computer screen (simple computer games) or immersive with the person having the sense of being completely within the VR environment via goggles or half-dome or dome-closed, projected environments. These systems might include haptic information through sensors in bands or robotics that increase the person's perception of being in and reactive to the simulated environment. They might also include olfactory information through scents (e.g., the smell of pine when walking in a VR forest scene).

Evidence for this recommendation is carried forward from the 2019 VA/DoD Stroke Rehabilitation CPG. The evidence used for the previous recommendation was primarily found in the 2010 VA/DoD Stroke Rehabilitation CPG which recommended considering VR for gait rehabilitation. The recommendation was based on three RCTs using VR to augment a robotic treadmill and conventional physical therapy protocol.(119-121) Sample sizes were very small (n=24, n=20, n=18), and there was significant heterogeneity among interventions. As a group, these RCTs found significantly greater improvements in the VR-augmented therapy groups compared with the control groups on a variety of gait parameters and balance measures (including, but not limited to, gait velocity, community walking speed, community ambulation, BBS, and Activities-specific Balance Confidence Scale [ABC Scale]). The quality of the evidence put forth in the 2010 VA/DoD Stroke Rehabilitation CPG was assessed as low.

The 2019 VA/DoD Stroke Rehabilitation CPG Work Group reviewed one RCT from Lee et al. (2017) (n=50) that used a non-immersive VR method for balance-related training.(122) Both the VR group and the control group exhibited significant improvement in balance as measured by the BBS (p=0.000) and Timed Up and Go cognitive test (p=0.005). Adverse events included soreness, hypertonicity, dizziness, or shoulder pain; all resolved with rest and did not carry over into subsequent sessions. The VR intervention group rated the VR experience more pleasurable than the control group intervention (p=0.027). No significant difference was observed in either group on other outcome measures (mBI for ADL ability; ABC Scale for balance confidence; and Stroke Impact Scale for QoL).

The current systematic evidence review found one SR by Zhang et al. (2021).(123) Significant inconsistencies and errors in this publication made it unsuitable to include in this evidence review.

Some variation occurs in patient values and preferences. Virtual reality system use might be inappropriate for patients who have significant cognitive or visual impairments or both. The group felt that there was no increased risk for falls, soreness, hypertonicity, or shoulder pain compared with usual care. There could be a slight increase in dizziness; these symptoms appeared to resolve quickly with rest. People have different levels of comfort with certain forms of technology. Some patients are more familiar with the commercially available VR systems used for gaming or home fitness. Virtual reality could enhance motivation to participate in therapy and increase engagement in repetitive task-specific practice. This technology is becoming more widely available. The