“MYSTERIOUS” Disease Outbreaks
A Symptom of Sick Disease Surveillance system

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Issue – Lack of Conceptual clarity—Not What/How- BUT- Understanding- LOGIC behind- WHY?

Problems with the way we look at Disease Surveillance- Paradigm Shift

HARD WARE PROBLEM
Funds, HR, Logistics, Training

SOFTWARE PROBLEM
Case definition, Data recording, Data transmission

Simplistic View- quick Fix Solution- Money/Resources

Only Invest- Labs- Test- Training- will not lead Public Health impact- Prevention of Outbreaks

Mysterious Diseases Outbreaks are like Terrorist attacks/Heart attacks-
For a Public health system- will keep happening repeatedly

-If Not invested in Good Disease Surveillance- (= Health Monitoring of community)
Mysterious diseases outbreak- are in fact Symptom of FAILED DISEASE

20 + year- mystery
Muzaffarpur- Bihar
Saharanpur- UP

JE Intervention?
Surveillance Conceptual meaning- in letter & Spirit

Synonym—close observation/Intelligence gathering -

• Oxford English dictionary

• The act of carefully watching a person Suspected of a crime or a place where a crime may be committed (crime NOT happened)-
  All Action before Crime- Very Important

Key words in Surveillance
Identifying - Suspected-Individuals- (at high Risk)
Identifying – BEFORE – Adverse outcome

Examples
Surveillance system for Crime-Catching - Suspected Criminal- before Crime (Terrorist attack)
Surveillance for Disease- Identifying At Risk Individual/community- Before Disease
Don’t Identify Disease- Identify Signals- At risk individuals/community- Intervene - Paradigm shift

SURVEILLANCE- Action on Signals/alerts
PREVENTIVE – Success Averting Disease/ Event
Analogy- Crime Surveillance- Airport

Example- Terrorist bomb/drug/gold smuggles – Prevention Crime

Screening – Baggage, frisking,
Behaviour surveillance
- Unattended baggage, restless, suspiciously moving, sweating, Tensed
- – Non specific “symptoms”- Signals- Not Normal passenger

- Surveillance - Screening – Abnormal from Normal
- he may or He may not be criminal – Preventive

Catch Suspect - send to Interrogation room- (May or May Not)
Diagnosis-Police official- Investigation- diagnose- Crime averted
Analogy – 2 Surveillance - Individual

Annual Health Check up

Screening - Above Base (Urine analysis, Blood Analysis, Liver function Test, Cholesterol, glucose, RBP, ECG-ECHO, BMI) SINGALS - NOT Disease

Objective / Success of Annual health check - PREVENTION - DIABETES, HEART ATTACK

BMI - Exercise, weight reduction - ACTION-PREVENTION
Blocks - stent - heart attack / stroke - ACTION-PREVENTION

Detecting block in heart - SUCCESS - Signal
Detecting - HEART ATTACK – NO POINT - DAMAGE IS DONE

Analogy – 3 Disease Surveillance In Community - PH

Surveillance broad Screening mechanisms - Preventive mechanism - work on signal detection - Epidemics
Incidence - Fever, diarrhoea, altered Sensorium, convulsion, - SIGNALS NOT Disease
Trend analysis - Excess expected - FEED BACK - CONTROL

Investigate - Laboratory - Malaria, JE, AES, GI,
Intervention - PUBLIC HEALTH ACTION - Vector control, Water disinfection

MORAL OF THE STORY

SURVEILLANCE
3 STAGE -
SCREENING - LARGE POPULATION
1. NON SPECIFIC SIGNALS
2. Suspects - Filter out

3. DIAGNOSIS - DD -
Specialist
capital intensive

Scanning - Criminal Records
Laboratory testing - ALL not possible

Proportion - Possible

Fever - cough - diarrhoea
Non specific - Suspect - PH
Cough / headache - CT SCAN - Cancer
Surveillance- Intelligence
Behind the screen activity- Media unawares

- World famous example:

‘Capture Osama Bin Laden – Hunt down by US Military- Brilliant success of Surveillance/Intelligence

- Indian- Surgical Strikes

- Media wakes up to news- Report- Post event

SUCCESS - SUVEILLANCE- MEDIA UNAWARES
Drawing the parallels in Public Health Surveillance

- Media Source-
- Public Health agency- Responder to Media report
- Outbreak Response – investigation- follow up to Media
- Initial Response- Public Health Agency- - To Deny it
- Accept - When initial smell- Turns into rot-
- (Uncoverable -increased morbidity and Mortality)- Wuhan?
- PH- Response- Outbreak- Too late – Damage is already done

- Mysterious Outbreaks- HEAR ATTACK OF PUBLIC HEALTH SYSTEM
MYSTERIOUS DISEASE Outbreaks
SYMPTOM OF FAILED DISEASE SURVEILLANCE

• AES-
• Mysterious- is undefined syndrome- Basket
• LITCHI/CASIA Seed- Rare

• Complications of common disease

• Malaria, dengue fever, chikungunya, scrub typhus and leptospirosis- typhoid fever,, shigellosis, influenza Post Measles, Mumps

• Cross reactivity - JE/WN/Dengue

• Lack of EPIDEMIOLOGICAL INTELLIGENCE- NOT LACK OF LAB
PUBLIC HEALTH MONITORING - VITAL SIGNS

• Public Health Vital Sign – Morbidity and Mortality- Beyond Base line- Incidence and Prevalence
• Detection of Faint signals – clearly in excess of known base line
• Analysis – Trend – Time Person Place
• Trigger Events- Clustering- Time place and Person- EARLY WARNING- SIRNE

• Cases are effects.
• If effects are clustered, their causes could also be.
• Or they could be in fact the same cause.
• A common cause may be easier to
  • identify (of all exposures, it is the one that cases share)
  • remove or control.

• Diagnosis – Action- Prevention
Intelligence- Combat – 2 separate- but a package

Intelligence gathering & Combative force- 2 separate unit
Both are highly specialist jobs- One cant do other

Intelligence- Highly technical- Engineering science- signal processing- Radar – incoming air craft- changes in frequency Wave length- = Physics Interpretation

Combat – Soldier- Army, navy, airforce

Similarly in public health
Disease surveillance- Intelligence gathering – ( OBI- Public Health, Epidemiologist, Microbiologist Clinician Statistic, computer simulation modelling)
Combat- Patient care- Hospital, Clinicians, Surgeons, Nurses- Mitigation measure
Surveillance-Flexible- Adaptive
Disease surveillance- continuously Updating —Climate change— Geographies, person, time all changing (KFD,- Maharashtra, Goa, Tamil Nadu and Kerala have recorded Kalzaar, Chikunguniya,)

• Terrorist/ Drug peddlers- keep changing tactics- surveillance keep changing
• Virus- mutation, emerging, remerging

Clinical signs and Symptoms-changing- formats- has to change
Covid- loss smell, skin manifestation

Indicator based surveillance ( Largely Infectious diseases)- Biological Agents
Acute Brain deaths- Encephalitis/ecnephalopaty ( non infectious- Toxin- Litchi, cassia oxididanlis, heat stroke, kasargode- pesticide, ) – Physical, Chemical, Biological
IHR) revised in 2005- All hazard Approach - EWARS

IBS + EBS Approach

• EWAR will rely on a process: Epidemic intelligence
• And
• 2 main channels of information,
• indicator-based surveillance and (30:70 Private)
• event-based surveillance.
EWARS

- EBS- complementing IBS- Esp developing country

- health-related behavioural information (e.g. sickness absenteeism in schools or in workplaces, medicine sales and repellent sales, social networks, etc- big data analytics

- EWAR designed to be sensitive signals and alerts coming from both
  - 1. formal and informal sources,
  - 2. within and outside of the health sector
Thank you