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Moving targets: Promoting physical activity in public spaces via open streets in the US

J. Aaron Hipp [a,b,c,*], Alyssa Bird [d], Margaret van Bakergem [a,b], Elizabeth Yarnall [e]

[a] Department of Parks, Recreation, and Tourism Management, North Carolina State University, Raleigh, NC, USA
[b] Center for Geospatial Analytics, North Carolina State University, Raleigh, NC, USA
[c] Center for Human Health and the Environment, North Carolina State University, Raleigh, NC, USA
[d] 8 80 Cities, Toronto, ONT, Canada
[e] Department of Citysand Regional Planning, University of North Carolina at Chapel Hill, Chapel Hill, NC, USA

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ABSTRACT

Popularity of Open Streets, temporarily opening streets to communities and closing streets to vehicles, in the US has recently surged. As of January 2016, 122 cities have hosted an Open Streets program. Even with this great expansion, the sustainability of Open Streets remains a challenge in many cities and overall Open Streets in the US differ from their successful counterparts in Central and South America.

Between summer 2015 and winter 2016, we reviewed the websites and social media of the 122 identified programs and interviewed 32 unique Open Streets programs. Websites and social media were reviewed for program initiation, number of Open Streets days, length of routes, duration of program, and reported participation. Interview questions focused on barriers and facilitators of expanding Open Streets and specific questioning regarding local evaluation activities. All interviews were transcribed verbatim and analyzed with constant comparative methodology.

Over three-quarters of US Open Streets programs have been initiated since 2010, with median frequency of one time per year, 4 h per date, and 5000–9999 participants. Seventy-seven percent of program routes are under 5 km in length.

Success of programs was measured by enthusiasm, attendance, social media, survey metrics, and sustainability. Thirteen of 32 program organizers expressed interest in expanding their programs to 12 dates per year, but noted consistent barriers to expansion including funding, permitting, and branding.

Though many cities now host Open Streets programs, their ability to effect public health remains limited with few program dates per year. Coordinated efforts, especially around funding, permitting, and branding may assist in expanding program dates.

1. Introduction

The United States Guide to Community Preventive Services recommends enhanced access to places for physical activity combined with informational outreach, social support interventions in the community setting, and community-scale and street-scale urban design to increase physical activity (Guide to Community Preventive Services, 2013). A program at the nexus of these recommendations and gaining popularity in the United States (US) is the Ciclovía, or Open Streets. Open Streets temporarily provide public space - city streets - for residents to use for physical activity and social interactions, and closes the streets to motorized traffic (County Health Rankings, 2016; Hipp et al., 2012; Lugo, 2013; Mason et al., 2011). Though similar programs of closing public streets in parks existed prior to 1974, the prevailing model of Open Streets began that year in Bogota, Colombia (Sarmiento et al., 2010; Torres et al., 2009). This model of Open Streets offers routes in areas with mixed commercial and residential development, encouraging local residents to be physically active in *their streets*, as well as engaging neighbors, local businesses, and additional stakeholders in the process, promotion, and success of the programs (Eyler et al., 2014; Hipp et al., 2013; Kuhlberg et al., 2014; Zieff et al., 2013).

Open Streets programs are viewed by health, community, and bicycle/pedestrian advocates and policy makers as potentially beneficial to physical, social, environmental, community, and economic health (Engelberg et al., 2014; Eyler et al., 2014; Shu et al., 2016; Wolf et al., 2015). Open Streets not only support active living and health, but many purposefully showcase sustainable, active transportation

* Corresponding author at: Department of Parks, Recreation, and Tourism Management and Center for Geospatial Analytics, North Carolina State University, Raleigh, NC, USA.
E-mail addresses: jahipp@ncsu.edu (J.A. Hipp), abird@880cities.org (A. Bird), mavanbak@ncsu.edu (M. van Bakergem), elizabethyarnall@alumni.unc.edu (E. Yarnall).

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alternatives and are routed through local business districts to highlight the ease of accessing services via active transportation. Recent evaluations of two programs in California have highlighted that Open Streets can improve local air quality (Shu et al., 2016) and increase sales of businesses along the route (Chaudhuri and Zieff, 2015). In combination with other programs (e.g., recreovia and bike share), policies (e.g., complete streets and shared use), and built environment change (e.g., greenways and parks) Open Streets are a strategy to improve the culture of health in public space (Gomez-Feliciano et al., 2009; Pratt et al., 2015; Trowbridge and Schmid, 2013).

Though the number of cities establishing Open Streets programs has been growing rapidly, the majority of programs continue to be limited in scale; with short routes, only one or a few dates per year, and open for only four to five hours per date (Eyler et al., 2014; Kuhlberg et al., 2014). With a narrow scale the potential public health benefits associated with increased access to places for physical activity and information outreach and social support in community settings are limited.

As a follow-up to surveys and program descriptions completed in 2012 (Eyler et al., 2014; Kuhlberg et al., 2014) and in collaboration with colleagues in Bogota, Colombia (Sarmiento et al., in press), we have two aims with the current study. First, to update and expand the description of past and current US Open Streets; so as to be more comparable to one another and Latin American Ciclovias. Second, to better understand the barriers and facilitators to US Open Streets programs increasing in scale. Guided by 8 80 Cities (healthiestpracticeopenstreets.org), we specifically asked programs' interest and ability to expand to at least twelve Open Streets dates per year. Associated with the latter aim, we are also interested in the definitions of success and collective evidence base for US Open Streets, including comparable evaluation metrics used across programs that may better inform increasing the frequency of Open Streets.

2. Methods

Building on an earlier database of US Open Streets created by the Open Streets Project (http://openstreetsproject.org/initiatives/) and Eyler and Hipp (Kuhlberg et al., 2014), research assistants searched the Internet, Facebook, Twitter, and Instagram in April 2015, for additional Open Streets programs in the United States. Search terms included the most common names of programs: Open Streets, Ciclovia, Sunday Parkways, Sunday Streets, and Streets Alive. Open Streets were defined as any program temporarily opening public streets for physical activity, active transportation, and social interactions, and closing the streets to motorized vehicles. The program had to be free to participants and excluded foot and bicycle road races, charity events, fun runs, and festivals with a non-physical activity-related theme. Open Streets are defined as “programs” in this paper regardless of frequency of Open Streets per year. Although a single event may not impact public health over the long term, single events can serve as a baseline marker for future program expansion. The list and contact information of US Open Streets programs and their organizers was updated and opened to interested parties, including the Open Streets Project, 8 80 Cities, and all participants of the 2014 Open Streets Summit, via Google Drive (http://tinyurl.com/usopenstreets). A total of 122 programs were identified. It should be noted that we will use ‘programs’ to describe Open Streets regardless of frequency.

2.1. Descriptive statistics of US open streets

In February and March 2016, a research assistant visited each Open Streets program website and social media platform to update (Kuhlberg et al., 2014) and describe each of the 122 unique programs. Specifically, the research assistant searched for and recorded the following information (Appendix 1; please see (Sarmiento et al., in press) for similar tables of Latin American Ciclovias: 1) host city; 2) program name; 3) year of initiation; 4) is program ongoing; 5) participants per program date; 6) day of the week and duration of program; 7) program dates per year in most recent year; 8) length of route (km); 9) connectivity to parks and/or places of cultural interest; 10) public transportation access to route; 11) complementary programs and activities; 12) availability of safety and first aid at program; 13) promotion and marketing strategies; and 14) sponsorship information.

2.2. Interview of open streets organizers in the United States

May through July 2015, research assistants attempted to contact an organizer of each of the 122 identified Open Streets programs. Two phone call attempts and one email attempt (if both modes available, otherwise three attempts of single mode) were completed for each program, netting an interview with 32 unique Open Streets programs. Each interview was guided by a Washington University in St. Louis IRB-approved list of 15 questions. Six of the 32 cities selected to write in responses to the interview guide, with the majority (26) completing a digitally recorded telephone interview.

Most of the survey questions were the same as those used in the related 2012 survey (Eyler et al., 2014). However, new questions were added regarding barriers and facilitators of expanding Open Streets frequency to twelve dates per year and specific questions regarding the definition of a successful program and evaluation activities. The current analyses focuses on these new questions. Interviews took approximately thirty minutes to complete and were transcribed verbatim by a third party vendor.

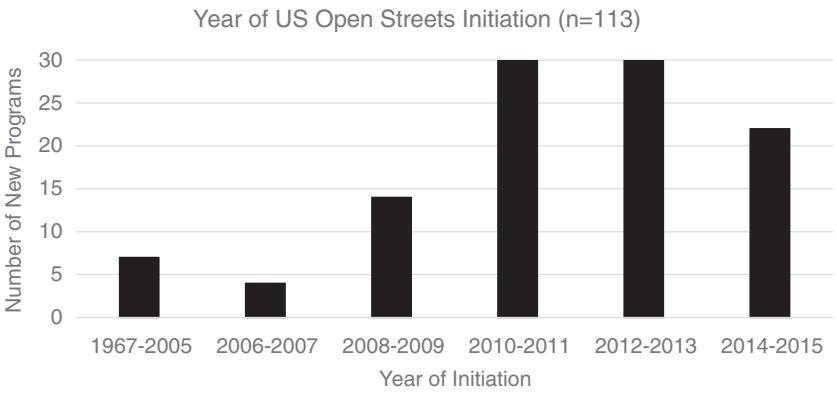
The authors twice independently reviewed each transcript. Between readings authors shared identified themes developed via constant comparative methodology (Glaser, 1965). Identified themes were searched and coded during the second reading. A second author meeting provided specific verbatim text and examples of themes with any disagreements or unique codes discussed and voted on by all authors. Analytic components of this study were approved by the North Carolina State University IRB.

3. Results

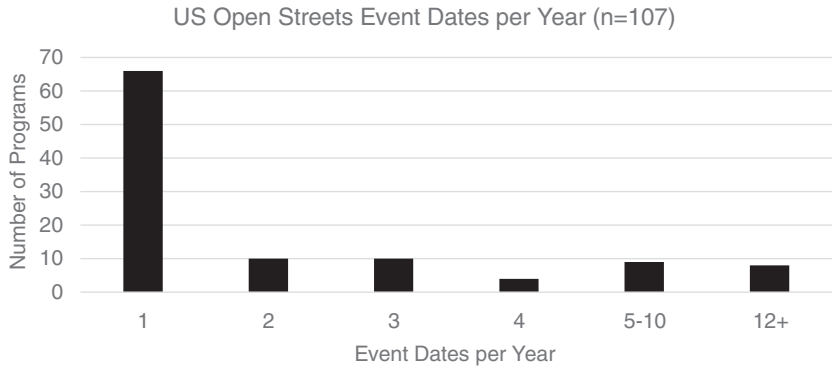
3.1. Descriptive results of US open streets programs

Full results can be found in Appendix 1 for the 122 unique programs identified in the US. The oldest Open Streets program we were able to identify was Car-Free Sundays in Golden Gate Park, San Francisco, CA, which began in 1967, by restricting vehicle access to park roads on Sundays, allowing the streets to be used by families, runners, cyclists, etc. In 1968, Seattle, WA, held its first Bicycle Sunday, closing Lake Washington Boulevard. The first US Open Streets to truly emulate Latin American Ciclovias (urban streets with residential and commercial properties) appears to be Cleveland, OH's, Walk + Roll Broadway Slavic Village in 2006. The eight programs identified prior to 2006 were all either solely within a park or parkway/boulevard with a lake or river on one side of the open street. Cleveland was the first to open streets to the community across mixed land uses. Fig. 1a shows the increase in new program development beginning in 2010, the year with the most new programs (19), followed by 2012 and 2014 with 17 new programs each year.

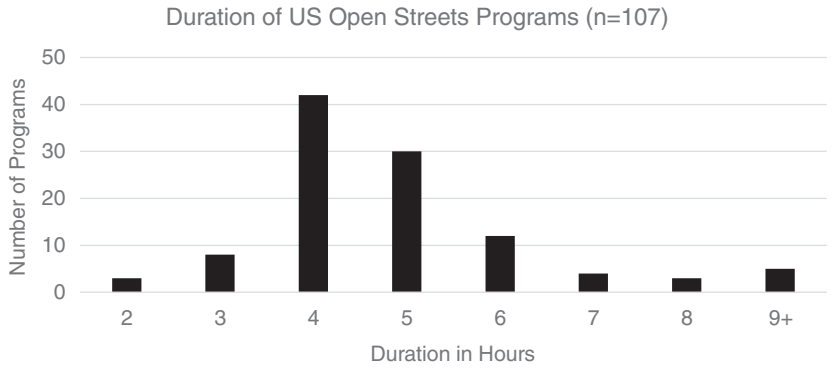
Annual dates of US Open Streets remains low, with 66 of 107 (61.7%) with data available found to occur on only one date per year (Fig. 1b). Only 16 programs occur six or more times per year (15.0%), with three park-based Open Streets occurring each Sunday throughout the year (2.8%). Sunday is the most prevalent day, with 85 (78.7%) programs occurring only on that day. Open Streets have a duration of 1.5 to 15 h per program date, with the longer durations occurring in parks. Four and five hours were the most common time lengths of the programs, occurring across 72 (67.3%) of the programs (Fig. 1c). The distance of Open Streets routes also greatly varies, with 21 (23.1%) programs under one mile (1.6 km; Fig. 1d) and all save one program



a. Initial year of US Open Streets programs.



b. US Open Streets program event dates per most recent calendar year.



c. Duration, in hours, of US Open Streets programs. Rounded to nearest hour and most recent information.

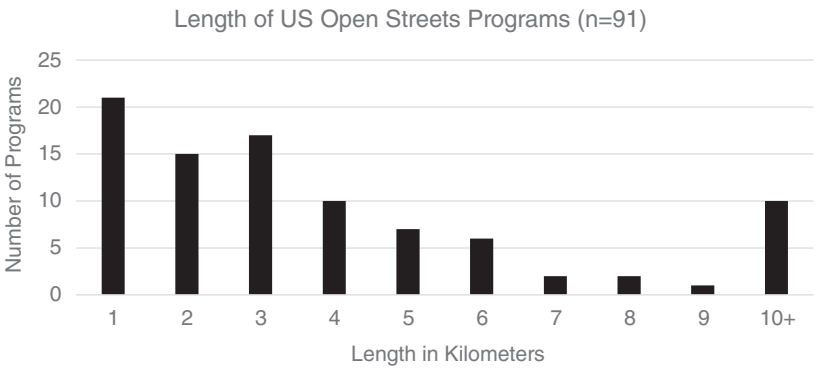
Fig. 1. a. Initial year of US Open Streets programs. b. US Open Streets program event dates per most recent calendar year. c. Duration, in hours, of US Open Streets programs. Rounded to nearest hour and most recent information. d. Length of US Open Streets routes in kilometers. Longest route, rounded to nearest kilometer. c. Reported participants per US Open Streets program. "Thousands" were included as 5000 and "Tens of Thousands" were included as 50,000.

under 10 miles (16.1 km). Phoenix Silent Sundays, occurring in a park, is 51 miles (82.1 km) in length. Finally, we could only locate participant numbers for 46 Open Streets programs. Five reported numbers under 1000 per date and two (Los Angeles and New York) reported over 100,000 (Fig. 1e). Over half of the programs reported participation between 5000 and 25,000 people per date.

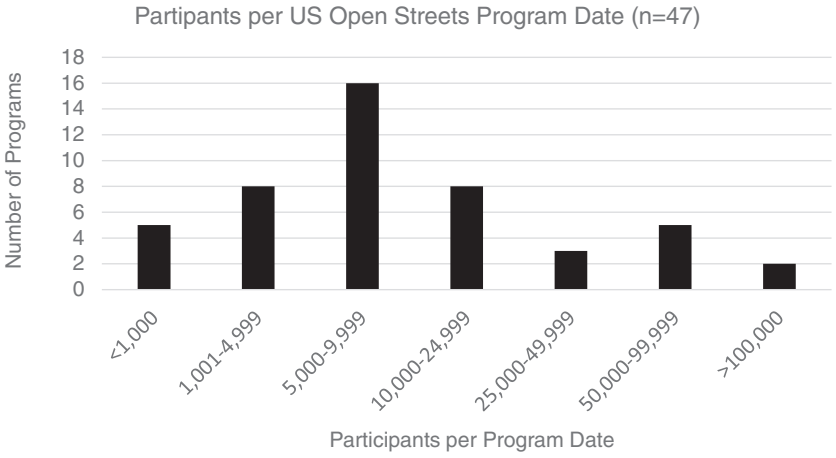
The Latin American counterpart article (Sarmiento et al., in press) reports some similarities and some stark differences in their programs compared to the US. There are certainly smaller programs in terms of attendance with a low of 40 and a median of 1600 and routes as short as one kilometer and two hours in duration. However, the maximum attendance of 1.5 million and mean of over 40,000 far outpaces the US. The median of five hours in duration is 25.0% longer than the median in the US. Most importantly is the range of frequency in Latin America, from 8 to 169 dates per year with a mean of 40 and a median of 42 Open Streets dates per program.

3.2. Open street program descriptions of those interviewed

Thirty-two unique Open Streets programs from 22 states participated in the 2015 interview. The 26.2% response rate could be associated with programs no longer hosting Open Streets, change in staff, incorrect contact information, or inability to participate in a 30 min interview. Host cities ranged in size from San Antonio, TX, and San Diego, CA, with approximately 1.4 million residents each to Carrboro, NC, and Albany, CA, with approximately 20,000 residents each. Programs began as far back as 2008 (Portland, OR, Sunday Parkways and Seattle, WA, Summer Streets/Sunday Parkways) and three were in the midst



d. Length of US Open Streets routes in kilometers. Longest route, rounded to nearest kilometer.



e. Reported participants per US Open Streets program. "Thousands" were included as 5,000 and "Tens of Thousands" were included as 50,000.

Fig. 1 (*continued*).

of their inaugural date during 2015 (Chattanooga, TN, Scenic Streets, Open Streets Pittsburgh, PA, and Akron, OH, Open Streets). Four programs that participated in the interviews are no longer hosting Open Streets; Roanoke, VA, Ciclovia, St. Cloud, MN, Downtown Walkabout, Tulsa, OK, Street Cred, and Streets Alive Lee County, FL. Participants per program date ranged from 2500 (Tulsa, OK, Street Cred) to over 65,000 per program date at San Antonio's SíClovía. Twenty of the 32 cities interviewed reported hosting only one program date per year while Portland and Minneapolis, MN, Open Streets hosted five and eight, respectively, in 2015. Route lengths ranged from a few blocks (Albany Alberrito Open Streets) to eight miles (Portland's Sunday Parkways).

3.3. Interview results: challenges, facilitators, and barriers to expansion

In total, 13 of 32 (40.6%) programs stated interest, though expressed the need to overcome barriers, in expanding their Open Streets program to at least 12 dates per year. Four (12.5%) unequivocally said no, and 15 (46.9%) were interested but felt the barriers may be too large to overcome. Several early themes emerged as to barriers to expanding Open Streets, though each organizer reported their Open Streets as currently a positive and successful program. Expense and funding continue to be the primary challenge to maintaining and increasing the frequency and route length of Open Streets with costs varying widely, but always costing at least $10,000 per date. Some Open Streets are city-funded and others grant-funded, with those grant-funded reporting the most difficulty in sustaining Open Streets after the completion of the grant.

Related to expense, especially for the Open Streets not organized by city departments, was the permitting process required to open public streets to families, pedestrians, and cyclists and close them to vehicular traffic. Two specific comments were: "Getting ahold of the property owners to sign the permit so that we can close the street. This is part of the application process and it's a tedious one. You need 80% of the property owners' approval along the route." And; "I will say on the sheer number of steps we took to get our city permit with closures and security [it] felt like they [city] were not supportive."

Branding and consistency was another identified limiting factor in the success and expansion of Open Streets. One city reported; "We do think it has been successful. However, people didn't seem to get the connection of what we were trying to accomplish." Another voiced what several programs are struggling with; how to maintain a consistent physical activity, public health, and active transportation program that is fun, but whose underlying message is not lost in the fun:

"I think in terms of attendance and the number of activity hosts and the types of sponsors, our program is very successful. What we've just been struggling with is that we have the signature downtown one mile route and for a lot of people it's an iconic summer event, but the connection to biking and walking and actively living and some of those goals that transcend [our program] and separates [Open Streets] from just being an event have been lost. And so as an event, it's really successful to us. Like any Open Streets program I would say we struggle because the emphasis on biking and walking and rethinking public space and making that connection to health has kind of gotten muddled because it has always been this one mile, downtown route."

Alternatively, in some cities routes consistently changed (moved, lengthened, and shortened) across programs often in a well-intentioned attempt to incorporate downtown business districts, new road, sidewalk, and cycling infrastructure, and to bring the program to areas with poor physical activity space access and low-income communities.

3.4. Interview results: evaluation and gauging success

The evaluation of Open Streets programs and program dates varied widely across US cities. Of the 32 cities interviewed, 75.0% were conducting some type of evaluation of their program, with a quarter of all evaluations solely attendance numbers and/or social media impressions ("amount of media earned and number in attendance," as provided by one program). In addition to participants, other programs tallied similar data including, "number of sponsors, amount from sponsors, number of activities, … and retail sales data."

Seventeen of the 32 (53.1%) programs used some form of survey with differences in who (participants, sponsors, complementary activities, businesses along routes, neighbors along route, volunteers), when (pre, during, and post), and how (mailed, intercept [participants], passive/online, direct approach [businesses]) surveys were completed. There were also differences in who developed and analyzed the surveys including organizers and staff, volunteers, third party vendors, and universities (5 of 17; 29.4% of those using surveys).

Surveys gathered a variety of information. "Evaluations and surveys that we had at the first event, we had some volunteers collecting that data. It was mostly about engagement, what the participants liked, what they didn't like, what they'd like to see more of, and their behavior." Others used surveys by "asking questions like how far did you come to the event, can you think of other places you'd like to do an event, just basic kind of subtle stuff about how you feel about biking and walking around." Another program added: "And we also have survey of attendees to try to figure out why they're there and of course, a lot them are there for that physical activity, but then we find a lot of them were also there just for that spontaneous experience of running into someone who they haven't seen for a while or meeting someone new or exploring businesses along the route, maybe identifying a new business that they haven't been to before."

For evaluations to be beneficial to stakeholders it should, at least in part, measure the predefined success of the program. Among the interview responses, success of Open Streets programs in the US were commonly gauged in five unique ways. One definition was *enthusiasm*, which incorporated comments on general enthusiasm and positive feedback. Example comments include: "We had nothing but positive and exciting feedback." And, "If people come out and we get positive feedback, which we, sure, we get some negative feedback, but the vast majority of feedback that we receive, and not just us, but many people around the city - partners, community - is positive. So I think that's how we evaluate our success." The latter quote also represents another common response related to gauging success, *attendance and participation*. Another city stated: "I think in terms of attendance and the number of activity hosts and the types of sponsors, our program is very successful." Related to the first two themes was a third, *social media:* "We also watch social media carefully. The event, for us, was designed to bring awareness of what we believe are some healthy lifestyle choices and through social media we have seen that not only those causes that we care about and championed, like people's personal comments, but it also has created an important moment in time for our community." A fourth theme was defining success by tying it directly to *survey metrics*: "I think the evaluation definitely plays into the measuring of success. Some of the questions in the participant intercept survey are geared directly toward some of the program goals." The final theme, *sustainability,* was mentioned by those no longer providing an Open Streets in their city: "From the aspect of being able to have a sustainable program, it was unsuccessful."

4. Discussion

Over 120 US cities have hosted an Open Streets program, yet important barriers continue to keep most programs from hosting more than one date per year. Currently, 61.7% of US Open Streets programs occur only once per year. On Open Streets dates, multiple US cities have found participants are exceeding daily, and in some cases weekly, physical activity recommendations (Engelberg et al., 2014; Hipp et al., 2012; Torres et al., 2016; Wolf et al., 2015; Zieff et al., 2014). By increasing the number of Open Streets dates per year, it may be possible to improve the culture of health and provide sustained opportunities for physical activity.

The popularity of Open Streets in the US continues to expand, more than doubling programs since the 2012 reviews (Eyler et al., 2014; Kuhlberg et al., 2014). However, many of the same challenges face Open Streets (asked as implementation challenges in 2012 and challenges to expanding in 2015). Consistent funding continues to be the number one challenge as programs use a variety of public/private models to cover programming expenses. However, Montes, Sarmeinto, and colleagues investigated the return on investment of Open Streets in terms of physical activity and direct health benefit, finding those programs with more participants and dates had a greater health return on their investment (Montes et al., 2012). Chaudhuri and Zieff in San Francisco have found that many businesses along Open Streets routes enjoy significantly higher retail sales during the program (Chaudhuri and Zieff, 2015). Both studies begin to support the positive economic impact Open Streets can have on local economies and wellbeing, but broader research is necessary. In Los Angeles day-of-program improvements in air quality have been measured (Shu et al., 2016), but to date there has been no attempt to combine health, economic, and environmental benefits as a total return on investment.

In 2012, staffing and street intersection barriers were a noted limitation to the implementation of Open Streets. The related, collective difficulty of permitting of Open Streets continues to be a barrier to expanding frequency. Because they are unique programs, there are no formal 'Open Streets permits,' instead cities are combining and doubling permits to cover all functions of Open Streets. This includes the very difficult task noted by one city of having 80.0% of all property owners agree to a street closure (to vehicles) before the program can occur. One challenge perhaps related to permitting is the general lack of involvement of local Park and Recreation Departments and Public Health Departments. One program added; "We had to convince our Parks and Recreation Department to get involved. They have had significant budget issues in the years past—everybody has budget issues—but our Parks and Recreation Department, sort of, kicking and screaming, got involved and has now embraced it… A critical component of [Open Streets], is the support and activation that is done through the Parks and Rec." In total, only nine of 32 (28.1%) interviews mentioned Parks and Recreation and only eight (25.0%) mentioned Public Health Departments.

The limited public health, active transportation, social cohesion, and economic evidence from the 122 US Open Streets is a potential barrier to expansion and sustainability. Los Angeles, San Francisco, San Diego, New York City, Atlanta, and St. Louis are the only cities and programs represented in peer-reviewed evaluation recommendations (Engelberg et al., 2014; Hipp et al., 2012; Shu et al., 2016; Torres et al., 2016; Wolf et al., 2015; Zieff et al., 2014). Though there are at least two Open Streets/Ciclovia evaluation toolkits available (Diaz del Casillo, 2010; Hipp and Eyler, 2014), many cities have not been exposed to these materials. In fact, only 11 of the 32 (34.4%) organizers interviewed either mentioned one of the toolkits or specific questions/methods located within the toolkits. Smiles and fun are central to Open Streets and anecdotes can be powerful in communicating with policymakers, but rigorous evidence-based public health evaluation is necessary to make or maintain policy-change (Brownson et al., 2014). This includes objective measures of physical activity at programs and a better understanding if participants are substituting physical activity

in one environment for another or if Open Streets are truly open to all and bringing new individuals and communities out to be active (Lugo, 2013). Evaluation needs to go beyond just day-of physical activity as well. Are behaviors and infrastructure to support more active transportation changing and becoming safer associated with, or because, of Open Streets programs? Equity is an important component of all public health programs and is central to the initiation of many Open Streets programs (Hipp et al., 2012; Lugo, 2013). However, beyond self-reported or observational demographic information, there have been limited efforts to understand the potential and actuality of Open Streets in providing a place for physical activity and social capital for those facing the greatest health disparities. Are Open Streets part of a broader culture of health in cities? Can smiles, enthusiasm, social connections, and interactions be better evaluated and how are Open Streets part of the potential answer along with Complete Streets policies, bike share, and other strategies? What reliable and valid scales may best measure these important constructs of Open Streets (e.g., physical activity, enjoyment, quality of life, social interactions, civic pride, active transportation intention, etc.)?

4.1. Strengths and limitations

The methods and analyses have strengths and limitations. The total of 32 interviews with Open Streets organizers provided over 15 h of recorded comments, but represented only 25.0% of current programs. The noted limitations in branding and consistency across programs extended to their online and social media presence. Programs in larger cities, with multiple dates per year, had independent webpages often with annual reports noting dates, routes, and attendance. Given over 60% of programs only occurred once per year many programs were limited to a Facebook or Twitter page with few if any updates between program dates. Thus the quality and quantity of information necessary for Appendix 1 was inconsistent. To continue to evaluate and improve US Open Streets, simple information such as dates, length of route, frequency of program, duration of program, and attendance are necessary.

5. Conclusions

As evidenced in Latin America, Open Streets is a scalable public health and active transportation program that has the potential for multiple benefits to communities. Open Streets in the US are moving from an event to programs, but barriers remain. Evidence shows Open Streets provide a space for physical activity and social interaction, but without scale cannot achieve a community-wide culture of health.

A replicable structure or model may 1) reduce and expedite permitting requirements, 2) decrease costs related to safety, policing, and intersection control, and 3) build a consistent brand and visibility to provide identity and encourage repeat participation and sponsorship. Without policy to support the expansion of initiatives, in frequency, length, and number, the impact Open Streets can have in promoting community-wide physical activity in public space is limited. Policy is best made with a firm evidence base, and more consistent and robust evaluation is necessary across initiatives. Such evaluation could identify cost-saving measures and inform a replicable model for efficient Open Streets production.

Appendix A. Supplementary data

Supplementary data to this article can be found online at doi:10.1016/j.ypmed.2016.10.014.

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