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## How to Build and Sustain a Transdisciplinary Community-based Exercise Program for Older Adults

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# How to Build and Sustain a Transdisciplinary Community-Based Exercise Program for Older Adults

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**Abstract.** We have built a community-based program called Stay Strong, Stay Healthy, which helps older adults improve muscle strength and flexibility while reducing fall risk. This report details lessons learned and keys to success for Extension practitioners. First, maximize the potential of your state's Extension framework by building a program that centers around your target population and is fun and easy to implement. Second, partner with researchers who can help to improve program effectiveness and logistical feasibility on larger scales. Lastly, continue to evaluate and adapt based on feedback from those who utilize and implement the program.

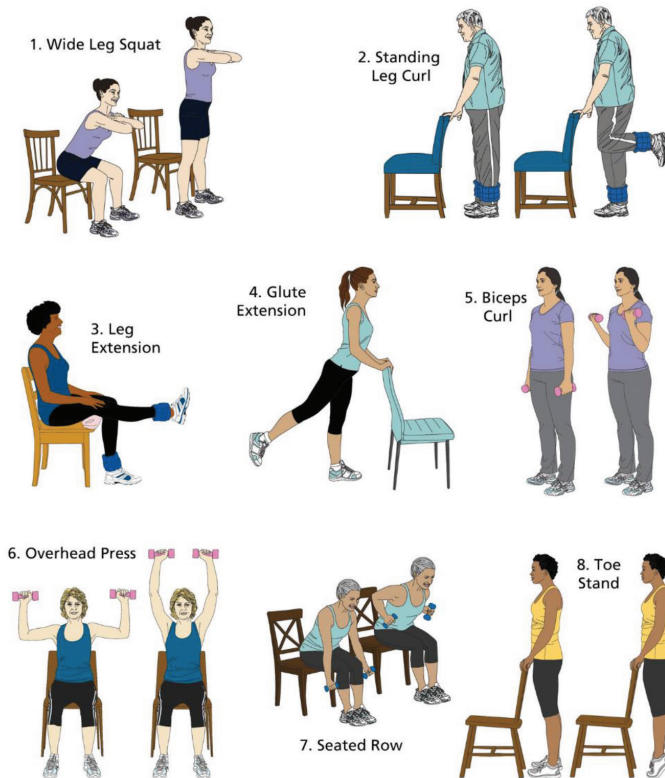
## INTRODUCTION

For a variety of reasons, all segments of the older adult population in the United States are growing at unprecedented rates (Administration for Community Living, 2022), and with this elongated life-span, the prevalence of chronic diseases has skyrocketed. Despite physical activity being one of the most beneficial interventions for nearly all age-related physiological vulnerabilities, most Americans do not engage in the recommended amount of exercise, and this percentage worsens with advancing age (Nagata et al., 2022). Community-based exercise programs targeting older adults must gain an understanding of older adults' barriers to exercise and find unique ways to combat these issues. This report details the creation of a community-based exercise program called Stay Strong, Stay Healthy (SSSH). In this discussion, we detail considerations for the creation, adaptation, and delivery of SSSH using the Extension framework. We have also included five lessons learned and keys to success for other Extension professionals who are working to implement exercise programs in their local communities.

## STAY STRONG, STAY HEALTHY'S PAST, PRESENT, AND FUTURE

Past resistance training programs that targeted older adults have been shown to improve strength, flexibility, and balance (Goble et al., 2017; Hughes et al., 2004). One such foundational program was the StrongWomen curriculum developed by Dr. Miriam Nelson and colleagues in the 1990s, which had participants meet two times per week for 12 weeks (Nelson et al., 1994; Seguin et al., 2002, 2008). Over 14 months in 2004–2005, with permission from Nelson, we adapted StrongWomen to create SSSH specifically for Extension professionals. Important modifications to StrongWomen included welcoming men, targeting adults ages 50 years and older, and creating a shorter duration of 10 weeks to overcome participant burnout. During this 14-month pilot period, Extension faculty offered SSSH in such community locations as churches, community centers, and senior centers, and we employed local focus groups, regional Extension faculty, and community partners to learn more about barriers to success. For instance, during this time, many Extension faculty noted that they felt uncomfortable teaching exercise classes if they weren't exercisers themselves. To combat this issue, we moved to face-to-face trainings, which faculty noted helped ease anxiety and better prepare them.

Next, we needed to implement and evaluate our program across the state. We first created a standardized training program used to certify our regional Extension faculty, which included training modules about exercise



Class Number	Sets x Repetitions	Weights	Exercise Execution
1	1 x 5	No weights	5 reps R, rest; 5 reps L, rest*; Repeat for **
2	2 x 5	No weights	5 reps R, rest; 5 reps L, rest; 5 reps R, rest; 5 reps L, rest*; repeat for **
3	2 x 6	No weights	6 reps R, rest; 6 reps L, rest; 6 reps R, rest; 6 reps L, rest*; repeat for **
4	2 x 6	Add weights	6 reps R, rest; 6 reps L, rest; 6 reps R, rest; 6 reps L, rest*; repeat for **
5	2 x 8	Weights	8 reps R, rest; 8 reps L, rest; 8 reps R, rest; 8 reps L, rest*; repeat for **
6	2 x 10	Weights	10 reps R, rest; 10 reps L, rest; 10 reps R, rest; 10 reps L, rest*; repeat for **
7	2 x 10	Weights	Same as class 6
8	2 x 10	Weights	Same as class 6
9	2 x 10	Weights	Same as class 6
10	2 x 10	Weights	Same as class 6
11	2 x 10	1-2 adaptations with weights	10 reps R, rest; 10 reps R, rest; 10 reps L, rest; 10 reps L, rest*; repeat **
12	2 x 10	Same adaptations with weights	Same as class 11
13	2 x 10	1-2 adaptations with weights	Same as class 11
14	2 x 10	Same adaptations with weights	Same as class 11
15	2 x 10	1-2 adaptations with weights	Same as class 11
16	2 x 10	Same adaptations with weights	Same as class 11

Figure 1. University of Missouri's Stay Strong, Stay Healthy exercise and progression chart.

programming and delivery, recruitment strategies, state faculty support, and data management. Certified instructors led participants through a warm-up, a set of upper- and lower-body strengthening exercises, and a cooldown. Visual materials, such as Figure 1, were created and provided for Extension faculty and participants to clearly demonstrate the exercise program and progression scheme. The program quickly gained popularity with participants and Extension faculty, and we began to amass testimonials and anecdotes that indicated SSSH's positive impact. Although testimonials were encouraging, we needed a more sophisticated quantitative assessment to be considered an evidence-based program. In 2010, our team connected with researchers at our land-grant university to collect pre- and post-SSSH assessments of muscle strength and flexibility, balance, and perceptions of ability for hundreds of participants. We published those studies, which demonstrated that the 10-week program had significantly improved older adults' physical mobility and flexibility (Ball et al., 2013) and self-confidence (Syed-Abdul et al., 2016).

Over the next 5 years, we continued to evaluate the program and learned three important things: (a) SSSH needed another level, (b) the program duration needed to be shorter, and (c) it was unclear whether the program was equally beneficial across age groups or geographical locations. In 2009, our team created a level II, which was more difficult and included transitions from standing to sitting to movements on the floor. This work stemmed from participant and instructor feedback indicating that repeat participants wanted more advanced training. This updated level II option helped participants significantly improve their muscle strength, flexibility, and balance, while reducing their body-fat percentage (Crowe & Ball, 2015). To ensure participants don't experience a training plateau, we are now programming level III, which will integrate highly scalable movements performed at higher velocities, as these have been shown to reduce fall risk more than slower tempo movements (Ramírez-Campillo et al., 2014). Next, we needed to see whether shortening the program duration to 8 weeks would negatively affect

## Resistance Training for Older Adults

program efficacy and whether the program was equally beneficial across age groups and geographical locations. Our research team found that the 8-week program significantly improved lower body strength, coordination, and flexibility to the same extent or more than did the 10-week program for SSSH level I (Baker, Miller, et al., 2021). We also found that the program improved these physical measures regardless of age group or rural or urban geographic location (Baker, Miller, et al., 2021), suggesting that the program was highly effective across these diverse groups. We have also now truncated the level II program to an eight-week program which again has been shown to improve dynamic coordination, balance, flexibility, and strength (Spokely et al., 2024).

Currently, more than 350 Extension professionals have been certified in five states, and the program has reached just under 20,000 participants—and is still growing. These numbers mean that the program must continue to undergo evaluation for efficacy compared to other forms of exercise and that we must adapt to new technology. In 2019, the team conducted a randomized control trial that demonstrated that SSSH improves participants' strength and flexibility, sleep quality, and engagement in other forms of exercise, reducing the risk for falls to the same or a greater extent than just walking (Baker, Weitzel, et al., 2021). Furthermore, 1-year follow-up with these same participants found that despite social distancing restrictions from COVID-19, they had actually increased their independent exercise engagement (Miller et al., 2022). Similar studies need to be conducted on our level II and new level III options to ensure that these are equally beneficial to all older adults. Secondly, the COVID-19 pandemic forced Extension professionals around the country to try virtual delivery. Our pilot efforts included lots of troubleshooting for our Extension agents and participants, but after multiple iterations of virtual SSSH, our pilot data demonstrate similar participant attendance rates and satisfaction after virtual program participation compared to in-person deliveries. We are currently researching whether this mode elicits the same physiological benefits as in-person classes.

In the nearly 20 years SSSH has been offered, we have learned many lessons and want to share five keys to success for our program to help other Extension professionals successfully reach as many communities as possible with their own exercise programs:

**1. Research is essential.** It is vital that you work to create an interdisciplinary team on campus who can study the outcomes of your program. Include research faculty who have expertise you do not. For example, our SSSH research team includes qualitative and quantitative folks from exercise science, nutrition, orthopedics, and physical therapy, all of whom work very closely with our practitioners, Extension faculty, and key stakeholders within the community. Their findings are immediately translational and improve engagement at multiple levels. This diversity also allows our team to present findings at conferences, publish peer-reviewed articles, and encourage student engagement. It will also allow your team to more easily apply for awards and grants. For instance, SSSH has been received the National Health Outreach Jeanne M. Priester Award and the University of Missouri Team Engagement Award. Use such interdisciplinary scholarship, presentation of findings, and team awards to leverage large federal grants that combine extension and engagement with research.

A major component of the research team that is often overlooked are the students. Involve them from the beginning. Undergraduate and graduate students can play a critical role in the success of your program. They can help implement the program, communicate with participants, and organize and collect data. Students benefit from hands-on experience and exposure to Extension and our mission. In the early years of the SSSH program (2004–2010), we recruited undergraduates as volunteers. As the program has grown, we have been able to hire students as interns and provide stipends for graduate students. Graduate students use SSSH data as theses and dissertation projects, helping build the evidence-based research needed for scalable programs. The body of SSSH literature would not have been possible without student involvement.

**2. Connect with your community.** Your off-campus teammates play a unique role in the development, implementation, evaluation, and progression of your program. Community partners are instrumental in communicating needs, assisting faculty in securing physical space to hold classes, marketing, garnering interest, and providing support during implementation. For SSSH, our partners include senior centers, nutrition centers, libraries, churches, independent living centers, college campuses, public schools, hospitals, YMCAs, health coalitions, health departments, and others. For example, in southwest Missouri, Extension faculty work closely with a local health system that supports SSSH through advertising classes, making referrals, providing space, and sponsoring some participant fees. Alternatively, in Oklahoma the YMCA has become a key logistical partner in offering space and equipment. Community allies can be anyone who shares your mission, and they are instrumental in your program's success and sustainability, so take the time to build these relationships.

**3. Use your resources.** It is important to have resources to be able to implement your program, including program delivery. Be sure to build your program with the evidence-based designation in mind. One way our team has been able to overcome this logistical hurdle is by offering nutritional programming in conjunction with SSSH. Now, SSSH is in the USDA Supplemental Nutrition Assistance Program Education (SNAP-Ed) toolkit as an approved research-tested, evidence-based intervention. This designation confirms efficacy and allows other implementing agencies to use federal funds to adopt SSSH. We are currently applying for Administration of Community Living's evidence-based program review. If we are selected, it will allow for Title III D funding from the Older Americans Act to be used to implement SSSH. Lastly, your community partnerships might turn into funding opportunities. For instance, in 2017, we partnered with Oasis, a learning institute in St. Louis, Missouri. This partnership has led to the development of a statewide network of organizations and individuals working to improve the health of aging adults. In 2018, Oasis and Missouri Extension secured \$500,000 for falls-prevention programming and sustainability planning from the U.S. Department of Health and Human Services.

**4. Sharing is caring.** In the past 5 years, we have sought out partnerships with other land-grant universities across the nation in Kansas, Nevada, Tennessee, North Carolina, and Oklahoma. You can negotiate to have these schools pay for your team to come train their Extension professionals to implement your program. You can also negotiate to have these Extension offices pay a small portion of your salary to use your program and to use your support of their faculty. To be able to scale your program across multiple states, it is important that you first research within your own counties and slowly build across your state while conducting continuous program evaluation before being confident that you have a truly scalable program. Then, cross state lines with an Extension team you know and trust who will also help you evaluate the program in their counties. It is very important that you continue to collect data from all program offerings, regardless of where or when the program is being offered.

**5. Do not reinvent the wheel.** An abundance of successful health programs can be modified and implemented by using the standard Extension framework. SSSH was modeled after the StrongWomen program developed at Tufts University by Nelson. With her permission, we reworked the program to meet the needs of our target population. Although many of the exercises are the same, how the movements are taught and performed are tailored specifically to older adults, and each movement has modifications for those who are unable to perform the exercises. SSSH created its own unique curriculum, resources, data management, and trainings to work specifically with an established Extension network. Before starting a program from scratch, reach out to your Extension colleagues across the country to determine which programs already exist. Ultimately, all of us share the same mission—to improve the lives of our neighbors.

## CONCLUSIONS

The blueprint for transdisciplinary engagement, teaching, and research, along with “keys to success” presented here, are lessons learned from more than 20 years of experience at a land-grant university. Not all of what is presented may be applicable to every organization or program. However, one “key” will apply to all programs: Do not attempt this type of program alone. The sustained success of any outreach endeavor is best achieved through teamwork. The depth and breadth of the team plays the most significant role in any program's success and sustainability.

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