

Statement of Peter R. Hecht, PhD, pedestrian representative
Pennsylvania Pedalcycle and Pedestrian Advisory Committee

Subject: Crosswalks and Pedestrian Safety

I would like to thank the members of the House Transportation Committee for allowing me the time to address the important topic of pedestrian safety in crosswalks.

Problem Statement:

Crosswalks, around schools or elsewhere in the community should be important features for alerting drivers to what they should already know - that pedestrians (and bicyclists) are equal users of our streets and roads whether there are marked crosswalks or not. When drivers are not aware of or do not expect to see pedestrians is frequently when tragedies occur. After all, drivers are the ones encased in a ton or more of metal, far less vulnerable than the pedestrian.

“Motorists failing to yield (on through movements) represented a large percentage of pedestrian crashes in marked crosswalks (41.5 percent) and unmarked crosswalks (31.7 percent). Likewise, vehicle turn and merge crashes, also generally the fault of the driver, accounted for 19.2 percent (marked crosswalks) and 12.2 percent (unmarked crosswalks) of such crashes...”¹

A recent analysis of crashes involving child pedestrians in Pennsylvania notes that

- 8% involve walking trips to/from school

- 11% involve school travel

An additional 8% could be related to school travel but police report data was not complete.

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- 70% of young pedestrian major injuries occur during daylight hours

- Only 52% of young pedestrian fatalities occur during daylight²

The analysis also notes an increasing frequency of distracted drivers and pedestrians in accident reports.

What can effectively heighten the attention of drivers to other types of users and improve yielding compliance at crosswalks?

Existing Knowledge:

Available research shows that marked crosswalks alone do not reduce vehicle-pedestrian crash rates.³ Similarly, the installation of marked crosswalks alone has not been shown to increase compliance of drivers with yielding to pedestrians.⁴ Consider that most crosswalks are unmarked.

Enforcement and education are effective components of improving traffic safety for pedestrians but neither by itself is going to be particularly effective.

Education is an important tool not only for youth but also for adult drivers and others. It is unquestionably valuable for youth but adult drivers also need reinforcement of the rules of the road on this and other issues along with enforcement of the laws. Most people only take the driving test once until, perhaps, very late in their lives yet the laws and technology keep changing all the time.

Fines might serve to improve awareness and compliance but their efficacy depends upon the expectation of enforcement. Police need to see that there are practical teeth in a law before they consider whether to expend the resources to enforce it. Is this a points offense for the driver; it does not appear to be in the proposed legislation. Even then enforcement will be weighed against competing demands on police resources.

The proposed legislation to amend title 75, section 3542 to require motorists to stop and yield to peds in a crosswalk in areas w/o traffic signals or controls is a positive step. However, it will take both education and enforcement efforts to ensure that the greatest number of drivers and pedestrians in the state are aware of such a change.

Distraction is also an issue, a significant one for children and for drivers. As of 2010 72% of teens and tweens (aged 12-17) owned cell phones. 54% of that group send text messages and 38% call daily on their cell phones.⁵ An age group not noted for their awareness of anything outside of their immediate interests, these technologies do not always serve them well. Drivers issue with distraction by technology is already well documented but regulation of it is spotty across the country and limited within Pennsylvania. At the same time, there is no research to date that shows that multi-tasking is a documented human capacity.⁶

Additional setting modifications are needed to realistically improve compliance with yielding at crosswalks, an idea supported by the work of Zegeer, Knoblauch and others.

Researchers has found that increased pedestrian and bicycle traffic comes with reduced crash rates. It is posited that this reduction in accidents is due to the increased expectation of drivers that they will encounter pedestrians and bicyclists.⁷ An article in the Philadelphia Inquirer (9/16/12, p. D-1ff.) provides anecdotal evidence that the increase in bicycle traffic in the city has been accompanied by greater accommodation by motorists for those riding bicycles in the city. Interventions that make it more likely that people will walk such as continuous sidewalks, pedestrian median refuges for wider street crossing, traffic calming measures and the like increase the probability that individuals will walk and thus increase drivers expectation that they will encounter pedestrians as legitimate and typical users of the roadway.

Increasing motorist experience and awareness can also be helped by the pedestrian crossing sandwich signs distributed successfully by the Department of Transportation for the past decade. A successful and continuing program implemented by the late David Bachman of PennDOT, these signs are placed in crosswalks to provide a strong visual reminder to motorists of existing state law to yield to pedestrians.

Pedestrian crossing signs prior to the xwalk and controlled flashing lights at crosswalks can help if implemented correctly. Flashing lights such as those approved by FHWA⁸, which strobe when activated create a much more salient signal to motorists. What should be avoided are lights that are always on. This undercuts the warning function for motorists.

Crossing guards, who provide a visible and active presence at school crossings are another positive step to school children's safety at crosswalks.

A significant negative factor for crosswalk safety near schools is the location of the school. Many public schools outside of urban centers are being located outside of the town(s) they serve on roads with higher average speeds and lower volume of pedestrian traffic than would be encountered within towns. A significant factor in this are minimum acreage requirements that come from many (23 at last report) state departments of education (not from federal government requirements) including Pennsylvania's.⁹ Relocation outside of population centers can increase the amount of busing for students, further reducing their walking and physical activity.

Conclusion:

While the proposed fines and regulatory changes are laudable and appear to demand little in the way of resources they are insufficient in themselves to improve the safety situation. Additional physical and policy changes are needed to improve the safety of young and all other pedestrians. These will require investment of resources of various types to attain the level of safety that is desired.

Notes & References

1. Knoblauch, R.L. and Raymond, P.D., The Effect of Crosswalk Markings on Vehicle Speeds in Maryland, Virginia, and Arizona, Report No. FHWA-RD-00-101, Federal Highway Administration, Washington, DC, August 2000.

Motorists failing to yield (on through movements) represented a large percentage of pedestrian crashes in marked crosswalks (41.5 percent) and unmarked crosswalks (31.7 percent). Likewise, vehicle turn and merge crashes, also generally the fault of the driver, accounted for 19.2 percent (marked crosswalks) and 12.2 percent (unmarked crosswalks) of such crashes (see figure 22). These results indicate a strong need for improved driver enforcement and education programs that emphasize the importance of yielding or stopping for pedestrians. More pedestrian-friendly roadway designs may also be helpful in reducing such crashes by slowing vehicles, providing pedestrian refuge (e.g., raised medians), and/or better warning to motorists about pedestrian crossings.

2. Chris Metka, PennDOT, personal communication based on analysis of 335 police crash reports 2002-2011 involving children ages 5-18..

3. (Zegeer et al. Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations Final Report and Recommended Guidelines. Report No. FHWA PUBLICATION NUMBER: HRT-04-100 Office of Safety Research and Development Federal Highway Administration. September 2005, Pp.51.

4. Knoblauch, R.L., Nitzburg, M., and Seifert, R.F., Pedestrian Crosswalk Case Studies: Richmond, Virginia; Buffalo, New York; Stillwater, Minnesota, Report No. FHWA-RD-00-103, Federal Highway Administration, Washington, DC, August 2001.

5. Pew Research Center, <http://pewresearch.org/pubs/1572/teens-cell-phones-text-messages>, September 18, 2012, 3:25pm.

6. A small selection of existing research on the impacts of technology is given below.

Nasar, J., P. R. Hecht, et al. (2007). "Mobile telephones, distracted attention, and pedestrian safety." *Accident Analysis and Prevention* 40(1): 69-75.

Driver distraction is a major cause of traffic accidents, with mobile telephones as a key source of distraction. In two studies, we examined distraction of pedestrians associated with mobile phone use. The first had 60 participants walk along a prescribed route, with half of them conversing on a mobile phone, and the other half holding the phone awaiting a potential call, which never came. Comparison of the performance of the groups in recalling objects planted along the route revealed that pedestrians conversing recalled fewer objects than did those not conversing.

The second study had three observers record pedestrian behavior of mobile phone users, i-pod users, and pedestrians with neither one at three crosswalks. Mobile phone users crossed unsafely into oncoming traffic significantly more than did either of the other groups. For pedestrians as with drivers, cognitive distraction from mobile phone use reduces situation awareness, increases unsafe behavior, putting pedestrians at greater risk for accidents, and crime victimization.

Hyman, I. E., Jr., S. M. Boss, et al. (2010). "Did you see the unicycling clown? Inattention blindness while walking and talking on a cell phone." *Applied Cognitive Psychology* 24(5): 597-607.

We investigated the effects of divided attention during walking. Individuals were classified based on whether they were walking while talking on a cell phone, listening to an MP3 player, walking without any electronics or walking in a pair. In the first study, we found that cell phone users walked more slowly, changed directions more frequently, and were less likely to acknowledge other people than individuals in the other conditions. In the second study, we found that cell phone users were less likely to notice an unusual activity along their walking route (a unicycling clown). Cell phone usage may cause inattention blindness even during a simple activity that should require few cognitive resources. (PsycINFO Database Record (c) 2010 APA, all rights reserved) (journal abstract)

Neider, M. B., J. S. McCarley, et al. (2010). "Pedestrians, vehicles, and cell phones." *Accident Analysis and Prevention* 42: 589-594.

With cellular phones and portable music players becoming a staple in everyday life, questions have arisen regarding the attentional deficits that might occur when such devices are used while performing other tasks. Here, we used a street-crossing task in an immersive virtual environment to test how this sort of divided attention affects pedestrian behavior when crossing a busy street. Thirty-six participants navigated through a series of unsigned intersections by walking on a manual treadmill in a virtual environment. While crossing, participants were undistracted, engaged in a hands free cell phone conversation, or listening to music on an iPod. Pedestrians were less likely to successfully cross the road when conversing on a cell phone than when listening to music, even though they took more time to initiate their crossing when conversing on a cell phone (~1.5 s). This success rate difference was driven largely by failures to cross the road in the allotted trial time period (30 s), suggesting that when conversing on a cell phone pedestrians are less likely to recognize and act on crossing opportunities.

Schwebel, D. C., D. Stavrinos, et al. (2011). "Distraction and pedestrian safety: How talking on the phone, texting, and listening to music impact crossing the street." *Accident Analysis and Prevention*.

As use of handheld multimedia devices has exploded globally, safety experts have begun to consider the impact of distraction while talking, text-messaging, or listening to music on traffic safety. This study was designed to test how talking on the phone, texting, and listening to music may influence pedestrian safety. 138 college students crossed an interactive, semi-immersive virtual pedestrian street. They were randomly assigned to one of four groups: crossing while talking on the phone, crossing while texting, crossing while listening to a personal music device, or crossing while undistracted. Participants distracted by music or texting were more likely to be hit by a vehicle in the virtual pedestrian environment than were undistracted participants. Participants in all three distracted groups were more likely to look away from the street environment (and look toward other places, such as their telephone or music device) than were undistracted participants. Findings were maintained after controlling for demographics, walking frequency, and media use frequency. Distraction from multimedia devices has a small but meaningful impact on college students' pedestrian safety. Future research should consider the cognitive demands of pedestrian safety, and how those processes may be impacted by distraction. Policymakers might consider ways to protect distracted pedestrians from harm and to reduce the number of individuals crossing streets while distracted.

7. Leden L. Pedestrian risk decrease with pedestrian flow. A case study based on data from signalised intersections in Hamilton, Ontario. *Accid Anal Prev* 2002;34:457-64. Academic OneFile Print
<http://find.galegroup.com.libproxy.temple.edu/gfx/printd...8> of 10 9/16/2012 6:52 PM

Jacobsen, P. L. (2003). "Safety in numbers: more walkers and bicyclists, safer walking and bicycling.(Original Article)." *Injury Prevention* 9(3); 205(205).

Objective: To examine the relationship between the numbers of people walking or bicycling and the frequency of collisions between motorists and walkers or bicyclists. The common wisdom holds that the number of collisions varies directly with the amount of walking and bicycling. However, three published analyses of collision rates at specific intersections found a non-linear relationship, such that collisions rates declined with increases in the numbers of people walking or bicycling.

Data: This paper uses five additional data sets (three population level and two time series) to compare the amount of walking or bicycling and the injuries incurring in collisions with motor vehicles.

Results: The likelihood that a given person walking or bicycling will be struck by a motorist varies inversely with the amount of walking or bicycling. This pattern is consistent across communities of varying size, from specific intersections to cities and countries, and across time periods.

Discussion: This result is unexpected. Since it is unlikely that the people walking and bicycling become more cautious if their numbers are larger, it indicates that the behavior of motorists controls the likelihood of collisions with people walking and bicycling. It appears that motorists adjust their behavior in the presence of people walking and bicycling. There is an urgent need for further exploration of the human factors controlling motorist behavior in the presence of people walking and bicycling.

Conclusion: A motorist is less likely to collide with a person walking and bicycling if more people walk or bicycle. Policies that increase the numbers of people walking and bicycling appear to be an effective route to improving the safety of people walking and bicycling.

8. A recent technology using strobed lights has been designated by the FHWA as experimental because they were not included in the last MUTCD revision but will be included in the next revision. The experimental designation is a way to allow them into practice prior to the next version of the MUTCD.

9. The Pennsylvania Code Section 22

§ 349.7. Approval of sites.

(a) Approvable size. Usable acreage as follows shall be considered optimum: elementary schools—10 acres; schools for middle grades—20 acres, schools for high school grades—35 acres; and part-time vocational-technical schools—15 acres.

(1) In general, maximum approvable site sizes shall be the stated optimum, plus one acre for each 100 full-time equivalent students in projected enrollment.

(2) Minimum approvable site sizes shall consider factors related to land availability, proximate shared use land, and other reasonable considerations.

(b) Reimbursable size. The Department will be flexible in its determination of the reimbursable acreage within an approved school site. The projected school educational program shall be a principal determinant.

(c) Recreation area. Maximum approvable reimbursable site size may make allowance for cooperative community recreation programs.

<http://www.pacode.com/secure/data/022/chapter349/s349.7.html>, Sept. 16, 2012, 7:34pm.