Long-term care facilities (LTCFs) are essential healthcare and residential settings where frail older adults live and receive care. This project addresses the knowledge gap related to resident safety, social connectedness, and physical activities for LTCF residents during and beyond infection outbreaks. Phase 1 includes a needs assessment to understand the status and desired solutions related to safety, social connectedness, and physical activities from the perspectives of LTCFs, family councils, and residents. Phase 2 introduces visually simulated physical environmental solutions that aim to enhance safety and social connectedness in LTCFs and assesses their potential usability and user acceptance through user surveys assisted by eye-tracking or virtual reality technology. Preliminary findings illustrated the frequencies and spatial and temporal patterns of residents’ falls, social activities, and physical activities. Initial regression results showed that a greater variety of outdoor spaces and provision of music/art activities and family-time mealtime services help promote walking among residents.