New Model for Evaluating Tuberculosis Surveillance, Performance and Cost: The Common Experience of Tanzania and Florida

By Sevim Ahmedov

The Tuberculosis (TB) Challenge: With the introduction of the first effective antimicrobial drugs in the 1950s for treatment of tuberculosis (TB), the possibility for eradication of this deadly disease seemed within reach for public heath officials[i]. Fifty years later, the attainment of that goal appears to be at a critical juncture, and TB is once again on the rise in the world. TB continues to kill approximately two million people each year, and the epidemic is gaining momentum, fueled by the swift spread of HIV/AIDS, mass migrations of people, the breakdown of public health infrastructure systems, especially in the poor and developing world, and the emergence of multi-drug resistant strains of TB[ii].

Burdened by increasing HIV/AIDS numbers, Sub-Saharan Africa also faces about two million additional cases of TB per year[ii]. The lethal combination of HIV/AIDS and TB extracts a heavy social and economic toll in that part of Africa.

Although TB has been on the decline in the US, the country's continued efforts toward eradication face critical challenges stemming from declining financial resources, complacency and benign neglect[i]. In Florida, 2003 was the ninth

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consecutive year of declining TB incidence. However, with 1,046 new cases, the state is ranked an unenviable fourth in the nation. With an incidence rate of 6.1 per 100,000, it is still well above the national average rate of 5.1 per 100,000.

It is becoming increasingly clear that in order to reach our intermediate goal of 3.5 cases per 100,000 persons, decisive action needs to be taken.

"Smart" tools need to be re-engineered and developed in our arsenal for TB elimination in Florida, the US and the world. During this paradigm shift process, the evaluation of the current interventions both on the program performance and cost-benefit side are becoming an integral and crucial part of our efforts. Evaluating the performance of public health surveillance and response performance activities

and measuring the costs are necessary to ensure that health events are surveyed and acted upon effectively and efficiently. Underlying the importance of evaluation, it now has become a core component of public health practice, especially as TB control programs strive toward disease elimination, while seeking to integrate evaluation into daily function and management[iii]. Leading the way in those efforts, the Florida Department of Health, with financial and technical support from the Centers for Disease Prevention and Control (CDC), is piloting a TB evaluation model that was initially tested by the Africa Bureau of the World Health Organization (WHO) in the United Republic of Tanzania in 1998[iv].

Innovative Approach to Disease Intervention Evaluation: The model is based on a public health action-led conceptual framework, which looks at public health surveillance and action as an integrated process and promotes "public health action-led" rather than "surveillance (data)-led" evaluation strategy. The model is comprised of eight core activities (detection, registration, reporting, confirmation, analysis, feedback, and acute and planned responses) and four support activities (communication, training, supervision, and resource provision)[v] (Figures 1 and 2).

The three main components consist of 12 distinct activities, which are defined as follows:

Component 1-Surveillance
1. Detection: identifying a suspected TB case.

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2. Registration: entering specific descriptive variables of a suspected TB case in the public health record.
3. Reporting: moving public health surveillance data from one level of the health system (e.g., county level) to another (e.g., state) level.
4. Confirmation: using epidemiological, medical or laboratory information to verify the status of a registered, suspected TB case.
5. Analysis: examining and interpreting surveillance data, including data presentation and the development of indicator targets for triggering public health action.
6. Feedback: feeding data, information, and messages back to original reporting sources.

Component 2-Action
7. Acute (epidemic-type) response: taking direct, reactive, and immediate public health actions designed to stop the ongoing transmission of disease (e.g., TB care coordination, contact investigation, targeted testing, or outbreak investigation).
8. Planned (management-type) response: taking long-term actions and a systematic approach to future needs identification, such as prevention, community education, or reallocation of staff and resources in response to emerging disease trends.

Component 3-Support
9. Communication: exchanging information; conveying, receiving, interpreting, and agreeing upon the meaning of data, information and messages.
10. Training: providing staff with job-related knowledge and skills; instructing or coaching in a mode of
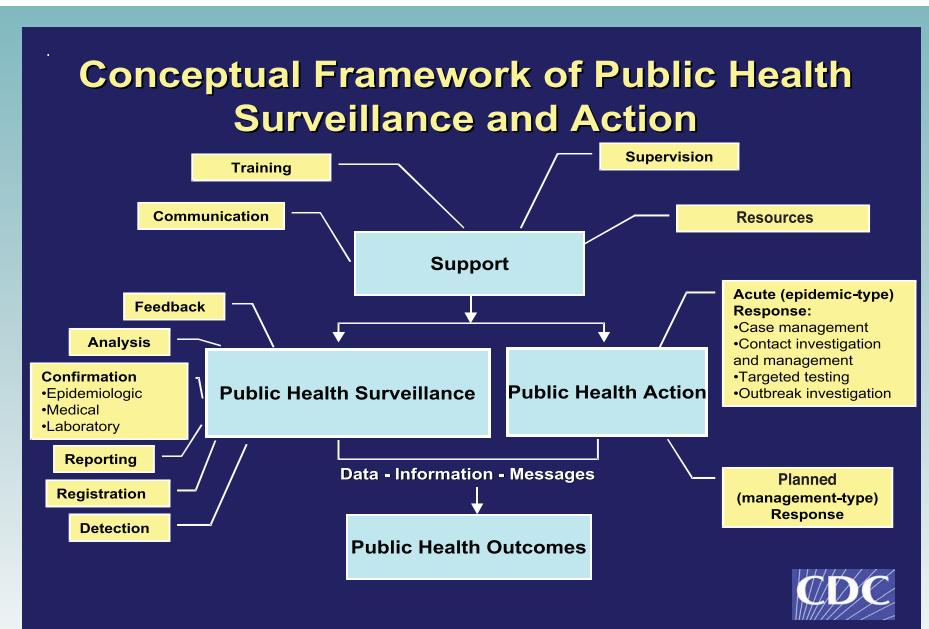
Conceptual Framework of Public Health Surveillance and Action

Training

Supervision

Communication

Resources

Support

Feedback

Analysis

Acute (epidemic-type) Response:
•Case management
•Contact investigation and management
•Targeted testing
•Outbreak investigation

Confirmation
•Epidemiologic
•Medical
•Laboratory

Public Health Surveillance

Public Health Action

Reporting

Registration

Detection

Data - Information - Messages

Planned (management-type) Response

Public Health Outcomes

CDC

Figure 1

Surveillance, Action, and Support Activities Logic Model

1	2	3	4	5	6
Support Activities	Organizational Level	Surveillance Activities	Action Activities	Mid-term Outcomes	Long-term Outcomes

Communication

Training

Supervision

Resources

State Health Dept

State Lab

District Health Dept

County Health Dept

Local Health Facility

Health Facility Lab

Feedback

Analysis

Confirmation

Reporting

Registration

Detection

Acute Response
•Case management
•Contact investigation
•Targeted testing
•Outbreak investigation

Planned Response

Fewer outbreaks

Reduced incidence

Better completion of treatment
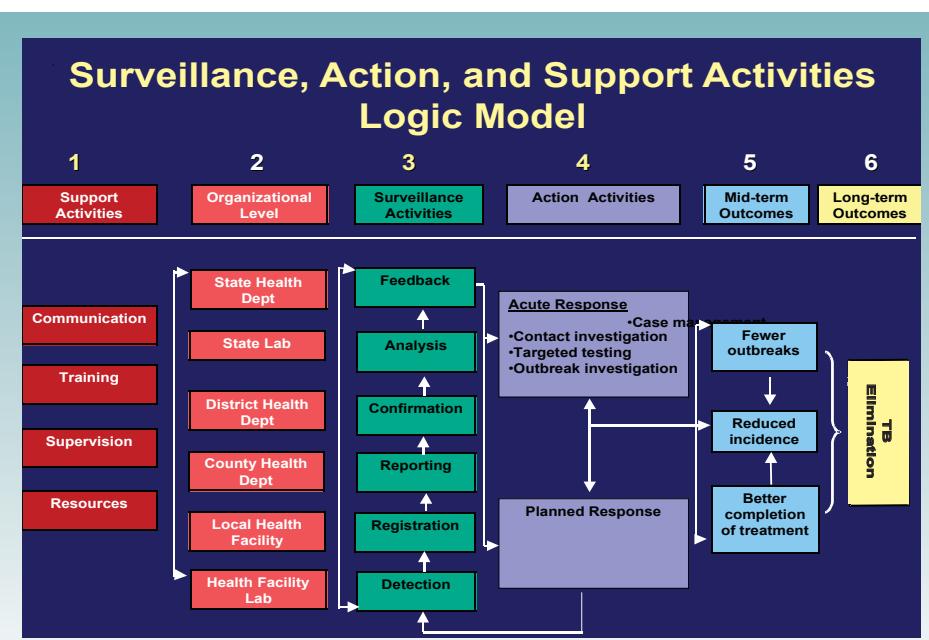
TB Elimination

Figure 2

behavior or performance.
11. Supervision: directing and guiding staff's work and job performance.
12. Resource provision: ensuring availability of funds, trained personnel, or other tangibles such as communications infrastructure, electricity, rent, and medications[vi].

Results: By applying the evaluation model, the group of researchers assessed the structure and performance of five infectious disease systems in the United Republic of Tanzania. By analyzing the core and support activities of surveillance and response, they identified certain gaps with regards to supervision, standardized case definitions, and improvements in the quality of reporting, analysis, and feedback. The findings from the assessment were used to develop a 5-year plan of action to improve the infectious disease surveillance and response system in the country[iv].

In a similar vein, the conceptual framework was implemented in Hillsborough County, Florida, in 2001, allowing for a measurement of TB surveillance, performance and cost. The systematic evaluation strategy revealed missed opportunities and program-matic gaps in detection and confirma-tion of TB cases. The cutting edge cost-analysis showed that of the $1.08 million annual budget, 22% was spent on surveillance, 49% on action and 29% on support activities[vi]. This year, the initial study is being expanded-the number of performance and response indicators has been increased from 24 to 144-both to validate the preliminary results and broaden the scope of the evaluation model. The model is to become the foundation upon which an up-scaled and user-friendly moni-toring and evaluation strategy will be built, allowing for increased effective-ness and efficiency of the state TB control program, and ultimately for the elimination of this curable disease.

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Endnotes

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