



LOS ANGELES FIRE DEPARTMENT

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FIRE CHIEF

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BOARD OF FIRE COMMISSIONERS
FILE NO. 19-015

TO: Board of Fire Commissioners

FROM:  Ralph M. Terrazas, Fire Chief

SUBJECT: TIERED DISPATCH SYSTEM (TDS) UPDATE

FINAL ACTION:	<input type="checkbox"/> Approved	<input type="checkbox"/> Approved w/Corrections	<input type="checkbox"/> Withdrawn
	<input type="checkbox"/> Denied	<input type="checkbox"/> Received & Filed	<input type="checkbox"/> Other

SUMMARY

On December 1, 2014, the Los Angeles Fire Department (LAFD) implemented a new emergency medical dispatch system called the Los Angeles Tiered Dispatch System (LA-TDS.) The purpose of TDS was to improve the handling of emergency medical calls for service by improving and streamlining the 911 interrogation process. This new medical dispatch system replaced a commercially available off-the shelf dispatch system which could not be modified and tailored to best fit our deployment model and the needs of our community. TDS was developed by the Emergency Medical Services Bureau (EMS Bureau) with considerable input by a workgroup of experienced dispatchers at Metropolitan Communications Center (MFC), evaluating best practices around the country and using the experience of the workgroup.

RECOMMENDATION

That the Board:
Receive and file.

FINDINGS

The following enhancements have been implemented in TDS:

1. Integration of fully automated TDS software to interrogate callers and quickly process 911 calls.
2. Replacement of the spiral bound manual TDS card sets with a card tray that allows for the updating of individual Complaint Cards.
3. Automation with software of the Emergency Instructions that direct call-takers to provide life-saving care by bystanders prior to the arrival of Fire Department resources. This provides for consistent, accurate and timely instructions for CPR, choking, childbirth, drowning, and severe hemorrhage.
4. Modifications of dispatch algorithms to refine the accuracy of resource assignment.
5. Implementation of a dispatch algorithm using Automated Vehicle Location (AVL).

In keeping with the Department's goal of maintaining TDS, the software is now fully supported by the in-house CAD Support Team instead of an outside vendor. The Dispatch Manager, the Dispatch Quality Improvement Unit, and the Medical Director continually monitor performance to enhance the system. There are currently 110 members of the LAFD with a TDS credential to work as an emergency medical dispatcher (EMD).

TDS performance metrics

The original goals this new dispatch system were to:

- (1) Improve dispatch efficiency,
- (2) Decrease call processing time to time-critical patients; and
- (3) Improve call-taker recognition of cardiac arrest and rate of dispatch-assisted CPR

A detailed analysis of the metrics of TDS compared to our previous dispatch system revealed the following:

1. Call processing times for the most critical EMS incidents ("Immediate Dispatches") decreased by 16 seconds, which was almost 20% faster. Call processing times for "active seizures", decreased by 30 seconds, which was a 32% decrease. (Just under 9% of all cardiac arrests found in a shockable rhythm present and are dispatched as an "active seizure.")
2. Recognition of cardiac arrests increased from 35% to over 90%, which is a remarkable achievement.
3. Operational efficiency: The dispatch algorithms associated with TDS are continually analyzed and periodically modified based upon comparing dispatch data with ePCR data, i.e., what level of resources were dispatched versus what the level of care the patient actually required on scene.

A primary focus was to decrease the overutilization of paramedic rescue ambulances (RAs) on incidents that only required BLS care (dispatch over-triage). The rate of dispatch over-triage for paramedic RAs decreased from 36% in 2016 to just under 20% in 2018. The rate of critical under-triage (sending BLS resources alone to critical ALS patients in 2018 was less than 0.1%.

Further adjustment of the dispatch algorithms included sending BLS ambulances alone (without fire companies) outside of the first-in districts on non-emergency responses and a select group of low risk emergency dispatches.

The impact of these changes over the past three years are shown below:

Annual Unit Dispatches for EMS Incidents				
Unit Type (LAFD)	2016	2017	2018	% Change 2016 – 2018
E - ENGINE	272,018	278,784	282,394	+3.8%
ALS RESCUE AMBULANCE	281,607	267,116	260,227	-7.6%
BLS RESCUE AMBULANCE	140,036	165,845	175,514	+25.3%
T - TRUCK	48,699	48,794	45,127	-7.3%
TOTAL	742,360	760,539	763,262	+2.8%

This data shows a much more efficient use of our resources for EMS incidents.

Despite an increase of 2.8% in the number of EMS incidents, paramedic RA responses actually *decreased by 7.6%*. The marked increase in BLS RA responses reflect more accurate dispatching and decrease over triage.

Using LA-TDS, LAFD call-takers have achieved the following metrics for cardiac arrest incidents:

1. ↑ the rate of cardiac arrest recognition by 9%
2. ↓ the average time to cardiac arrest recognition by 31%
3. ↓ the average call processing time by 26%
4. ↓ the average time to provision of dispatcher-assisted chest compression CPR by 22%
5. ↑ the number of cardiac arrest patients getting immediate bystander CPR from 43% to 57% - the largest one year increase ever documented in a major US city.

CONCLUSION

The LAFD has taken significant steps in improving fire department dispatch operations, emergency resource utilization, and patient care with the implementation of LA-TDS.

LA-TDS has significantly improved and expedited care for the most critical patients in our city, while simultaneously improving dispatch efficiency to low acuity calls. Careful analysis and refinement of our dispatch algorithms has significantly decreased over-triage by sending the right level of resources to the patient, which increases availability of paramedic ambulances.

Ongoing efforts are to implement additional dispatch algorithms using AVL to ensure that the closest resource is dispatched to time-critical incidents.

Board Report prepared by Marc Eckstein, M.D., MPH, Medical Director, EMS Bureau Commander.