Preferences and Perceptions of Biosurveillance System Users - Results from a Recent Survey

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BACKGROUND

"The ultimate measure of whether a surveillance system has achieved the optimal balance of attributes lies in its usefulness."[1] No one is better qualified to comment on usefulness than the users. As system developers, we are well advised to consider the opinions of users when building, evaluating, and considering revisions to surveillance systems.

Health Monitoring Systems, Inc. (HMS) is a for-profit company that provides biosurveillance capabilities to public health agencies and hospitals using a software-as-a-service model.

METHODS

A survey was distributed via a web-based service (SurveyMonkey.com, Portland, OR) to 240 registered public health users of biosurveillance systems provided by Health Monitoring Systems. Questions measured desires relating to system function (early detection and situational awareness), preference of analytic sophistication with regards to accuracy of results, perceptions regarding value of potential data sources, and value of analysis for earlier implementation of intervention efforts. The survey also recorded professional demographics (i.e. number of epidemiology courses completed, job function, and number of years they have worked in public health).

RESULTS

• 65 (27.1%) surveys were returned

Job Function (62 respondents)
- Epidemiologist – 32 (51.6%)
- Nurse – 12 (19.4%)
- Supervisor – 12 (19.4%)
- Health Commissioner – 3 (4.8%)
- Statistician – 3 (4.8%)

Epidemiology Courses
- Range = (0, 20)
- Mean = 5.7
- Median = 5

Years in Public Health
- Range = (0, 34)
- Mean = 10.4
- Median = 8

•Responses were found to be independent of Job Function, the number of epidemiology course completed, and the number of years worked in public health.

• 55 of 61 (90.1%) respondents reported that they had investigated notifications (mean = 11.3, median = 5) generated in response to statistical anomalies. 19 (34.5%) stated that the notifications resulted in earlier interventions 35.8% of the time.

Sophistication refers to the complexity of statistical methods. While not always true, more sophisticated methods may result in more accurate determinations of expected counts. To those without a graduate-level understanding of time series analysis, the manner in which these values are determined may not be as intuitive as other methods. Would you prefer statistical methods that are highly accurate but less intuitive or methods that are intuitive but may not be as accurate?

I prefer models that are as accurate as possible even if it means that they are not intuitive. - 29.7% (19)
Accuracy is important to me but I am willing to accept some reasonable reduction in accuracy to have intuitive methods. - 65.6% (42)
Intuitive methods are a primary desire over accuracy for me. - 4.7% (3)

Early detection is a function of many biosurveillance systems that strives to decrease the time between the onset of an event (e.g. infectious disease epidemic) and discovery. Situational awareness is another function that provides for timely information that public health can use to assess status of events (e.g. outbreak progression or general community health). With 1 being "No Importance" and 5 being "Most Important", please rate each of these functions as they relate to your desires. (65 respondents)

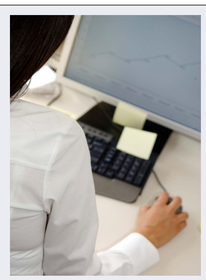
	No Importance				Most Important	Rating Average
Early Detection	0.0% (0)	1.6% (1)	4.7% (3)	29.7% (19)	**64.1% (41)**	4.56
Situational Awareness	0.0% (0)	3.1% (2)	4.6% (3)	43.1% (28)	**49.2% (32)**	4.38

Please rate the following data types in terms of their value or potential value for biosurveillance efforts with 1 being "Of no use" and 5 being "Essential".

	Of no use	Of little use	Useful	Important	Essential	Rating Average
Air temperature	9.7% (6)	22.6% (14)	**48.4% (30)**	17.7% (11)	1.6% (1)	2.79
Precipitation/Rainfall	6.6% (4)	27.9% (17)	**50.8% (31)**	14.8% (9)	0.0% (0)	2.74
Water quality	3.3% (2)	19.7% (12)	**45.9% (28)**	27.9% (17)	3.3% (2)	3.08
Environmental indicators (e.g. pollen count, air quality index)	1.6% (1)	19.4% (12)	**37.1% (23)**	**37.1% (23)**	4.8% (3)	3.24
Over-the-counter medication sales	0.0% (0)	8.1% (5)	12.9% (8)	**48.4% (30)**	30.6% (19)	4.02
Prescription medication orders	0.0% (0)	8.1% (5)	21.0% (13)	**43.5% (27)**	27.4% (17)	3.90
Clinical laboratory orders	0.0% (0)	8.1% (5)	22.6% (14)	**43.5% (27)**	25.8% (16)	3.87
Clinical laboratory results	0.0% (0)	1.6% (1)	14.8% (9)	24.6% (15)	**59.0% (36)**	4.41
Veterinary laboratory orders	0.0% (0)	27.4% (17)	**37.1% (23)**	32.3% (20)	3.2% (2)	3.11
Veterinary laboratory results	0.0% (0)	19.4% (12)	**32.3% (20)**	**32.3% (20)**	16.1% (10)	3.45
Veterinary office visits	4.8% (3)	**35.5% (22)**	27.4% (17)	27.4% (17)	4.8% (3)	2.92
Food recalls	0.0% (0)	9.8% (6)	29.5% (18)	**31.1% (19)**	29.5% (18)	3.80

CONCLUSIONS

- Users desire both the capability for early detection of outbreaks and function of situational awareness.
- Users continue to look for new way to achieve earlier intervention through the use of biosurveillance systems.
- There is need among users for the systems to use intuitive analytical processes.
- Public health users expressed their desire to incorporate other data sources into their biosurveillance activities.
- Researchers and developers should study and integrate these data into flexible biosurveillance systems designed to work with multiple sources.



References
[1] Buehler JW. Surveillance. In: Rothman KJ, Greenland S, editors. *Modern Epidemiology*. 2nd ed. Philadelphia, PA: Lippincott Williams & Wilkins; 1998. p. 435-57.

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