Costs Saved Using Video Directly Observed Therapy on Tuberculosis Patients

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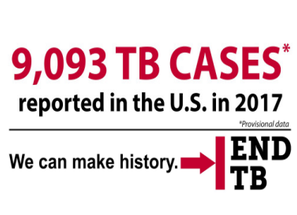
Harris County Public Health

Harris County Public Health (HCPH) is the county health department serving Harris County, Texas jurisdiction. The county covers 1778 square miles and ranks as the 3rd most populous county in the nation. The tuberculosis (TB) case rate in Harris County is twice the US and Texas rate (7.6 cases per 100,000 population). Video Directly Observed Therapy (VDOT) for TB disease and infection was adopted by HCPH in 2014 to offer patients increased flexibility while reducing the enormous cost of providing traditional Directly Observed Therapy (DOT). To date, 548 patients have used VDOT in Harris County.

Background and Epidemiology of Tuberculosis

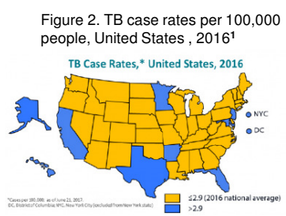
Tuberculosis (TB) is an infectious airborne disease caused by Mycobacterium tuberculosis.



CDC

Figure 1. Number of TB cases in 2017 in the U.S.

Figure 2. TB case rates per 100,000 people, United States , 2016[1]



CDC

Video Directly Observed Therapy (VDOT)

- HCPH VDOT: asynchronous; patients upload videos of themselves taking medication on a HIPAA compliant platform.
- Trained TB staff view the videos during normal business hours and accept or reject the videos.

Table 1. Advantages and disadvantages of VDOT compared to DOT

Advantages of VDOT	Disadvantages of VDOT
• Better medication adherence • Time and cost-savings • Convenient for patient and staff • Allows patients autonomy and flexibility	• Not reliable with patients who are likely to have poor DOT adherence • Smartphone-based technology required

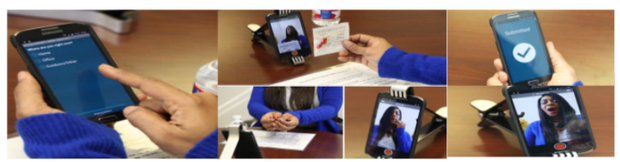


Figure 3: A collection of photos demonstrates how a patient records her video on the mobile device while taking her pills and then submits the video to HCPH for review.

Project Description and Objectives

- **Objective 1:** To calculate the costs averted by switching patients from DOT to VDOT in the funding years October 2015-September 2016 and October 2016-September 2017
- **Objective 2:** To compare these cost savings with 2014-2015 savings.

Methods

Schematic of workflow

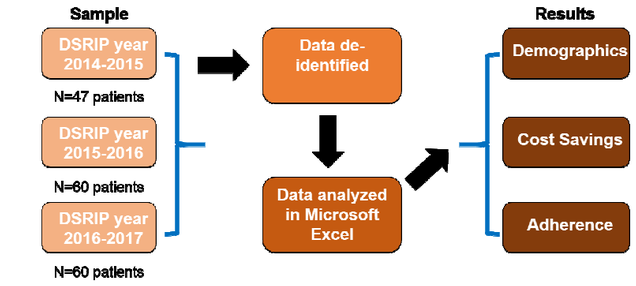


Figure 4. Workflow of data analysis. DSRIP represents the funding year beginning October 1 and ending September 30. See Table 1 for explanation of adherence calculations.

Conceptual model of cost savings calculations

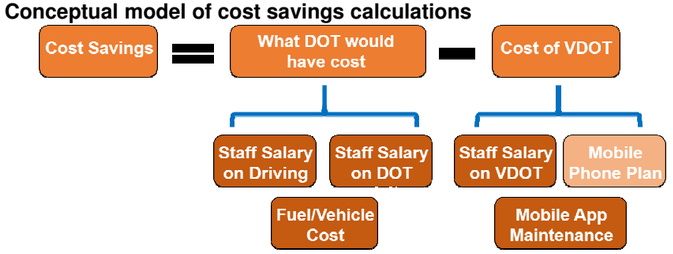


Figure 5. Conceptual model used to calculate the costs averted by placing 167 patients on VDOT. In DSRIP years 2014-2015 and 2015-2016, patients were given mobile phones with monthly plans. In 2016-2017, the app became available on Android eliminating the cost of the plan.

Results of VDOT Enrollment and Adherence 2014-2016

Table 2. Adherence rate of VDOT doses for individuals with active TB disease or TB infection enrolled in VDOT program for calendar years 2014-2016

Year	Individuals enrolled in VDOT*	VDOT adherence** percentage	DOT adherence percentage
2014-2015	47	92%	97%
2015-2016	60	95%	97%
2016-2017	60	94%	97%

*Samples do not represent all patients enrolled in VDOT, but the number of patients needed for DSRIP requirements

**Adherence percentage calculated by dividing the total number of successfully observed doses for all patients by the total number of scheduled doses for all patients.

Results of VDOT Cost Savings

Cost averted by using VDOT in 3 DSRIP years

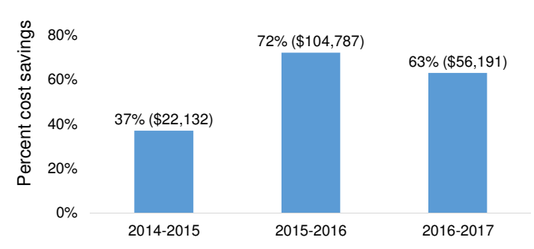


Figure 6. Percent of costs saved by enrolling patients on VDOT instead of DOT for DSRIP years 2014-2015, 2015-2016 and 2016-2017. For example, in DSRIP year 2014-2015, treating 47 patients on VDOT was 37% cheaper than it would be to treat them on DOT. Dollar amount saved in parentheses.

In 2014-2015, 37% of the theoretical cost of providing DOT were averted by placing patients on VDOT, an amount totaling $22,132. In 2015-2016, the program averted 72% of the costs of providing DOT, an amount totaling $104,787. In 2016-2017, 63% of the program costs providing DOT were averted, totaling $56,191. Adherence rate of VDOT cohort in 2014-2015 was 92%, slightly lower than the 97% rate achieved with traditional DOT. Whereas, cohorts in 2015-2016, the VDOT and DOT adherence rates were 95% and 97%, respectively. While in 2016-2017, the rates were 94% and 96%.

Public Health Context and Recommendations

- Asynchronous VDOT liberates funds.
- Savings depend on patients' distance to clinic and number of doses.
- VDOT may not be suitable for patients who need hands-on support from outreach workers or have trouble using smart-phone technology.
- Small difference in adherence between VDOT and DOT; addressing technical issues of video scoring could raise VDOT adherence.

Conclusion

The large improvement in cost savings after the 2014-2015 year were due to several factors, including the ability of patients to use their personal mobile devices to download a VDOT app and the greater number of VDOT doses assigned to patients in the 2015-2016 year compared to the 2014-2015 year.

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References

1. CDC Tuberculosis (TB) Fact Sheet. Retrieved from CDC website: https://www.cdc.gov/tb/publications/factsheets/statistics/tbtrends.htm