

COMPLETENESS AND TIMELINESS OF ELECTRONIC LABORATORY REPORTING FOR TUBERCULOSIS —

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BACKGROUND

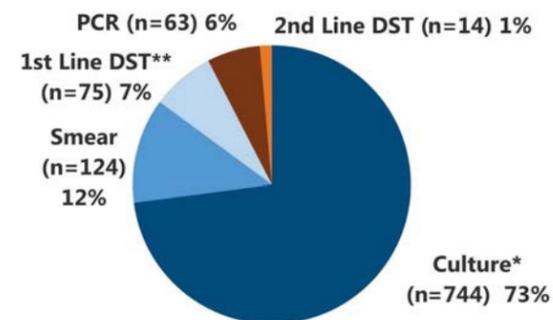
- The California Reportable Diseases Information Exchange (CalREDIE) is the infectious disease surveillance system of the California Department of Public Health for California.
- CalREDIE Electronic Laboratory Reporting (ELR) was launched in October 2013. Over 350 laboratories currently report results electronically through CalREDIE¹.
- California Code of Regulations Title 17, Section 2505, requires laboratories that identify evidence suggestive of tuberculosis (TB) or an acid fast bacillus (AFB) to report these findings to the local health officer within one working day of notification of the ordering provider.
- During 2017, the TB case rate in Santa Clara County (9.6 per 100,000 persons) was over three times as high as the U.S. (2.8 per 100,000 persons) and almost twice as high as California (5.2 per 100,000 persons)^{2,3}. Complete and timely reporting of patients with TB disease is critical to TB prevention and control in SCC.
- The Santa Clara County Public Health Department (SCCPHD) currently receives laboratory results both by fax and ELR, through CalREDIE.
- To determine whether the SCCPHD TB Prevention & Control Program can transition to receiving laboratory reports by ELR only, we assessed the completeness and timeliness of ELR and fax-based reporting for TB.

METHODS

- For all positive laboratory results received between June 1 and August 30, 2017, the TB Program recorded the fax transmission date; ELR report date; test type; specimen collection date, source, and accession number; reporting laboratory; name; date of birth; and SCCPHD identification number. Subsequent duplicate reports were excluded.
- ELR completeness was measured as the percentage of test results received by ELR among all results received.
- For results received by both ELR and fax, the number of days between the ELR date and fax date was calculated (ELR date – fax date) to estimate the relative timeliness of ELR reporting.
- Pair-wise comparison by laboratory and test type was conducted using Pearson chi-square test with Bonferroni adjustment to individual *p*-values for multiple comparisons.

RESULTS

Fig 1. Laboratory results received by test category



*Includes AFB isolated (n=492) and *M.tb* identified (n=252) from culture.
**Includes partial (n=13) and complete (n=62) first-line DST results.

Fig 2. Laboratory results received by reporting method

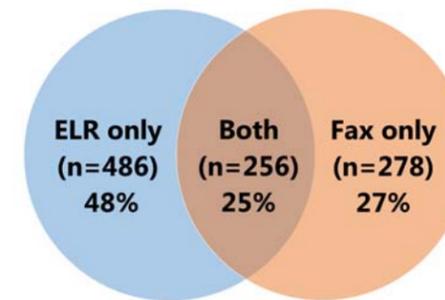
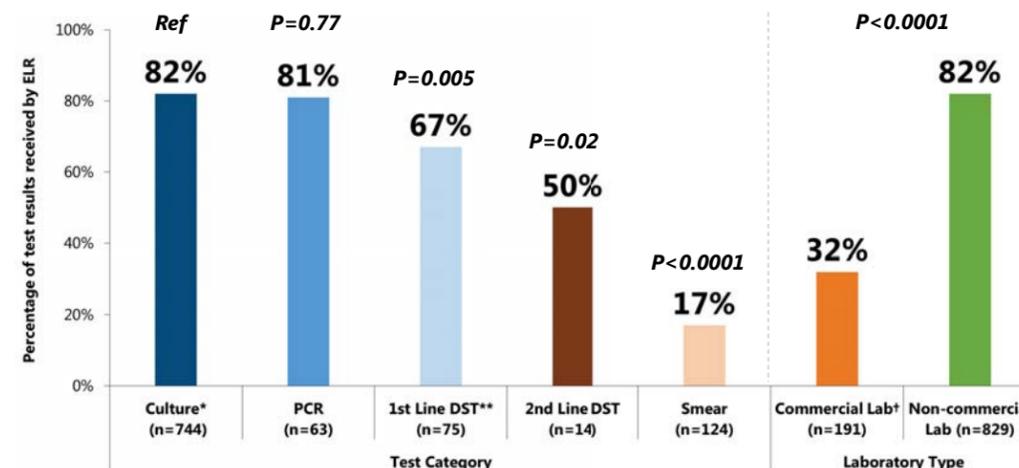


Figure 3. Percentage of test results received by ELR per test category and laboratory type



*Reference group for test category includes AFB isolated (n=492) and *M.tb* identified (n=252) from culture.
**Includes partial (n=13) and complete (n=62) first-line DST results.
†Includes ARUP (n=18), LabCorp (n=73), and Quest (n=100).

Table 1. ELR delays by laboratory type and test category

	Number of Tests	Median Time, Days (Q1, Q3) [^]	Min [^]	Max [^]
Laboratory Type				
Commercial [†]	34	0 (-1, 0)	-26	25
Non-commercial	222	0 (0, 0)	-54	226
Test Type				
Culture*	173	0 (-1, 0)	-54	226
DST**	39	0 (-1, 0)	-17	75
PCR	36	0 (0, 0)	-9	25
Smear	8	1 (0, 1)	0	2

Includes results received by both ELR and fax.
[^]A positive value indicates that the ELR was received after the corresponding fax.
[†]Includes LabCorp (n=9) and Quest (n=25).
*Includes AFB isolated (n=52) and *M.tb* identified (n=121) from culture.
**Includes partial (n=5) and complete (n=28) first-line DST and second-line DST (n=6).

KEY FINDINGS

- During the 3 month evaluation, 1,276 positive laboratory reports were submitted to SCCPHD TB Program (Figure 1), including 256 (25%) received by both ELR and fax, 486 (48%) by ELR only, and 278 (27%) by fax only (Figure 2).
- ELR completeness for AFB smear (17%, *p*<0.0001), first-line (67%, *p*=0.005), and second-line (50%, *p*=0.02) drug susceptibility testing (DST) results were significantly lower than for AFB/*Mycobacterium tuberculosis* complex isolated from culture (82%; Figure 3). The percentage of results received by ELR was lower for commercial laboratories (i.e. Quest, LabCorp and ARUP) than non-commercial laboratories (32% vs. 82%, *p*<0.0001; Figure 3).
- Among 256 results received by both fax and ELR, 30 (12%) had ELR delays of ≥ one day, and 62 (24%) had fax delays of ≥ one day, with a median time of zero days between the ELR date and fax date (Table 1).

CONCLUSIONS

- ELR is a critical component of laboratory reporting for tuberculosis as 48% of laboratory results were received only by ELR.
- ELR is not sufficient at the present time, however, as 27% of all results were received only by fax. ELR for AFB smears and DST results is less complete as compared with culture results and is less complete for commercial laboratories than non-commercial laboratories.
- Receipt of laboratory results by fax, in addition to ELR, is still needed at the present time to avoid missed reports of TB cases.
- During the laboratory onboarding process, it is essential to verify that reportable laboratory results are electronically transmitted with fidelity. Before altering laboratory reporting practices, a systematic assessment of the completeness and timeliness of ELR is advised.
- SCCPHD is collaborating with the California Department of Public Health to address ELR deficiencies.

REFERENCES

1. California Reportable Diseases Information Exchange, <https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/CalREDIE.aspx>
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3. Stewart RJ, Tsang CA, Pratt RH, et al. Tuberculosis — United States, 2017. MMWR, 2018; 67:317-23.