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Online Supplemental Information—Part I

One multi-disciplinary approach related to built/physical and natural environments and their role in promoting positive behaviors and reducing crime including violence with guns and other weapons is crime prevention through environmental design or CPTED (CPTED, 2020; CDC, 2020b; Lamoreaux and Sulkowski, 2019). To date, most use of CPTED has been in urban compared to non-urban areas, with a more of a focus on neighborhoods and sidewalks/pedestrian areas in between main roads and commercial areas (restaurants, stores, offices, etc.) than on schools. Specifically, regarding secondary schools, few peer-reviewed studies have been about actual assessed secondary school campus built/physical environment features and school-based shootings (either one victim or involving many/mass victims). A previous review of 25 articles (as of 2008-09) reported most were cross-sectional surveys of social factors (Johnson, 2009). One study looked at overall crime rates and social and educational factors in secondary schools in Los Angeles, California with only neighborhood environmental factors (Limbos and Casteel, 2008). Another study focused on junior high or middle schools and the use of CPTED but only examined perceptions of safety and violence in general, not specifically to guns (Vagi et al., 2018). In those studies, two of the current six environmental aspects of the CPTED model for schools (Carter and Carter, 2001; CDC, 2020b) received focus, natural surveillance and access management, as compared to the 3-4 collapsed categories typically referenced for neighborhoods, buildings, offices, streetscaping, parks and potentially schools (CPTED, 2020; Lamoreaux and Sulkowski, 2019). Specifically, the focus was on buildings exits/egress, outdoor lighting, and outdoor landscaping as compared to teacher and/or student cross-sectional survey-based perceptions about safety and/or to general violence indicators like crime or specific types of crime like assault (Limbos and Casteel, 2008; Vagi et al., 2018). Also, outcomes data were based on community-level or Census tract data (Limbos and Casteel, 2008), not school-specific data and not specifically about guns.

Online Supplemental Information—Part II

In the social-ecological model, physical, mental and social support includes personal and societal factors contributing to the development of an individual's security and well-being (Bronfenbrenner, 1979; CDC, 2020a; Wessells, 2020). The social-ecological model--with an individual's knowledge, attitudes and behaviors or attributes encompassing the workings of this framework--recognizes the role interpersonal relationships, community relationships, organizations and social institutions including national, state and local laws and policies play in contributing to an individual's well-being including violence prevention (Bronfenbrenner, 1979; CDC, 2020a). Interpersonal relationships, supports and beliefs between family, friends, peers, and social groups or networks may influence behaviors to increase the likelihood of being a victim or perpetrator of violence (CDC, 2020a). Prevention strategies at both of these levels, however, do not pertain to the present study on the built/physical environment of public secondary school campus features beyond classrooms and offices. While interventions of the built/physical environment implemented at the community and societal level most readily impact public health and environmental health, increased safety measures can both reduce the likelihood of future violence in schools and promote individual well-being. (Please see Supplemental Figure S1)

Supplemental Figure S1

Applying the social-ecological model to the present study on specific aspects of the school built/physical environment in relation to secondary school security and gun violence.

