

Research Brief

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Local Health Department Electronic Disease Surveillance: Best Practices and Costs, North Carolina, 2010

The North Carolina Electronic Disease Surveillance System (NC EDSS) is a centralized web-based system for communicable disease surveillance. The system was implemented in 2007, replacing a paper-based disease reporting system. Training in the new system was conducted for local health department (LHD) staff in 2007 and 2008, and NC EDSS is now used in all of the state's LHDs. However, best practices for NC EDSS use at the local level have not been identified. The study reported here provides a foundation for identifying best practices by examining current surveillance practices in LHDs and evaluating the associations between these practices and surveillance performance and costs.

Methods

In 30 randomly selected counties, the county staff member responsible for supervising NC EDSS practice (NC EDSS lead) and a communicable disease (CD) staff member responsible for reportable disease case management and data entry were invited to an interview. Two questionnaires were developed and administered. The lead was asked about the role of NC EDSS in case management, use of NC EDSS capacities, use of NC EDSS to support program management and provide data to policy makers, and barriers to effective use of NC EDSS. The CD staff member was asked about disease surveillance and case management processes, bottlenecks in reporting data, and use of NC EDSS capacities. In addition to the interviews, system data on all vaccine-preventable, sexually transmitted and other communicable diseases reported in these counties during the study period (May-August 2010) were analyzed. Specifically, we assessed the number of cases

reported, the timeliness of the reporting (defined as the proportion of cases reported to the state within 30 days), the accuracy of the reporting (defined as the proportion of cases returned to the LHD for further work following submission to the state), and the number of deprioritized cases (defined as cases not handled by county staff for 45 days).

The following practices were reported more frequently by counties with best surveillance performance and by counties with lower average cost per case; thus they can be recommended to LHDs:

- 1) Daily review of NC EDSS workflows
- 2) Use of the NC EDSS case entry wizard for data entry

Use of surveillance data from NC EDSS for evaluation, in annual reports, and for other local purposes.

To identify counties with best surveillance outcomes, defined as best timeliness and accuracy, a composite score was created for each county based on whether the county was in the top third of counties for timeliness (79% of cases submitted in < 30 days), accuracy (<17% returned for corrections), and deprioritized cases (<1% of total cases not handled in 45 days). Counties were rated as best (2/3 points) or not best (0/1 point) for comparison of surveillance practices and costs.

To assess the resources used for electronic disease surveillance, cost was calculated based on FTE staff time used for NC EDSS, using county-specific average public health nurse and administrative staff salaries for 2010. Cost per case was calculated as the total FTE cost for May-August divided by the number of cases reported during the study period.

Results

Interviews were completed with staff in 28 of the 30 counties invited to participate. One county which was a significant outlier on a case data measure was excluded from the analysis; thus the final sample was 27 counties. In these counties, 10,865 cases were reported by 136 employees using NC EDSS in May-August 2010. The number of cases reported per FTE per month was related to county size: in small counties the average was 50 per month; in medium sized counties, 72, and in large counties, 89. The average local cost per case was \$108; the cost per case was higher for small counties (\$162) than for medium (\$91) or large counties (\$74). The average cost of all NC EDSS-based surveillance per capita per year was \$0.70. Three of 9 small counties, 3 of 8 medium counties and 2 of 10 large counties were classified as having best surveillance performance. These counties had a significantly lower average cost per case (\$71) than other counties (\$124; Figure 1). They also had a lower average cost per case per capita than other counties (\$0.59 vs. \$0.75), though this difference was not significant. Among counties with best surveillance timeliness and accuracy, the cost per case was similar (Figure 2); however, among the remaining counties, the cost per case was lower in large than in small/medium counties.

County characteristics and practices that were reported more frequently by counties with best timeliness and accuracy than by other counties included having a CD nurse who was confident in his/her computer abilities, checking NC EDSS workflows every day, and using the NC EDSS case data entry wizard (which limits data entry to required fields only). County characteristics associated with a lower cost per case included having data entered by administrative and/or lab staff in addition to public health nurses, and having a CD nurse confident in his/her computer abilities. Surveillance practices associated with lower cost per case were daily entry of case data, linkages of events in NC EDSS, and daily review of NC EDSS workflows.

Surveillance practices reported by both counties with best timeliness and accuracy and counties with lower cost per case were: (a) daily review of NC EDSS workflows, (b) use of the wizard for data entry, (c) use of NC EDSS data in annual reports, (d) use of surveillance data for program evaluation, and (e) use of data from Part II of the surveillance form for local purposes.

Figure 1

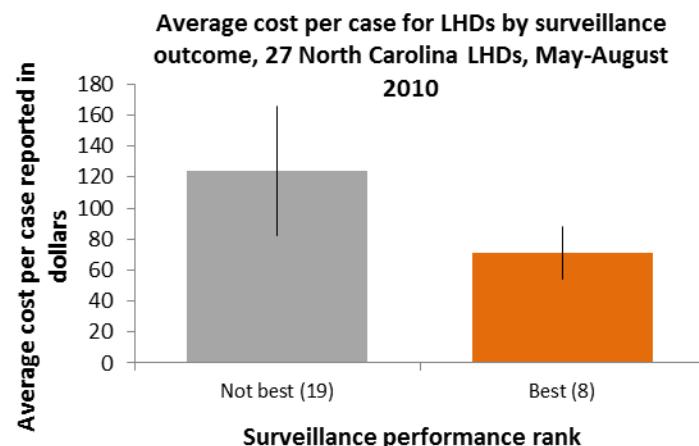
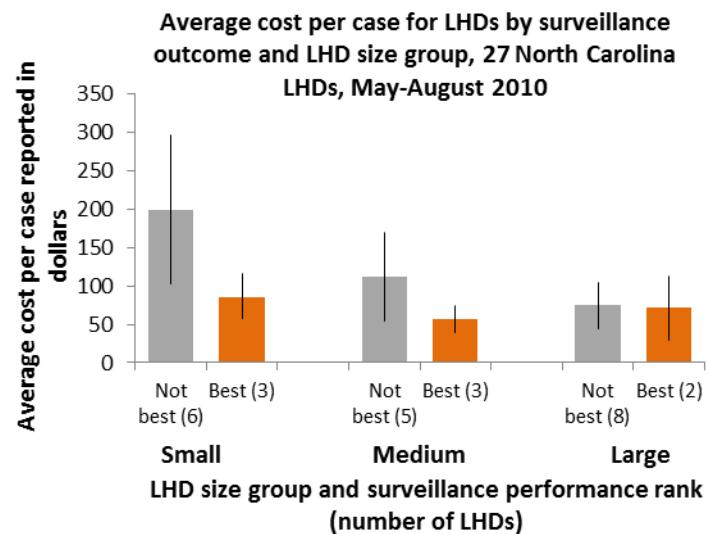


Figure 2



Discussion

The number of cases reported per FTE in these 27 counties and the average cost per case per capita were lower in counties with the best surveillance performance, suggesting that lower cost practices can support timely and accurate performance. Efficient use of NC EDSS and incorporation of surveillance data into county education and program management practices were reported by counties with best surveillance outcomes and lower cost, and these practices should be considered by all LHDs.

Some practices reported by best surveillance counties were more frequently reported by counties with higher average costs per case. These included restricting NC EDSS data entry to public health nurses, and having a lead who reported being “confident” or “very confident” in his/her computer abilities. While it may be difficult to recommend these practices, they highlight opportunities for improvement.

Limitations

While this survey captured valuable data on the costs of local electronic disease reporting, it had limitations. The cost data are incomplete: local infrastructure, supplies, and training costs were not captured. Furthermore, the FTEs upon which costs were based were estimated only for use of the NC EDSS system, and may not have included some case and contact investigation activities which were performed away from the computer/system. Addition of these costs would increase the cost per case. Latent tuberculosis infection (LTBI) cases were not included in the total cases calculation. In the majority of counties, LTBI accounted for less than 15% of the cases reported; however, in 4 of these counties, LTBI cases accounted for >40% of the cases reported. Addition of these cases would decrease the cost per case. Thus, it is likely that the costs reported here reflect most of the cost of local use of the electronic disease surveillance system.

Conclusions

This evaluation has shown that in North Carolina, timely and accurate communicable disease surveillance is associated with a lower cost per case reported. Timely and accurate reporting is also more effective in supporting communicable disease control. Thus

adopting surveillance practices that improve the timeliness and accuracy of reporting may improve both business and public health outcomes.

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