QUESTIONS FROM THE WEBINAR

1. *Will you be discussing the relationship between where and when one attempts to count and the intended application of the counts (e.g. trend analysis, modeling, safety exposure, other performance measures)*

   It is an important topic, but due to time constraints we were not able to address it sufficiently during the webinar.

2. *Can you address challenges related to privacy when using automated video image processing?* **[SHAWN]**

   Yes, privacy is a concern with video imaging. Best practice is to count what you need, then delete the video. That limits future use, but protects privacy and chance for video to be misused.

3. *Could Theo discuss how weather is integrated into the method?* **[THEO]**

   I do not actually see this being a commonly applied factor – creating the factors would take a significant amount of historical data. In most cases, I expect seasonal/monthly factors would address this. However, I can envision conducting regularly scheduled short term counts and having a day be unseasonably warm in the spring or fall (perhaps resulting in abnormally low counts) or unseasonably warm in winter (perhaps resulting in abnormally high counts). Alternatively a string of dry clear days during the rainy season, or rain during the dry season could result in the need for adjustments.

4. **Biggest Non-motorized count challenge we have had is determining a good way to get on-road bike counts such as on regular paved shoulders or bike lanes. Any equipment suggestions on that? [SHAWN]**

   For short duration, use pneumatic tubes that can differentiate between bikes and shoulder-driving cars based on axle length or other parameters. Same thing with permanent, but pick inductance loop equipment that differentiates between bikes and motor vehicles. And in some cases, you may just have live with some bikes that don't ride directly over your tubes or loops (eg wrong way bikes or in-lane bikes. Good site selection can help to minimize this. Also, perfect is the enemy of good enough. :-)

5. *How do sectors outside of transportation (such as economic development, event planning, etc. that was referenced earlier by Shawn Turner) currently access pedestrian (or motor vehicle) traffic data? How can transportation departments make the bike/ped data accessible and helpful for these non-transportation interested parties?* **[SHAWN]**

   Short answer: it varies. In some cases, the Parks/Rec department are doing trail counts and Public Works doesn't know about it. In other cases, retail stores may be sniffing Bluetooth or WiFi signals, which is only a sample of pedestrians. Best advice: publicize your walking counts to Chamber of Commerce and other business groups (Open Data), then ask around and see if anyone in your region has common interests.

6. *What kinds of QA/QC checks can be performed on SDC data, and are there example processes to share*

    Answered during the Q&A portion of the webinar.

7. *What pedestrian and/or bicycle volume is 'too low' to do anything with it?* [KRISTA]
    Very low volumes are difficult to do anything with. For example, if there are only 10 pedestrians per day at a site it's hard to do any statistics on them, but useful to know they're there. If we see such sites in an urban area, it maybe the sign of an incomplete street (a sick road), but if it's in a rural context it may be completely normal. But with over 20 pedestrians per day, we can start to do some statistics. If possible, sites with 100 or more pedestrians per day are better for analysis.

8. *When validating the equipment's accuracy and precision, how many hours of data collected manually is needed to compare? (i.e. to determine if it is consistently under- or over-counting?)*

    Answered during the Q&A portion of the webinar.

9. *How many CCS's do you need to develop adjustment factors per factor group? I know the TMG says 3-5 as the rule of thumb, but I really question whether that transfers to bike/ped volume data.* [KRISTA]

    Some preliminary work from Colorado seemed to indicate that 7 to 9 counters per factor group would be best to minimize error based on bicycle counts.
    > Nordback, Krista, Wesley E. Marshall, and Bruce N. Janson. Development of Estimation Methodology for Bicycle and Pedestrian Volumes Based on Existing Counts. Denver, Colorado: Colorado Department of Transportation, 2013.
    > http://www.coloradodot.info/programs/research/pdfs/2013/bikecounts.pdf/view

10. *Has any work been done on leveraging permanent counts from other areas for communities that don't have the permanent counts, ie using permanent count data from a similar weather, topography, population, facility to help establish factors for a facility in a community that has fewer resources for a counting program.*

    Answered during the Q&A portion of the webinar.

11. *How low is too low? - We've been collecting data from 22 CCS's in NC, but many of our bike locations show really low numbers. So, for example, if a certain proportion of your time intervals show zeros, or if the daily volumes are "too low", it makes it difficult to run it through checks (because everything gets flagged), and it's difficult to see travel patterns. So, is there a threshold for "too low" and over what time period is that established?* [KRISTA]
    Great question! In talking with Greg Lindsey of University of Minnesota the other day, he also concluded that the checks we talked about may make sense for higher volume sites, but don't

work for the low volume sites. Our checks for variation and consecutive zeros don't make sense at low volume sites. What is low volume? (see question 7 above) But for QA purposes, I think we need further research to answer that question adequately.

12. *Any ideas on ped trip gen studies aside from interviewing folks?* [KRISTA]
There are numerous apps for GPS trip tracking.

13. *Are there "standard" factor groups?* [KRISTA]
As Theo showed in his slides: commute, recreational/utilitarian, and mixed.
There's a paper by Miranda-Moreno et al. that documents four standard groups for bicycles (2 mixed).

> Miranda-Moreno, Luis F., Thomas Nosal, Robert J. Schneider, and Frank Proulx. "Classification of Bicycle Traffic Patterns in Five North American Cities." In *Annual Meeting of the Transportation Research Board*. Washington, DC: Transportation Research Board of the National Academies, 2013.

Some work by Dr. Robert Schneider shows pedestrian patterns on sidewalks in the Bay area.
Rails to Trails is working on standard groups for trail users as part of their T-MAP Program.

14. *Has anyone worked on how to develop/determine segments for bike/ped counts? (i.e. are there any programs that know their infrastructure network extent and have counts that they can attribute to segments?) How do you figure out the length of a given segment? (is there a probing data collection technique that is used and tied to point counts?)* [KRISTA]
Great question! Greg Lindsey and his team at University of Minnesota) has done some work attributing counts on a path network in Minneapolis:

> Hankey, Steve, Greg Lindsey, and Julian Marshall. "Day-of-Year Scaling Factors and Design Considerations for Non-Motorized Traffic Monitoring Programs." In 93rd Annual Meeting of the Transportation Research Board. Washington, D.C.: National Academies, 2014.

Also, Mike Lowry at University of Idaho has a GIS tool to bicycle turn turning movements into counts on a network using origin-destination centrality:

> McDaniel, Stephen, Michael B. Lowry, and Michael Dixon. "Using Origin-Destination Centrality to Estimate Directional Bicycle Volumes." In 93rd Annual Meeting of the Transportation Research Board. Washington, D.C.: National Academies, 2014.

15. *Is the bike/ped data web viewer based on spreadsheets imported into Google Maps/Earth, ie is it easily shared/used by other communities as long as their data is in the format used by Philly?*

Answered during the Q&A portion of the webinar.

16. *Can the Philly web viewer be used to graphically view data from Krista's database program?* [SCOTT and KRISTA]

We hope to implement that type of data sharing in the future. –Krista
We made the web viewer open code, so we can share it with anyone who would like it. I'm sure it can be modified to display data in whatever format the user uses. ---Scott

17. ***What are some of the legal ramifications in setting u video counts of pedestrians?*** **[SHAWN]**

   Yes, privacy is a concern with video imaging. Best practice is to count what you need, then delete the video. That limits future use, but protects privacy and chance for video to be misused.

18. ***Do you have any feedback on the National Bicycle and Pedestrian Documentation Project? Any concerns with manual counts by volunteers? What is the data quality like?*** **[KRISTA]**

   Volunteers can become overwhelmed with high volume locations and/or complicated instructions requiring lots of information including gender, age, helmet use, direction of travel etc. Recruiting additional volunteers for high volume locations or switching from intersection to segment (screenline) counts can help manage volunteer work load. If volumes are manageable for the number of volunteers, manual counts are generally considered more reliable than automated counts and often used as "ground truth" when checking automated equipment. Of course accuracy varies by volunteer and depends on the training given.

19. ***Do you have good references for evaluations of the accuracy of different types of counting equipment and manufacturers?*** **[SHAWN]**

   NCHRP Report 797 Guidebook and Web-Only Document 205
   (http://www.trb.org/PedestriansAndBicyclists/Blurbs/171973.aspx)

20. ***Fitness apps were mentioned - this is a limited sample size. How have others used this information in conjunction with their manual or automatic count data? Any potential applications people are exploring?*** **[SHAWN]**

   The only example I can think of is Sean Co at MTC or MTA in San Fran, who is combining Strava data with some of their manual counts. We don't have any more details. There may be others who have done this data mashup.

21. ***For those of us that have not seen the guide, can we have a link to it?***

   TMG Chapter 4: https://www.fhwa.dot.gov/policyinformation/tmguide/)

   NCHRP 797 Guidebook and Web-only Document 205:
   http://www.trb.org/PedestriansAndBicyclists/Blurbs/171973.aspx

22. ***Please discuss staff time needed to manage counters. maintenance, repair, calibrating, checking, changing batteries, etc. This is obviously highly variable.*** **[SCOTT]**

This is a tough question, in that our unit also does motorized counts, and field staff fill their time with both motorized and non-motorized counts. Generally speaking, we have one of our seven field people who specializes in the pedestrian and bicycle counting equipment. The amount of time depends upon the volume of count requests that are being received. For the last few months it has meant 100% of his time as we have been trying to knock out the 150 locations on the cyclical program. At the same time we were sliding in approximately 30 "after" counts for TIGER grants. Next will be the Center City Cordon for model validation – 78 locations. It should be obvious that setting counts, monitoring the locations while the counts are "down", retrieving the equipment and data are the majority of the staff time.

As for calibrating, changing batteries (once every two years), these functions require very little time. We are early in the program so we haven't had much need for maintenance and repair of permanent stations yet, but data flow is monitored in the office so that the need for a site visit to repair is generated here in the office, not by regularly visiting each site. Portable equipment for short duration counts is dropped off during regular office visits and then office staff forward the equipment for repair; however, to date there have been few instances of this.

23. *I am a proponent of using video image processing camera systems. What would be recommendations for best vendors/devices to use?* **[SHAWN]**

   I don't have any recommendations especially since we haven't tested any.

24. *What are your thoughts on "disaggregate" AKA day-of-year scaling factors, as opposed to the more traditional expansion factor approach?* **[KRISTA]**
   Day or year factors have been shown by researchers at McGill and University of Minnesota to be more accurate for the cases studied than the traditional factoring approach. And the day of year factoring approach is documented in Appendix D of NCHRP 797 (http://www.trb.org/Main/Blurbs/171973.aspx).

   > Hankey, Steve, Greg Lindsey, and Julian Marshall. "Day-of-Year Scaling Factors and Design Considerations for Non-Motorized Traffic Monitoring Programs." In 93rd Annual Meeting of the Transportation Research Board. Washington, D.C.: National Academies, 2014.
   > Miranda-Moreno, Luis F., Thomas Nosal, Robert J. Schneider, and Frank Proulx. "Classification of Bicycle Traffic Patterns in Five North American Cities." In *Annual Meeting of the Transportation Research Board*. Washington, DC: Transportation Research Board of the National Academies, 2013.