Timeliness of electronic laboratory reporting vs. traditional laboratory reporting in Southern Nevada from 1999-2012

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Background

Electronic laboratory reporting (ELR) has been implemented in many parts of the United States, and is perceived to be faster than traditional reporting. One large commercial laboratory provides the Southern Nevada Health District (SNHD) with 70-90% of its electronic and traditional laboratory reports, including reports of gastrointestinal (GI) illnesses. GI illnesses are a concern in Southern Nevada due to the transient population and short incubation periods of these illnesses.[1,2]

Objective

This project aims to compare timeliness between traditional laboratory reporting, ELR, and reporting after the implementation of TriSano, a modern electronic surveillance system, for common GI illnesses in Southern Nevada, with a prediction that ELR will be faster than traditional reports, and TriSano will be faster than the other two methods.

Methods

Data

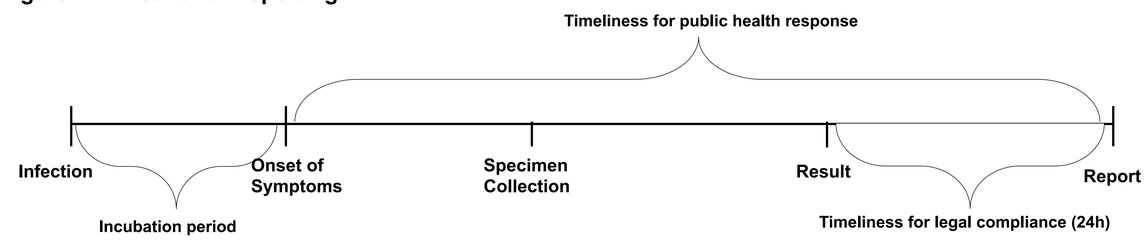
In this descriptive study, reports of campylobacteriosis, salmonellosis, and shigellosis were examined for timeliness in days.

- Traditional reports from January 1999 – May 2004 (n = 751)
- Electronic reports from July 2004 – August 2010 (n = 915)
- TriSano reports from September 2010 – May 2012 (n = 114)
- Timeliness for public health response was measured from onset of symptoms to when the result was reported to SNHD. Incubation time of diseases was compared to assess appropriate response time.
- Timeliness for compliance with state laws was measured from time of laboratory result to report to SNHD (Figure 1)

Analysis

- Median days were calculated
- Kruskal-Wallis tests for difference across report test type
- Post hoc tests: Mann Whitney U tests with Bonferroni corrections to control for Type I error (significant at $p < .017$)

Figure 1. Timeline for Reporting



Results

Public health response time

Median days (Figure 2)

- Traditional reporting = 8 days
- Regular ELR = 9 days
- TriSano reporting = 10 days

Kruskal-Wallis test, public health response time

- Statistically significant difference in time across the three methods ($\chi^2 = 24.329$, $p < .001$).

Post hoc tests

- Difference in time between traditional reporting and ELR is statistically significant ($p < .001$)
- Difference between traditional reporting and TriSano is statistically significant ($p = .001$) (Table 1)

Legal compliance time – Median days (Figure 2)

- Traditional reporting = 5 days
- Regular ELR = 6 days
- TriSano = 1 day

Kruskal-Wallis test, compliance with state law

- Statistically significant difference in time across the three methods ($\chi^2 = 345.928$, $p < .001$).

Post hoc tests

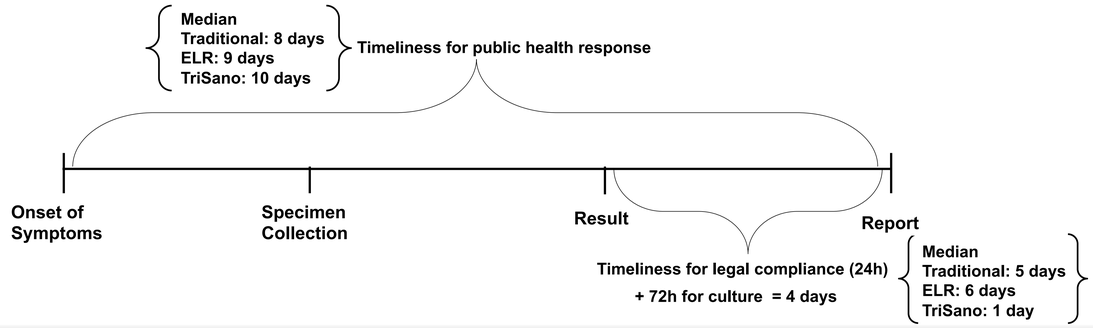
- Significant differences between all three methods ($p < .001$)

Table 1. Post hoc analyses

	Public Health Response Timeliness			
	U	z	p	r
Traditional/ELR	300624.0	-4.415	.000*	.11
Traditional/TriSano	34691.0	-3.279	.001*	.11
ELR/TriSano	48520.5	-1.220	.223	.04
	Legal Requirement Timeliness			
	U	z	p	r
Traditional/ELR	257998.5	-8.954	.000*	.22
Traditional/TriSano	5217.5	-15.383	.000*	.53
ELR/TriSano	3449.0	-16.546	.000*	.52

*Significant at $p < .017$

Figure 2. Median Report Days

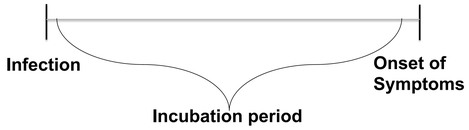


Discussion

The three diseases in this analysis of this laboratory are all tested using culture which can take 72 hours to develop a result[3]. State law mandates results after 24 hours; diseases tested with culture have a legal requirement of 96 hours[4]. This analysis demonstrates that public health response time in Southern Nevada is not fast enough with any system.

All methods can take longer than the incubation periods for all three diseases (campylobacteriosis incubation period ≈ 2-5d, salmonellosis incubation period ≈1-3d, shigellosis incubation period ≈ 1-3d) (Figure 3). Therefore, with the current methods, it may be impossible to prevent secondary infections of these three illnesses in Southern Nevada. The TriSano system looks promising and SNHD should continue to use it. Additionally, different testing methods should be explored by the laboratory.

Figure 3. Incubation Periods



campylobacteriosis ≈ 2-5d
salmonellosis ≈ 1-3d
shigellosis ≈ 1-3d

Acknowledgments

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References

1. Las Vegas Convention and Visitors Authority. (2011). http://www.lvcva.com/press/statistics-facts/index.jsp
2. Heymann, D.L. (Ed.). (2008). *Control of Communicable Diseases Manual: An Official Report of the American Public Health Association.* Washington D.C.: American Public Health Association.
3. Personal Communication. Brian Labus. Senior Epidemiologist at the Southern Nevada Health District.
4. Nevada Administrative Code 441A, 2012