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Hospital Carpooling App: Give a Ride to Improve Sustainable Mobility
 Taichung Tzu Chi Hospital, Tzu Chi Medical Foundation

GGHH Agenda Goals

- Leadership
- Transportation

Hospital Goal

- Reduce carbon dioxide emission 3 tons per year through integration of sustainable transport system.
- Encourage participation of employees and patients through heightened number of carpooling by 6500 users in 2016

Progress Achieved

The development of a Carpooling Services mobile app truly entails the initial cost. By implementing this strategy, the hospital invested approximately NTD 100,000 (USD 3,200). However, the benefits reaped from the established system offsets the costs. Since 2011, accumulated total savings of 1,688,412 liters for the 95 unleaded gasoline vehicles is NT\$26,405,656 (US\$ 833,512). The transport system has serviced 277,534 passengers. Together, this system had successfully offset 3,732 tons of carbon dioxide.

The Issue

The World Health Organization recommends reducing greenhouse gas emission to promote populations' health. According to statistics from the U.S. Environmental Protection Agency, 13% of greenhouse gas emission comes from vehicle exhaustion. Hospital carpooling services can support sustainable transport, optimizing the occupancy rate of vehicles and increasing accessibility of rural populations to medical care. Carpooling passengers will help reduce high greenhouse gas emission by cars through reduced vehicle use, hence leading to less air pollution.

Sustainability Strategy Implemented



The screenshot shows the 'Tanzi Line Bus Schedule' app interface. At the top, it displays the hospital logo and the title '潭子共乘車' (Tanzi Line Bus). Below this is a table with two columns: '時間' (Time) and '停靠點' (Stops). The table lists two main time slots: 09:00-10:00 and 14:00-15:00. The 09:00-10:00 slot includes stops at 光陽、潭陽路口 (7-11), 法冠素食(雅潭 中山路口), and 全聯潭子店斜對面(潭秀國中). The 14:00-15:00 slot includes stops at 康是美(勝利路185號), 國通南興第一路口(58號公車站牌), 中山合作街口公車站, 僑志國小公車站, 中山路一段45號(楓康超商), and 復興路一段(怡美計程車行). Below the table is a map showing the bus route. At the bottom of the app interface, there are several blue buttons for navigation and information.

Tanzi Line Bus Schedule

The hospital carpooling buses are to serve the community who would be travelling more than 20 kilometers (km) away from the hospital. Buses are linked with a customized mobile application (Patent no. M46339). The application provides real-time information about the departure and arrival time of the buses in every stop. Passengers can conveniently wait at the out-patient area once they arrive at the hospital.

In order to encourage more hospital visitors to use the service, the hospital developed brochures which are strategically placed within the hospital premises. To maintain and enhance the quality of transportation services the hospital need to spend around NTD 1,400,000 (US\$ 44,191). These measures enable Taichung Tzu Chi Hospital to keep their transportation services quality maintained.

Implementation Process

The hospital established a team which consists of staff from Medical Affairs Department and General Affairs Department. They also involve the hospital carpooling volunteers who are trained and are tasked to plan and adjust routes of the Carpooling service. They are required to monitor the number of passengers from each and every stop. The collected data are used for tracking the service, analyzing the current system and identifying possible improvements for future.



Tracking Progress

The carpooling services had been able to reduce the volume of fuel utilized to transport individuals and patients from the hospital to other strategic locations near their homes. The table provided below shows the volume of fuel conserved and the cost saved annually since its implementation.

Table 1.0 Conserved Fuel from the Transportation System

Year	Volume of Fuel in Liters for 95 unleaded gasoline buses	Cost Savings in New Taiwan Dollar (NTD)
2011	45,825	714,622
2012	133,412	2,087,262
2013	234,070	3,658,018
2014	465,437	7,280,660
2015	529,364	8,278,302

2016 (Jan-Jul)	280,304	4,386,792
Total saving:	1,688,412	NT\$26,405,656 (US\$ 838,700)

Table 2.0 Carbon Emission Reduction from the Transportation System

Year	Distance Travelled (in Km)	Total Distance Travelled(km)	Number of passenger	Carbon Dioxide Emission Reduction (tons)
2011	27	458,255	16,844	101
2012	35	1,334,124	37,573	295
2013	36	2,340,705	65,027	517
2014	74	4,654,378	62,897	1029
2015	88	5,293,640	60,155	1170
2016 Jan-Jul	80	2,803,040	35,038	620
Total	340	16,884,142	277,534	3732

The service provided by the hospital to their patients enables them to sustainably transport 250 persons per day to meet their medical needs. The Bus Transit System particularly services the patients and individuals living 20Km or farther from the hospital.

Since December 2010 to July 2016 the hospital carpooling service provided 277,534 person-times. Ninety percent of the passengers were between ages 40-65 years old, 36% had Oriental Medicine appointments, 22% had Neurology appointments, and 16% had Gastroenterology appointments. The number of carpooling routes increased from 9 to 12 in year 2013 with about 120 bus stops. The number of person-year served increased by 1.7 fold in year 2012. From year 2011 to 2015 CO2 emission equivalent to 3,112 metric tons was conserved (4,893,082 Kilowatt-Hour).

Challenges and Lessons Learned

We collaborated with community health center, through their routine health talks and workshops; we try to promote the benefits of Bus Transit System. During off-peak hours, when fewer passengers are taking the rides, the frequency of the pick-ups is adjusted.

The local government has learned of the need for public transportation to the hospital in certain areas, they therefore had to reorient the service route in order to avoid overlapping of their own resources with that of what Tzu Chi is already doing. One certain bus – Bus #123’s route was integrated with that of the service areas of Tzu Chi and therefore has avoided unnecessary trips and excess in resources.

Next Steps

In the future, the plan is to develop routes according to the feedbacks collected from passengers and volunteers. The service expansions will be planned geographically (distance of every 10kms from hospital). We wish to increase the engagement of the local community leaders, volunteers other stakeholders in developing the Bus Transit System. They will join the hospital in identifying the stops and ways to further improve the service. With the use smart integrating system, the most energy-efficient and carbon - emission saving way of transporting hospital visitors will be calculated and developed.



Demographic Information

Taichung Tzu Chi Hospital is located in Tanzi District of Taichung City (Central part of Taiwan), spanning over 184,921 square-meters and holds a 1081 beds capacity, with a staff member of more than 1,500. We provide holistic health care and preventive medicine services through community, home visits and health counseling. We opted for local construction materials to protect the ecosystem and to prevent land erosion.

Links

<http://taichung.tzuchi.com.tw/w/?id=1581>