
<td>0</td>
<td>50</td>
<td>33</td>
<td>0</td>
<td>0</td>
<td>68</td>
</tr>
<tr>
<td>Hospitalizations</td>
<td>0</td>
<td>2</td>
<td>9</td>
<td>0</td>
<td>0</td>
<td>11</td>
</tr>
<tr>
<td>Fatalities</td>
<td>0</td>
<td>6</td>
<td>1</td>
<td>9</td>
<td>0</td>
<td>10</td>
</tr>
</tbody>
</table>

Source: The IHS Primary Care Provider; February 2010, Vol. 35, No. 2; p. 25.

**Summary**

Now that you’ve completed this section you should be able to:

- Identify injury data sources and the strengths and weaknesses of each
- Identify available data sources that can provide information to your surveillance system
- Describe the size of the injury problem
Notes
Resources & References

Resources


References

2 Ibid.

3 Tsatoke G, Berger L, Hicks K, Piontkowski S. Challenges to Injury Surveillance at the Local Level. Phoenix, AZ: The IHS Primary Care Provider, February 2010. Vol. 35 No. 2; p. 25
Section 3: Building Partnerships/Coalitions to Support Injury Surveillance System

Section 3 at a Glance

Approximate Time Frame: 1 hour

<table>
<thead>
<tr>
<th>Topics Covered</th>
<th>Slide #</th>
<th>Manual Page #</th>
<th>Time Frame</th>
</tr>
</thead>
<tbody>
<tr>
<td>Considerations if You Are Forming a Partnership or Coalition</td>
<td>3-1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identify People and Organizations to Include</td>
<td>3-1 - 3-2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identify State and Local Organizations Working in Injury Prevention</td>
<td>3-2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Determine Existing Social, Legal and Political Framework</td>
<td>3-3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Exercise/Activities in this Section
None

Materials Checklist
No extra materials needed for this section

General Information
While partnerships and coalitions would be helpful, it’s important to stress that it may not be realistic in every circumstance. They shouldn’t let this stall their efforts. They can identify a few people they can call on from time to time for advice or assistance. For examples of successful coalitions see the Appendix Success Stories, San Carlos Apache explained on page 210, column 2 of the July 2007 issue of The IHS Primary Care Provider.

Text, charts and tables that may need updating

<table>
<thead>
<tr>
<th>Page No.</th>
<th>Section</th>
<th>Possible Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td></td>
<td>None needed for this section</td>
</tr>
</tbody>
</table>
Build Partnerships or Coalition to Support the Injury Surveillance System, Data Collection and Prevention Activities

Section 3
Section 3 Objectives

• Identify partners to include in the system
• Identify local, regional and national organizations working on injury prevention in your area
• Define the existing social, legal and political framework in which an injury surveillance system and prevention activities may be established.
Considerations if You Are Forming a Coalition

- Commitment of lead agency
- Effective core planning group
- Planned recruitment of coalition members
- Coalition structure
- Staff roles
- Mission and goals
- Leadership
- Education of coalition members
- Ownership and commitment of coalition members
- Successful implementation of pilot project
- Recognition for members

P. 3-1
A coalition is an alliance of organizations working together for a common purpose. Ideally an injury surveillance system would include people from many different sectors in the community with different skill sets and expertise to lend to the effort. However, this may not be a practical approach in Indian Country. In most circumstances the work of surveillance will fall to one or two people. It might make more sense to identify a few people you can call on for advice or assistance from time to time. The slide shows some considerations when you are forming a coalition or a partnership.
Identify Partners to Include in Coalition

- The different roles that might be necessary to the success of your surveillance system
- Who might have access to the different data sources you need
- What support do you need and which organizations can provide that support
- Whose objectives overlap with yours
- What role will the organization members fulfill
- What kind of data do they collect
- Why do they collect data
- Can you share or link data
- What are their sources of data

p. 3-1 – 3-2
When identifying partners to include in your system or to assist you, consider the following:
The different roles that might be necessary to the success of your surveillance system. Include people with different expertise. For example, is there someone at a health center that can provide information on HIPAA guidelines for that center.
Who might have access to the different data sources you need such as, someone from the tribal police department, health personnel (community health reps, EMS team, tribal clinical staff), tribal court staff
What support do you need and which organizations can provide that support
Whose objectives overlap with yours
What role will the organization members fulfill
What kind of data do they collect
Why do they collect data
Can you share or link data
What are their sources of data they have
Identify State and Local Organizations
Working in Injury Prevention

- Health care providers
- Police Departments
- Fire Departments
- Schools
- Social Service Agencies
- Employers
- Government Agencies
- Local IP Coalition
- County IP Coalition
- State Death Review Team
- Trauma Registry

3-3

Injury prevention is a goal for many institutions within and outside the health sector. Some of these institutions can be sources of financial or technical assistance.

Since injury prevention is best done at the local level where problems can be addressed, there is an opportunity to form a local coalition of institutions that share a concern about an injury problem and in doing so, strengthen the response and probability of having an impact.

At the national level, a variety of government institutions – not just the Indian Health Service, but the Bureau of Indian Affairs, the Department of Education, the National Parks Service – might be working on preventing injuries, such as violence- or traffic-related injuries. Similar agencies exist at the state and local level, such as Education Department, the Parks Department. And locally and across the nation, church and non-profit organizations have formed to address a number of injury issues, such as violence prevention.

The slide shows some organizations that might have an interest in injury prevention.
Determine the Existing Social, Legal, and Political Framework

It’s important to be aware of the social, political and legal implications that injury surveillance or prevention programs might have in your community. For example, does the tribal council have an interest in doing something to address the possible cause of injuries, such as domestic violence or driving under the influence of alcohol? Is there money for surveillance or prevention efforts? Would community members be apprehensive about privacy issues? Are there socially or culturally acceptable practices that might come under scrutiny as the result of surveillance?

If your surveillance efforts are successful, the data you gather and present will drive policy at the local level and maybe even at the national or state level. Depending on your focus, you may experience resistance for any of a number of reasons, including those mentioned above.
Summary of Section 3

- Identify partners to include in the system and develop a strategy to involve them
- Identify local, regional and national organizations working on injury prevention in your area
- Define the existing social, legal and political framework in which an injury surveillance system and prevention activities may be established.

Now that they’ve completed this section they should

Read from slide
Section 3: Build a Partnership or Coalition to Support the Injury Surveillance System and Prevention Activities

Learning Objectives

- Identify partners to include in the system
- Identify local, regional and national organizations working on injury prevention in your area
- Define the existing social, legal and political framework in which an injury surveillance system and prevention activities may be established

Introduction

A coalition is an alliance of organizations working together for a common purpose. Ideally an injury surveillance system would include people from many different sectors in the community with different skill sets and expertise to lend to the effort. However, this may not be a practical approach in Indian Country. In most circumstances the work of surveillance will fall to one or two people. It might make more sense to identify a few people you can call on for advice or assistance from time to time.

If forming a formal coalition or partnership, below are some things that you may want to consider. 1

- Commitment of lead agency
- Effective core planning group
- Planned recruitment of coalition members
- Coalition structure
- Staff roles
- Mission and goals
- Leadership
- Education of coalition members
- Ownership and commitment of coalition members
- Successful implementation of pilot project
- Recognition for members

Identify Partners to Include in the Coalition

When identifying partners to include in your system or to assist you, consider the following:

- The different roles that might be necessary to the success of your surveillance system. Include people with different expertise. For example, is there someone at a health center that can provide information on HIPAA guidelines for that center.
- Who might have access to the different data sources you need such as, someone from the tribal police department, health personnel (community health reps, EMS team, tribal clinical staff), tribal court staff
Section 3: Build Partnerships or Coalition to Support the Injury Surveillance System and Prevention Activities

- What support do you need and which organizations can provide that support
- Whose objectives overlap with yours
- What role will the organization members fulfill
- What kind of data do they collect
- Why do they collect data
- Can you share or link data
- What are their sources of data

The table below shows some possible institutions and participants for an injury surveillance coalition or partnership.2

<table>
<thead>
<tr>
<th>Partner</th>
<th>Institutions</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td>Community Health Representatives, Hospitals, Health Centers, IHS Hospital,</td>
<td>Epidemiologists, doctors, nurses, health educators, health promoters, paramedics, and other health</td>
</tr>
<tr>
<td></td>
<td>tribal clinic, Trauma registry</td>
<td>workers</td>
</tr>
<tr>
<td>Justice</td>
<td>Forensic Medicine Offices (Coroner/Medical Examiner), Courts, Public</td>
<td>Forensic pathologists, judges, public defenders, prosecutors or their assistants, directors or</td>
</tr>
<tr>
<td></td>
<td>Defenders’ Offices, Prosecutors’ Offices, Family Services or Counseling</td>
<td>professional staff of family services or family counseling</td>
</tr>
<tr>
<td>Law Enforcement</td>
<td>Police (Homicide Investigation Office) Security Companies</td>
<td>Regional or local police chiefs, statistical officers</td>
</tr>
<tr>
<td>Transportation</td>
<td>Transportation Departments and Offices</td>
<td>Department directors or traffic police, statistical officers</td>
</tr>
<tr>
<td>Administration</td>
<td>Planning Departments</td>
<td>Statisticians, geographers</td>
</tr>
<tr>
<td>Education</td>
<td>Universities, Colleges, Schools</td>
<td>Researchers, professors, and student leaders</td>
</tr>
<tr>
<td>Community</td>
<td>Community Organizations</td>
<td>Community leaders, youth leaders, community groups, Pastors or other religious leaders</td>
</tr>
<tr>
<td></td>
<td>Youth and Mothers’ Organizations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Religious Organizations</td>
<td></td>
</tr>
<tr>
<td>Private</td>
<td>Nongovernmental Organizations Insurance Agencies</td>
<td>Spokespersons and leaders of private organizations, statisticians</td>
</tr>
<tr>
<td>Organizations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Political</td>
<td>National, Regional, and Local Authorities</td>
<td>Staff in the president’s, governor’s, or mayor’s offices, tribal council</td>
</tr>
<tr>
<td>Media</td>
<td>Television, Radio, Newspapers</td>
<td>Journalists and personnel working in mass media</td>
</tr>
</tbody>
</table>

Identify Local and State Organizations Working in Injury Prevention

Injury prevention is a goal for many institutions within and outside the health sector. Some of these institutions can be sources of financial or technical assistance. 3

Since injury prevention is best done at the local level where problems can be addressed, there is an opportunity to form a local coalition of institutions that share a concern about an injury problem and in doing so, strengthen the response and probability of having an impact.

Some organizations that may be working on injury prevention include:
- Health Care Providers
- Police Departments
- Fire Departments
- Schools
- Social Service Agencies
- Employers
- Government Agencies
- Local IP Coalition
- County IP Coalition
- State Death Review Team
- Trauma Registry

At the national level, a variety of government institutions—not just the Indian Health Service, but the Bureau of Indian Affairs, the Department of Education, the National Parks Service—might be working on preventing injuries, such as violence- or traffic-related injuries. Similar agencies exist at the state and local level, such as Education Department, the Parks Department. And locally and across the nation, church and non-profit organizations have formed to address a number of injury issues, such as violence prevention.

Determine the Existing Social, Legal and Political Framework

It’s important to be aware of the social, political and legal implications that injury surveillance or prevention programs might have in your community. For example, does the tribal council have an interest in doing something to address the possible cause of injuries, such as domestic violence or driving under the influence of alcohol? Is there money for surveillance or prevention efforts? Would community members be apprehensive about privacy issues? Are there socially or culturally acceptable practices that might come under scrutiny as the result of surveillance?

If your surveillance efforts are successful, the data you gather and present will drive policy at the local level and maybe even at the national or state level. Depending on your focus, you may experience resistance for any of a number of reasons, including those mentioned above.
Summary

Now that you’ve completed this section, you should be able to:

- Identify partners to include in the system
- Identify local, regional and national organizations working on injury prevention in your area
- Define the existing social, legal and political framework in which an injury surveillance system and prevention activities may be established.

Resources & References

Resources


References


## Section 4: Determine the Appropriate Methodology for Your Surveillance System

### Section 4 at a Glance

#### Approximate Time Frame 4.5 hours

<table>
<thead>
<tr>
<th>Topics Covered</th>
<th>Slide #</th>
<th>Manual Page #</th>
<th>Time Frame</th>
</tr>
</thead>
<tbody>
<tr>
<td>Considerations when Developing a Methodology</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Define the Injury Events and Determine the Data Elements to Include in Your System</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of E-Codes in Your System</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coding Exercise</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Case Definition Exercise</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Determine the Variables to Include in the System</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Develop Data Collection Instrument and Determine Data Collection Frequency</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Determine the Type of Surveillance System</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plans for Systemization, Maintenance and Data Security</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Define Necessary Staff and Key Positions</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Exercises and Additional Activities**

- Comparing ICD-9 Summary of Codes and ICD-10 Summary of Codes (handouts 2 and 3)
- Coding Exercise (handouts 4 and 5)
- Case Definition Exercise – No handout
- A Look at Sample Data Collection Instruments Used in Indian Country – Appendix 7 – No handout
- A Look at Sample Injury Surveillance System Protocols from Indian Country – Appendix 8 – No handout
Materials Checklist
ICD-10 CM Code Book (Chapter 9) --can be downloaded or printed at [http://www.cdc.gov/nchs/icd/icd10cm.htm#10update](http://www.cdc.gov/nchs/icd/icd10cm.htm#10update)
Note that Chapter 19, which pertains to injury, is more than 300 pages long.
Handout 2 – Summary of ICD-9 Codes
Handout 3 – Summary of ICD 10 Codes
Handout 4 – Coding Exercise
Handout 5 – Answers to Coding Exercise

General Information & Instruction

Case Definition Exercise (30 Minutes): Ask the class to pose some potential injury concerns in their community. Select one and ask them to write a case definition for that scenario. The following points should be shared with the class.

1. The primary data are hospital ED records and patient medical charts
2. Considerations: person, place, time, intent, severity

Ask some people in the class to share their case definitions. Evaluate them based on the criteria on page 4-2.

Coding Exercise (30 Minutes): Poll the class to determine their familiarity with the use of e-codes. If a significant number are not familiar with e-codes explain e-codes using the additional slides in the presentation. There are 10 scenarios in the coding exercise; they may not have to do all of them. To get the exercise started, provide the handout. Select 2 and do them as a group. Then let them do as many as they can in 15 minutes. Debrief by sharing the answers and discussing. The object of the exercise is to help them become familiar with e-codes and how they are applied to identify the cause of injuries. Note that some protocols may require them to assign e-codes to injuries when e-codes are absent from the data they collect.

Sample Data Collection Instruments (15 minutes): Ask the class to turn to Appendix 7. There are examples of data collection forms from three different service areas that are being used in Indian Country. Some are very simple and some are very detailed. Discuss the differences in the forms used in each service area. Ask them which form they prefer and why. Explain that there is no right or wrong form as long as it works. And that what works for one area might not work for another. Note the importance of testing a form to make sure it will work and modifying it as necessary.

Sample Surveillance System Protocols (15 minutes): Ask the class to turn to Appendix 8. There are three examples of surveillance system protocols. Two are for service units and one is general guidance from the IHS. Note the differences in the Bristol Bay and the Whiteriver protocols. There is no right or wrong way of developing a protocol. Just as with forms, it depends on what works for their circumstances. Ask the class where a more simple protocol might be beneficial and where a more detailed protocol might be necessary.
## Text, charts and tables that may need updating

<table>
<thead>
<tr>
<th>Page No.</th>
<th>Section</th>
<th>Possible Source</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Check <a href="http://www.cdc.gov/nchs/icd/icd10cm.htm#10update">http://www.cdc.gov/nchs/icd/icd10cm.htm#10update</a> for most recent version of ICD-10 CM Coding Manual.</td>
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</tbody>
</table>

## Notes
# ICD-9

List of Injury and Poisoning Groups (800-999)
(Injury Diagnosis Codes)

<table>
<thead>
<tr>
<th>Code Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>800-829</td>
<td>FRACTURES</td>
</tr>
<tr>
<td>800-804</td>
<td>Fracture of Skull</td>
</tr>
<tr>
<td>805-809</td>
<td>Fracture of Neck &amp; Trunk</td>
</tr>
<tr>
<td>810-819</td>
<td>Fracture of Upper Limb</td>
</tr>
<tr>
<td>820-829</td>
<td>Fracture of Lower Limb</td>
</tr>
<tr>
<td>830-839</td>
<td>DISLOCATION</td>
</tr>
<tr>
<td>840-848</td>
<td>SPRAINS &amp; STRAINS OF JOINTS &amp; ADJACENT MUSCLES</td>
</tr>
<tr>
<td>850-854</td>
<td>INTERCRANIAL INJURY, EXCLUDING THOSE WITH SKULL FRACTURE</td>
</tr>
<tr>
<td>860-869</td>
<td>INTERNAL INJURY OF CHEST, ABDOMEN, &amp; PELVIS</td>
</tr>
<tr>
<td>870-897</td>
<td>OPEN WOUND</td>
</tr>
<tr>
<td>870-879</td>
<td>Open Wound of Head, Neck, &amp; Trunk</td>
</tr>
<tr>
<td>880-887</td>
<td>Open Wound of Upper Limb</td>
</tr>
<tr>
<td>890-897</td>
<td>Open Wound of Lower Limb</td>
</tr>
<tr>
<td>900-904</td>
<td>INJURY TO BLOOD VESSELS</td>
</tr>
<tr>
<td>905-909</td>
<td>LATE EFFECTS OF INJURIES, POISONINGS, TOXIC EFFECTS, &amp; OTHER EXTERNAL CAUSES</td>
</tr>
<tr>
<td>910-919</td>
<td>SUPERFICIAL INJURY</td>
</tr>
<tr>
<td>920-924</td>
<td>CONTUSION WITH INTACT SKIN SURFACE</td>
</tr>
<tr>
<td>925-929</td>
<td>CRUSHING INJURY</td>
</tr>
<tr>
<td>930-939</td>
<td>EFFECTS OF FOREIGN BODY ENTERING THROUGH ORIFICE</td>
</tr>
<tr>
<td>940-949</td>
<td>BURNS</td>
</tr>
<tr>
<td>950-957</td>
<td>INJURY TO NERVES AND SPINAL CORD</td>
</tr>
<tr>
<td>958-959</td>
<td>CERTAIN TRAUMATIC COMPLICATION &amp; UNSPECIFIED INJURIES</td>
</tr>
<tr>
<td>960-979</td>
<td>POISONING BY DRUGS, MEDICINAL &amp; BIOLOGICAL SUBSTANCES</td>
</tr>
<tr>
<td>980-989</td>
<td>TOXIC EFFECTS OF SUBSTANCES CHIEFLY NONMEDICAL AS TO SOURCE</td>
</tr>
<tr>
<td>990-995</td>
<td>OTHER &amp; UNSPECIFIED EFFECTS OF EXTERNAL CAUSES</td>
</tr>
<tr>
<td>996-999</td>
<td>COMPLICATIONS OF SURGICAL &amp; MEDICAL CARE NEC</td>
</tr>
</tbody>
</table>
ICD-9
External Cause of Injury (E800-E999)
(E-Codes)

E800-E807  Railway Accidents
E810-E819  Motor Vehicle Traffic Accidents
E820-E825  Motor Vehicle Non-Traffic Accidents
E826-E829  Other Road Vehicle Accidents
E830-E838  Water Transport Accidents
E840-E845  Air & Space Transport Accidents
E846-E848  Vehicle Accidents NEC
E849  Place of Occurrence for E850-869; E880-928
E850-E958  Acc. Poisoning by Drugs, Medicinal, & Biologicals
E860-E869  Acc. Poisoning by Other Solid, Liquid, Gas, & Vapors
E870-E876  Misadventures to Patients during Surgical & Medical Care
E878-E879  Surgical & Medical Procedure & No Misadv. at Time of Procedure
E880-E888  Accidental Falls
E890-E899  Accidents Caused by Fire and Flames
E900-E909  Accidents Due to Natural and Environmental Factors
E910-E915  Accidents Caused by Submersion, Suffocation, & Foreign Bodies
E916-E928  Other Accidents
E929  Late Effects of Accidental Injury
E930-E949  Drugs, Medicinal & Biologicals Causing Adverse Effects in Therapeutic Use
E950-E959  Suicide and Self-Inflicted Injury
E960-E969  Homicide and Injury Purposely Inflicted by Other Persons
E970-E978  Legal Intervention
E980-E989  Injury Undetermined Whether Accidentally or Purposely Inflicted
E990-E999  Injury Resulting from Operations of War
Sample Listing: ICD-9 External Cause of Injury Codes

ACCIDENTAL FALLS (E880-E888)
Excludes falls (in or from):
- burning building (E890.8, E891.8); into fire (E890.0-E899);
- into water (with submersion or drowning) (E910.0-E910.9);
- machinery (in operation) (E919.0-E919.9)
- on edged, pointed, or sharp object (E920.0-E920.9);
- transport vehicle (E800.0-E845.9);
- vehicle not elsewhere classifiable (E846-E848)

E880  Fall on or from stairs or steps
E881  Fall on or from ladders or scaffolding
E882  Fall from or out of building or other structure
  Includes (fall from): balcony; bridge; building; flagpole; tower; turret; viaduct; wall; window; through roof
  Excludes: collapse of a building or structure (E916); fall or jump from burning building (E890.8, E891.8);
E883  Fall into hole or other opening in surface
  Includes (fall into): cavity; dock; hole; pit; quarry; shaft; swimming pool; tank; well
  Excludes: fall into water NOS (E910.9); that resulting in drowning/submersion w/o mention of injury (E910.0-E910.9)
E884  Other fall from one level to another
E885  Fall on same level from slipping, tripping, or stumbling
E886  Fall on same level from collision, pushing, or shoving, by or with other person
  Excludes: crushed or pushed by a crowd or human stampede (E917.1, E917.6)
E887  Fracture, cause unspecified
E888  Other and unspecified fall
  Includes: accidental fall NOS; fall on same level NOS
ICD-10
Chapter XIX: Injury, poisoning and certain other consequences of external causes (S00-T98)
(Injury Diagnosis Codes)

S00-S09  Injuries to the head
S10-S19  Injuries to the neck
S20-S29  Injuries to the thorax
S30-S39  Injuries to the abdomen, lower back, lumbar spine and pelvis
S40-S49  Injuries to the shoulder and upper arm
S50-S59  Injuries to the elbow and forearm
S60-S69  Injuries to the wrist and hand
S70-S79  Injuries to the hip and thigh
S80-S89  Injuries to the knee and lower leg
S90-S99  Injuries to the ankle and foot
T00-T07  Injuries involving multiple body regions
T08-T14  Injuries to unspecified part of trunk, limb or body region
T15-T19  Effects of foreign body entering through natural orifice
T20-T32  Burns and corrosions
T33-T35  Frostbite
T36-T50  Poisoning by drugs, medicaments and biological substances
T51-T65  Toxic effects of substances chiefly nonmedicinal as to source
T66-T78  Other and unspecified effects of external causes
T79    Certain early complications of trauma
T80-T88  Complications of surgical and medical care, not elsewhere classified
T90-T98  Sequelae of injuries, of poisoning and of other consequences of external causes
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>V01-X59</td>
<td>Accidents</td>
</tr>
<tr>
<td>V01-V99</td>
<td>Transport accidents</td>
</tr>
<tr>
<td>V01-V09</td>
<td>Pedestrian injured in transport accident</td>
</tr>
<tr>
<td>V10-V19</td>
<td>Pedal cyclist injured in transport accident</td>
</tr>
<tr>
<td>V20-V29</td>
<td>Motorcycle rider injured in transport accident</td>
</tr>
<tr>
<td>V30-V39</td>
<td>Occupant of three-wheeled motor vehicle injured in transport accident</td>
</tr>
<tr>
<td>V40-V49</td>
<td>Car occupant injured in transport accident</td>
</tr>
<tr>
<td>V50-V59</td>
<td>Occupant of pick-up truck or van injured in transport accident</td>
</tr>
<tr>
<td>V60-V69</td>
<td>Occupant of heavy transport vehicle injured in transport accident</td>
</tr>
<tr>
<td>V70-V79</td>
<td>Bus occupant injured in transport accident</td>
</tr>
<tr>
<td>V80-V89</td>
<td>Other land transport accidents</td>
</tr>
<tr>
<td>V90-V94</td>
<td>Water transport accidents</td>
</tr>
<tr>
<td>V95-V97</td>
<td>Air and space transport accidents</td>
</tr>
<tr>
<td>V98-V99</td>
<td>Other and unspecified transport accidents</td>
</tr>
<tr>
<td>W00-X59</td>
<td>Other external causes of accidental injury</td>
</tr>
<tr>
<td>W00-W19</td>
<td>Falls</td>
</tr>
<tr>
<td>W20-W49</td>
<td>Exposure to inanimate mechanical forces</td>
</tr>
<tr>
<td>W50-W64</td>
<td>Exposure to animate mechanical forces</td>
</tr>
<tr>
<td>W65-W74</td>
<td>Accidental drowning and submersion</td>
</tr>
<tr>
<td>W75-W84</td>
<td>Other accidental threats to breathing</td>
</tr>
<tr>
<td>W85-W99</td>
<td>Exposure to electric current, radiation and extreme ambient air temperature and pressure</td>
</tr>
<tr>
<td>X00-X09</td>
<td>Exposure to smoke, fire and flames</td>
</tr>
<tr>
<td>X10-X19</td>
<td>Contact with heat and hot substances</td>
</tr>
<tr>
<td>X20-X29</td>
<td>Contact with venomous animals and plants</td>
</tr>
<tr>
<td>X30-X39</td>
<td>Exposure to forces of nature</td>
</tr>
<tr>
<td>X40-X49</td>
<td>Accidental poisoning by and exposure to noxious substances</td>
</tr>
<tr>
<td>X50-X57</td>
<td>Overexertion, travel and privation</td>
</tr>
<tr>
<td>X58-X59</td>
<td>Accidental exposure to other and unspecified factors</td>
</tr>
<tr>
<td>X60-X84</td>
<td>Intentional self-harm</td>
</tr>
<tr>
<td>X85-Y09</td>
<td>Assault</td>
</tr>
<tr>
<td>Y10-Y34</td>
<td>Event of undetermined intent</td>
</tr>
<tr>
<td>Y35-Y36</td>
<td>Legal intervention and operations of war</td>
</tr>
<tr>
<td>Y40-Y84</td>
<td>Complications of medical and surgical care</td>
</tr>
<tr>
<td>Y40-Y59</td>
<td>Drugs, medicaments &amp; biological substances causing adverse effects in therapeutic use</td>
</tr>
<tr>
<td>Y60-Y69</td>
<td>Misadventures to patients during surgical and medical care</td>
</tr>
<tr>
<td>Y70-Y82</td>
<td>Medical devices associated with adverse incidents in diagnostic and therapeutic use</td>
</tr>
<tr>
<td>Y83-Y84</td>
<td>Surgical and other medical procedures as the cause of abnormal reaction of the patient, or of later complication, without mention of misadventure at the time of the procedure</td>
</tr>
<tr>
<td>Y85-Y89</td>
<td>Sequelae of external causes of morbidity and mortality</td>
</tr>
<tr>
<td>Y90-Y98</td>
<td>Supplementary factors related to causes of morbidity and mortality classified elsewhere</td>
</tr>
</tbody>
</table>
Sample Listing: ICD-10 External Cause of Injury Codes

Falls (W00-W19)

[See at the beginning of this chapter for the classification of the place of occurrence and activity]

Excludes: assault ( Y01-Y02 )

fall (in)(from):

- animal ( V80.- )
- burning building ( X00 )
- into water (with drowning or submersion) ( W65-W74 )
- into fire ( X00-X04 , X08-X09 )
- repeated falls not resulting from accident ( R29.6 )
- intentional self-harm ( X80-X81 )
- transport vehicle ( V01-V99 )

W00  Fall on same level involving ice and snow

Excludes: fall with mention of:
- ice-skates and skis ( W02 )
- stairs and steps ( W10 )

W01  Fall on same level from slipping, tripping and stumbling

Excludes: fall involving ice or snow ( W00 )

W02  Fall involving ice-skates, skis, roller-skates or skateboards

W03  Other fall on same level due to collision with, or pushing by, another person

Includes: fall involving recreational machinery ( W31 )

W04  Fall while being carried or supported by other persons

Includes: accidentally dropped while being carried

W05  Fall involving wheelchair

W06  Fall involving bed

W07  Fall involving chair

W08  Fall involving other furniture

W09  Fall involving playground equipment

Excludes: fall involving recreational machinery ( W31 )

W10  Fall on and from stairs and steps

Includes: escalator · incline · involving ice or snow on stairs and steps · ramp

W11  Fall on and from ladder

W12  Fall on and from scaffolding

W13  Fall from, out of or through building or structure

Includes: balcony · bridge · building · flag-pole · floor · railing · roof · tower · turret · viaduct · wall · window

Excludes: collapse of a building or structure ( W20 ) · fall or jump from burning building ( X00 )

W14  Fall from tree

W15  Fall from cliff

W16  Diving or jumping into water causing injury other than drowning or submersion

Includes: striking or hitting: against bottom when jumping or diving into shallow water · wall or diving board of swimming-pool · water surface

Excludes: accidental drowning and submersion ( W65-W74 ) · diving with insufficient air supply ( W81 ) · effects of air pressure from diving ( W94 )

W17  Other fall from one level to another

Includes: fall from or into: cavity · dock · haystack · hole · pit · quarry · shaft · tank · well

W18  Other fall on same level

Includes: fall: from bumping against object · from or off toilet · on same level NOS

W19  Unspecified fall

Includes: accidental fall NOS
Determine the Appropriate Methodology for Your Surveillance System

Section 4
Section 4 Objectives

• Define the injury events and data elements to include in the system
• Develop the data collection instrument and determine data collection frequency
• Plan for systemization, maintenance and data security
• Define the functions and skill sets for key positions in your surveillance system
Considerations When Developing Methodology

- What do you want the system to do?
- The size and type of the injury problem
- Availability of data sources
- Access to information
- Political priorities
- Potential for intervention
- Sustainability

P. 4-1 – 4-2
- What do you and other stakeholders want the system to do? Should it be comprehensive, gathering data on all types of injuries? Or should it focus on a particular injury?
- The size and type of the injury problem. The magnitude of an injury problem in your area may impact which injury events you decide to monitor.
- Availability of data sources. You must identify the sources of information for the system. In Section 2 we talked about identifying appropriate data sources and how to determine their strengths and weaknesses.
- Access to information. How easy or difficult will it be to get the information you need from the institutions that have it?
- Political priorities. Involving stakeholders and elected officials in the development of your system will keep them informed and will help you understand their priorities.
- Potential for intervention. The primary goal of an injury surveillance system is to identify appropriate interventions. You should not waste time and resources on collected data and data analysis if it won’t result in prevention activity.
- Sustainability. Make sure the system you design will be able to be sustained by the resources you have available, both staff an financial resources.
Considerations When Developing Methodology

Keep the data collection plan in mind
– Identify your topic
– Narrow your focus
– Identify a specific question
– Anticipate data needs
– Develop and pre-test your data collection instrument
Defining Injury Events

What are Your Objectives

• Identifying emerging hazards
• Describing injury patterns to justify the need for intervention
• Assessing the impact of a prevention program
• Determining the health care costs associated with injury

P. 4-2
The first task in creating a surveillance system is determining the objectives and then deciding the injury events. This slide shows four possible objectives for a surveillance system. What others are there?
Defining Injury Events

Case Definition

• Needs to be clearly stated and easily understood
• Use comparable definitions as those used elsewhere
• Contain a clear statement of the following
  – Person: race, Tribe, age, gender
  – Place: state, reservation, roadway
  – Time: year, time of day, day of week, specific dates (4th of July), weekends
  – Intentionality: intentional/unintentional
  – Age grouping
  – Severity

P. 4-2
Explain that comparable definitions mean that they should use the same generally accepted standards – for example the national definition for elderly is 65 or older; theirs should be the same.
The biggest decision you will make regarding your case definition is determining the severity of the injuries you will track. The Injury Severity Pyramid in Section 1, Page 1-5, ranks the severity of injuries based on the degree of medical intervention required. There are advantages and disadvantages to tracking cases at each level as noted on the following slides.
Deaths
Advantages
• Data is readily accessible from death certificates which are tracked by the state and kept in a central database
• Cause of death is consistently reported on death certificates
• Race or ethnicity information is usually available
Disadvantages
• Rare event. Injury deaths represent less than 1% of injury events
• Not a good guide to ascertaining overall injury problem or medical consequences, such as long term disability
• Influenced by small numbers, especially in small populations or over a short period of time

Defining Injury Event
Decide on the Severity of Injury

Deaths
180,811
Hospitalization
2.4 million
Ambulatory Care
Visits to physicians offices, out-patient care and emergency department
80.2 million

P. 4-2 – 4-3
Hospitalization
Advantages
• When combined with mortality data it offers a better picture of overall problem
• Disability and healthcare costs can be better described
Disadvantages
• Access to data is more difficult
• Privacy is more of a consideration
• Records may be manual
• Inconsistent, incomplete or incorrect coding of injury causation
• Race or ethnicity information is sometimes available
ED Visits
Advantages
• When combined with other data, helps provide the big picture
• You may benefit from casting the net wider
• Can be useful for specialized studies
Disadvantages
• Large number of cases may be difficult to handle
• Access to data may be difficult
• Records may be manual
• Inconsistent, incomplete or incorrect coding of injury causation
• Race or ethnicity information is not readily available from non-local sources

Defining Injury Event
Decide on the Severity of Injury

Death
180,811
Hospitalization
2.4 million
Ambulatory Care
Visits to physicians offices, out-patient care and emergency department
80.2 million

P. 4-3

ED visits and out-patient visits are included under ambulatory care on the pyramid.
Defining Injury Event

Decide on the Severity of Injury

Out-Patient Visits

Advantages
- May be a primary source of injury data if there is no hospital
- May be good for specialized injuries, such as sports related injuries or eye injuries
- Might be good supplemental information

Disadvantages
- Difficult access
- Privacy issues (data is highly protected by practitioners)
- Race or ethnicity information is not readily available

Death 180,811
Hospitalization 2.4 million
Ambulatory Care 80.2 million

Visits to physicians offices, out-patient care and emergency department
Ask the class to pose some potential injury concerns in their community. Then ask them to write a case definition for the scenarios.

The primary data to be used is hospital ED records and patient medical charts.

Considerations: person, place, time, intent, severity.

Ask class to share their definitions and evaluate them based on criteria on the Slide title “Case Definition”
In selecting a case definition for the injury surveillance system, you could use ICD-10 codes which are used by the public health sector. There are advantages and disadvantages to using e-codes as noted on the slide. Tell the class that they should keep in mind that other data sources in their system, such as law enforcement, use different definitions for incidents, such as assault or neglect.
P. 4-4 – 4-7

Note to Instructor:
• The purpose of this presentation is not to make students expert, certified coders; instead we’re providing a general overview for students to have a good understanding of how injury is classified, how to query an existing database with ICD codes, and how to conduct a simple analysis of such a database. For some this will be a review from Level 2.

International Classification of Disease (general history & description):
• History of ICD dates back to the 1850s (again, see WHO website for more on history)
• Since 1948, World Health Organization (oversees the ICD
• ICD is the international standard diagnostic classification system for all general epidemiological, many health management purposes and clinical use (including billing).
• ICD includes codes for diagnosis of disease and injury; and cause of injury codes
• Codes are updated annually; so it’s important to understand that new codes will influence multi-year analysis (example: Fall from skateboard introduced in year 3 of a 5 year dataset…if you didn’t know that was a new code, you would misinterpret that skateboard fall injuries didn’t start until yr3).
• Since 1999 the United States has utilized two ICD versions:
• ICD-9: Used to code non-fatal (i.e., doctor’s office visits and hospitalizations)
• ICD-10: Used to code deaths
• The two versions don’t directly correlate. One reason is that ICD-10 expands to 141,000 codes compared to ICD-9’s 17,000
An E-code is a 4 (sometimes just 3) digit number preceded by the letter E. The first 3 digits indicate the type of injury group. The fourth digit, which follows the decimal point, provides additional descriptive information or specificity of the injury event.
P. 4-5
This slide illustrates the additional detail that can be provided with ICD 10. An ICD-10 Code consists of three to seven characters. The first digit is a letter. Second digit is a number and third digit can be a number or a letter. The fourth, fifth, sixth, and seventh digits can be alpha or numeric. Decimal placed after the first three characters. As is illustrated in the diagram the first three digits are a category of injury, the next three digits are for the cause, anatomical site or severity of injury and the final digit is an extension used to indicate whether the visit was an initial encounter or subsequent encounter or the result of a chronic condition resulting from the original injury.
ICD diagnosis codes for illness and nature of injury (some “old timers” might refer to them as “N-Codes)

**Note to Instructor:**
- Describe differences between ICD-9 and ICD-10 diagnosis codes (as they related to injury prevention)

**ICD-9 (Diagnosis Codes)**
- Used exclusively in the US for coding diagnosis of non-fatal illness & injury (most other countries use ICD-10 for both morbidity & mortality coding)
- Diagnosis codes are required for medical billing.
- Medical personnel may generically refer to diagnosis codes as ICD9 codes; although you will learn that ICD9 includes more than just diagnosis codes.
- Injuries are numeric codes in the range 800-999 of the ICD-9
- Updated at least annually
- The Dept of Health & Human Services has indicated on Oct. 1, 2014 the ICD-9 will be phased out for coding of medical bills (Medicare reimbursement) and replaced with ICD-10.
ICD-10 (Diagnosis Codes)

• Used exclusively in the US for coding diagnosis of fatal illness & injury (most other countries use ICD-10 for both morbidity & mortality coding)
• Basically, this is the “cause of death” on a death certificate
• Injuries are alphanumeric codes in the range S00-T98 of the ICD-10
• “S” are codes to a specific body part
• “T” are codes to multiple body parts; burns; poisoning
Slide 62

Defining an Injury Event
Using ICD-Codes

<table>
<thead>
<tr>
<th>ICD-9</th>
<th>ICD-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fractures</td>
<td>Injury to…</td>
</tr>
<tr>
<td>Open Wound</td>
<td>Head</td>
</tr>
<tr>
<td>Crushing</td>
<td>Neck</td>
</tr>
<tr>
<td>Burns</td>
<td>Knee/Lower Leg</td>
</tr>
<tr>
<td>Poisoning</td>
<td>Mult. Body Parts</td>
</tr>
<tr>
<td>800-829</td>
<td>S00-S09</td>
</tr>
<tr>
<td>870-897</td>
<td>S10-S19</td>
</tr>
<tr>
<td>925-929</td>
<td>S80-S89</td>
</tr>
<tr>
<td>940-949</td>
<td>T00-T07</td>
</tr>
<tr>
<td>960-979</td>
<td>T20-T32</td>
</tr>
<tr>
<td>fx vault of skull; closed; no intercranial injury less than 1 hr LOC</td>
<td>Burns &amp; Corrosn</td>
</tr>
<tr>
<td></td>
<td>Frostbite</td>
</tr>
<tr>
<td></td>
<td>Poisoning</td>
</tr>
<tr>
<td></td>
<td>T33-T35</td>
</tr>
<tr>
<td></td>
<td>T36-T50</td>
</tr>
</tbody>
</table>

See Reference Handout

fx vault of skull; closed; no intercranial injury less than 1 hr LOC 800.02

P. 4-4 – 4-7

Slide is intended to illustrate coding differences between ICD-9 and ICD-10
•A big difference is ICD-9 code categories focus on the nature of injury (i.e., fracture or burn); while ICD-10 categories focus more on the injured body part
•The example ICD-9 code illustrates the specificity of the coding where 800 refers to fx vault of skull; the 4th digit (.0) refers to no intercranial injury; and the 5th digit (.x5) refers to mild loss of consciousness (LOC) defined by ICD-9 as less than 1 hr.
•After brief overview, refer to ICD-9 and ICD-10 handouts for full listing of injury diagnosis groups.
External Cause of Injury Coding References

- American Academy of Professional Coders
  http://www.aapc.com/
- World Health Organization
  http://www.who.int/classifications/icd/en/
- CDC National Center for Health Statistics
  http://www.cdc.gov/nchs/icd.htm
- CDC article on improving E-coding
  http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5701a1.htm

P. 4-4 – 4-7
- A few ICD-9, ICD-10, and E-coding references
- Note: A quick internet search will also result in several vendors for code books, as well as, several online listings of codes.
Coding Exercise (30 Minutes): This requires the coding handout for this section. There are 10 scenarios in the coding exercise; they may not have to do all of them. To get the exercise started, provide the handout. Select 2 and do them as a group. Allow the class to code the rest or as many as they can in 15 minutes. Debrief by sharing the answers and discussing. The object of the exercise is to help them become familiar with e-codes and how they are applied to identify the cause of injuries. Note that some protocols may require them to assign codes to injuries when codes are absent from the data they collect.
Determine the Variables in Your System

- Name
- Age and sex
- Marital Status
- Education Level
- Employment Level
- BAC - *Nice to have, but rarely available*
- Occupant Protection for Transportation
- Time
- Place
- Circumstances around the injury event

p. 4-7 – 4-8

**Determine the Variables to Include in Your System**

Data elements are the variables needed for each injury event, such as the demographic information, information on the time of the event, information on where the event took place or where the victim died and the circumstances surrounding the event. The case definitions and codes are included in the data elements as well.

Stress the following to the class:
They will be creating a data collection form based on the variables they determine they want to track in their system.
There’s value in collecting as much information as possible, but the more information they try to collect, the less likely their form will be filled out accurately or at all.
Explain that some injury surveillance systems within the IHS areas have used a two phased approach. A Phase 1 form is used to collect basic information about injury and a Phase 2 form is used to collect more detailed information based on the specific injury. They should keep the goal of surveillance in mind – the goal is intervention. Will all the information they are collecting, such as education or employment, impact their intervention strategy.
Deciding on the variables in a system will lead to the creation of a form. Point out there is no right or wrong way to design a form. The slide shows some basic considerations when designing a form. Examples of forms used by other IHS area injury surveillance systems are in the Appendix.

The simpler the form, the greater its usefulness over a long period of time.

Gather only the data that is needed, they can use analysis to answer case definition questions later.

A well-designed form is easy to fill out.

Explain that pre-coding means providing a pre-coded list of possible answers, rather than filling the answers in. If they do pre-code, use numbers if possible. Numbers are easier to process and less prone to errors.
This is a very important step. Get feedback from anyone who will use it and make modifications as necessary. Explain that pre-testing helps identify if the questions and format are appropriate, clear, relevant and result in the appropriate data. It will also help you determine if the case definition is accurate. It’s not unusual to change a form two or three times before implementing it. Include a discussion of when a form should be changed or abandoned.
Frequency of Data Collection
Stress that the frequency with which they collect data will depend on their circumstances. The frequency could be affected by: the number of cases they are reviewing, resources—how many people, and how much time they have, whether data collection is active or passive (see below) and the needs of your system.

Active and Passive Data Collection
Most surveillance done at the area level is passive surveillance. Data collection may not be the primary focus of the organization or department that provides the information to you, but it’s possible to get information from the forms filled out by the personnel in these other systems. For example, a hospital emergency room is not primarily interested in collecting data, but it does collect information about patients that you can use in your system.

Active surveillance involves seeking out cases, investigating them and interviewing injured people with follow-up. Active surveillance usually involves large expenditures of time and money. Stress that active surveillance is not usually practical at the local level, but sometimes it is done as a follow up to gather more information on specific injuries.
Data Collection Instrument and Data Collection Frequency

Data Collection Planning Summary

- Decide what you want out of your system
- Identify your case definition
- Define your variables
- Develop your form
- Consider how HIPAA/Privacy issues may impact your collection efforts
- Test your form
Allow about 15 minutes for discussion

Ask the class to turn to Appendix 7 of the manual where there are examples of various forms being used in surveillance systems in Indian Country. Ask the class to compare the forms and discuss the similarities and differences. Though each of these forms is different, they have all yielded data and results and have led to successful interventions.
Determining the Type of Surveillance System

- Universal surveillance
- Surveillance based on samples of cases
- Surveillance based on a review of institutional registries
- Survey-based surveillance
- Sentinel surveillance

p. 4-10 – 4-11
Explain that there are several ways of setting up a surveillance system. In Indian Country, they will most likely be collecting information on all the injury cases that occur and therefore they are using a Universal Surveillance System. The other surveillance systems on the slide can be used in some circumstances.

**Universal Surveillance:** Most commonly used system and the one most likely to work for Indian Country. This tracks the total number of cases occurring within a defined population. This population-based surveillance accounts for all cases that occur. This is the preferred method of monitoring the occurrence of fatal injuries because rates of injuries and injury risk factors can be calculated and generalized to the population. Most surveillance in Indian Country is an attempt to capture all data. The methods below may be done as a follow up to capture more data on specific injuries.

**Survey-based surveillance:** Information is obtained through questionnaires focused on a specific topic, within a predefined period of time, and at predefined intervals.

**Sentinel surveillance:** One or more institutions are chosen to monitor trends, target surveillance activities, and suggest interventions.
Setting Up an Electronic Database

- Seek the assistance of a programmer, epidemiologist or statistician
- Epi Info 2002
  - Free software available through CDC
  - [http://wwwn.cdc.gov/epiinfo/7/index.htm](http://wwwn.cdc.gov/epiinfo/7/index.htm)
- Make sure all paper records with identifiers are locked away

If you don’t have an electronic database set up, seek the assistance of a programmer, an epidemiologist or a statistician. Epi Info 2002 is free software available through the CDC. For an overview of the software and installation and use instructions, visit [http://wwwn.cdc.gov/epiinfo/7/index.htm](http://wwwn.cdc.gov/epiinfo/7/index.htm). Any paper records associated with the system – original data sources, forms, etc. -- need to be kept in locked storage if there are personal identifiers.
Systemization & Maintenance

• Reducing errors that may be introduced through flaws in the design.
• Improving the system’s scope and services through routine maintenance, emergency maintenance and requests for special reports.
• Safeguarding the system

P. 4-11 – 4-12
• Data maintenance should focus on ... see slide.
Systemization and Maintenance

Improving the System’s Scope

• Backing up data and system files according to an established schedule.
• Maintaining records in a secure environment
• Requiring requests for emergency maintenance to be in writing and entered into a log
• Assigning priorities for special requests on the basis of urgency of need and time and resources required for fulfillment
• Institutionalizing routine maintenance
• Documenting maintenance that is conducted

The frequency and extent of maintenance should be based on your needs and resources.
Consider the following: See slide
Systemization and Maintenance

Ways of Safeguarding Your System

- Limit access to one person
- Install the database on two computers.
- Keep a second copy of the database off site.

P. 4-11-4-12

- Safeguarding your system. This should be based on your needs and resources.
  - Consider limiting access to one person.
  - Consider installing the database on two computers. A primary computer and one reserved for testing changes to the system. The second computer can also serve as a backup in case the first one fails. Remember that changes need to be transferred from one computer to the other once the changes are tested and approved.
  - Consider keeping a second copy of the database off site. If you do this, remember routine updates of the offsite copy must be done.
Threats to a Database

- Human error
- Mechanical failure
- Malicious damage
- Cyber crime
- Invasion of privacy
- Computer viruses

You will not be able to safeguard against all of these threats. Seek assistance from a programmer in protecting the database when needed.
Protocols need to be written documents that are updated as needed. Protocols should be written for all surveillance systems. They should include the points on the slide.
P. 4-12 Allow 15 minutes for discussion

Ask the class to turn to Appendix 8 of the manual where there are examples of various protocols for surveillance systems in Indian Country. Ask the class to compare the different protocols. What do similarities do they notice. What differences. There is no right or wrong way to write a protocol is depends on the needs. The goal is to simply note that there are different approaches to surveillance.
Define Staff

- Coordinate system activities
- Establish contact with data sources and stakeholders
- Data entry
- Quality control
- Analysis
- Preparation of reports

p. 4-12
It is unlikely that a surveillance system in Indian Country will have a large staff. Usually it will be one or two people who is responsible for all the functions of a surveillance system that are listed on the slide.
Advisory Board

- Obtaining the data necessary for the injury surveillance system
- Review and advise on policy and procedures
- Identifying the best use of data
- Strategizing about how to remove obstacles and inefficiencies
- Providing speaking opportunities with professional organizations
- Obtaining data sharing agreements
- Showing broad, high-level support for the system
- Getting local approval for a surveillance system
- Navigating Tribal politics or resistance to surveillance, data collection or data sharing

P. 4-13
Advisory Board/Coalition
An advisory board could be helpful for offering technical advice, strategic planning and support for the surveillance system, but the reality is that often they will be working with just a few people.

It may be more realistic to consider frequent consultation with a few people who can assist you with various aspects of the surveillance system. Within the IHS, sometimes district or area IP staff can fill some of the functions of an advisory board.

A Tribal health director or Tribal epidemiologist can assist by providing information or answering specific questions. The slide shows some aspects of surveillance where outside consultation may prove helpful.
Summary of Section 4

- Define the injury events and data elements to include in the system
- Develop the data collection instrument and determine data collection frequency
- Plan for systemization, maintenance and data security
- Define the functions and skill sets for key positions in your surveillance system

P. 4-11

Now that Section 4 has been covered class should be able to

Read from slide
Section 4: Determine the Appropriate Methodology for Your Surveillance System

Learning Objectives

- Define the injury events and data elements to include in the system
- Develop the data collection instrument and determine the data collection frequency
- Plan for systemization maintenance and data security
- Define key positions

Introduction

When selecting a methodology for your injury surveillance system, several factors must be taken into consideration, including data needs and existing resources. In this section we will discuss the key elements that must be addressed:

- What are your objectives in developing the system
- What injury events do you want to include in your system
- What is your case definition
- Variables
- Data collection instruments
- Systemization of data
- Required staff

Considerations When Developing a Methodology

The following considerations will help you determine the appropriate methodology for your system.1

1. What do you and other stakeholders want the system to do? Should it be comprehensive, gathering data on all types of injuries? Or should it focus on a particular injury?
2. The size and the type of the injury problem. The magnitude of an injury problem in your area may impact which injury events you decide to monitor.
3. Availability of data sources. You must identify the sources of information for the system. In Section 2 we talked about identifying appropriate data sources and how to determine their strengths and weaknesses.
4. Access to information. How easy or difficult will it be to get the information you need from the institutions that have it?
5. Political priorities. Involving stakeholders and elected officials in the development of your system will keep them informed and will help you understand their priorities.
6. Potential for intervention. The primary goal of an injury surveillance system is to identify appropriate interventions. You should not waste time and resources on collected data and data analysis if it won’t result in prevention activity.2
7. **Sustainability.** Make sure the system you design will be able to be sustained by the resources you have available, both staff and financial resources.

8. Keep in mind the plan for data collection from the IHS Level 2 course: identify the topic; narrow your focus; identify a specific question; anticipate data needs; develop and pre-test your instrument.

**Define the Injury Events and Determine the Data Elements to Include in Your Surveillance System**

**Injury Case Definition**

The first task in creating your surveillance system is determining the objectives of your system and then deciding what injury events should be included.

A surveillance system can have any one of a number of objectives, including the following:

- Identifying emerging hazards
- Describing injury patterns to justify the need for intervention
- Assessing the impact of a prevention program
- Determining the health care costs associated with injury
- Determining the magnitude of an injury problem
- Determining the characteristics of injury events

Being aware of the objectives of your system will help you develop a case definition. The injury definition and case definition are inter-related.

The case definition should:

- Be clearly stated and easily understood
- Use comparable definitions as those used elsewhere – for example, the national definition for elderly is 65 or older; yours should be the same
- Contain a clear statement of the following
  - Person: race, tribe, age, gender
  - Place: state, reservation, roadway
  - Time: year, time of day, day of week, specific dates (4th of July), weekends
  - Intentionality: intentional/unintentional/undetermined intention, legal intervention
  - Age grouping
  - Severity: non-fatal, fatal, disability

The biggest decision you will make regarding your case definition is determining the severity of the injuries you will track. The Injury Severity Pyramid in Section 1, Page 1-5, ranks the severity of injuries based on the degree of medical intervention required. There are advantages and disadvantages to tracking cases at each level as noted below and on the following pages.

**Deaths**

**Advantages**

- Data is readily accessible from death certificates which are tracked by the state and kept in a central database
Section 4: Determine the Appropriate Methodology for Your Surveillance System

- Cause of death is consistently reported on death certificates
- Race or ethnicity information is usually available

**Disadvantages**
- Rare event. Injury deaths represent less than 1% of injury events
- Not a good guide to ascertaining overall injury problem or medical consequences, such as long term disability
- Influenced by small numbers, especially in small populations or over a short period of time

**Hospitalization**

**Advantages**
- When combined with mortality data it offers a better picture of the overall problem
- Disability and healthcare costs can be better described
- Data can be collected by staff
- Patients are captive audience that can be interviewed at the hospital, along with their relatives

**Disadvantages**
- Access to data is more difficult
- Privacy is more of a consideration
- Records may be manual
- Inconsistent, incomplete or incorrect coding of injury causation
- Race or ethnicity information is sometimes not available
- May not be representative of the problem as only most severe injuries require hospitalization

**ED Visits (Under Ambulatory Care on pyramid)**

**Advantages**
- When combined with death and hospitalization data, helps provide the big picture
- If you’re dealing with a small population and have limited injury and mortality information you may benefit from casting the net wider
- Can be useful for specialized studies
- Data can be collected by staff
- Patients are captive audience that can be interviewed at the hospital, along with their relatives

**Disadvantages**
- Large number of cases may be difficult to handle
- Access to data may be difficult
- Records may be manual
- Inconsistent, incomplete or incorrect coding of injury causation
- Race or ethnicity information is not readily available from non-local sources

**Outpatient Visits (Under Ambulatory Care on pyramid)**

**Advantages**
- Clinics might be a primary source of information if there is no hospital
- May be good for specialized injuries, such as sports related injuries or eye injuries
Exercise 1

Case Definition
1. Ask the class to pose some potential injury concerns in their community. Then ask them to write a case definition for that scenario. If the class is large divide it into smaller groups.
2. The primary data you intend to use is hospital ED records and patient medical charts
3. Considerations: person, place, time, intent, severity
4. Share the case definitions. Ask class to evaluate them based on criteria on page 4-2. Allow 20-30 minutes.

The Use of ICD Codes in Your System
In selecting a case definition for your injury surveillance system, you could use ICD codes.

The use of standard codes in your system allows the accurate comparison of state, local, and international data to assess the magnitude and distribution of injuries as a public health problem. In the public health sector, mortality data on death certificates are coded using the International Classification of Diseases (ICD) codes. ICD codes translate verbal descriptions, usually provided by a physician or medical examiner or from hospital inpatient or outpatient records, into coded descriptions that can be grouped together for statistical purposes. ICD is the international standard diagnostic classification system for all general epidemiological purposes, many health management purposes and for clinical use, including billing. ICD includes codes for diagnosis of disease and injury; and cause of injury codes.

Since 1948, the World Health Organization (WHO) has had responsibility for preparing and publishing ICD codes and all revisions. In 1999, the tenth revision of ICD codes (ICD-10) replaced the ninth revision (ICD-9). In the ICD-9, external causes of death were coded with a supplementary set of codes (commonly known as E-codes). E-codes indicated the mechanism causing death (e.g., a motor vehicle traffic crash) and the injuries resulting from the external causes (e.g., fractures, open wounds), both of which were listed as contributing causes on the death certificate. In the ICD-10, external causes are classified under a series of alphanumeric codes, V01–Y98. (For a list of ICD-10 codes, see: Ftp://Ftp.cdc.gov/pub/Health_Statistics/NCHS/Publications/ICD10/).
Another classification is the ICD-9-CM, which is a clinical modification of ICD-9. ICD-9-CM codes are widely used to code external causes of injury for visits in hospitals, emergency departments, and ambulatory care settings across the United States. However, within the next few years, the ICD-9-CM classification system will be replaced with the ICD-10-CM coding system, including expansion of external-cause-of-injury codes. When implemented, ICD-10-CM will allow for more detailed coding of the external cause of injury based on information in the medical record about injury circumstances (e.g., intentionality, mechanism, place of occurrence, and activity at the time of injury).

Currently in the United States, both ICD-9 and ICD-10 codes are in use. ICD-9 codes are used for coding the diagnosis of non-fatal illness and injuries and ICD-10 codes are used for coding the diagnosis of fatal illnesses and injuries. Most countries use ICD-10 codes for both non-fatal and fatal diagnoses. Beginning October 1, 2014, the United States will implement the use of ICD-10 codes for both fatal and non-fatal illnesses and injuries. As of October 1, 2014 all Indian Health Service/Tribal/Urban programs must use ICD-10 codes on all HIPAA electronic record transactions.

ICD-10 codes are not simply an update of ICD-9. There are changes in structure and content of the codes that make them very different from ICD-9. The structure allows for greater detail. In addition, the code sets include greater detail, changes in terminology and expanded concepts for injuries, laterality (right or left side) and related factors. ICD-9 has 17,000 codes compared 141,000 codes for ICD-10.

An ICD-10 Code consists of three to seven characters. The first digit is a letter. Second digit is a number and third through seventh digits can be alpha or numeric. A decimal placed after the first three characters. As is illustrated in the diagram below, the first three digits are a category of injury, the next three digits are for the cause, anatomical site or severity of injury and the final digit is an extension used to indicate whether the visit was an initial encounter or subsequent encounter or the result of a chronic condition resulting from the original injury.

Anatomy of an ICD-10 Code

For more information on ICD codes, you can check the following web sites:

- American Academy of Professional Coders
  http://www.aapc.com/
If you decide to include other data sources in your system, such as law enforcement, you must keep in mind that these sources use different definitions for incidents, such as assault or neglect. Table 1 below shows how the definitions used for ICD-10 Codes compared to those used in the law enforcement sector. You should also keep in mind that updates to the codes can impact multi-year analysis of data. For example, if a code for “fall from skateboard” is introduced in year three of the five-year dataset, and you didn’t know that it was a new code, you would think there were no injuries from skateboard falls prior to year three.

### Table 2. Case Definition for Violence-Related Injuries: Public Health versus Law Enforcement

<table>
<thead>
<tr>
<th>Public Health (ICD-10)*</th>
<th>Law Enforcement**</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assault (X85–Y09):</strong></td>
<td><strong>Criminal Homicide:</strong> Murder and no negligent manslaughter: the willful killing of one human being by another.</td>
</tr>
<tr>
<td>Includes homicide and injuries inflicted by another person with intent to injure or kill, by any means.</td>
<td><strong>Aggravated Assault:</strong> An unlawful attack by one person upon another for the purpose of inflicting severe or aggravated bodily injury. This type of assault is usually accompanied by the use of a weapon or by means likely to provide death or great bodily harm.</td>
</tr>
<tr>
<td>Excludes: Legal intervention and operations of war.</td>
<td><strong>Other Assaults:</strong> Assaults and attempted assaults in which no weapons are used and do not result in serious or aggravated injury to the victim.</td>
</tr>
<tr>
<td>Assaults are classified by mechanism; a four-digit code is used for place of occurrence of the event and for activity of the victim.</td>
<td></td>
</tr>
<tr>
<td><strong>Legal Intervention (Y35):</strong></td>
<td><strong>Justifiable Homicide (Not a Crime):</strong> Killing of a felon by a law enforcement officer in the line of duty.</td>
</tr>
<tr>
<td>Includes legal intervention according to the mechanism: Involves firearm discharge, explosives, gas, blunt object, sharp objects, legal execution, other means, and unspecified.</td>
<td>The killing of a felon, during the commission of a felony, by a private citizen.</td>
</tr>
<tr>
<td><strong>Neglect and Abandonment (Y06):</strong></td>
<td><strong>Manslaughter by Negligence:</strong> The killing of another person through gross negligence.</td>
</tr>
<tr>
<td>Classified according to the perpetrator: Spouse or partner, parent, acquaintance or friend, other specified persons, unspecified person.</td>
<td></td>
</tr>
</tbody>
</table>

*International Statistical Classification of Diseases and Related Health Problems (ICD-10)*

The advantages and disadvantages of e-coding are listed below.

**Advantages**
- Allows the ability to identify trends
- Allows the ability to describe the specific causes and contributing factors associated with an injury
- Standardization of injury descriptions which can aid in sharing data or linking databases.
- As of October 1, 2014 all Indian Health Service/Tribal/Urban programs must use ICD-10 codes on all HIPAA electronic record transactions.

**Disadvantages**
- Not all records are coded
- Records are miscoded or inconsistently coded
- Poor chart information results in non-specific e-code
- Don’t always provide the desired specificity
- You must stay apprised of updates
- Previously not required for billing, so seen by some coders as unnecessary

**Exercise 2**

**Coding Exercise**
There are 10 scenarios in the coding exercise; they do not have to do all of them. To get the exercise started, provide the handout. Select 2 and do them as a group. Then let them do as many as they can in 15 minutes. Debrief by sharing the answers and discussing. The object of the exercise is to help them become familiar with e-codes and how they are applied to identify the cause of injuries. Note that some protocols may require them to assign e-codes to injuries when e-codes are absent from the data they collect.

**Determine the Variables to Include in Your System**
Data elements are the variables needed for each injury event, such as the demographic information, information on the time of the event, information on where the event took place or where the victim died and the circumstances surrounding the event. The case definitions and codes are included in the data elements as well.

The variables you define will determine the data you collect and the data collection form you develop. When determining the variables, keep the goal of surveillance in mind. The goal is prevention activity. There’s value in collecting as much information as possible, but the more information you try to collect, the less likely your form will be filled out accurately or at all. A simple form will be more likely to yield information, even if it’s not all the information you would like. Some IHS areas have used a two-phased approach. A Phase 1 form is used to collect basic information about an injury. A Phase 2 form is used to
collect more detailed information based on the specific injury. There are examples of these forms in Appendix 7.

The variables you choose to include will depend on many things, including your locality, culture and the availability of data sources. Be realistic about what you include based on your circumstances and location. Below are some commonly included variables.

- **Name/Identifier** – The name of the injured person is often not available. For surveillance purposes it is not used or not collected because of privacy issues. Use hospital case number or DOB in lieu of name. It’s important to use some kind of unique identifier in place of a name to avoid a duplication of cases, particularly when you are using data from two or more sources.
- **Age and sex**
- **Marital Status**
- **Education Level** – Consider whether this information is needed. Will knowing the education level of the victim impact your intervention activities?
- **Employment Level** – Same consideration as Education Level. Will it impact intervention? In some circumstances it could help you determine work-related injuries.
- **BAC** – This is an important variable, but it’s not always available. You may have to settle for “Alcohol-involved” or “Alcohol-related” designations. If you are using “alcohol-involved” or “alcohol-related” you will have to check with the local government or law enforcement to determine how these designations are defined.
- **Occupant Protection for Transportation** – Transportation includes all modes, such as horses, skateboards, bicycles as well as motorized vehicles, such as snow mobiles, boats. Protection includes seat belts, helmets, life jackets, etc.
- **Time** – This is the date and time of an injury event. Ideally it’s the time the injury occurred, but most of the time you will only know the time of medical treatment. Choose one variant and go with it, even if it’s not the most accurate indication of when the injury occurred. A drawback to choosing the time of treatment is that in some cases people don’t seek medical treatment until much later.
- **Place** – This could be the place where the injury occurred and/or the residence of the injured person. Injuries often occur when people travel to places for activities – hunting, fishing, drinking – ideally you collect both. Sometimes the information is very general – such as the nearest village. Specifics are great, but if you can’t get them you work with what you have.
- **Circumstances surrounding the injury event** – This could include information about the following.
  - Relationship of victim to aggressor
  - Mechanism
  - Context
  - Criminal history of victim and/or aggressor

<table>
<thead>
<tr>
<th>Variables Sometimes Included in IHS Surveillance Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service Unit</td>
</tr>
<tr>
<td>Community</td>
</tr>
<tr>
<td>Chart No.</td>
</tr>
<tr>
<td>Age</td>
</tr>
<tr>
<td>Sex</td>
</tr>
</tbody>
</table>

Designing and Implementing Injury Surveillance Systems in Indian Country – Instructor Guide 4-8
Develop Data Collection Instrument and Determine Data Collection Frequency

**Designing a form**

Once you’ve determined what you want in your system, you must design a form that will capture all the data/variables you’ve decided to include.

Most of your data collection will involve record extraction, which means it will be gathered from someone or someplace, such as the Tribal police or the health clinic that is already recording the information you need to know. The form you develop will assist you in the collection of the information.

There is no right or wrong way to design a form. In Appendix 7 you will find examples of forms used by other surveillance systems in Indian Country. Each surveillance system is unique and will have access to different data. The form you design should fit the needs of your system and the available data sources. Find something that works for you and stick with it. Below are some things to consider when designing a form for your system.

- Define what you want in your system first. This will lead to the creation of a form.
- Keep it simple. The simpler the form, the greater its usefulness over a long period of time.
- Only include the data you need and then use analysis to answer case definition questions later.
- Make sure it is well-designed and easy to follow or read.
- Decide whether or not to pre-code the form – provide a pre-coded list of possible answers, rather than filling the answers in. If you do pre-code, use numbers if possible. Numbers are easier to process and less prone to errors. You will need to develop a list of codes as a reference.

**Pre-test your form**

It’s very important to pre-test a draft of your data-collection instrument or form before you begin a full-scale investigation. Get feedback from anyone who will use it and make modifications as necessary. Pre-testing helps identify if the questions and format are appropriate, clear, and relevant and result in the appropriate data. It will also help you determine if the case definition is accurate. It’s not unusual to change a form two or three times before implementing it.

**Frequency of Data Collection**

The frequency with which you collect data will depend on your circumstances. You will want to consider the magnitude of the injury problem in your area which will impact the number of cases you’re reviewing, your resources (both human and financial), whether your data collection is active or passive (see below) and the needs of your system.

**Active and Passive Data Collection**

Active surveillance involves seeking out cases, investigating them and interviewing injured people with follow-up. Active surveillance usually involves large expenditures of time and money. Though active surveillance is not usually practical at the local level, sometimes it is done as a follow up to gather more information on specific injuries after you’ve looked at the initial data.

Most surveillance done at the area or regional level is passive surveillance. In this approach, you’re using data from sources that gather information in the process of doing other routine tasks. The generation of data may not be the primary focus of the organization that yields the data, but it’s possible to get the data you need from the forms filled out by the personnel in these other systems.
Data Collection Planning Summary

- Decide what you want out of your system
- Identify your case definition
- Define your variables
- Develop your form
- Consider how HIPAA/privacy issues may impact your data collection efforts
- Test it

Exercise 3

Turn to Appendix 7 of this manual where there are examples of various forms being used in surveillance systems in Indian Country. Ask the class to compare the forms and discuss the similarities and differences. Though each of these forms is different, they have all yielded data and results and have led to successful interventions.

Determining the Type of Surveillance System

There are several ways of setting up your surveillance system depending on the coverage needed, the objectives to be met, and the financial and human resources available. Most areas will use a Universal Surveillance System, but all of the systems are described below as they can be applied in some circumstances.10

- **Universal Surveillance**: Most commonly used system and the one most likely to work for Indian Country. The total number of cases occurring within a defined population is included in the system. This population-based surveillance accounts for all cases that occur. This is the preferred method of monitoring the occurrence of fatal injuries because rates of injuries and injury risk factors can be calculated and generalized to the population. Most surveillance in Indian Country is an attempt to capture all data. The methods below may be done as a follow-up to capture more data on specific injuries.

- **Surveillance Based on Samples of Cases**: The information is obtained from a portion of the total number of cases or events. The sample must be representative so that inferences can be made regarding all possible cases occurring in the population. This method can be used to collect information about nonfatal injuries or as a follow-up to collect more data on specific injuries.

- **Surveillance Based on a Review of Institutional Registries**: Institutional registries are reviewed periodically to analyze and identify variables of interest. When using this method, it is important to properly identify the institutions and the sources within institutions, such as clinical and emergency records, hospital discharges, or complaints filed with police or family welfare institutions. It is useful for monitoring specific injuries.

- **Survey-Based Surveillance**: Information is obtained through questionnaires focused on a specific topic, within a predefined period of time, and at predefined intervals. In the United States, for example, self-reported seat belt and safety seat use is measured at the state level by household surveys conducted for the Behavioral Risk Factor Surveillance System (BRFSS), by school-based
surveys conducted for the Youth Risk Behavior Surveillance System (YRBSS), and by direct observation of passenger vehicle occupants for the National Occupant Protection Use Survey.

- **Sentinel Surveillance**: One or more institutions are chosen to monitor trends, target surveillance activities, and suggest preventive interventions. In general, surveillance systems of this type are not representative of the population, but are useful for calling special attention to risk situations and thus fulfill a key function for injury prevention decision-making. One example of this type of surveillance is the approach taken by child death review teams, which gather and analyze data on the circumstances surrounding all causes of child deaths. Sentinel surveillance systems complement other sources of information for injury prevention.

### Plans for Systematization, Maintenance and Data Security

If you don’t have an electronic database set up, seek the assistance of a programmer, an epidemiologist or a statistician. Epi Info 2002 is free software available through the CDC. For an overview of the software and installation and use instructions, visit [http://wwwn.cdc.gov/epiinfo/7/index.htm](http://wwwn.cdc.gov/epiinfo/7/index.htm). Any paper records associated with the system – original data sources, forms, etc. -- need to be kept in locked storage if there are personal identifiers.

Data maintenance should focus on the following:

- Reducing errors that may be introduced through flaws in the design.
- Improving the system’s scope and services through routine maintenance, emergency maintenance and requests for special reports. The frequency and extent of maintenance should be based on your needs and resources. Consider some of the following:
  - Backing up data and system files according to an established schedule.
  - Maintaining records in a secure environment
  - Requiring requests for emergency maintenance to be in writing and entered into a log
  - Assigning priorities for special requests on the basis of urgency of need and time and resources required for fulfillment
  - Institutionalizing routine maintenance
  - Documenting maintenance that is conducted
- Safeguarding your system. This should be based on your needs and resources.
  - Consider limiting access to one person.
  - Consider installing the database on two computers. A primary computer and one reserved for testing changes to the system. The second computer can also serve as a backup in case the first one fails. Remember that changes need to be transferred from one computer to the other once the changes are tested and approved.
  - Consider keeping a second copy of the database off site. If you do this, remember routine updates of the offsite copy must be done.

### Threats to a database

There are many things that could compromise your database. Below are just a few to guard against.
- Human error
Section 4: Determine the Appropriate Methodology for Your Surveillance System

• Mechanical failure
• Malicious damage
• Cyber crime
• Invasion of privacy
• Computer viruses

Protocol
Successful surveillance systems will have clearly written protocol. In Appendix 8 you will find a number of examples from Indian Country. The protocol for your system will vary with your needs, but it should include the following:

• The procedures for obtaining and securing data
• Maintenance procedures
• Rules for data storage
• Rules for password protection and passwords
• Documents that detail all changes to the system, including maintenance, changes to the data collection instrument, case definition, etc.

Exercise 4

Turn to Appendix 8 of this manual where there are examples of various protocols for surveillance systems in Indian Country. Ask the class to compare the different protocols. What do similarities do they notice. What differences. There is no right or wrong way to write a protocol is depends on the needs. The goal is to simply note that there are different approaches to surveillance.

Define Necessary Staff and Key Positions
Ideally a surveillance system will have a core staff, both part time and full time, that would include a program manager, a data manager, a research analyst and a coordinator. This is seldom if ever possible in Indian Country. In Indian Country it is more likely that your staff will consist of one or two people who will fulfill all of the functions of the system. You should also consider and plan for any training that may be necessary for staff to fulfill the tasks necessary. Some of the key staff functions and skill sets include:

• Coordinate system activities
• Establish contact with data sources and stakeholders
• Data entry
• Quality control
• Analysis
• Preparation of reports
Advisory Board/Coalition/Relationships

Just as with coalitions mentioned in the previous section, an advisory board could be helpful for offering technical advice, strategic planning and support for the surveillance system, but the reality is that often you will be working with just a few people. Within the IHS, sometimes district or area IP staff can fill some of the functions of an advisory board. A Tribal Health Director or a Tribal Epidemiologist can assist you as well by providing information or answering specific questions. This may be more realistic than an advisory board or coalition. Whether your advisors are a board or just a few people, it may be necessary from time to time to seek a group’s or an individual’s assistance with the following:

- Obtaining the data necessary for the injury surveillance system
- Review and advice on policy and procedures for data collection, linkage, publications, and mechanisms for implementing a reporting system
- Identifying the best use of data
- Strategizing about how to remove obstacles and inefficiencies
- Providing speaking opportunities with professional organizations
- Obtaining data sharing agreements
- Showing broad, high-level support for the system
- Getting local approval to start a surveillance system
- Navigating Tribal politics or resistance to surveillance, data collection or data sharing

Summary

Now that you've completed this section you should be able to:

- Define the injury events and data elements to be included in the system
- Develop the data collection instrument and determine data collection frequency
- Plan for systemization, maintenance and data security
- Define the functions and skill sets for key positions in your surveillance system
Section 4: Determine the Appropriate Methodology for Your Surveillance System

Resources & References

Resources


References


3 Children’s Safety Network Economics and Data Analysis Resource Center. From E to VWXY Cause of Injury Coding Fact Sheets. Pacific Institute for Research and Evaluation. Calverton, MD.


12 Ibid.
## Section 5: Define and Develop an Analysis Plan for the Surveillance Data; Develop a Plan for Disseminating Results

### Section 5 at a Glance

<table>
<thead>
<tr>
<th>Topics Covered</th>
<th>Slide #</th>
<th>Manual Page #</th>
<th>Time Frame</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epidemiological Concepts and Terms</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data Analysis: General Guidelines and Terms</td>
<td></td>
<td></td>
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<tr>
<td>Basic Statistics</td>
<td></td>
<td></td>
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<tr>
<td>Basic Statistics – Rates</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Years of Potential Life Lost</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Geographic Analysis of Data</td>
<td></td>
<td></td>
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<tr>
<td>Plan to Disseminate and Communicate Results</td>
<td></td>
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</tr>
</tbody>
</table>

### Exercises and Additional Activities

- Rate Exercise
- Optional Discussion

### Materials Checklist

- Most people will have calculators on their phones, but have a few calculators in case some people don’t have them on their phone
- Handout for Rate Exercise
- White board or flipchart and markers
- Pens or pencils for participants

### General Information & Instruction

**Rate Exercise (60 Minutes):** Ask class to get out their calculators. Provide class with Handout and remind them of the equations they use to calculate the rates. Begin the exercise by doing two or three calculations with them. When you feel they understand what they need to do, ask them to do the rest on their own. Debrief by sharing the correct answers and showing how the answer for each question was obtained.

**Optional Discussion (30 Minutes):** After covering surveillance system reports, you can begin a discussion with the class by asking them the following:
- Which information is most important to present to stakeholders?
- Which indicators would best show the size of the problem?
- Do you think cost data is important to stakeholders?
- Should you include recommendations about prevention strategies in your surveillance report?
### Text, charts and tables that may need updating

<table>
<thead>
<tr>
<th>Page No.</th>
<th>Section</th>
<th>Possible Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-5</td>
<td>Table 1: Specific Rates of Suicide for AI/AN Population by Age Group - 2010</td>
<td>CDC WISQARS Fatal Injury Report <a href="http://www.cdc.gov/injury/wisqars/fatal_injury_reports.html">http://www.cdc.gov/injury/wisqars/fatal_injury_reports.html</a></td>
</tr>
<tr>
<td>5-6</td>
<td>Table 2: Years of Potential Life Lost Before Age 65 AI/AN Population - 2010</td>
<td>CDC WISQARS YPLL Report <a href="http://www.cdc.gov/injury/wisqars/years_potential.html">http://www.cdc.gov/injury/wisqars/years_potential.html</a></td>
</tr>
</tbody>
</table>

### Notes:
The above data represent the number of injury deaths for 5 communities in a region (i.e., IHS Area). The total number of injury deaths (N) during this one year (2006) time period was 187.

Calculate the proportion of injury deaths for community.

1. Complete the calculations for the proportion of deaths for each community. Which community has the highest proportion of injury deaths?

2. Complete the calculations for the Injury Death Rate per 100,000 population for each community. Which community has the highest injury death rate?

3. What is the Injury Death Rate per 100,000 for this 5-community region?

4. The following additional data has been provided to you: 174 Injury Deaths in 2007; 172 Injury Deaths in 2008; 163 Injury Deaths in 2009; 159 Injury Deaths in 2010. Assuming a population growth rate of 2% per year, calculate the injury death rate for this population for the time period 2006-2010.

5. An intervention to reduce crashes on a two mile section of highway was implemented. For the 3 years prior to the intervention, there were 110 crashes. For the 3 years after the intervention, there were 85 crashes.

   Calculate the percentage change of crashes for the pre and post intervention time periods.

   Was the intervention successful?
Rates Exercise

6. The Transportation Department has estimated the ADT (average daily traffic count) for this section of road as 1800, 1850, 1700, 910, 845, and 790 respectively for each of the project years. Compare the pre and post intervention crash rates.

7. You received the following data representing injury fatalities in your region over the past 10 years. Recognizing there are problems in calculating rates for a small number of events (less than 20), how might you report these data with stable rates?

<table>
<thead>
<tr>
<th>Year</th>
<th># of Injury Deaths</th>
<th>Population</th>
<th>Rate/10,000 pop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>15</td>
<td>10,350</td>
<td>14.5</td>
</tr>
<tr>
<td>Year 2</td>
<td>9</td>
<td>10,447</td>
<td>8.6</td>
</tr>
<tr>
<td>Year 3</td>
<td>19</td>
<td>10,683</td>
<td>17.8</td>
</tr>
<tr>
<td>Year 4</td>
<td>24</td>
<td>10,889</td>
<td>22.0</td>
</tr>
<tr>
<td>Year 5</td>
<td>13</td>
<td>10,760</td>
<td>12.1</td>
</tr>
<tr>
<td>Year 6</td>
<td>6</td>
<td>10,609</td>
<td>5.7</td>
</tr>
<tr>
<td>Year 7</td>
<td>9</td>
<td>10,589</td>
<td>8.5</td>
</tr>
<tr>
<td>Year 8</td>
<td>11</td>
<td>10,646</td>
<td>10.3</td>
</tr>
<tr>
<td>Year 9</td>
<td>17</td>
<td>10,788</td>
<td>15.8</td>
</tr>
<tr>
<td>Year 10</td>
<td>8</td>
<td>11,310</td>
<td>7.1</td>
</tr>
</tbody>
</table>
8. You received the following data representing injury hospitalizations in his region for a 5-year time period. What are the top 3 injury causes that should be prioritized for your limited intervention resources? Explain.

<table>
<thead>
<tr>
<th>Cause</th>
<th>Total Number (%)</th>
<th>Total Expenditures</th>
<th>Expenditures per Victim</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suicide attempt</td>
<td>143 (28)</td>
<td>$655,000</td>
<td>$4,580</td>
</tr>
<tr>
<td>Fall</td>
<td>91 (18)</td>
<td>$652,000</td>
<td>$7,164</td>
</tr>
<tr>
<td>Violent act</td>
<td>80 (16)</td>
<td>$816,000</td>
<td>$10,200</td>
</tr>
<tr>
<td>Motor vehicle</td>
<td>52 (10)</td>
<td>$600,000</td>
<td>$11,538</td>
</tr>
<tr>
<td>Misc. other causes</td>
<td>32 (6)</td>
<td>$282,000</td>
<td>$8,057</td>
</tr>
<tr>
<td>Snowmobile/ATV</td>
<td>30 (6)</td>
<td>$508,000</td>
<td>$16,933</td>
</tr>
<tr>
<td>Unintentional poison</td>
<td>30 (6)</td>
<td>$142,000</td>
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<tr>
<td>Sports/recreation</td>
<td>25 (5)</td>
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<tr>
<td>Env. Hazard (exposure)</td>
<td>16 (3)</td>
<td>$149,000</td>
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<td>Firearm (unintentional)</td>
<td>12 (2)</td>
<td>$207,000</td>
<td>$17,250</td>
</tr>
<tr>
<td>TOTAL</td>
<td>511 (100)</td>
<td>$4,145,000</td>
<td>$8,112</td>
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The above data represent the number of injury deaths for 5 communities in a region (i.e., IHS Area). The total number of injury deaths (N) during this one year (2006) time period was 187.

Calculate the proportion of injury deaths for community.

1. Complete the calculations for the proportion of deaths for each community. Which community has the highest proportion of injury deaths?

   **Community 4 has the highest proportion of injury deaths at 36%**

2. Complete the calculations for the Injury Death Rate per 100,000 population for each community. Which community has the highest injury death rate?

   **Community 3 has the highest injury death rate at 183 per 100,000.**

3. What is the Injury Death Rate per 100,000 for this 5-community region?

   $\frac{187}{137,000} \times 100K = 136$ per 100,000 population

4. The following additional data has been provided to you: 174 Injury Deaths in 2007; 172 Injury Deaths in 2008; 163 Injury Deaths in 2009; 159 Injury Deaths in 2010. Assuming a population growth rate of 2% per year, calculate the injury death rate for this population for the time period 2006-2010.

   - 2006 Population = 137,000
   - 2007 Population = 137,000 x .02 = 139,740
   - 2008 Population = 139,740 x .02 = 142,535
   - 2009 Population = 142,535 x .02 = 145,386
   - 2010 Population = 145,386 x .02 = 148,294

   Rate = $\frac{187 + 174 + 172 + 163 + 159}{137,000 + 139,740 + 142,535 + 145,386 + 148,294} \times 100K = 120/100K pop = 712,955$

5. An intervention to reduce crashes on a two mile section of highway was implemented. For the 3 years prior to the intervention, there were 110 crashes. For the 3 years after the intervention, there were 85 crashes.

   Calculate the percentage change of crashes for the pre and post intervention time periods.

   $110 - 85 = 25 \quad \frac{25}{110} = 23\%$ reduction in crashes

   Was the intervention successful?
6. The Transportation Department has estimated the ADT (average daily traffic count) for this section of road as 1800, 1850, 1700, 910, 845, and 790 respectively for each of the project years. Compare the pre and post intervention crash rates.

Pre-Intervention:

\[
\text{110 Crashes} \quad \times \quad \text{1M miles} = 9.4 \text{ crashes/1M miles driven}
\]
\[
(1800+1850+1700)(2 \text{ miles})(365 \times 3)
\]

Post-Intervention:

\[
\text{85 Crashes} \quad \times \quad \text{1M miles} = 15.3 \text{ crashes/1M miles driven}
\]
\[
(910+845+790)(2 \text{ miles})(365 \times 3)
\]

Was the intervention successful?

Taking into account traffic volume, it appears as though the intervention was not effective. In fact, investigation should be done to determine if the intervention influenced an increase in crashes.

7. You received the following data representing injury fatalities in your region over the past 10 years. Recognizing there are problems in calculating rates for a small number of events (less than 20), how might you report these data with stable rates?

\[
\begin{array}{|c|c|c|}
\hline
\text{Year} & \# \text{ of Injury Deaths} & \text{Population} \\
\hline
\text{Year 1} & 15 & 10,350 \\
\text{Year 2} & 9 & 10,447 \\
\text{Year 3} & 19 & 10,683 \\
\text{Year 4} & 24 & 10,889 \\
\text{Year 5} & 13 & 10,760 \\
\text{Year 6} & 6 & 10,609 \\
\text{Year 7} & 9 & 10,589 \\
\text{Year 8} & 11 & 10,646 \\
\text{Year 9} & 17 & 10,788 \\
\text{Year 10} & 8 & 11,310 \\
\hline
\end{array}
\]

Combine rates.

IHS Program Statistics normally used three years of data to calculate rates.

\[
\begin{array}{|c|c|c|c|}
\hline
\text{Year} & \# \text{ of Injury Deaths} & \text{Population} & \text{Rate}/10,000 \text{ pop} \\
\hline
\text{Year 1-3} & 15+9+19/(10350+10447+10683) = 43/31480 = 13.6/10,000 \text{ pop} \\
\text{Year 2-4} & 52/32019 = 16.2 \\
\text{Year 3-5} & 56/32332 = 17.3 \\
\text{Year 4-6} & 43/32258 = 13.3 \\
\text{Year 5-7} & 28/31958 = 8.8 \\
\text{Year 6-8} & 26/31844 = 8.2 \\
\text{Year 7-9} & 37/32023 = 11.6 \\
\text{Year 8-10} & 36/32744 = 11.0 \\
\hline
\end{array}
\]
8. You received the following data representing injury hospitalizations in his region for a 5-year time period. What are the top 3 injury causes that should be prioritized for your limited intervention resources? Explain.

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<td><strong>511 (100)</strong></td>
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<td><strong>$8,112</strong></td>
</tr>
</tbody>
</table>

Discussion: The table illustrates that the causes of injury that deserve priority for intervention vary, depending on the criteria chosen for decision-making: Frequency, Total expenditures, Highest expenditure per victim, Incidence rates, etc.
Define and Develop an Analysis Plan; Develop a Plan for Disseminating Results

Section 5
Slide 83

Section 5 Objectives

• Calculate injury indicators such as frequency, percentages and crude, specific and adjusted rates
• Calculate Years of Potential Life Lost
• Describe the geographical analysis of the data
• Define a plan to disseminate and communicate the data

P. 5-10

If there is time: Discuss the following with the class:
• Which information is most important to present to stakeholders?
• Which indicators would best show the size of the problem?
• Do you think cost data is important to stakeholders?
• Should you include recommendations about prevention strategies in your surveillance report?

Now that they’ve completed Section 5 they should ...

Read from the slide
Data Analysis & Interpretation

Epidemiological Concepts and Terms

- Epidemiology
- Population-based
- Injuries are not random
- Morbidity v. Mortality
- Risk
- Endemic vs. Epidemic

P. 5-1 -5-2
This is a review of terms from Level 2
Epidemiological Concepts and Terms

Epidemiology

“The study of the distribution and determinants of health-related states or events in specified populations and the application of this study to control health problems.” A Dictionary of Epidemiology

- Who
- What
- Where
- Why
- When
- How
Data Analysis & Interpretation

Epidemiological Concepts and Terms

Epidemiology is POPULATION-BASED (concerned with the community, not the individual)
Data Analysis & Interpretation
Epidemiological Concepts and Terms

Risk:
“The probability that an event will occur.”

A Dictionary of Epidemiology
Risk Factor:

“An attribute or exposure that could increase the probability of a specific outcome.”

“A determinant can sometimes be modified by an intervention, thereby reducing the probability of occurrence of ... specified outcome.”

A Dictionary of Epidemiology

Some risk factors, such as age, sex, race and family history are often major determinants of risk. These types of risk factors cannot be changed. Other risk factors, such as seat belt use, drinking and driving, and personal protective equipment use can be modified to reduce risk.
Data Analysis & Interpretation
Analysis – General Concepts

• Analysis involves:
  – Basic statistics (the counting)
  – Interpretation (what does it mean)
Data Analysis & Interpretation

Analysis – General Concepts

• To analyze:
  – Separate into elements or constituent parts
  – Separate the parts of the whole so as to reveal their relation to it and to one another
  – Examine critically or methodically
• No set formula, rule or methodology ... analysis is as much an art as it is a science
• Look for patterns, clusters, the unusual, unexpected
• Progress to more complex analysis as necessary
Data Analysis & Interpretation

Analysis – General Concepts

Basic Rules to Consider

• Indicate the “N” (number of data items in the data set or “n” (number of data items in the data subset)
• Small numbers ≠ “bad results” ... just qualify or acknowledge the “N” upfront.

P. 5-2
Two Common Misconceptions to Avoid

• A computer does not think for you. It does the counting; you have to interpret the numbers.
• Correlation does not necessarily imply causation

Correlation does not necessarily imply causation – Explain that just because there may be a correlation between two variables, it does not necessarily mean that one causes the other.

Just because A occurs in correlation with B it does not necessarily mean that A causes B.
As already mentioned analysis involves basic statistics (the counting) and interpretation (what does it mean). There are numerous ways to analyze data. The level of analysis will depend on what you are trying to determine from the data (e.g. descriptive study, grants evaluation) and your technical abilities to analyze the data. You don’t need to be a statistician to utilize basic statistics to help you better describe and understand injury data. The slide shows basic data analysis methods that you can use.
Simply presenting the numeric value of a data variable is one data analysis method. Data from an injury surveillance system provides information about the number of cases in a given event. This method is very common and the information is easy to understand. Numeric value of one variable cannot be compared to that of the same variable in a different population. As a result, numeric values do not indicate risk.
### Data Analysis and Interpretation

#### Basic Statistics

Midpoint (measure of central tendencies)

- Mode
- Median
- Mean (average)

---

**Midpoint – Measure of central tendencies**

Mode – value that appears most often in a set of data

Median – middle most number in a set of data

Mean – the average
Proportional Distribution

- Commonly used
- Simple calculation
- Sum of all values = 100%
- Can be misleading
- Not a measure of risk

**Proportional distribution** – the percent of the total number of events in a data set which occurred in each of the categories (or subgroups) of that set. Percentages are commonly used and simple to calculate. For any given data set, the sum of all the values must equal 100%. When data sets are small, percentages can be misleading and may not be an indicator of risk.
Calculating and analyzing rates is a critical part of your injury surveillance. It will help you formulate and test theories about causes and identify risk factors for injuries.

You’ve heard the expression, “comparing apples to oranges.” The phrase applies to injury data analysis when you compare the number of deaths in different communities without considering the unique factors in each community that may account for the numbers, such as the size of the population or the volume of traffic. Rates are calculated to adjust for variations in exposure.
Rates are an expression of the frequency with which an event occurs in a defined population over a specific period converted to a whole number by multiplying by some power of 10 (usually 10,000 or 100,000).

There are different types of rates based on the cases used. An incidence rate, new cases in a defined period of time, is most commonly used in injury surveillance. Prevalence rates, new and existing cases, are less common in injury surveillance. Specific rates are based on the actual number of events in a sub-group of the population over a given period of time, such as the injury death rate for a specific age group in a community.
### Data Analysis and Interpretation

#### Basic Statistics - Rates

<table>
<thead>
<tr>
<th>Community</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community A</td>
<td>150 per 100,000</td>
</tr>
<tr>
<td>Community B</td>
<td>100 per 100,000</td>
</tr>
<tr>
<td>Community C</td>
<td>500 per 100,000</td>
</tr>
</tbody>
</table>

P. 5-3
Types of Rates

• Incidence Rate
• Prevalence Rate
• Specific Rate

P. 5-3

There are different kinds of rates based on the cases you use. An incidence rate, new cases in a defined period of time, is most commonly used in injury surveillance. Prevalence rates, new and existing cases, are less common in injury surveillance. Specific rates are based on the actual number of events in a sub-group of the population over a given period of time, such as the injury death rate for a specific age group in a community.
The components of a rate are: -- numerator, denominator x a power of 10

The denominator can come from a number of sources, such as Tribal enrollment, U.S. Census data, traffic volume data or user population. Note that sometimes denominators are not people. For example if you’re measuring plane crashes, the denominator may be landings and takeoffs. For motor vehicle crashes, it may be number of vehicle miles traveled. It’s best to consult a statistician or local injury prevention specialist if you’re unsure about the appropriate denominator.

K is usually expressed as 10,000 or 100,000.

It’s important to use common sense when selecting K. A small number of cases with small K may result in a fraction per K. That may not make sense to a lay person. On the other hand, expressing the rate using per 100,000 population may not make sense when presenting data on a population of 150 people.
Data Analysis and Interpretation

Basic Statistics - Rates

Combine population when calculating a rate for a multi-year period.

Example

Injury Death Rate for a community from 2008-2010

\[
\]

P. 5-4

It's important to remember that when you are calculating the rate for a multi-year period the population should be the combined period for each year. For example, the injury death rate for a community for a 3-year period, 2008-2010, is calculated as the number of cases in 2008 plus the number of cases in 2009 plus the number of cases in 2010 divided by the population in 2008 plus the population in 2009 plus the population in 2010 times K.
Data Analysis and Interpretation

Basic Statistics - Rates

Rate

\[
\frac{17 \text{ cases}}{13,000 \text{ Population}} \times 100,000 \text{ Standard Pop.} = 131 \text{ per 100,000 pop.}
\]
Crude Rate
A crude rate is based on the actual number of events in a total population over a given period of time. Determining the crude rate is your first step, because information about a population must be obtained and compared.

Specific Rate
A specific rate is based on the actual number of events in a subgroup of a population over a given period of time. Sometimes the overall rate may not provide a clear picture of injury. For example, in the United States injury mortality rates are higher among men than women or greater among the AI/AN population than among whites. If only overall rates are calculated, you will not discover the variations and the magnitude of the problem in subgroups. Awareness of such differences can guide the development of injury prevention programs among populations at the greatest risk. An example of specific rate is the chart on page 5-5. It shows a specific rate of suicide for AI/AN population. Looking at the chart, you can see the age where suicide is most prevalent.

Adjusted Rate
Adjusted rates are constructed to permit fair comparison between groups differing in some important characteristic. For example: adjusted rates for the miscoding of Indian race or adjusted rates to account for variation in age among different populations (the large number of
retirees in Florida or the large number of youth in AI/AN population). Calculating an adjusted rate is complicated. You can use CDC WISQARS for national and state level data, but for an adjusted rate on local data seek the assistance of a statistician or an epidemiologist.
Some general considerations

- Accurate Numerator
- Estimated Denominator
- Used Primarily for Comparison
- Indicator of risk

P. 5-5

Some general considerations for rates
The numerator should be accurate
The denominator is typically estimated
The denominator isn’t always population based. It could be some other indicator of exposure such as vehicle miles or work hours.
Rates are primarily used to compare different groups (like communities) or different subgroups (like age groups within a community)
Rates indicate the probability or risk of an event, such as an injury, occurring
This exercise is meant to get the class familiar with calculating rates which is a basic part of data analysis. Ask class to get out their calculators. Provide Handout for Rate Exercise and remind them of the equations they use to calculate the rates. Begin the exercise by doing two or three calculations with them. When you feel they understand what they need to do, ask them to do the rest on their own. Debrief by sharing the correct answers and showing how the answer for each question was obtained.
Data Analysis and Interpretation

Years of Potential Life Lost

YPLL = Years of Potential Life Lost
- Measure of Premature Death
- YPLL = 65 – age at death

P. 5-6 – 5-7
Use the life expectancy of your population. AI/AN populations have a shorter life expectancy than the general population. Note that if a person dies at an age greater than the life expectancy you’re using, you ignore it. WISQARS allows for YPLL calculations for AI/AN population. The chart on Page 5-7 shows YPLL for Indian Country.
Data Analysis and Interpretation

Geographic Analysis of Data

Depicts data using maps
• Spot Map - produced by placing a dot or other symbol on the map where an injury occurred
• Area or Choropleth Map - regions are shaded or marked proportionally to the data being depicted
• Pin or Cluster Map is a way of indicating road traffic hazards or crash prone locations along roads

P. 5-7 – 5-8
Area maps for AI/AN data can be created within WISQARS. Other software programs are available. If they do not have a software program, they can depict data on a map is by placing pins on a printed map where injuries occur.
This is an example of a Choropleth Map or an area map for Arizona, based on data for fatal motor vehicle crashes for the American Indian/Alaska Native population. Point out the areas of the map that indicate a higher death rate. Explore with the class how this map might be used in surveillance efforts.
Data Analysis and Interpretation

Summary

• Epidemiology serves as a foundation
• Many data analysis methods
• Importance of rates
• Need to interpret results and explain what they mean
• Utilize available resources
• Communicate your findings
Communicate Results

Surveillance can only achieve results if the information is communicated to the appropriate people.
Communicate Results

Steps to Take
• Determine who will get the information
• Check with each tribe within your surveillance system
• Develop the message
• Select the format
• Market the message
• Evaluate the impact

P. 5-9
Determining who will get the information will depend on their location. Depending on the community it could be members of a coalition, in addition to decision makers at the Tribal, village government, state or national level. It’s also important to get information to the organizations or agencies that provide services so they can tailor their services to address the issues presented by the data.

They should check with Tribes regarding the review and approval of plans to publicize the information they’ve collected.

The interpretation aspect of analysis is very important when they are developing the message. You need to give context to the information, not just numbers. Be aware that low numbers can skew things up or down, even when you’re well within standard deviation.

Some format considerations are:
• Summary vs. detailed
• Narrative graphs
• How often the material will be produced and how it will distributed
• Electronic or paper
• Web-based
Surveillance System Report

- A means to convey the results of the surveillance system to all the stakeholders
- Consider the needs to the stakeholders when making decisions about design and frequency

A surveillance system report is a means to convey the results of the surveillance system to all the stakeholders. Consider the needs of the stakeholders when making decisions about design and frequency of your report. The specifics may vary depending on your location, but here are some things to consider including in an injury surveillance system report.
Surveillance System Report

Considerations for inclusion

- Introduction
- Leading causes of death: frequency, proportions, and crude rates
- Leading causes of injury deaths: frequency, proportions and crude rates
- Leading causes of morbidity if available
- YPLL
- Cost of injuries
- Priority injuries
- Recommendations for intervention

P. 5-9
They may not have access to all the data. They should use the data they have available.
Surveillance System Report

Recipients

• Stakeholders, decision makers, law enforcement, public health directors, school officials, etc.
• Hospital, emergency departments, health clinics
• Health professionals in the scientific community
• Scientific/academic researchers
• Grassroots organizations
Surveillance System Reports

**Delivery method**
- Health department newsletters
- PSAs
- Press releases
- Flyers
- Periodicals/annual reports
- Presentations
- Newspapers
- Websites

P. 5-9 – 5-10

You will also need to consider how best to deliver your report. In some cases, the delivery method you choose will depend on the audience you are trying to reach. The slide a number of options for disseminating your report or the information in it. There are examples of surveillance system reports in Appendix 9.
Summary of Section 5

- Calculate injury indicators such as frequency, percentages and crude, specific and adjusted rates
- Calculate Years of Potential Life Lost
- Describe the geographical analysis of the data
- Define a plan to disseminate and communicate the data

P. 5-10

If there is time: Discuss the following with the class:
- Which information is most important to present to stakeholders?
- Which indicators would best show the size of the problem?
- Do you think cost data is important to stakeholders?
- Should you include recommendations about prevention strategies in your surveillance report?

Now that they’ve completed Section 5 they should ...

Read from the slide
Section 5: Define and Develop an Analysis Plan for the Surveillance Data; Develop a Plan for Disseminating Results

Learning Objectives

- Calculate injury indicators such as frequency, percentages and crude, specific and adjusted rates
- Calculate Years of Potential Life Lost
- Describe the geographical analysis of the data
- Define a plan to disseminate and communicate the data

Introduction

In the previous section we discussed the collection of data. In this section we will talk about how to analyze data once it is collected. Data requires analysis. In this section we will discuss ways of analyzing data and how to disseminate the results of the analysis to policy-makers and the community.

Epidemiological Concepts and Terms

Below is a review of some epidemiological concepts and terms related to data analysis. You should be familiar with many of these terms from the IHS Level 2 Injury Prevention Course.

- **Epidemiology** as it applies to injury prevention is the study of trends and patterns of injury in a community - the who, what, when, where, why and how of injury. “The study of the distribution and determinants of health-related states or events in specified populations and the application of this study to control health problems.” *A Dictionary of Epidemiology*

- **Population-Based** – Epidemiology is population based and concerned with the community not the individual. Some injuries, such as a shark attack, may get the headlines. But real numbers tell a different story. If IP efforts were based on headlines, you might fail to address the leading causes of injuries, such as MVCs, poisoning, falls, drowning or suffocation. Headlines, emotions and politics can and sometimes do influence injury prevention efforts, but utilizing data will help you discover the leading causes of injury and keep things in perspective.

- **Injuries are not random.** There are causes for injuries and a way to reduce them.

- **Risk** is the probability that an event will occur.

- **Risk Factor** is an attribute or exposure that could increase the probability of a specific outcome. A risk factor can sometimes be modified by an intervention, which would reduce the probability of the specific outcome. Some risk factors, such as age, sex, race and family history are often major determinants of risk. These types of risk factors cannot be changed. Other risk factors,
such as seat belt use, drinking and driving, personal protective equipment can be modified to reduce risk.

- **Endemic vs. Epidemic.** Something that is endemic is present in a community at all times but in relatively low frequency. Something that is endemic is typically restricted or peculiar to a locality or region. An epidemic is a sudden severe outbreak within a region or a group.

### Data Analysis: General Guidelines and Terms

**What does it mean to analyze something?** Below are some definitions.

- Separate into elements or constituent parts
- Separate the parts of the whole so as to reveal their relation to it and to one another
- Examine critically or methodically

There is no set formula, rule or methodology for analyzing surveillance data. Analysis is as much an art as it is a science. Below are some recommendations for analyzing surveillance data.

**Some things to keep in mind when analyzing your data:**

- It may be tempting to immediately examine trends over time. But gaining an intimate knowledge of the day-to-day strengths and weaknesses of the data collection method and the reporting process can provide a better sense of the trends that emerge.
- Start with simple frequencies or counts of data variables. Begin with questions, such as: How many events were reported by week, month or year? How many events were reported by sex? How many cases were reported by age group? Look for patterns or clusters, the unusual or the unexpected. Progress to more complex analysis as may be necessary.

**Basic rules:**

- Indicate “N” (number of data items in the data set) or “n” (number of items in the data subset)
- Small numbers do not mean “bad” results ... you simply need to acknowledge the N upfront.

**Two common misconceptions about data analysis:**

- The computer does not think for you. It does the counting, but you have to interpret what the numbers mean.
- A correlation does not necessarily imply a causation.

### Basic Statistics

Analysis involves basic statistics (the counting) and interpretation (what does it mean). There are numerous ways to analyze data. The level of analysis will depend on what you are trying to determine from the data (e.g. descriptive study, grants evaluation) and your technical abilities to analyze the data. You don’t need to be a statistician to utilize basic statistics to help you better describe and understand injury data. Below are some basic data analysis methods that you can use.

**Numeric Value** – Simply presenting the numeric value of a data variable is one data analysis method. Data from an injury surveillance system provides information about the number of cases in a given
event. This method is very common and the information is easy to understand. Numeric value of one variable cannot be compared to that of the same variable in a different population. As a result, numeric values do not indicate risk.

**Midpoint – Measure of central tendencies**
- **Mode** – value that appears most often in a set of data
- **Median** – middle most number in a set of data
- **Mean** – the average

**Proportional distribution** – the percent of the total number of events in a data set which occurred in each of the categories (or subgroups) of that set. Percentages are commonly used and simple to calculate. For any given data set, the sum of all the values must equal 100%. When data sets are small, percentages can be misleading and may not be an indicator of risk.

**Basic Statistics – Rates**
Calculating and analyzing rates are a critical part of your injury surveillance. It will help you formulate and test theories about causes and identify risk factors for injuries.

You’ve heard the expression, “comparing apples to oranges.” The phrase applies to injury data analysis when you compare the number of deaths in different communities without considering the unique factors in each community that may account for the numbers, such as the size of the population or the volume of traffic. Rates are calculated to adjust for variations in exposure.

Rates are an expression of the frequency with which an event occurs in a defined population over a specific period converted to a whole number by multiplying by some power of 10 (usually 10,000 or 100,000).

The components of a rate are:
1. Numerator (the number of events in a specific time period)
2. Denominator (generally the population exposed: sometimes related to other expressions of exposure, such as traffic volume)
3. A power of ten

There are different kinds of rates based on the cases you use. An incidence rate, new cases in a defined period of time, is most commonly used in injury surveillance. Prevalence rates, new and existing cases, are less common in injury surveillance. Specific rates are based on the actual number of events in a subgroup of the population over a given period of time, such as the injury death rate for a specific age group in a community.

To determine the rate you need an accurate numerator and the appropriate denominator. The numerator will come from your surveillance data, the denominators are sometimes more difficult to obtain. Denominators will often be an estimate. Below is the calculation for determining a rate for 100,000.
Number of cases \(\frac{10^n \text{ or } (K)}{\text{Population at risk}}\)

Your denominator can come from a number of sources, such as Tribal enrollment, U.S. Census data, traffic volume data or user population. Note that sometimes denominators are not people. For example if you’re measuring plane crashes, the denominator may be landings and takeoffs. For motor vehicle crashes, it may be the number of vehicle miles traveled. It’s best to consult a statistician or local injury prevention specialist if you’re unsure about the appropriate denominator.

K is usually expressed as 10,000 or 100,000. Just as we multiply by 100 in determining percentages, we multiply by 10,000 or 100,000 in calculating rates.

It’s important to remember that when you are calculating the rate for a multi-year period the population should be the combined period for each year. For example, the injury death rate for a community for a 3-year period, 2008-2010, is calculated as the number of cases in 2008 plus the number of cases in 2009 plus the number of cases in 2010 divided by the population in 2008 plus the population in 2009 plus the population in 2010 times K.

It’s important to use common sense when selecting K. A small number of cases with small K may result in a fraction per K. That may not make sense to a lay person. On the other hand, expressing the rate using per 100,000 population may not make sense when presenting data on a population of 150 people.

**Crude Rate**
A crude rate is based on the actual number of events in a total population over a given period of time. Determining the crude rate is your first step, because information about a population must be obtained and compared.

**Specific Rate**
A specific rate is based on the actual number of events in a subgroup of a population over a given period of time. Sometimes the overall rate may not provide a clear picture of injury. For example, in the United States injury mortality rates are higher among men than women or greater among the AI/AN population than among whites. If only overall rates are calculated, you will not discover the variations and the magnitude of the problem in subgroups. Awareness of such differences can guide the development of injury prevention programs among populations at the greatest risk. Table 1 on page 5-5 shows the specific rates of suicide for the AI/AN Population by Age Group. Note where the highest number of deaths occurred.

**Adjusted Rate**
Adjusted rates are constructed to permit fair comparison between groups differing in some important characteristic. For example: adjusted rates for the miscoding of Indian race or adjusted rates to account for variation in age among different populations (the large number of retirees in Florida or the large number of youth in AI/AN population). Calculating an adjusted rate is complicated. You can use CDC WISQARS for national and state level data, but for an adjusted rate on local data seek the assistance of a statistician or an epidemiologist.
Table 1: Specific Rates of Suicide for AI/AN Population by Age Group – 2010

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Suicide Deaths</th>
<th>Population</th>
<th>Crude Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 4</td>
<td>0</td>
<td>393,726</td>
<td>0</td>
</tr>
<tr>
<td>5 to 9</td>
<td>0</td>
<td>377,904</td>
<td>0</td>
</tr>
<tr>
<td>10 to 14</td>
<td>14</td>
<td>372,896</td>
<td>3.75</td>
</tr>
<tr>
<td>15 to 19</td>
<td>70</td>
<td>393,320</td>
<td>17.8</td>
</tr>
<tr>
<td>20 to 24</td>
<td>88</td>
<td>362,892</td>
<td>24.25</td>
</tr>
<tr>
<td>25 to 29</td>
<td>51</td>
<td>340,576</td>
<td>14.97</td>
</tr>
<tr>
<td>30 to 34</td>
<td>49</td>
<td>311,098</td>
<td>15.75</td>
</tr>
<tr>
<td>35 to 39</td>
<td>37</td>
<td>292,412</td>
<td>12.65</td>
</tr>
<tr>
<td>40 to 44</td>
<td>38</td>
<td>280,013</td>
<td>13.57</td>
</tr>
<tr>
<td>45 to 49</td>
<td>45</td>
<td>283,889</td>
<td>15.85</td>
</tr>
<tr>
<td>50 to 54</td>
<td>32</td>
<td>253,858</td>
<td>12.61</td>
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<td>55 to 59</td>
<td>20</td>
<td>197,306</td>
<td>10.14</td>
</tr>
<tr>
<td>60 to 64</td>
<td>8</td>
<td>148,434</td>
<td>5.39</td>
</tr>
<tr>
<td>65 to 69</td>
<td>6</td>
<td>97,909</td>
<td>6.13</td>
</tr>
<tr>
<td>70 to 74</td>
<td>5</td>
<td>66,019</td>
<td>7.57</td>
</tr>
<tr>
<td>75 to 79</td>
<td>2</td>
<td>43,090</td>
<td>4.64</td>
</tr>
<tr>
<td>80 to 84</td>
<td>3</td>
<td>26,959</td>
<td>11.13</td>
</tr>
<tr>
<td>85+</td>
<td>1</td>
<td>21,237</td>
<td>4.71</td>
</tr>
<tr>
<td>All Ages</td>
<td>469</td>
<td>4,263,538</td>
<td>11</td>
</tr>
</tbody>
</table>

Source: CDC WISQARS Fatal Injury Reports

Some general considerations for rates
- The numerator should be accurate
- The denominator is typically estimated
- The denominator isn’t always population based. It could be some other indicator of exposure such as vehicle miles or work hours.
- Rates are primarily used to compare different groups (like communities) or different subgroups (like age groups within a community)
- Rates indicate the probability or risk of an event, such as an injury, occurring
Rate Exercise (60 Minutes)
Ask class to get out their calculators. Provide class with Handout and remind them of the equations they use to calculate the rates. Begin the exercise by doing two or three calculations with them. When you feel they understand what they need to do, ask them to do the rest on their own. Debrief by sharing the correct answers and showing how the answer for each question was obtained.

Years of Potential Life Lost (YPLL)
The burden of injury falls disproportionately on the young. It is important to consider how the deaths of so many young people affect the future of a community. The effect of this premature mortality is reflected in the measurement of YPLL.

YPLL measures the potential life lost for people between the ages of 1 and 65 at the time of death. The calculation is simple:

\[
65 - \text{Age at the time of death} = \text{YPLL.}
\]

For example, for a person who dies in a car crash at age 25 the YPLL is 40 (65-25 = 40). Use the life expectancy of your population. AI/AN populations have a shorter life expectancy than the general population. Note that if a person dies at an age greater than the life expectancy you’re using, you ignore it. WISQARS allows for YPLL calculations for AI/AN population.

The table below shows the YPLL in Indian Country for 2010 using age 65 as the base number. Note where injury ranks in comparison to other causes of death. In Indian Country, 66,612 years of potential life were lost because of unintentional and intentional injuries. More potential years of life were lost because of injury than all the other seven identified causes of death combined.
Table 1. Years of Potential Life Lost Before Age 65 American Indian/Alaska Native Population - 2010

<table>
<thead>
<tr>
<th>Cause of Death</th>
<th>YPLL</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Causes</td>
<td>167,928</td>
<td>100.0%</td>
</tr>
<tr>
<td>Unintentional Injury</td>
<td>43,055</td>
<td>25.6%</td>
</tr>
<tr>
<td>Suicide</td>
<td>14,730</td>
<td>8.8%</td>
</tr>
<tr>
<td>Heart Disease</td>
<td>14,689</td>
<td>8.7%</td>
</tr>
<tr>
<td>Malignant Neoplasms</td>
<td>14,524</td>
<td>8.6%</td>
</tr>
<tr>
<td>Liver Disease</td>
<td>11,290</td>
<td>6.7%</td>
</tr>
<tr>
<td>Homicide</td>
<td>8,827</td>
<td>5.3%</td>
</tr>
<tr>
<td>Perinatal Period</td>
<td>7,604</td>
<td>4.5%</td>
</tr>
<tr>
<td>Congenital Anomalies</td>
<td>7,209</td>
<td>4.3%</td>
</tr>
<tr>
<td>Diabetes Mellitus</td>
<td>4,307</td>
<td>2.6%</td>
</tr>
<tr>
<td>Influenza &amp; Pneumonia</td>
<td>2,340</td>
<td>1.4%</td>
</tr>
<tr>
<td>All Others</td>
<td>39,353</td>
<td>23.4%</td>
</tr>
</tbody>
</table>

Source: CDC WISQARS YPLL Reports

Geographic Analysis of Data

Depicting data using maps is a valuable exercise that provides a clear and quick method for grasping data, particularly with people who are familiar with the geographic area. There are software packages that can create maps and WISQARS allows for mapping as well. Even if you do not have the software or the necessary equipment to produce a digital map, you can create a spot map by placing a pin on a printed map where each injury occurred.

The following are some common types of mapping.

- Spot Map: produced by placing a dot or other symbol on the map where an injury occurred. Different symbols can be used for multiple events at the same location. A spot map is useful for displaying the geographic distribution of an event, but it does not provide a measure of risk, since population size is not taken into account.

- Area or Choropleth Map: On an area or choropleth map regions are shaded or marked proportionally to the data being depicted. For example, population density or per capita income. Area maps are useful for depicting rates of injury in specific areas. The Figure 1 on page 5-8 is an example of an area or choropleth map generated using the CDC WISQARS map program.
Pin or Cluster Map: This is a way of indicating road traffic hazards or crash prone locations along roads. Identifying “black spots” helps to pinpoint specific hazards that can often be corrected in a cost-effective manner.

**Data Analysis Summary**

- Epidemiology serves as a foundation
- There are many data analysis methods
- Rates are important
- You need to interpret results and explain what they mean
- Utilize available resources
- Communicate your findings
Plan to Disseminate and Communicate the Results

Surveillance can only achieve results if the information is communicated to the appropriate people or stakeholders. Effectively disseminated data can lead to support for continued data collection; prioritization of injury interventions; implementation of interventions; and visibility for the problem of injury and your program.

Below are some steps to take in developing a dissemination plan.

• Determining who will get the information will depend on your location. Depending on where you are it could be members of your coalition in addition to decision makers at the tribal, village government, state or national level. It’s also important to get information to the organizations or agencies that provide services so they can tailor their services to address the issues presented by the data.

• Check with each tribe within your surveillance system regarding the review and approval of your plans to publicize the information you’ve collected.

• Develop the message. This is where the interpretation aspect of analysis is very important. You need to give context to the information, not just numbers. Be aware that low numbers can skew things up or down, even when you’re well within standard deviation.

• Select the format for presenting the information. Different audiences may require different formats. Use an appealing format. Use plain language the public would understand. Keep it simple, provide only the most important facts.

• Some format considerations
  • Summary vs. detailed
  • Narrative graphs
  • How often the material will be produced and how it will distributed
  • Electronic or paper
  • Web based

• Market the message

• Evaluate the impact

Surveillance system report

A surveillance system report is a means to convey the results of the surveillance system to all the stakeholders. Consider the needs of the stakeholders when making decisions about design and frequency of your report. The specifics may vary depending on your location, but here are some things to consider including in an injury surveillance system report

• Introduction: Offer a brief description of the injury surveillance system, the purpose, related prevention activities and the objective of the report

• Leading causes of death, frequency and proportion and rank of injuries among all causes

• Leading causes of injury mortality, frequency, proportions, and crude rates, emphasizing the highest indicators

• Leading causes of injury morbidity, if the information is available

• YPLL

• Cost of injuries, comparing local data if available

• Priority injuries identified in the region, summarizing those with the highest number, percentage, rates, costs and YPLL

• Recommendations for prevention strategies. This is an important step because it helps stakeholders decide what actions to take. Sometimes the analysis of local data presents a
specific local problem with a specific local solution. An example is a night time pedestrian crash cluster at a specific location which can be solved by the installation of streetlights. When more general problems are identified (e.g. lack of seat belt use), the Guide to Community Preventive Services (Community Guide) or other sources of effective prevention strategies may be referenced for the most effective ways to address the identified problems.

When disseminating your report, consider the groups below:

- Stakeholders, decision makers, law enforcement, public health directors, school officials, etc.
- Hospital, emergency departments, health clinics
- Health professionals in the scientific community
- Scientific/academic researchers
- Grassroots organizations
- Data sources

You will also need to consider how best to deliver your report. In some cases, the delivery method you choose will depend on the audience you are trying to reach. Below are a number of options for disseminating your report or the information in it.

- Health department newsletters
- Tribal meetings
- Home by home
- PSAs
- Press releases
- Flyers
- Periodicals/annual reports
- Presentations
- Newspapers
- Websites
- Schools

**Exercise**

*Optional Discussion (15-30 Minutes): After covering surveillance system reports,* you can begin a discussion with the class by asking them the following:

- Which information is most important to present to stakeholders?
- Which indicators would best show the size of the problem?
- Do you think cost data is important to stakeholders?
- Should you include recommendations about prevention strategies in your surveillance report?
Summary

Now that you've completed this section you should be able to

- Calculate injury indicators such as frequency, percentages and crude, specific and adjusted rates
- Calculate Years of Potential Life Lost
- Describe the geographical analysis of the data
- Define a plan to disseminate and communicate the data
Resources & References

Resources


References


2 Ibid.


4 Ibid.


Section 6: Use Surveillance Data to Inform Injury Prevention

**Section 6 at a Glance**

<table>
<thead>
<tr>
<th>Topics Covered</th>
<th>Slide #</th>
<th>Manual Page #</th>
<th>Time Frame</th>
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<tbody>
<tr>
<td>Use of Surveillance Data</td>
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<tr>
<td>Criteria to Prioritize Injury Events</td>
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<tr>
<td>Identify and Select Potential Interventions to Prevent Priority Injuries</td>
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<tr>
<td>Tie Surveillance to Action and Funding</td>
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**Exercises and Additional Activities**

Discussion Exercise at the end of the section.

**Materials Checklist**


**General Information & Instruction**

**Discussion Exercise (15 minutes):** There are several examples in Appendix 1 that show how surveillance efforts have been tied to action and funding. You can point some of these out during the discussion activity. Ask the class for their own examples and provide some local examples that may be familiar to the class.
Text, charts and tables that may need updating

<table>
<thead>
<tr>
<th>Page No.</th>
<th>Section</th>
<th>Possible Source</th>
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<tbody>
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<td></td>
<td></td>
<td>There are no charts or text that need updating in this section.</td>
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</table>

Notes:
Use of Surveillance Data to Inform Injury Prevention

Section 6
Objectives for Section 6

• Understand the use of surveillance data to identify priority injuries.
• Understand models that help identify risk factors and intervention strategies for priority injuries.
• Understand the models for identifying the most appropriate interventions for the injuries in your Tribe or community.
• Understand how to tie surveillance to action and funding.
Establishing injury priorities is one of the main reasons for gathering injury data. To define injury priorities you need to determine a number of factors, such as the magnitude of the problem, the cost in terms of life lost or disabilities, and the direct and indirect financial costs.

We look at the severity and magnitude of injuries because it’s important that prevention efforts focus on the problems that have the most devastating impacts. There are limited funds and human resources to devote to injury prevention and it’s impossible to address every injury. Prevention efforts should be focused on those injuries that are most costly to the Tribe or community and that have the most severe impact on the quality of life for the victim or community. Surveillance data can assist you in making these determinations.
How do you establish that an injury is a priority for prevention activity. One way is to consider the importance of the injury event and the likelihood that there will be money and the local interest in preventing or controlling the activity that causes the injury. This slide and the next six deal with ways of determining injury priorities.

First determine the importance of the injury based on the criteria on the slide.
Criteria to Prioritize Injury Events

Prevention Control Capacity

- Possibility for controlling the event
- Interest among local and regional groups for controlling the event

P. 6-2
Next determine the prevention control capacity.
Criteria to Prioritize Injury Events

High Importance + Good Control and Prevention Capacity = High Priority for Prevention and Control

P. 6-2
If the event is important and there’s a good possibility that they can implement prevention efforts – it’s a high priority
Criteria to Prioritize Injury Events

High Importance + Low Control and Prevention Capacity = High Priority for Research

P.6-2
If the event is important, but there is no interest or money for controlling or preventing the activity, it should be researched.
Criteria to Prioritize Injury Events

Low Importance + Good Control and Prevention Capacity = Low Priority for Prevention and Control

P. 6-2
Even if there’s money or interest for prevention efforts, it would be a low priority if it is not of high importance.
Criteria to Prioritize Injury Events

Low Importance + Low Control and Prevention Capacity = Not a Priority
Criteria to Prioritize an Injury Event
Information that Will Help in Setting Priorities

General Information
• Leading causes of death
• Number, proportion, and crude and adjusted rates
• YPLL from injuries by intention
• Trend of injuries over a minimum of five years

P. 6-2
To following information will help you in applying the criteria.
General Information
  Leading causes of death
  Number, proportion, and crude and adjusted rates
  YPLL from injuries by intention
  Trend of injuries over a minimum of five years
Specific Information that will be useful

Homicide: crude and specific rates by age group and sex and mechanism
Motor vehicle related deaths: crude and specific rates by age group, sex and road user (pedestrian, vehicle occupant, motorcyclist or cyclist)
Leading causes of injury morbidity: crude rates by age group, sex and nature of injury, lethality rate, admission rate and disability
Criteria to Prioritize an Injury Event
Information that Will Help in Setting Priorities

- Costs
- Disability Adjusted Life Years
- Information on Activities to Control Injuries
- Control Possibilities or Vulnerabilities

Costs
- Direct costs expended for patient care
- Indirect costs
- Economic and human costs

Disability Adjusted Life Years (if available)
Information on activities to control injuries at local, regional and national levels.
Control possibilities or vulnerability – This refers to the potential to implement a program with existing resources. Problems that can be controlled easily with less cost, should be assigned a higher priority than those where control or prevention would be more difficult or expensive.
The Haddon Matrix and Ecological Models, which were described briefly in Section 1 and in more detail in Appendix 10, can be used to help you organize and prioritize causal factors for priority injuries.
NOTE TO INSTRUCTOR FOR PILOT – If this slide and the next 2 don’t work out because the image is too small, please refer class to Appendix 10 where they can see the charts in their manual.

This model of the Haddon Matrix is in Appendix 10

The Haddon Matrix

In Section 1 we discussed how the Haddon Matrix can be used to identify risk factors. After risk factors have been identified, the matrix can be used to identify potential prevention strategies. This is done by filling in the cells with strategies or ideas for prevention that are directed at each of the factors (columns) and that have an influence on each of the phases (rows). This example shows how it was used to identify strategies to prevent childhood dog bites.
The Ecological Model for Violence-Related Injuries

Ecological model helps to identify and organize the multiple levels of influence that affect behavior. Violence is considered the product of the interaction between these multiple levels. The strength of the model is its ability to distinguish among the multitude of influences on violence while providing a framework for understanding the interaction. To use the Ecological Model to identify causal behavior and intervention strategies consider potential interventions aimed at each level as defined below:

Individual. The first level of the model focuses on the characteristics of the individual to increase the likelihood of being a perpetrator or victim.

Relationship. The second level explores relationships, such as relationship with peers, intimate partner or family, can increase the risk of violence.

Community. The third level of the model examines how community in which the relationships are embedded.

Society. The final level examines the societal factors that influence behavior.

This slide show an example of this model used to identify causal factors and interventions. It is in Appendix 10.
The Intervention Decision Matrix is a tool designed to help people identify and choose among intervention options. This matrix can also help identify long-term goals and intervention options, which must be considered together. This tool is applied after the priority injury problems have been identified. The original Decision Matrix has seven elements. For the purposes of this manual, the matrix has been adapted to include five elements, to make it more workable. The elements are:

1. Effectiveness,
2. Cost,
3. Sustainability,
4. Social and political acceptability,
5. Possible unintended consequences.

The scoring ranges from 1 for low, 2 for medium, and 3 for high. However, for some elements, the score must be applied in reverse order. Finally, the scores are summed. The strategy with the highest score should be the most viable.

<table>
<thead>
<tr>
<th>Elements</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Effectiveness</td>
<td>1. Not proven effective</td>
</tr>
<tr>
<td></td>
<td>2. Moderately effective</td>
</tr>
<tr>
<td></td>
<td>3. Highly effective</td>
</tr>
<tr>
<td>2. Cost</td>
<td>1. High cost</td>
</tr>
<tr>
<td></td>
<td>2. Medium-cost</td>
</tr>
<tr>
<td></td>
<td>3. Low-cost</td>
</tr>
<tr>
<td>3. Sustainability</td>
<td>1. Low sustainability</td>
</tr>
<tr>
<td></td>
<td>2. Medium sustainability</td>
</tr>
<tr>
<td></td>
<td>3. High sustainability</td>
</tr>
<tr>
<td>4. Social and political acceptability</td>
<td>1. Low acceptability</td>
</tr>
<tr>
<td></td>
<td>2. Medium acceptability</td>
</tr>
<tr>
<td></td>
<td>3. High acceptability</td>
</tr>
<tr>
<td>5. Possible unintended consequences</td>
<td>1. Known consequences</td>
</tr>
<tr>
<td></td>
<td>2. Unknown or unclear</td>
</tr>
<tr>
<td></td>
<td>3. No consequences</td>
</tr>
</tbody>
</table>

**Use the Decision Matrix to Identify the Most Appropriate Intervention for the Injuries in Your Region**

**Decision Matrix — Elements and Score**

**p. 6-3**

**Decision Matrix**

The Intervention Decision Matrix is a tool designed to help people identify and choose among the intervention options. This tool is applied after the priority injury problem has been identified. There are five elements to consider: Effectiveness; Cost; Sustainability; Social and Political Acceptability; and Possible Unintended Consequences. Each element is given a score from 1 to 3. The sum of the score will help you rate your intervention options. (See this example in the Appendix 10)
Tie Surveillance to Action and Funding

- Injury Prevention
- Policy Change
- Improved Data Collection
- Funding to Support Prevention Efforts

There is no particular “recipe” to translate data to action. Much will depend on your community and your resources. The slide shows some activities that could result from surveillance efforts.
6-4 Ask the class to discuss their experiences where data has translated in to action or funding. Consider the following:
• Improved Data Systems
• Policy Changes
• Funding Through Grants
• Interventions (e.g., highway safety improvements)
Summary of Section 6

✓ Understand the use of surveillance data to identify priority injuries.
✓ Understand models that help identify risk factors and intervention strategies for priority injuries.
✓ Understand the models for identifying the most appropriate interventions for the injuries in your Tribe or community.
✓ Understand how to tie surveillance to action and funding.

P. 6-4
Now that they’ve completed this section they should:

Read from slide.
Section 6: Use Surveillance Data to Inform Injury Prevention

Learning Objectives

- Understand the use of surveillance data to identify priority injuries in your region
- Understand the models that can help identify risk factors and intervention strategies
- Understand the models that can help identify the most appropriate intervention for your community
- Tie surveillance to action and funding

Introduction

There are many reasons for developing an injury surveillance system. Surveillance is not done for surveillance’s sake. The data collected can be used to help paint a picture of the injury problem in the population you are observing. It can help you determine the magnitude and severity of injury events, the trend of injury events over time or place and the cost of injury, both financially and in terms of life lost. In short it can help you establish injury priorities.1

Once you have identified the injury priorities you should define some strategies to prevent them. In this section we will talk about ways to identify injury priorities, identify the causal factors for these injury priorities and tie injury surveillance to action and funding.

Use of Surveillance Data

Establishing injury priorities is one of the main reasons for gathering injury data. To define injury priorities you need to determine a number of factors, such as the magnitude of the problem, the cost in terms of life lost or disabilities, and the direct and indirect financial costs.2 3 4

We look at the severity and magnitude of injuries because it’s important that prevention efforts focus on the problems that have the most devastating impacts. There are limited funds and human resources to devote to injury prevention and it’s impossible to address every injury. Prevention efforts should be focused on those injuries that are most costly to the Tribe or community and that have the most severe impact on the quality of life for the victim or community. Surveillance data can assist you in making these determinations.

Some other uses of surveillance data include:

- Provide perspective on headlines and injuries that may be getting a lot of attention, but may not warrant intervention based on the number of people affected.
• Help you determine the trend of injury events over time, which can help point to injuries that are increasing in frequency and may need to be addressed.

• Help you inform local, regional and national authorities, organizations and the public about the magnitude of an injury problem, which could lead to support for prevention efforts.

You don’t have to engage in an overwhelming surveillance effort in order to gather enough data to begin prevention. It’s not necessary to know everything about injuries in your community. Start small, focusing your data collection efforts on what you can reasonably achieve. You can work on prevention activities without knowing everything about an injury problem or just using the data you have available.

Criteria to Prioritize Injury Events

How should you determine an injury priority? The equations below offer you some insight on how to determine which events are a high priority and which events should be low priorities. The criteria is based on the Event Importance (magnitude, severity, trend and cost) and the Prevention Control Capacity (possibilities for controlling the event and the interest among local and regional groups for controlling the event).

High Importance + good Control and Prevention Capacity = High Priority for Prevention and Control
High Importance + low Control and Prevention Capacity = High Priority for Research
Low Importance + good Control and Prevention Capacity = Low Priority for Prevention and Control
Low Importance + low Control and Prevention Capacity = Not a Priority

To following information will help you in applying the criteria.

1. General Information
   • Leading causes of death
   • Number, proportion, and crude and adjusted rates
   • YPLL from injuries by intention
   • Trend of injuries over a minimum of five years

2. Specific Information
   • Homicide: crude and specific rates by age group and sex and mechanism
   • Motor vehicle related deaths: crude and specific rates by age group, sex and road user (pedestrian, vehicle occupant, motorcyclist or cyclist)
   • Leading causes of injury morbidity: crude rates by age group, sex and nature of injury, lethality rate, admission rate and disability

3. Costs
   • Direct costs expended for patient care
   • Indirect costs
   • Economic and human costs

4. Disability Adjusted Life Years (if available)

5. Information on activities to control injuries at local, regional and national levels.

6. Control possibilities or vulnerability – This refers to the potential to implement a program with existing resources. Problems that can be controlled easily with less cost,
should be assigned a higher priority than those where control or prevention would be more difficult or expensive.

Identify and Select Potential Interventions to Prevent Priority Injuries

The Haddon Matrix and Ecological Models, which were described briefly in Section 1 and in more detail in the Appendix, can be used to help you organize and prioritize causal factors for priority injuries.

The Haddon Matrix

The Haddon Matrix is used both to conceptualize causal factors and to identify potential prevention strategies. The Haddon Matrix is built using columns and rows. In the columns, Haddon identifies – host, agent and environment (brief description of each). In the rows he identifies phases of the event – pre-event, event and post event. By filling in the cells of the matrix, one can identify a range of potential risk factors. You can then use the matrix to address the risk factors by filling in the cells with strategies or ideas for prevention that are directed at each of the factors (columns) and that have an influence on each of the phases (rows). An example of the matrix used in this way can be found in Appendix 10.

The Ecological Model for Violence-Related Injuries

Ecological model helps to identify and organize the multiple levels of influence that affect behavior. Violence is considered the product of the interaction between these multiple levels. The strength of the model is its ability to distinguish among the multitude of influences on violence while providing a framework for understanding the interaction. To use the Ecological Model to identify causal behavior and intervention strategies consider potential interventions aimed at each level as defined below:

- Individual. The first level of the model focuses on the characteristics of the individual that increase the likelihood of being a perpetrator or victim.
- Relationship. The second level explores relationships, such as relationship with peers, intimate partner or family, that can increase the risk of violence.
- Community. The third level of the model examines the community in which the relationships are embedded.
- Society. The final level examines the societal factors that influence behavior.

An example of this model used to identify risk factors and interventions is in Appendix 10.

Decision Matrix

The Intervention Decision Matrix is a tool designed to help people identify and choose among the intervention options. This tool is applied after the priority injury problem has been identified. There are five elements to consider: Effectiveness; Cost; Sustainability; Social and Political Acceptability; and Possible Unintended Consequences. Each element is given a score from 1 to 3. The sum of the score will help you rate your intervention options. (See example in Appendix 10.)

Tie Surveillance to Action and Funding

The ultimate goal for your surveillance effort is action, in the form of injury prevention, policy changes, improved data collection and funding to support your prevention efforts. There is no particular “recipe” to translate data to action. Much will depend on your community and your resources.
Exercise

Ask the class to discuss their experiences where data has translated to action or funding. Consider the following:

- Improved data systems
- Policy changes
- Funding through grants
- Interventions (e.g., highway safety improvements)

Summary

Now that you’ve completed this section you should:

- Understand the use of surveillance data to identify priority injuries.
- Understand models that help identify causal factors and intervention strategies for priority injuries.
- Understand the models for identifying the most appropriate interventions for the injuries in your Tribe or community.
- Understand how to tie surveillance to action and funding.
Notes
Resources & References

Resources

References


Section 7: Define an Evaluation Plan for your Surveillance System and Monitor Prevention Activities

Section 7 at a Glance

Approximate Time Frame  1 hour

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<tbody>
<tr>
<td>Evaluation Process</td>
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<tr>
<td>Determine the Process for Evaluation</td>
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<tr>
<td>Factors to Consider</td>
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<tr>
<td>Use Surveillance Data to Monitor Prevention Activities</td>
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Exercises and Additional Activities

Design a Surveillance System

Materials Checklist

Paper
Pens or Pencils
Handout Describing Scenario for Surveillance System (Replace with a local example if you have one)

General Information & Instruction

Design a Surveillance System (2-3 hours): This last exercise of the course is designed to tie in all the concepts that have been discussed over the last three days. Break the class into groups based on the scenario that was assigned them on the first day. They should design a system and write a brief protocol that addresses the following:

- Possible data sources
- Steps necessary to gain access to data
- Case definition
- Variables
- Primary data collection form
- Use of supplemental data collection form
- Frequency of data collection
- Frequency and recipients of surveillance system reports
- System security
- Confidentiality issues

Give them adequate time to collaborate. Ask someone in each group to share what they came up with. Debrief by discussing the potential challenge they could face (lack of access to data, quality of data, lack
of resources) and people/partners who could assist them or procedures that could help. Discuss the feasibility of the systems and stress the need to work within the confines of each situation. Ask them to talk about how they would publicize the results and what actions they might expect.

Text, charts and tables that may need updating

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<tr>
<td>7-1</td>
<td>CDC Guidelines for Surveillance Systems – check for updates. They were last updated in 2001.</td>
<td>CDC</td>
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</table>

Notes:
Define an Evaluation Plan for your Surveillance System and Monitor Prevention Activities

Section 7
Section 7 Objectives

- Know the steps to evaluating the system.
- Be able to use surveillance to monitor prevention activities
Engage stakeholders in the evaluation
It would ideal to engage the stakeholders in evaluating the systems, but it may not always be practical. Coalition members, if you were able to establish one, and other stakeholders may be a source of feedback on the systems. Officials, public health workers and officers, media and others in the affected communities can provide input to ensure that the evaluation of the surveillance system addresses the appropriate questions and that the findings will be useful.

Describe the surveillance system to be evaluated
In this step you describe the process—the flow of activity in your surveillance system. It’s not where you evaluate the data you’re getting from the system. The flow chart on the next page is an example of the flow of activity for a surveillance system.

Determine a process for evaluation
Circumstances and resources will determine how you want to proceed with the evaluation of your system. You could do a process analysis of the system, looking at each step and evaluating its effectiveness. Or you could do quality assurance, looking at the data that’s been inputted into the system and determining the quality of it.
Factors to Consider When Evaluating Your System

• Simplicity
• Flexibility
• Data Quality
• Acceptability
• Timeliness
• Stability
• Sensitivity
• Representativeness

Factors to consider when evaluating your system

- Simplicity. This refers to the structure of the system and the ease of operation. Surveillance systems should be as simple as possible while still meeting the needs of their objectives.
- Flexibility. A flexible surveillance system can adapt to changing information needs and can accommodate changes in case definitions or technology and variations in funding or reporting sources.
- Data Quality. This reflects the completeness and validity of the data recorded in the public health system. Examining the percentage of “unknown” or blank responses to items is an easy measure of the data quality. Data of high quality will have a low percentage of blanks or unknowns.
- Acceptability. This is the measure of how willing other organizations are to participate in the system.
- Timeliness. Measures the speed at which information travels through the system. It’s usually the amount of time between the onset of an event and the reporting of the event to the public health agency or group that is responsible for instituting control and prevention measures. The need for a rapid response in a surveillance systems depends on the event being measured and the objectives of the system. The use of electronic data collection from reporting sources via the internet and the increased use of electronic data interchange by surveillance systems helps promote timeliness.
• Stability. This measures the ability to collect, manage and provide data properly on a regular basis without fail. Data needs to be collected over a long period of time in order to provide opportunity for analysis.

• Sensitivity. This measure can refer to two things. One is the level of the proportion of cases detected by the surveillance system. Second, sensitivity can refer to the ability of the system to detect outbreaks or monitor changes over time.

• Representativeness. A surveillance system that has good representativeness accurately describes the occurrence of an injury event over time and its distribution in the population by person and place.
It's very important to communicate your findings to the appropriate people. Gather your thoughts about any problems you have discovered about the system and talk to the people involved about whether to fix problems.

It’s also important to keep notes about any changes you make to the system and whether those changes may impact data and how. For example, when you have a new focus, such as suicide plus drugs, or you have new people or you switch from ICD 9 to ICD 10, you should note these things in a file you have earmarked just for documenting changes to the system.
Use Surveillance Data to Monitor Prevention Activities

- Monitor changes that occur after the prevention effort is implemented – look at the number of injuries, the rate of injuries or the severity
- Monitor changes in the trend of an event before and after a strategy is applied
- Monitor the impact of strategies applied for purposes other than injury prevention that could impact the results
- Possible over or under representation of certain groups in the population
- Possible over or under representation of some types of events in the region

P. 7-3
In this step you are tracking data, not trying to prove cause and effect. The bullet points on the slide are just an informal evaluation. But it’s important to be aware that other contributing factors may have influenced the outcome or if changes in the system/investments are the reason for the difference.
Summary of Section 7

- Know the steps to evaluating the system.
- Be able to use surveillance to monitor prevention activities

P. 7-4
Now that they’ve completed this section they should:

Read slide
Design a Surveillance System (2-3 hours): This last exercise of the course is designed to tie in all the concepts that have been discussed over the last three days. Break the class into groups based on the scenario they were assigned on the first day. Remind that they are design a surveillance course based on the scenario on their worksheet. They should consider:
Possible data sources
Steps necessary to gain access to data
Case definition
Variables
Primary data collection form
Use of supplemental data collection form
Frequency of data collection
Frequency and recipients of surveillance system reports
System security
Confidentiality issues

Give them adequate amount of time to collaborate in their groups. Ask someone in each group to share what they came up with. Debrief by discussing the potential challenge they could face (lack of access to data, quality of data, lack of resources) and people/partners who could assist them or procedures that could help. Discuss the feasibility of the systems and stress the need to work within the confines of each situation. Ask them to talk about how they would publicize the results and what actions they might expect.
Section 7: Define an Evaluation Plan for your Surveillance System and Monitor Prevention Activities

Learning Objectives

- Know the steps to evaluating an injury surveillance system
- Use surveillance data to monitor prevention activities

Introduction

Surveillance systems should meet their objectives as efficiently as possible. For this reason it is necessary to obtain continuous feedback on the operation of the system. The CDC has published the Guidelines for Evaluating Surveillance Systems. These guidelines were updated in 2001 and published in the MMWR. In this objective we will discuss some of the steps outlined in those guidelines.

Evaluation Process

Engage stakeholders in the evaluation
It would ideal to engage the stakeholders in evaluating the systems, but it may not always be practical. Coalition members, if you were able to establish one, and other stakeholders may be a source of feedback on the systems. Officials, public health workers and officers, media and others in the affected communities can provide input to ensure that the evaluation of the surveillance system addresses the appropriate questions and that the findings will be useful.

Describe the surveillance system to be evaluated
In this step you describe the process—the flow of activity in your surveillance system. It’s not where you evaluate the data you’re getting from the system. Figure 1 on the next page is an example of the flow of activity for a surveillance system.
Determine a process for evaluation
Circumstances and resources will determine how you want to proceed with the evaluation of your system. You could do a process analysis of the system, looking at each step and evaluating its effectiveness. Or you could do quality assurance, looking at the data that’s been inputted into the system and determining the quality of it.

As you’re evaluating the system, ask if the system is working the way you intended it to work and is it giving you the information you need. If not, you might look into a preliminary evaluation based on the factors below. If you are a one or two-person operation, it is much better to devote your time to building and operating the system than to evaluating it. If the system is not giving you the information you need or intended you should seek the assistance of the technical advisor or technical resource.

Factors to consider when evaluating your system
- Simplicity. This refers to the structure of the system and the ease of operation. Surveillance systems should be as simple as possible while still meeting the needs of their objectives.
- Flexibility. A flexible surveillance system can adapt to changing information needs and can accommodate changes in case definitions or technology and variations in funding or reporting sources.
Data Quality. This reflects the completeness and validity of the data recorded in the public health system. Examining the percentage of “unknown” or blank responses to items is an easy measure of the data quality. Data of high quality will have a low percentage of blanks or unknowns.

Acceptability. This is the measure of how willing other organizations are to participate in the system.

Timeliness. Measures the speed at which information travels through the system. It’s usually the amount of time between the onset of an event and the reporting of the event to the public health agency or group that is responsible for instituting control and prevention measures. The need for a rapid response in a surveillance system depends on the event being measured and the objectives of the system. The use of electronic data collection from reporting sources via the internet and the increased use of electronic data interchange by surveillance systems helps promote timeliness.

Stability. This measures the ability to collect, manage and provide data properly on a regular basis without fail. Data needs to be collected over a long period of time in order to provide opportunity for analysis.

Sensitivity. This measure can refer to two things. One is the level of the proportion of cases detected by the surveillance system. Second, sensitivity can refer to the ability of the system to detect outbreaks or monitor changes over time.

Representativeness. A surveillance system that has good representativeness accurately describes the occurrence of an injury event over time and its distribution in the population by person and place.

It’s very important to communicate your findings to the appropriate people. Gather your thoughts about any problems you have discovered about the system and talk to the people involved about whether to fix problems.

It’s also important to keep notes about any changes you make to the system and whether those changes may impact data and how. For example, when you have a new focus, such as suicide plus drugs, or you have new people or you switch from ICD 9 to ICD 10, you should note these things in a file you have earmarked just for documenting changes to the system.

Use Surveillance Data to Monitor Prevention Activities
In this step you are tracking data, not trying to prove cause and effect. The bullet points below are just an informal evaluation. But it’s important to be aware that other contributing factors may have influenced the outcome or if changes in the system/investments are the reason for the difference.

Monitor the association of the implementation of the prevention strategies with changes in the number, rate and characteristics of injury, which allows decision-makers to decide whether or not to continue prevention activities.

Monitor changes in the trend of an event before and after a strategy is applied.

Monitor the impact of strategies applied for purposes other than injury prevention that could positively or negatively affect the events under surveillance.

Possible over- or under-representation of certain groups in the population.
Possible over- or under presence of some types of events in areas of the region

Summary
Now that you’ve completed Section 7 you should:

- Know the steps to evaluating an injury surveillance system
- Be able to use surveillance to monitor prevention activities

Final Exercise

Design a Surveillance System (2-3 hours): This last exercise of the course is designed to tie in all the concepts that have been discussed over the last three days. Break the class into groups based on the scenario that was assigned them on the first day. They should design a system and write a brief protocol that addresses the following:

- Possible data sources
- Steps necessary to gain access to data
- Case definition
- Variables
- Primary data collection form
- Use of supplemental data collection form
- Frequency of data collection
- Frequency and recipients of surveillance system reports
- System security
- Confidentiality issues

Give them adequate time to collaborate. Ask someone in each group to share what they came up with. Debrief by discussing the potential challenge they could face (lack of access to data, quality of data, lack of resources) and people/partners who could assist them or procedures that could help. Discuss the feasibility of the systems and stress the need to work within the confines of each situation. Ask them to talk about how they would publicize the results and what actions they might expect.

Conclusion
Congratulations! You have now completed Designing and Implementing Injury Surveillance Systems in Indian Country.

Over the last several days you have covered many topics and should have mastered the objectives outlined below.

1. Understand the conceptual framework of injury prevention
Section 7: Define an Evaluation Plan for Your Surveillance System; Monitor Prevention Activities

- Understand the concepts, definitions and classification of injuries
- Know the difference between violence related injuries and unintentional injuries
- Describe the burden and cost of injuries
- Know the conceptual models for understanding and preventing injury
- Know the steps to develop an injury surveillance system
- Review the ethical considerations

2. Assess injury data sources and describe the injury problem
   - Identify the injury data source strength and weakness
   - Identify the available data sources that can provide information to the surveillance system
   - Describe the size of the injury problem
   - Compare the frequency of injuries calculated with the data from different sources

3. Build a coalition to support the injury surveillance system and prevention activities
   - Identify and recruit partners to include in the coalition
   - Identify local and national organizations working on injury prevention in the region
   - Define the existing social, legal and political framework in which an injury surveillance system and prevention activities may be established

4. Determine the appropriate methodology for the surveillance system
   - Define the injury events and data elements to be included in the system
   - Define objectives
   - Develop the data collection instrument and determine the data collection frequency
   - Perform validation
   - Re-evaluate objectives
   - Plan for systemization, maintenance and data security
   - Define key positions

5. Define and develop an analysis plan for the surveillance data
   - Calculate injury indicators such as frequency, percentage, and crude, specific and adjusted rates
   - Calculate years of potential life lost
   - Describe the geographical analysis of the data
   - Define a plan to disseminate and communicate data

6. Use injury surveillance data to inform injury prevention
   - Using surveillance data to identify injuries in your region
   - Identify potential causal factors of injuries
   - Tie surveillance to action and funding

7. Define an evaluation plan for the surveillance system and monitor prevention activities
   - Know the steps to evaluating an injury surveillance system
   - Use surveillance data to monitor prevention activities

Resources & References

Resources

References
