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Organized youth sports and commuting behavior: The environmental impact of decentralized community sport facilities

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1. Background

For many children, their lives revolve around an expanding territory to attend school, sports and other activities (Freeman and Quigg, 2009). Freeman and Quigg (2009) reported parents were typically very supportive of their children's out-of-school activities but spend a considerable amount of time transporting to and from activities. For example, Hjorthol and Fyhri (2009) found that most organized activities for children take place outside the immediate neighborhood and the most typical transportation to these activities is by car. Zeiher (2001) characterizes children's everyday life as "insularizational" and claims that home, school, and sport environments are seen as islands in the landscape that require parent-controlled transportation.

An unintended consequence of parents driving their children to and from an array of activities is the contributed carbon emissions and subsequent environmental impact. For example, automobile use represents the human activity contributing the most to air pollution (Barkenbus, 2009). When parents use their car to drive their children to an expanding territory of extracurricular activities like sport practices, they are contributing to global carbon (CO2) emissions, and with 40 percent of all households having at least one child participating in youth sports across the United States (SFIA, 2015), 75% of all families with school aged children have at least one child participating in sport accounting for approximately 45 million youth sport participants (Merkel, 2013), the commuting behavior associated with children participating in sport represents a significant environmental concern. Furthermore, with regard to personal car travel, people tend to perceive car emissions as less severe because it is associated with a personal benefit or necessity. Globally, an unfortunate reality of youth sport today is the decentralized location of participation opportunities, not only in the United States, but in countries such as Norway (Hjorthol and Fyhri, 2009). If parents want their children to participate in sport than car travel is viewed as a necessity.

Historically, most communities included small neighborhood schools that served as "anchors" in the community offering safe places for after-school programs that included recreation and sport activities. However, after the 1950s, most states created policies on the size and location of school buildings that influenced siting of facilities (Schlossber et al., 2006). In order to qualify for state funding, schools were required to have a minimum acreage which pushed schools and, subsequently community recreation facilities, to the outskirts of urban areas (Schlossber et al., 2006). The result has been an increasing territory or decentralization of facilities to accommodate children's sport participation and greater dependence on car travel to allow participation.

As Mallen et al. (2011) found, environmental degradation is a concern across all levels of the sport industry. Grant (2014) provided evidence that sport produces challenges around waste, disproportionate consumption of raw materials, draining of local water supplies, and an increase in traffic and traffic related air pollution. However, at the sport facility, event, and organizational level there has been progress to mitigate environmental impacts (Casper and Pfahl, 2015). Indeed, McCullough et al. (2016) found that professional sport organizations have begun to address the environmental issues of sport and Babiak and Trendafilova (2011) suggested that many sport organizations are moving toward green management practices. Furthermore, Trendafilova et al. (2013)

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report that environmental management practices are being diffused throughout the professional sport industry. Yet, the environmental impact of youth sport at the individual level has received little attention.

In one of the very few, if not only, studies examining the linkages between automobile use and environmental impacts of a community-based children's sport program, Chard and Mallent (2012) surveyed the car travel behaviors of a small group of parents when travelling to competitions that were not at their home sport facility (e.g., away games). Participants in their study (n = 32) were asked to provide details on the type of car they typically used to transport their child to sport competitions and what "away" games they attended. Their results indicated that a group of 32 sport parents travelled a combined 78,000 km emitting approximately 20 tons of C02 in the course of attending only away games for their child's hockey team. While Chard and Mullen's (2012) study sample was small and didn't include local travel for "home" games and practices, it does seem apparent that the carbon footprint of individual behaviors associated with community recreation and sport participation has been neglected and may be substantial. There is also evidence that children's travel behaviors and attitudes mirror those of their parents, thus the chauffeured child becomes the chauffeuring adult (Mitchell et al., 2007). Moreover, organized youth sports and attributes of the built environment created to support these activities may be contributing to a decentralized commuting culture that is negatively impacting the environment. The energy expenditure or carbon footprint of organized recreation and sports in its current form may be compromising the overall benefits of participation and objective examination of travel behaviors associated with youth sports is needed to evaluate the impact on the environment. Thus, the purpose of this study was to measure the extent of travel associated with a youth sport program and estimate its subsequent environmental impact.

2. Methods

All parents or guardians from a regional competitive youth swim team in Wake County, NC were invited to participate in a study to determine car travel behavior associated with their child's participation in weekly swim practices at area aquatic facilities. From the 450 families with children currently participating on the swim team, 172 parents/guardians agreed to participate in the study (38%). Each participating parent/guardian was asked to complete an informed consent form followed by a brief survey to identify where they lived, the number of children in their household who participated on the swim team, characteristics of the car they used to drive their child to swim practice, and if they participated in a carpool with other swim team families to reduce the number of weekly commutes to practices.

The swim program operates during 47 weeks for the year, which is typical for a competitive swim club. This is representative of a swimming season for a club that participates in short course season and long course season. For example, Team Sopris, a competitive swim club in Glenwood Springs, Colorado suggests to new parents that most swimmers get a break in August, but otherwise participate in "swimming season" from September through early August (Team Sopris, 2017). For a period of three non-consecutive weeks during the season, each participating parent received a series of text messages with questions about their car travel associated with driving to and from swim practices over the previous seven days and the number of additional non-familial children they provided rides to/from practices in the past week. Travel data collection weeks were purposely selected to avoid weeks that included statutory holidays or weekend swim meets that would disrupt a typical week of practices.

The use of Short Message Service (SMS) messages in this study was an efficient and effective method of collecting data on participant car travel behavior associated with their child's participation in weekly swim practices. The usage of SMS messaging for data collection has been validated in a number of health studies (e.g. Chang et al., 2014; Kew, 2010; Whitford et al., 2012). Participants would receive specific messages to respond to on Sundays because no practices are ever scheduled on Sunday. For example, participants received the following text: "In the past seven days, how many times did you drive your child either to practice or pickup and drive your child home from practice."

Responses to car travel inquiry texts sent to the 172 participants were as follows: Week 1, 128 respondents (74%); Week 2, 128 respondents (74%); Week 3, 125 respondents (73%). Travel data responses were then matched with participant survey responses using subject identifiers to determine travel distances, time of travel, and logical route choices for each participant. Participant practice times, provided by the youth sport organization, varied by participant but all occurred between 4:30p.m. and 7:00p.m. Monday to Friday and 10:00 a.m. – 12:30p.m. on Saturday each week. Google maps was used to determine distance, time, and route choice for each participant. The researchers input the starting location of each vehicle as the origin and the practice facility as the destination. We then specified the "Depart At" time in order to allow the vehicle to arrive at the practice facility on time. For example, if a practice start time was indicated as being 5PM and Google Maps expected the trip to take 30 min for the vehicle to arrive at practice, we would set the "Depart At" time from the origin at 4:25 to allow the vehicle to arrive 5 min before practice began. When inputting the "Depart At" time as 4:25, Google Maps provides a "typical" expected time for arrival with a low estimate and a high estimate. In this example, Google Maps might indicate that if you leave from a specific origin at 4:25, it will take you 25–35 min to arrive at a destination. We would average the expected time to arrive at one number. Therefore, in this example, the expected number of minutes would be 30 min for an arrival time of 4:55.

After recording the time, the researchers would then record the miles driven on the shortest and quickest recommended route. We recorded the total miles traveled and recorded the miles driven on each route as miles driven on local roads, highways, and interstate. We then did the process all over again, but with the origin and destination reversed. For example, if a practice ended at 7PM, we would record the time and miles in precisely the exact same fashion, but with the origin being the facility and the destination the vehicle driver's home. We would set the "Depart At" time at 7 pm. Because drivers of the vehicles only indicated how many one-way trips they took and did not indicate if they were dropping off or picking up, we then took the average of each route (one with the facility as the destination and one with the facility as the origin). Therefore, if the time going to the facility for practice was expected