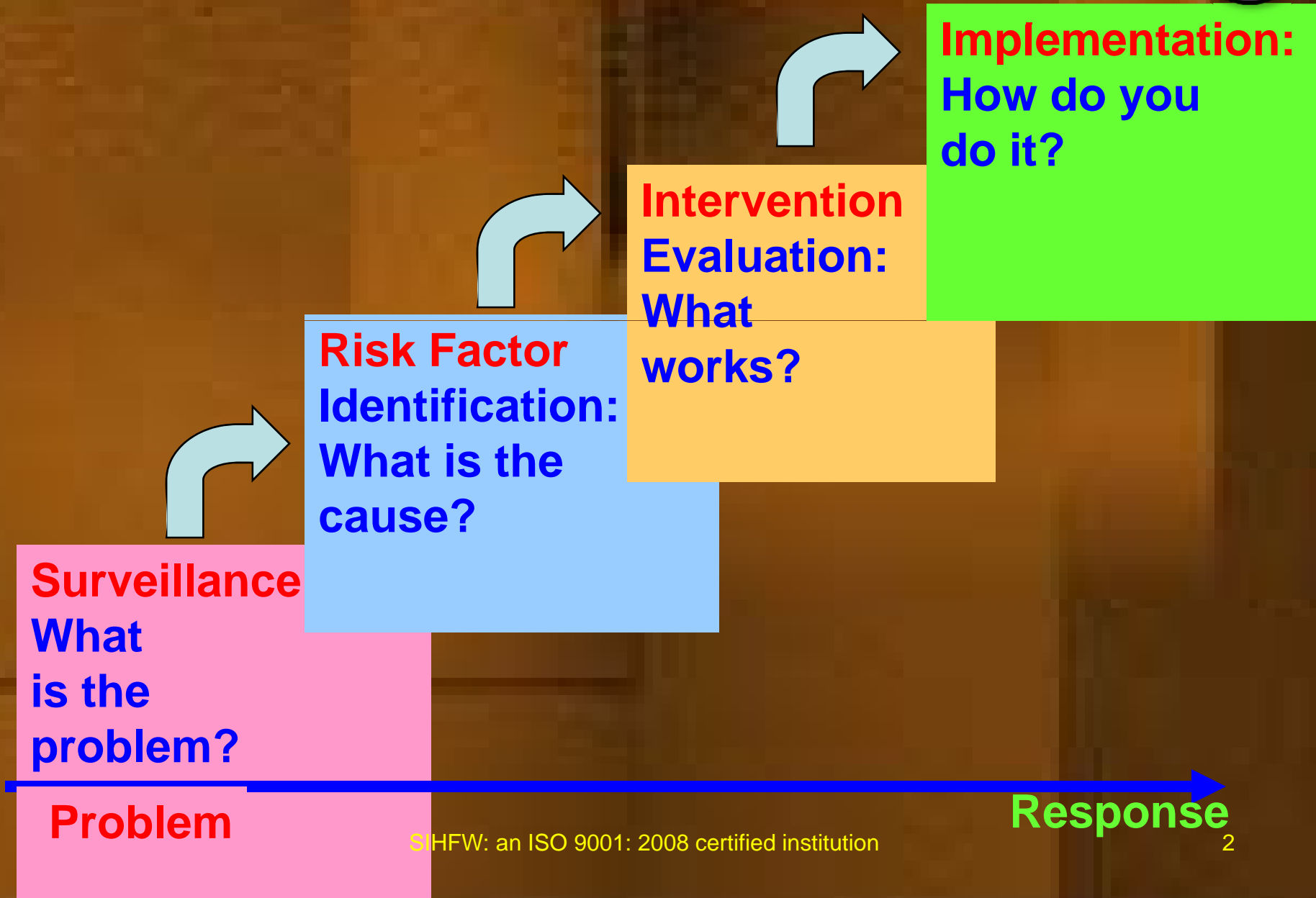




# Surveillance

State Institute of Health & Family Welfare,  
Jaipur

# Public Health Approach





# Surveillance Information for Action

Surveillance is the bridge between what we think is happening and What actually is happening

# Surveillance ?

“a system of close, continuous *observation* of all aspects of the *occurrence & distribution* of a disease through systematic

Collection,  
Tabulation,  
Analysis and

Dissemination (Timely) of all relevant data pertaining to that Disease/event”.

Descriptive (purposeful)

Action ↓ (Public health policy)

SIHFW: an ISO 9001: 2008 certified institution



# Purpose:



## General-

Reducing mortality/ morbidity through **timely** prevention & control



## Specific-

- **Understanding problem**  
**NHD,**  
**Magnitude,**  
**Trend**
- **Define priorities**
- **Decide objectives**
- **Determine strategies**
- **Evaluate control/ prevention**
- **Suggest further research**



# Surveillance Helps in:

- Understanding Natural History
- Deciding levels of existence of disease
- Explaining changes in pattern with time
- Identifying Changes in agent characteristics
- Measuring efficacy of control measure
- Forecasting trends



# Uses of Public Health Surveillance

- Estimate magnitude of the problem
- Determine geographic distribution of illness
- Portray the natural history of a disease
- Detect epidemics/define a problem
- Generate hypotheses, stimulate research
- Evaluate control measures
- Monitor changes in infectious agents
- Detect changes in health practices
- Facilitate planning

# Types:

## ➤ Routine

- **Active** (agency solicited)
- **Passive** (provider initiated)

## ➤ Sentinel

- Reporting by specified units from defined area
- Denominator absent

## ➤ Focused (Situation / Process / Area)

- Case/outbreak investigations
- Special surveys-Nutritional surveillance





# Routine Surveillance

- Through Out Patient Dept. of Health facilities (Passive) Wait & See who reports what
- Field surveys (Active) Go & Get Data/ Information

Issues-

Representative?

Home treatment?

Number of Health Facilities reporting

Completeness of reporting



# Passive

- Simple
- Less burdensome
- Inexpensive
- May not be representative
- May fail to identify outbreaks

# Active

- Assures complete reporting
- Can be used with specific investigations
- Can be done for brief periods
- Requires skilled personnel
- May be perceived as invasive
- Expensive



# Sentinel Surveillance

Monitoring of key health events through sentinel:

- Sites
- Events
- Providers
- Vectors/animals



# Sentinel Surveillance

- Reporting of health events by selected Units/ Professionals representing a geographic area
- Could be active or Passive
- Only a small number of units selected
- Selected units report all cases for a specific time period
- Reports include additional information
- Easier to maintain Quality & Regularity
- Denominator absent
- Data collected are *Not representative & NO generalization*



# Good Surveillance System:

- **Simplicity-**
  - ease of operation-** minimum paper work
  - simple definitions**
  - using existing system**
- **Flexibility**
- **Acceptability**
- **Sensitivity**
- **Predictive value**
- **Representative**
- **Timeliness**
- **Regularity**
- **Data quality-complete/reliable/accurate**
- **Cost-effectiveness**



# Initiating a Surveillance System Activities:

- Choose a disease that has proved control measures available
- Define how data collected shall be used
- Set a standard case definition
- Use existing system
- Visit those who supply Data
- Develop a data base
- Develop a regular reporting system for distribution (Feed back)



# Disease Selection for Surveillance

## Eligibility Criteria:

- Public Health problem (Quantitative BOD)
- Impact
  - Clinical spectrum (Severity)
  - Mortality
- Communicability (Epidemic potential)
- Preventability (in terms of feasibility & cost)
- Risk perception
  - Global health organizations
  - National authority
  - NGO
  - People
- Political pressure





# Prerequisites of an Effective Surveillance System

- Standard case definition
- Enumeration of Reporting units
- System For Disease Surveillance
  - Notifiable disease reporting System
  - Laboratory based surveillance
  - Hospital based surveillance
  - Population based surveillance

# Standard Case Definition

- May not necessarily be the same as what clinician perceives
- Depends on-
  - Severity
  - Certainty of Diagnosis
    - Confirmed
    - Probable
    - Possible
    - Suspect
    - Non-case
  - Purpose
    - Sensitivity
    - Specificity

# Systems of Disease Surveillance



- Notifiable disease reporting System
  - Morbidity
  - Mortality
  - Case investigation
  - Epidemic reporting
  - Field investigation
  - Drug and Biological use
- Laboratory based surveillance
- Hospital based surveillance
- Population based surveillance
  - Surveys
  - Services



# Sources of Surveillance Data

- Mortality
- Morbidity
- Case reports
- Epidemic reporting
- Epidemic field investigations
- Laboratory reporting
- Surveys
- Vector distribution studies
- Biologics & drug distribution
- Demographic & environmental data
- News media

# Choice of Source Depends On

- Disease
- Method used for identifying disease
- Program goals
- Resources-personnel/material
- Population involved
- Characteristics of disease occurrence



# Surveillance Processes:

- Routine surveillance
  - Reporting
  - Motivation
  - Procedural simplicity
  - Case definition
- Active reporting
- Sentinel physician reporting
- Lab. Surveillance
- Hospital surveillance
- Absenteeism surveillance
- Special surveillance
- Data analysis (time, place, person)
- Reports and evaluation

# Diseases Under NPSCD#

- Acute Flaccid Paralysis (AFP)
- HIV/AIDS
- Chickenpox
- Cholera like Diarrhea
- Diphtheria
- Dysentery
- Encephalitis
- Fever Syndrome (fever of more than 6 days duration)
- Fever with Bleeding
- Hepatitis
- Malaria
- Measles
- Meningitis
- Rabies
- Tetanus Neonatorum@
- Tetanus@
- Pulmonary Tuberculosis
- Whooping cough
- Any other disease of public health importance that might come up.

**# But for two all are communicable disease**



# Notifiable/Under Surveillance Diseases

- ✿ Under WHO surveillance-

Louse borne Typhus  
Relapsing fever  
Paralytic Polio  
Malaria  
Viral Influenza

- ✿ Notifiable

- ✿ Cholera/
- ✿ Plague/
- ✿ Yellow fever

- ✿ Notifiable as part of routine HIS

Cholera  
Malaria  
Plague  
Polio  
Relapsing fever  
Influenza  
Rabies  
Salmonellosis





# How to Notify

## Notification-

1. Report of Cases- Individually  
Collectively

2. Report of Epidemics-

- ✓ Case report universally required under International Health Regulations or as disease under WHO surveillance
- ✓ Case reports regularly required whenever a disease occurs Report to local health authority by fastest means
- ✓ Selectively reportable in endemic areas

3. Obligatory reporting of Epidemics



# What Steps Do I Take for Notification

- Collect basic data-(Health facility)
- Compile at
  - ✿ District,
  - ✿ State and
  - ✿ National level
- Report: District – State - National Health authority to WHO

# How Do I Disseminate Surveillance Data



- Morbidity and mortality weekly report
- Surveillance summaries
- Surveillance reports
- Annual summary
- Medical literature

# General Framework of Surveillance System



- Engagement of stakeholders
- Evaluation objective
- System description
- System performance
- Conclusions and recommendations
- Communication

# A. Engagement of Stakeholders

Stakeholders ?

- Owners and the customers
- Users of surveillance system information
  - Public health workers
  - Government
  - Data providers
  - Clinicians
- Steering group?
- A condition for change

## B. Evaluation Objective

- Objective and methods
- Specific purpose
- Scope of evaluation
- Methods
  - Document studies
  - Interviews
  - Direct observations
  - Special studies

## C. System Description

- Public health rationale(why?)
- Objectives (what?)
- Operations (how?)
- Resources (how much?)

# 1. Rationale for Surveillance

## The disease

- Severity
- Frequency
- Communicability
- International obligations
- Costs
- Preventability

## Society

- Public and mass media interest
- Will to prevent
- Availability of data



## 2. Objectives of System

- Documented?
- SMART?
  - Specific
  - Measurable
  - Action oriented (information for action)
  - Realistic
  - Time frame specified

# 3. Operations of System

- Health events under surveillance
  - Type of event:  
exposure -> infection -> disease / outbreaks -  
> outcome
  - Case definitions
- Legal framework
- Organisational framework
- Components
  - Flow chart
  - Description

# Components of System

- Population under surveillance
- Period of data collection
- Type of information collected
- Data source *Confidentiality,*
- Data transfer *security*
- Data management and storage
- Data analysis: how often, by whom, how
- Dissemination: how often, to whom, how



# 4. Resources for System Operation

- Funding sources
- Personnel time
- Other costs
  - Training
  - Mail
  - Forms
  - Computers

# Importance of Evaluation

## ➤ Quality

- Often neglected
- Basis for improvements

## ➤ Obligation

- Does the system deliver?
- Credibility of public health service

## ➤ Learning process

- "Do not create one until you have evaluated one"

# Goals of Surveillance Evaluation:



- Prioritizes health events under surveillance
- Surveillance systems meet objectives
- Surveillance systems operate efficiently

# System Performance

*Does it work?* → *Is it useful?*

## System attributes

- Simplicity
- Flexibility
- **Data quality**
- Acceptability
- **Sensitivity**
- Positive predictive value
- Representativeness
- **Timeliness**
- **Stability**

## Use of information

- Users
- Actions taken

## *Link to objectives*

# Data Quality

## Completeness

- Proportion of blank / unknown responses
- Simple counting

## Validity

- True data?
  - Records inspection
  - Patient interviews



# Evaluation of Surveillance System

## 3 Basic



- Does the system address an important public health problem?
- Does it accomplish the Objectives (purpose) of the system?
- Does the system have the right combination of attributes to achieve its purpose?

# Does the System Address an Important Public Health Problem?



## Can it measure-

- **Disease burden**
  - Incidence/prevalence
  - Severity
  - Lost productivity
  - Premature mortality
  - Medical care costs
- **Potential burden**
  - Emerging problems
  - Problems under control
- **Preventability**



# Does it Meets the Goal

**Reduction in-**

- **Morbidity**
- **Mortality**



# Does it Accomplish the Objectives

- Projects NHD and trends ?
- Quantifies morbidity / mortality ?
- Detects changes in epidemiologic pattern of disease ?
- Evaluates hypotheses ?
- Identifies and evaluates control/ prevention measures ?
- Detects epidemics ?
- Leads to public health action ?
- Stimulates research ?

# Meeting Objectives?

- **Has information produced?**
  - Trends
  - Outbreaks
  - Future impact
  - Cases for further studies
- **Was information used, and by whom?**
  - Actions: list
  - Consequences: list



# Does it Have Right Combination of Attributes

- Sensitivity (ability to detect all cases)
- Specificity (non-cases not reported)
- Predictive value (Reported are real)
- Representative
- Timeliness

# Limitations

- Severe events need treatment  
(Treatment sought alters the course of disease)
- Laboratory facilities- availability
- Reporting-Timeliness and accuracy
- Sources for identifying mild or sub clinical cases
- Support of Public Health system



A good Surveillance System does not necessarily ensure making of right decisions; but it reduces the chances of wrong ones





# Thank You

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