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### **Fall Prevention in Community-Dwelling Older Adults**

Unintentional injuries are the 7<sup>th</sup> leading cause of death in adults 65 years or older, a majority of which are the result of falls.<sup>1</sup> Due to the high mortality associated with falls amounting to 66.3 deaths per 100,000 people in 2019<sup>2</sup>, the Office of Disease Prevention and Health Promotion within the U.S. Department of Health and Human Services made reducing fall-related deaths among older adults an objective of their Healthy People 2030 platform to address public health priorities.<sup>2</sup> Unfortunately, the rate of deaths from falls in people who are 65 years or older has been steadily increasing in recent years by an average of 3.0% each year between 2007-2016 with an overall rate increase of 31%.<sup>3</sup> According to projections from the United States Census Bureau, one in five Americans will be 65 years or older by 2030.<sup>4</sup> Fall prevention is, therefore, more important than ever before as the population of the United States ages and more people are at increased risk of falls and their associated impact on healthcare costs and quality of life.<sup>5</sup>

The extent of harm that falls have on both individuals and the community is significant. Approximately 36 million falls occur annually, which cause eight million injuries, three million emergency department visits, 950,000 hospitalizations, and ultimately 32,000 deaths.<sup>6</sup> The United States collectively spends \$50 billion annually on medical expenses related to non-fatal fall injuries and \$754 million related to fatal falls.<sup>5</sup> With the aging population and increasing rate of falls, treatment costs are projected to more than double to \$101 billion annually by 2030.<sup>5</sup> Falls are also associated with loneliness,<sup>7</sup> decreased social participation,<sup>8</sup> loss of independence,<sup>6,9</sup> decreased mobility as well as fear of falling.<sup>6</sup>

Reducing falls and fall-related deaths will require a holistic approach as the risk of falling is multifactorial.<sup>10,11</sup> While contributing factors such as increasing age, female sex, and history of falls cannot be changed, other factors once identified have the potential to be addressed and reduce the individual's risk of falling.<sup>10</sup> Examples of modifiable risk factors include medications, balance and gait impairment, lower extremity muscle weakness, vision impairment, foot problems, home hazards, vitamin D deficiency, and certain cardiac and neurologic conditions.<sup>10</sup> To aid in identification of fall risk and implementation of evidence-based interventions, the CDC developed a coordinated care plan for healthcare teams called Stopping Elderly Accidents, Deaths, & Injuries (STEADI).<sup>6</sup> This plan incorporated clinical guidelines from the American Geriatrics Society/British Geriatrics Society (AGS/BGS) for fall prevention in older persons which recommends that older adults are asked each year if they have fallen and, if so, how often and whether they sustained injuries as well as whether they experience difficulty with walking or balance.<sup>12</sup> These questions along with asking about worries of falling comprise the CDC's Three Key Questions that medical providers can use as a quick screening tool to determine if a patient's fall risk is high enough to warrant further exploration.<sup>6</sup> Alternatively, the CDC also created a 12-question self-report tool called Stay Independent which covers additional risk factors.<sup>6</sup> Following a positive screen, administering assessments (e.g. Timed Up and Go Test to assess mobility) to pinpoint an individual's specific risk factors and subsequently executing a matching multifactorial intervention is successful at reducing the number of falls in community-dwelling older adults by 24%.<sup>10</sup>

Exercise that improves balance, gait, and strength is recommended by the AGS/BGS, U.S. Preventive Services Task Force (USPSTF), CDC, and American Academy of Family Physicians (AAFP) in community-dwelling adults 65 years or older.<sup>6, 10, 12, 13</sup> Evidence

demonstrates that exercise is effective whether on its own or as part of a multifactorial intervention<sup>10,14</sup> and that fall prevention exercise programs can reduce falls causing fractures by 61% and falls necessitating medical care by 43%.<sup>10</sup> No specific setting is preferred over another as group-exercise in the community, home-based exercise programs, tai chi, and physical therapy have all been shown to reduce fall risk; therefore, this recommendation can be tailored to a person's ability and interest.<sup>15</sup>

Medications can increase fall risk in older adults.<sup>10, 12, 16</sup> In particular, antidepressants, antipsychotics, antiepileptics, opioids, benzodiazepines, and nonbenzodiazepine receptor agonist hypnotics are high risk medications per the AGS's Updated Beers Criteria.<sup>16</sup> Taking four or more medications concurrently, termed polypharmacy, also increases risk of falls.<sup>6,12</sup> Reducing or withdrawing psychotropic medication is an effective strategy for reducing fall rates either as a single intervention or as part of a multifactorial intervention.<sup>12</sup>

Unsurprisingly, impaired vision also increases fall risk.<sup>6</sup> A randomized control trial of 606 elderly participants who regularly wore multifocal glasses were provided single lens glasses to be worn while walking or participating in other outside activities.<sup>17</sup> During the year of follow up, Haran et. al. noted an 8% decrease in falls for participants who regularly spent time outdoors.<sup>17</sup> However, the participants who had low levels of outside activity experienced a significant increase in falls occurring outside after switching to single lenses.<sup>17</sup> Therefore, for the right person this is a straightforward and cost-effective intervention to reduce their risk of falls.<sup>17</sup>

Foot problems such as deformities or diabetic neuropathy have the potential to increase fall risk.<sup>6</sup> Wearing shoes without good grip, arch support, and heel support also contribute to falls as does wearing socks alone or going barefoot.<sup>6</sup> Educating patients to wear supportive shoes with

traction is the primary intervention recommended by the CDC to address these factors.<sup>6</sup> Medical providers should refer individuals identified with foot problems to a podiatrist.<sup>6</sup>

Hazards in the home which increase fall risk take many forms including loose extension cords, slippery bathtubs, darkened hallways, and throw rugs.<sup>6</sup> The CDC recommends that medical providers give their patients their Check for Safety Checklist to complete and review it with them.<sup>6</sup> The checklist gives simple, actionable directions for fixing hazards such as asking a family member to replace a burnt out lightbulb, putting a lamp next to their bed so it is within easy reach, and adding a non-slip rubber mat to the bathtub or shower.<sup>18</sup> The AGS/BGS guidelines also recommend that any older adult who has fallen or has risk factors for falling have a medical professional assess and implement home safety modifications as part of a multifactorial intervention.<sup>12</sup> Home safety modifications have been found to decrease the rate and number of falls.<sup>11</sup>

Supplementation with 800 IU of vitamin D is a fall prevention intervention recommended by the AGS/BGS in at-risk older adults.<sup>12</sup> However, many studies on vitamin D supplementation demonstrated no change in fall risk and one study evaluating high-dose vitamin D (500,000 IU) administered annually showed an increase in falls and injuries.<sup>14</sup> The USPSTF's previous recommendation was aligned with AGS/BGS guidelines<sup>10</sup> but it was updated in 2018 to recommend against vitamin D supplementation for community-dwelling older adults.<sup>13</sup> The CDC still recommends vitamin D supplements for older adults if their dietary intake is inadequate or if they have low serum levels of vitamin D, however it acknowledges that this intervention may not be appropriate for people with certain conditions such as kidney stones, osteoporosis, or chronic kidney disease.<sup>6</sup>

Cardiac conditions are known culprits of dizziness, syncope, and impaired consciousness which increase a person's risk of falls and therefore should be included in a medical provider's risk assessment.<sup>6</sup> Pacemakers are effective at reducing falls and syncope in people with carotid sinus hypersensitivity which may present as multiple unexplained falls.<sup>10</sup> Additionally, the AGS/BGS and the CDC recommend assessment and treatment for orthostatic hypotension as part of a multifactorial intervention.<sup>6, 12</sup> The assessment includes having the patient lie supine for 5 minutes before checking their blood pressure, then having the patient stand up, and then rechecking blood pressures at 1 and 3 minutes.<sup>6</sup> The assessment is positive if the patient experiences a 20 point or more decrease in systolic blood pressure, a 10 point or more decrease in diastolic blood pressure, and/or lightheadedness or dizziness while switching positions.<sup>6</sup> Reducing the associated medication(s) or switching to another medication with a lower risk profile are reasonable options.<sup>6</sup> The CDC also recommends educating patients with orthostatic hypotension to drink plenty of water, to pump their feet from heel to toe twenty times before standing, to stand up slowly and wait to begin walking for 1-2 minutes, and to wear compression stockings.<sup>6</sup> Medical providers can also provide their patients with the CDC's Postural Hypotension brochure<sup>6</sup> which offers additional management strategies.<sup>19</sup>

Neurologic conditions such as cognitive impairment, dementia, and Parkinson's can also increase fall risk in older adults.<sup>6</sup> While the AGS/BGS declined to make any recommendations for the population affected by these disorders due to insufficient evidence,<sup>12</sup> physical exercise has been shown to reduce the rate of falls in older adults who are cognitively impaired.<sup>20</sup> The CDC's approach is to encourage medical providers to be proactive in addressing neurologic risk factors, to engage the services of physical and occupational therapists when indicated, and to educate family members about fall prevention using their Family Caregivers brochure.<sup>6</sup>

In conclusion, since most falls are the result of multiple overlying risk factors,<sup>10, 15</sup> it will require a customized approach to prevent falls and their long-term sequelae. The role of a one-time presentation at a senior center serving community-dwelling older adults is to raise awareness of this public health issue and to empower attendees with evidence-based information that has the potential to save their life or that of a family member. To make the presentation effective for an older audience, I will speak slowly and plainly, and use the teach-back method to engage the audience and check for understanding.<sup>21</sup> Additionally, I will provide printed materials for attendees to take home with them including instructions on how to access the Oregon Health Authority's map of Senior Fitness Classes in Oregon and SW Washington<sup>22</sup> and the CDC's Stay Independent, Check for Safety, and Family Caregivers brochures. Currently less than half of people who experience a fall will tell their medical provider.<sup>6,10,11</sup> However, I am hopeful that attendees who learn about the risk factors of falling combined directly with concrete steps to avoid them will understand that fall prevention is relevant to them, that it is important to communicate with their medical providers if they experience a fall, and that falls are preventable.<sup>11</sup>

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