SOUTHERN ILLINOIS UNIVERSITY EDWARDSVILLE
SCHOOL OF PHARMACY

Evaluating the Accessibility of Automated External Defibrillators (AEDs) in a Community Setting

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BACKGROUND

- Outside-of-hospital cardiac arrest (OHCA) has a survival rate of 10.7%, with approximately 357,000 EMS-assessed OHCA events occurring annually in the U.S.
- High-quality CPR and early defibrillation are the standard care for OHCA; publicly available automatic external defibrillators (AEDs) are crucial for the bystander response to an OHCA prior to EMS arrival
- However, bystander AED application and rates of defibrillation remain low

OBJECTIVES

- Primary: measure the mean time it takes to locate an AED by ambulation in a community setting
- Secondary: rating the difficulty of finding each AED, their accessibility, and reporting the distance from the entrance

METHODS

Study Design
- Quantitative study
- Four Midwest cities: St. Louis, MO, Metro East St. Louis, IL, Indianapolis, IN, and Nashville, TN
- Four categories of locations: retail stores, stand-alone retail pharmacies (front store + visible pharmacy area), fast food restaurants, and grocery stores
- Data collection took place between 8/19/24-11/7/24 between 1200-1700 hours on any day of the week by a sole collector
- Likert scales were used to assess the difficulty of finding each AED and their accessibility
  - Accessibility scale: 3-point scale from accessible with assistance, accessible without assistance, or inaccessible
  - Difficult scale: 8-point scale from very easy to unable to find

Study Sample
- Sample size: minimum of 40 stores per city, with a total of 10 stores in each of four pre-determined categories
- Exclusion criteria: locations that the researcher does not have membership to, require assistance, purchase of a ticket, or permission to enter, banks, and locations unique to a single city

Study Outcomes
- Mean time, distance, difficulty of finding the AED, and accessibility of each AED were all assessed

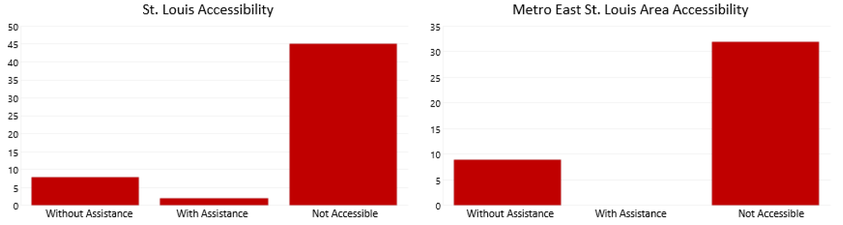
Statistical Analysis
- Hypothesis: there is a statistically significant difference in the mean time to find an AED among the cities compared, with at least one city's mean time differing from the others
- Statistical test: one-way analysis of variance (ANOVA) followed by a post-hoc analysis using Tukey's Honest Significant Difference (HSD)

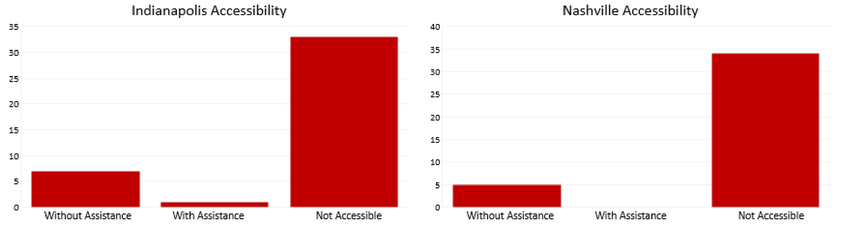
RESULTS

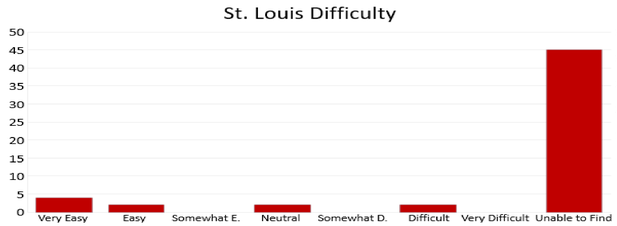
Primary objective
- Low discovery rates; only 32 AEDs found in 177 locations investigated

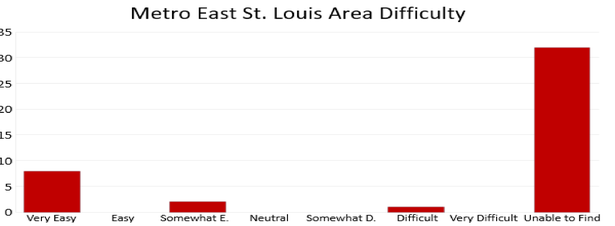
Secondary objectives
- Of the AEDs located, most (28/32) were rated as "accessible without assistance"
- Of the AEDs located, most (24/32) were rated as "very easy" to access
- Average overall distance to available AEDs: 119.46 feet from the entrance of the building

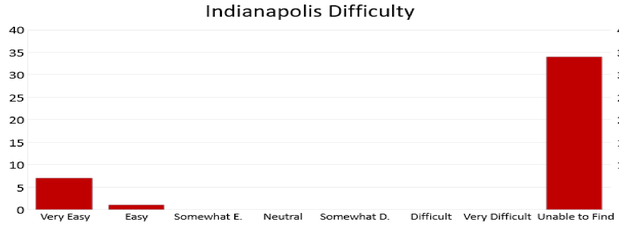
Statistical analysis
- One-way ANOVA results: statistically significant difference in mean times to locate an AED between the four cities ($F(1,6)=7.11$, $p=0.0368$)
- Confirmed with Tukey's HSD: $p = 0.0368$

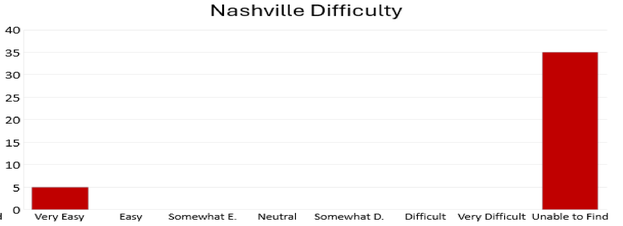












Number of AEDs Found per Category

	St. Louis, MO	Metro East St. Louis, IL	Indianapolis, IN	Nashville, TN
Found/Total Searched	15/54	9/42	8/41	5/40
Retail	8/15	5/9	7/8	5/5
Fast Food	0	0	0	0
Pharmacy	0	0	0	0
Grocery	7/15	4/9	1/8	0/5

	St. Louis, MO	Metro East St. Louis, IL	Indianapolis, IN	Nashville, TN
Overall mean time to AED	113.4 seconds	43.4 seconds	34.4 seconds	29.2 seconds
Mean Time to AED by Category of Store (in seconds)				
Retail	86.3	33.4	35.8	29.2
Fast Food	N/A*	N/A*	N/A*	N/A*
Pharmacy	N/A*	N/A*	N/A*	N/A*
Grocery	125	55.7	24	N/A

*No AEDs located; no mean time could be calculated

CONCLUSION

- The difference between the mean times to find an AED in each city was statistically significant ($p < 0.05$)
- The mean times to find an AED for all cities and categories of locations are all less than two minutes from the entrance of the buildings
- AEDs that are available are predominately accessible to the public without assistance and very easy to find
- AED availability is low overall, with retail pharmacies and fast-food restaurants lacking AEDs in all instances
- Grocery stores and retail stores had the most AEDs
- The average distance to an AED was 119.46 feet
- These findings suggest that the time to locate an AED is influenced by the city in which a search is conducted, warranting further investigation into the underlying reasons for these differences

LIMITATIONS

- Unknown effect of how bystander or employee assistance would impact the length of time to find an AED
- Data collector is in the healthcare profession and therefore may have more knowledge of what an AED is and how to find one in a public setting
- Concern that the data collector improved in the ability to find an AED based on the repetition of the activity over the study period
- Small sample size compared to available community settings and cities in the United States

APPLICATION

- Scan QR code below to see an outline of a plan to create a mobile application to locate nearby AEDs for bystanders that witness an OHCA

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