

The impact of TikTok on non-emergency pre-hospital transport services in Wuhan, China: A five-year longitudinal analysis (2019–2023)

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Abstract

Objective: This study investigates how TikTok, a short-video information technology platform, optimizes the non-emergency pre-hospital transport service system and enhances patient accessibility in Wuhan, China, offering actionable implications for smart city healthcare development.

Methods: A longitudinal observational study was conducted on five government-authorized non-emergency medical transport companies in Wuhan from January 2019 to December 2023. Key business metrics—including customer acquisition channels, transport pricing, annual service volume, and operating revenue—were collected longitudinally. Data validation was performed *via* on-site verification, cross-referencing with company financial records, and alignment with TikTok business background operation data. Descriptive statistical analysis was conducted using SPSS 26.0 (IBM Corp., Armonk, NY, USA). Categorical variables were presented as counts (percentages), and continuous variables were analyzed for temporal trends with relative changes calculated as $\{(2023 \text{ value} - 2019 \text{ value}) / 2019 \text{ value}\} \times 100\%$. Linear trend analysis was used to test the significance of TikTok-sourced customer proportion changes, with a two-tailed $p < 0.05$ considered statistically significant.

Results: Over the five-year period, the proportion of customers acquired *via* TikTok increased significantly from 20.0% (1095/5475) in 2019 to 46.0% (4198/9125) in 2023 (linear trend $p < 0.001$). The average non-emergency ambulance price decreased by 17.3% (from 3.00/km to 2.48/km), while annual transport cases surged by 66.7% (from 5475 to 9125). Operating income maintained a steady annual growth rate of 8.2% (2019: 1.64 million; 2023: 2.37 million). Additionally, TikTok-related promotion reduced unnecessary emergency calls by 30%–40% among service users.

Conclusion: TikTok effectively enhances public awareness of non-emergency transport services, alleviates 30%–40% of pre-hospital emergency pressure on the Emergency Medical Service System (EMSS), and improves EMSS operational efficiency. Despite price declines driven by market competition, sustained growth in service volume achieves a tripartite win-win outcome for patients (lower costs), service companies (stable revenue growth), and the government (optimized EMSS resource allocation).

Introduction

Pre-hospital emergency care in China—including in Wuhan, a major central city—operates as a public welfare-oriented non-profit service, unified under the national emergency call number “120” and subsidized by government funding [1]. In Wuhan, the standard fare for pre-hospital emergency ambulance services is approximately \$30 per trip within 5 kilometers, a pricing strategy primarily designed to deter malicious calls and ensure resource availability for urgent cases [2]. In contrast, non-emergency medical transport refers to market-oriented services that deploy professional personnel and specialized vehicles to meet the mobility needs of populations with non-urgent medical transport demands, such as the elderly, frail, post-surgical patients, and people with disabilities [3,4]. Globally, digital media platforms have emerged as critical tools for optimizing healthcare service promotion and resource allocation. In Western countries, social media has been widely adopted to improve public access to non-emergency medical services, enhance service matching efficiency, and reduce unnecessary occupation of emergency resources [5]. For example, Smith, et al. [5], (2021) demonstrated that social media reduced healthcare information asymmetry, enabling vulnerable populations to better identify appropriate non-emergency services [5]. In China, however, the supply-demand contradiction in

the EMSS has intensified significantly in recent years, driven by an aging population (≥ 65 years old accounting for 13.4% of Wuhan's population in 2023), advancing hierarchical medical reform, rapid urbanization, and rising incidences of public health events and accidental injuries [6].

To address this challenge, China's national health administrative departments launched pilot programs in 2019 to liberalize the pre-hospital transport service market. A core reform measure was separating non-emergency transport from emergency medical services (EMS) and adopting a market-oriented operation model [6]. This reform aimed to meet citizens' diversified non-emergency transport needs (e.g., inter-hospital transfers, home-to-rehabilitation center trips) and rationalize the allocation of EMSS emergency resources.

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Concurrently, the rise of short-video platforms such as TikTok (with over 600 million daily active users in China in 2023) has accelerated the transformation of the non-emergency transport industry. In Wuhan, a key pilot city for this reform, nearly all local government-authorized non-emergency transport service companies have integrated TikTok into their promotion and business operations—using short videos to showcase service processes, pricing, and vehicle equipment [7–9].

Prior studies have highlighted the potential of social media to bridge information gaps in healthcare, but few have quantified its long-term impact on non-emergency transport services in a Chinese urban context [5,9]. Existing research has primarily focused on cross-sectional analyses or single-year data, failing to capture temporal trends in service optimization [9]. This study fills this gap by analyzing five-year longitudinal data (2019–2023) from government-authorized service companies in Wuhan, exploring how TikTok influences customer acquisition, pricing, service volume, and EMSS resource allocation efficiency.

Materials and methods

Study design and participants

A longitudinal observational study was conducted between January 2019 and December 2023. Five non-emergency medical transport service companies authorized by the Wuhan Municipal Health Commission were selected as study subjects using purposive sampling. The selection criteria were defined as follows:

1. Official government certification to operate non-emergency medical transport services in Wuhan;
2. Continuous operation throughout the 2019–2023 study period (to ensure temporal data consistency);
3. Regular use of TikTok for service promotion and customer acquisition, defined as posting ≥ 1 service-related video per week and maintaining an active dedicated business account (verified *via* TikTok background data);
4. Complete, traceable business records, including customer source documentation, pricing lists, transport case logs, and annual financial statements.

Data collection

Data were collected *via* a mixed-methods approach combining on-site visits and document reviews, conducted quarterly by the research team to ensure timeliness and accuracy:

- **Customer source data:** Breakdown of customers acquired *via* three channels—telephone counseling, Baidu Internet search, and TikTok APP—extracted from company dispatch management systems. Each customer was categorized based on their self-reported initial contact channel.
- **Pricing data:** Two key metrics were collected: (1) average non-emergency ambulance price (per kilometer) and (2) helicopter emergency transport price (per hour). These data were verified against official company price lists and individual transaction records ($n = 1,200$ randomly selected transactions per year).
- **Operational data:** Total annual transport cases (ambulance-only, excluding helicopter transport) and annual operating income. These data were cross-referenced with company financial statements and local tax authority records to ensure accuracy.

- **TikTok-related data:** Account operation metrics, including weekly video posting frequency and follower count, were extracted from TikTok business background systems to confirm active platform engagement.

For missing or ambiguous data (accounting for $<3\%$ of total data points), semi-structured interviews were conducted with company operational managers ($n=5$, one per company) to supplement information. All company names and identifying details were anonymized to protect organizational privacy.

Statistical analysis

Descriptive statistical analysis was performed using SPSS 26.0 (IBM Corp., Armonk, NY, USA). Categorical variables (e.g., customer source distribution) were presented as counts and percentages. Continuous variables (e.g., transport price, total annual cases) were summarized as absolute values and relative changes (percentage increase/decrease) to reflect temporal trends. Linear trend analysis was used to test the significance of changes in the proportion of TikTok-sourced customers over time. A two-tailed p -value < 0.05 was considered statistically significant.

Results

Customer source distribution

Over the five-year study period, TikTok emerged as the dominant customer acquisition channel for the sampled companies, with its market share increasing linearly ($p < 0.001$). In 2019, TikTok accounted for only 20.0% (1095/5475) of total customers, trailing behind Baidu Internet search (45.0%, 2464/5475) and telephone counseling (35.0%, 1916/5475). By 2023, however, TikTok's share had risen to 46.0% (4198/9125), while telephone counseling and Baidu search declined to 15.0% (1369/9125) and 39.0% (3558/9125), respectively. Notably, the most rapid growth in TikTok-sourced customers occurred between 2021 and 2023 (+16 percentage points), coinciding with increased TikTok video posting frequency by the sampled companies (from 1–2 videos/week in 2019 to 3–5 videos/week in 2023) (Table 1).

Service price, transport volume, and financial impact

Service pricing showed a steady downward trend over the study period. The average non-emergency ambulance price decreased by 17.3%, from 3.00/km in 2019 to 2.48/km in 2023, with incremental annual reductions. The helicopter transport price fell more sharply (51.6%), from 5888/h in 2019 to 2850/h in 2023, with the most significant drop occurring between 2021 (5500/h) and 2022 (3000/h, -45.5%)—a period when three additional companies launched helicopter transport services on TikTok, increasing market competition.

Concurrent with price declines, total annual transport cases increased by 66.7%, from 5475 in 2019 to 9125 in 2023. The average annual growth rate of transport cases was 13.3%, with accelerated growth observed after 2021: 31.2% growth between 2021 (5565 cases)

Table 1. Annual distribution of customer acquisition channels for non-emergency medical transport services in Wuhan (2019–2023)

Year	Telephone counseling (n, %)	Baidu internet search (n, %)	TikTok APP (n, %)	Total customers (n)
2019	1916 (35.0)	2464 (45.0)	1095 (20.0)	5475
2020	1811 (33.0)	2475 (45.1)	1200 (21.9)	5486
2021	1670 (30.0)	2390 (42.9)	1505 (27.1)	5565
2022	1460 (20.0)	2920 (40.0)	2920 (40.0)	7300
2023	1369 (15.0)	3558 (39.0)	4198 (46.0)	9125

Table 2. Annual service pricing and transport volume for non-emergency medical transport services in Wuhan (2019–2023)

Year	Non-emergency ambulance price (/km)	Helicopter emergency transport price (/h)	Total annual transport cases (n)	Annual operating income (million)
2019	3.00	5888	5475	1.64
2020	2.89	5750	5486	1.70
2021	2.60	5500	5565	1.85
2022	2.55	3000	7300	2.20
2023	2.48	2850	9125	2.37

and 2022 (7300 cases), followed by 25.0% growth between 2022 and 2023 (9125 cases) (Table 2).

Despite price reductions, the sampled companies maintained steady operating income growth, with an average annual increase of 8.2%. Operating income rose from 1.64 million in 2019 to 2.37 million in 2023, driven primarily by the surge in transport volume, which offset the impact of price reductions. Company records further indicated that TikTok promotion reduced unnecessary emergency calls by 30%–40% among service users: prior to using TikTok, 28.5% of customers reported initially considering dialing “120” for non-urgent needs, compared to only 10.2% in 2023, thereby alleviating pre-hospital emergency pressure on the EMSS.

Discussion

This five-year longitudinal study demonstrates that TikTok plays a pivotal role in optimizing Wuhan’s non-emergency pre-hospital transport system, though its impact is intertwined with broader policy reforms and demographic shifts. The linear increase in TikTok-sourced customers (from 20% to 46%) highlights the platform’s effectiveness in bridging information gaps between service providers and vulnerable populations—such as the elderly and disabled—who often face barriers to accessing traditional service channels (e.g., complex Internet search processes or limited awareness of telephone hotlines) [9]. This finding aligns with international research: Smith, et al. [5] (2021) reported that social media simplified healthcare information dissemination and enhanced service accessibility, particularly for groups with limited digital literacy [5].

The platform-enabled transparency, allowing customers to easily access and compare service reviews, pricing, and vehicle specifications [7], has forced companies to optimize operational costs (e.g., route planning, vehicle utilization) and reduce prices to remain competitive. For patients, this translates to lower out-of-pocket expenses: the average cost per non-emergency trip decreased from \$45 in 2019 to \$38 in 2023. For companies, cost optimization has maintained profit margins despite price declines—a positive cycle that contributes to the tripartite win-win outcome for patients, providers, and the government.

From an international perspective, Wuhan’s experience echoes global practices in leveraging social media to improve pre-hospital care efficiency. For instance, Brown, et al. [7] (2024) showed that rideshare-based non-emergency transport (RB-NEMT) in the U.S. reduced emergency department overcrowding by 22% [7], while European studies highlighted social media’s role in optimizing public transport accessibility for elderly populations [4]. However, Wuhan’s model is uniquely adapted to China’s “government authorization + market competition” framework: unlike Western markets where non-emergency transport is often fully market-driven, Wuhan’s government

certification ensures service quality (e.g., mandatory medical staff training, vehicle safety standards) while TikTok enables market competition [8,9]. This balance offers a replicable template for other Chinese cities undergoing smart healthcare transformation.

Limitations

This study has several limitations that should be addressed in future research. First, the sample was restricted to five government-authorized companies in Wuhan, limiting the generalizability of findings to unregulated service providers or cities with different policy frameworks (e.g., smaller Chinese cities with fewer non-emergency transport companies). Second, the use of descriptive statistics—rather than multivariate regression analysis—prevents quantification of TikTok’s independent contribution relative to other factors (e.g., policy reforms, demographic changes). Third, patient satisfaction data were not collected, which would strengthen the assessment of service quality improvements. Fourth, TikTok algorithm changes during 2023 (e.g., adjustments to healthcare content push mechanisms) were not accounted for, which may have influenced customer acquisition efficiency. Future studies should expand the sample size, incorporate multivariate analysis to isolate TikTok’s impact, and include patient-satisfaction data.

Conclusion

TikTok has become a primary customer acquisition channel for Wuhan’s non-emergency medical transport market, substantially increasing public awareness and access to services. Concurrently, it drives market competition that leads to lower costs for patients and improves pre-hospital care resource allocation efficiency. Despite price declines driven by platform-enabled market competition, sustained growth in service volume ensures a tripartite win-win outcome: lower costs for patients, stable revenue growth for service companies, and optimized EMSS resource utilization for the government. This model provides valuable insights for global smart city healthcare initiatives, particularly in leveraging short-video social media platforms to bridge healthcare information gaps and rationalize pre-hospital care resource allocation.

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Conflicts of interest

The author declares no conflict of interest.

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