Michigan 2011 CAP LPX-A Survey Analysis

Introduction

One purpose of the CAP LPX survey is to provide laboratories with an educational exercise that can be used to help prepare for the detection of pathogens of epidemiologic importance, including pathogens that can be used as biothreat agents. Another purpose of the LPX is to prepare participant laboratories for effective and efficient communication of critical information related to potential BT agents. This report summarizes the results of the Michigan Laboratory Response Network (LRN) Sentinel Laboratories on the 2011 LPX-A survey panel in aggregate and compares Michigan lab responses to those of participating labs throughout the country.

Performance Summary

The LPX survey consists of organism identification (rule-out) plus a notification component to test communications between LRN Sentinel Laboratories and LRN Reference Labs. In these exercises, LRN Sentinel Labs are required to contact their LRN Reference Lab if, after following the established Sentinel Laboratory Guidelines on a challenge isolate, they are unable to rule out an agent of bioterrorism. Both organism rule-out and notification are summarized below.

Approximately 40% of Michigan sentinel labs participated in the 2011 LPX-A survey.

The 2011 LPX-A survey contained the following samples:

LPX-01	*Vibrio alginolyticus*
LPX-02	*Bacillus anthracis*
LPX-03	*Francisella tularensis*

Correct Result Reporting LPX-A	N = 45
Sample Number	% of MI Labs with Intended Response
LPX-01	95.55% (43/45)
LPX-02	97.78% (44/45)
LPX-03	93.33% (42/45)

Notification Drill Results

Notification Drill LPX-A			
Sample Number	Notification Required	% MI Labs Indicating Would Notify the LRN Ref Lab	% MI Labs Actually Notified the LRN Reference Lab
LPX-01	No	8.9% (4/45) ∇	13.04% (6/45) * ∇
LPX-02	Yes	93.3% (42/45)	69.6% (32/45) *
LPX-03	Yes	91.1% (41/45)	67.39% (31/45) *

∇ Although notification was not necessary in these cases, it is great that sentinel labs are willing and able to communicate with their LRN Reference Lab.

Analysis by Sample

LPX-01: *Vibrio alginolyticus*		
Submitted Answers	Michigan Participants	All Participants
§ Non-BT Culture	43/45 95.56%	1213/1324 91.6%
Gram-negative bacillus, rule out *Burkholderia pseudomallei*	2/45 4.4%	-

§ Acceptable response

LPX-02: *Bacillus anthracis*		
Submitted Answers	Michigan Participants	All Participants
§ *Bacillus anthracis*, confirmed	0/45 0%	44/1328 3.3%
§ *Bacillus anthracis*, refer for confirmation	1/45 2.2%	75/1328 5.7%
§ *Bacillus* sp., refer to rule out *Bacillus anthracis*	39/45 86.66%	904/1328 68.1%
§ Gram-positive bacillus, refer to rule out *Bacillus anthracis*	4/45 8.9%	239/1328 18.0%
Non-BT Culture	1/45 2.2%	-

§ Acceptable response

LPX-03: *Francisella tularensis*		
Submitted Answers	Michigan Participants	All Participants
§ *Francisella tularensis*, confirmed	0/45 0%	60/1321 4.5%
§ *Francisella tularensis*, refer for confirmation	2/45 4.4%	129/1321 9.8%
§ *Francisella* sp., refer to rule out *Francisella tularensis*	9/45 20.0%	220/1321 16.6%
§ Gram-negative bacillus/coccobacillus, refer to rule out *Francisella tularensis*	31/45 68.89%	834/1321 63.1%
Non-BT culture	3/45 6.67%	46/1321 3.5%

§ Acceptable response

Discussion

LPX-01

This challenge contained *Vibrio alginolyticus* in pure culture. The intended response was "Non-BT Culture." Nationally, the majority of participants appropriately managed this sample. 91.6% of all laboratories replied with an intended response.

Over ninety-five percent of the 45 Michigan laboratories who participated in this survey responded with an acceptable response indicating this was not a potential biothreat agent. Two Michigan laboratories indicated the presence of a gram-negative bacillus and indicated they would refer to an LRN Reference laboratory for rule-out of *Burkholderia pseudomallei.*

The two Michigan labs that suspected *Burkholderia pseudomallei* indicated they would contact their LRN Reference Lab, as would be indicated when unable to rule out an agent of bioterrorism. Participants in LPX exercises are required to contact their LRN Reference Laboratory if, after performing the established Sentinel Laboratory Guidelines on a challenge isolate, they are unable to rule out an agent of bioterrorism. This challenge would not require notification of the LRN Reference Laboratory unless the Sentinel lab could not rule out the presence of a biothreat agent.

LPX-02

This challenge contained *Bacillus anthracis* in pure culture. The intended responses for this challenge were *Bacillus anthracis*, confirmed; *Bacillus anthracis*, refer for confirmation; *Bacillus* sp., refer to rule out *Bacillus anthracis*; or Gram-positive bacillus, refer to rule out *Bacillus anthracis*. Nationally, 93.4% of participating laboratories responded with an intended response and 86% indicated they would refer the isolate to their LRN Reference Laboratory. This is an appropriate response for Sentinel Laboratories. Since Reference Laboratories also participate in the LPX exercise, the responses that provided full identification or refer for confirmation could be a correct response if reported from an LRN Reference Laboratory.

Over 97% of Michigan labs participating in this survey responded with an acceptable response indicating they were not able to rule out *Bacillus anthracis*. One Michigan laboratory indicated they had ruled out all agents of bioterrorism and reported this challenge as "Non-BT Culture." Also, one Michigan laboratory indicated they would refer the isolate to their LRN Reference Laboratory but did not indicate they would contact that laboratory prior to sending the isolate. Participants in LPX exercises are required to contact their LRN Reference Laboratory if, after performing the established Sentinel Laboratory Guidelines on a challenge isolate, they are unable to rule out an agent of bioterrorism. This challenge required notification of the LRN Reference Laboratory.

LPX-03

This challenge contained the live vaccine strain (LVS) of *Francisella tularensis.*. Nationally, the majority of participants appropriately managed this sample. Over ninety-six percent of all participating labs provided an intended response for this sample, plus 79.7% would have referred to rule out as suspicious for *F. tularensis*. The remainder of participants may have been LRN Reference Laboratories who confimed the identity or referred to confirm the identity as *F. tularensis*. Nationally, only 3.5% considered this challenge a non-bioterrorism agent.

42/45 (93.3%) of participating Michigan labs correctly identified the possibility of *Francisella tularenses* being present in this sample. Three Michigan laboratories indicated this was a non-BT agent. One participating Michigan laboratory identified the possibility of *Francisella tularensis* in this challenge yet did not indicate they would contact their LRN Reference Laboratory. LRN Sentinel Labs are required to notify their LRN reference laboratory when they are unable to rule out an agent of bioterrorism. The isolate from this challenge should have triggered a communication with the participant's LRN Reference Laboratory.

Comparison between Michigan 2011 with 2010 LPX Survey Results

Michigan Result Reporting		
Organism Present	% of MI Labs with Intended Response 2011 (LPX A only)	% of MI Labs with Intended Response 2010 (LPX A| LPX B)
B. anthracis	97.8%	79.55% | NI*
F. tularensis	93.3%	NI* | 97.7%
Non-BT culture	95.6%	76.7% | 95.5%

* NI = Not included in challenge set.

Comparison between Michigan 2009, 2010, and 2011 Notification Drill Results

Michigan Notification Results		
Year	Lowest % of MI Labs that Actually Notified the LRN Reference Lab When Notification Required	Highest % of MI Labs that Actually Notified the LRN Reference Lab When Notification Required
2009	41.9%	53.5%
2010	56.8%	72.7%
2011	67.4% (LPX-A only)	69.6% (LPX-A only)

Overall Performance

Nationally, for the two bioterrorism challenges (LPX-02 and LPX-03) most participants reported the interval between specimen set-up and notification of their LRN Reference Laboratory in the first 1-4 days. *B. anthracis* is reported more frequently on day one as compared to *F. tularensis*, probably because of more rapid growth and easily identifiable morphological and Gram-stain features. Approximately 10% of participants did not report results until 10 days or more after specimen set-up. Reporting to the LRN Reference Laboratory should be performed in real-time to adequately assess laboratory performance in the LPX series.

In Michigan, the data from 2009 to 2010 showed that Sentinel Laboratories were improving their detection techniques for biothreat agents as the percentage of labs with the intended response was stable for *Y. pestis* and *F. tularensis* and improved for *B. anthracis*. The 2011 LPX-A challenge shows improvement in *B. anthracis* identification as well. *F. tularensis* identification appears to be more challenging for participants. The Notification Drill appears stable as well. Improvement is needed in this area as only 67-69% of Sentinel Labs actually notified their LRN Regional Laboratory when they could not rule out an agent of bioterrorism during the 2011 LPX-A challenge.

Remember, Sentinel Labs MUST actually contact their LRN Regional Laboratory when a biothreat agent can not be ruled out. It is not sufficient to simply state you would make that contact.

Supplemental information was also collected in this survey to characterize the current microbiology laboratory setting, the availability of testing as recommended by the Sentinel Level Clinical Microbiology Laboratory Guidelines for Suspected Agents of Bioterrorism and Emerging Infectious Diseases, what transportation mechanisms are used to transport isolates to the LRN Reference Laboratory, and laboratory participation in training activities. See the LPX-A Final Critique for responses to these supplemental questions.

Of concern in Michigan is the lack of participation in drills and exercises. Of the 45 Michigan laboratories participating in this survey, 17 (37.7%) did not participate in drills or exercises in the last two years. Bioterrorism drills provide an excellent opportunity to determine preparedness status.

Thank you for participating in the CAP LPX Challenges. If your laboratory desires refresher training on any of the LRN Rule-Out Procedures or wishes to discuss participation in a bioterrorism drill or exercise, please contact the Michigan Department of Community Health Bureau of Laboratories Bioterrorism Coordinator, Valerie Reed, via e-mail at ReedV@michigan.gov.