

Running Head: HEALTHY LIVING

## **Development and Evaluation of the *Stoplight Healthy Living* Program**

Dorothy E. Nary, PhD and Kim Bruns, MS Ed

Institute for Disability and Policy Studies, University of Kansas

### **Acknowledgement**

The data reported in this paper were collected with support through Grant/Cooperative Agreement Number DD000006 from CDC, National Center on Birth Defects and Developmental Disabilities, Disability and Health Branch. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of CDC, NCBDDD, Disability and Health Branch.

Nary, D., & Bruns, K. (2019). Development and evaluation of the Stoplight Healthy Living Program. *Inclusion*, Advance online publication, <http://aaid.org/publications/journals/articles-accepted-for-publication>

Running Head: HEALTHY LIVING

**Development and Evaluation of the *Stoplight Healthy Living* Program**

Dorothy E. Nary, PhD and Kim Bruns, MS Ed

Institute for Disability and Policy Studies, University of Kansas

**Acknowledgement**

The data reported in this paper were collected with support through Grant/Cooperative Agreement Number DD000006 from CDC, National Center on Birth Defects and Developmental Disabilities, Disability and Health Branch. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of CDC, NCBDDD, Disability and Health Branch.

### **Abstract**

To address health disparities of adults with intellectual disability (ID), the Kansas Disability and Health Program developed the *Stoplight Healthy Living* program to promote good nutrition and increased physical activity. The program is based in part on the Stoplight Diet, which uses a color-coded system to teach healthy food choices. The *Stoplight Healthy Living* program was tested with two groups recruited through a local disability service provider in Kansas. Evaluation results suggested increases in daily fruit and vegetable consumption after participation in the program as well as increased purchases of healthy foods, reduction in soda consumption, and increased knowledge of healthier fast food meal choices. The program was well-received by participants, and shows promise in supporting good nutrition and health of adults with ID.

Keywords: intellectual disability, nutrition, physical activity, healthy living

### Development and Evaluation of the *Stoplight Healthy Living* Program

Adults with intellectual disability (ID) in the U.S. are five times more likely to report being in poor health compared to individuals without disabilities, 1.3 times more likely to report being obese, and five times more likely to report being physically inactive, according to an analysis of Behavioral Risk Factor Surveillance System (BRFSS) data (Havercamp & Scott, 2015). These differences represent health disparities, which are defined as *preventable* differences in health of a group within the overall population. They affect the quality of life and community participation of adults with ID (Krahn, Walker, & Correa-De-Araujo, 2015).

As in the broader U.S. population, adults with disabilities in Kansas also experience health disparities. Although data specific to adults with ID in Kansas are not available, 2017 Kansas BRFSS data suggested that adults with any type of disability in Kansas are six times more likely to report fair/poor health than the general population, 1.4 times more likely to be obese, and almost twice as likely to be physically inactive outside of the work setting (Kansas Department of Health and Environment Behavioral Risk Factor Surveillance System [KDHE/BRFSS], 2017). Additionally, adults with disability are nearly twice as likely to have hypertension, three times more likely to have diabetes, and more than five more likely to have had a stroke (KDHE/BRFSS, 2017).

Given these disparities, the Kansas Disability and Health Program (KDHP) was funded by the Centers for Disease Control and charged with improving the health and quality of life of adults with ID by adapting and implementing evidence-based strategies in community settings to improve health and quality of life (CDC, 2019). KDHP staff developed a program to improve nutrition and increase physical activity among adults with ID living in the community, with the goal of reducing health disparities. The program developed by KDHP adapted the evidence-

based “Stoplight Diet,” which supports participants to make healthy eating choices to improve their health and quality of life (Epstein & Squires, 1988).

Development and evaluation of the of the *Stoplight Healthy Living* program is described in the following sections. In developing and evaluating the program, KDHP staff aimed to discover whether a program based on the Stoplight diet could be used to improve the health of adults with ID. Specifically, the aim was to create an program that could be delivered by service providers to support adults with ID to adopt more nutritious diets and increase their physical activity levels.

### ***Stoplight Healthy Living Program Development***

#### **Evidence Base for Stoplight Diet**

The *Stoplight Diet for Children* (Epstein & Squires, 1988) is an eight-week program that uses a simple, visual method of teaching adolescents to distinguish healthy foods from less healthy and unhealthy foods. Epstein and Squires classified foods into three groups based on their caloric content and nutritional value and recommended that low calorie, high volume foods make up the bulk of an individual’s diet. These food groups were color-coded to correspond with the color scheme of a stoplight: Green (Go, eat all you want), Yellow (Slow, use caution) and Red (Whoa, eat rarely or never). For example, fresh apples and broccoli were assigned to the Green group, low fat yogurt and sweet potatoes were assigned to the Yellow group, and cookies and French fries were assigned to the Red group.

This program had documented success in several weight loss trials with adults with ID (Ptomey et al., 2017; Saunders et al., 2011) and adults with mobility impairments (Reichard et al., 2015). In each study, a “diet phase” lasted six months and included self-monitoring; monthly meetings; incentives for compliance; and recommendations for

exercise, which typically consisted of walking, using an arm cycle, and/or strengthening with elastic stretch bands. All trials employed meal replacement shakes and packaged entrees for portion control and ease of preparation. Researchers provided some of these foods and intervention participants were encouraged to choose any additional foods consumed from the Green food group list. Reichard et al. (2015) reported significantly improved body mass index (BMI) and more weight loss at 6- and 12-month follow-up points for the intervention group than for a “usual care” group. Ptomey et al. (2017) reported significantly greater weight loss at six months for the intervention group compared with a conventional diet group; however, no significant difference in weight loss was reported at the 18-month follow-up point. Saunders et al. (2011) did not use a control group but reported that almost 90% of the participants lost an average of 6.3% of their baseline weight at the end of the intervention period and lost an average of 9.4% of baseline weight at the 6-month follow-up point.

### ***Stoplight Health Living Program***

The existing research suggests that the Stoplight Diet can assist adults with ID to improve their health by supporting healthy lifestyle choices. Further, Anderson, MapelLentz, Hallas-Muchow, and Gulaid (2019) suggest that individual wellness practices, support for physical activity and good nutrition, and support for social connections can promote health and community participation. In developing the *Stoplight Healthy Living* program, the KDHP incorporates aspects of the Stoplight Diet as well as information on other effective health promoting practices to devise a program that could be implemented in the community with adults with ID and supported by direct support professionals (DSPs).

In developing the program, the KDHP staff established several parameters for the development of *Stoplight Healthy Living* in consultation with key stakeholders that are members of the KDHP Consumer Advisory Board (CAB). Members of the CAB include adults with ID, as well as other stakeholder groups, including administrative and direct support staff at local organizations that support adults with ID. The four parameters included:

1. Promote choice and self-determination for participants
2. Focus on behavior change by reinforcing the importance of good nutrition *and* increased physical activity
3. Involve disability service providers, including direct support professionals (DSPs), who can provide ongoing support for healthy lifestyle choices after the formal program ends
4. Disseminate the program through disability service providers across the state via a train-the-trainer model.

The reasons for designing the program with these parameters are described in the following paragraphs.

First, self-determination means “making things happen in a person’s own life, instead of having others do things to, or for them” (Palmer & Wehmeyer, 2019, p.1). As a means of promoting active involvement in one’s own life, self-determination has been identified as a key component of health and quality of life for people with ID (Shogren, Wehmeyer, Reese, & O’Hara, 2006). Researchers note the importance of providing information on the benefits of healthy behaviors to people with ID to facilitate informed decision-making, as well as providing the necessary supports to effectively implement these informed decisions. Others have posited that providing opportunities for people with ID to make choices is increasingly recognized as an

element of high-quality services and should extend to health and wellness (Webber & Cobigo, 2014). Based on this evidence, KDHP staff chose to emphasize self-determination and supporting participants in making healthy choices as part of the *Stoplight Healthy Living* program.

Second, several recent systematic reviews examining behavior change techniques in health behavior or lifestyle change programs for people with ID indicate evidence of efficacy for adding a physical activity component. A review by Scott and Haverkamp (2016) of 13 studies evaluating 10 health promotion programs found preliminary evidence for programs combining nutrition and physical activity components. Additionally, a review conducted by Willems, Hilgenkamp, Havik, and Waninge (2016) identified 23 programs that aimed to improve both physical activity and nutrition for people with ID. The authors of this review noted that providing information on behavioral consequences in general and incorporating social support were commonly used program components. However, both reviews noted deficits in the research overall including weak designs, incomplete presentation of data, and lack of a theoretical framework for the studies. Still, enough evidence exists to test a health promotion program with a dual focus on nutrition and physical activity for people with ID, suggesting merging physical activity supports with the Stoplight diet could be useful in community settings.

Third, KDHP staff sought the buy-in of administrators and DSPs at local service providers to support participants during and after the delivery of the program, given the importance of promoting environmental conditions supportive of health and wellness. Inviting DSPs to participate in training and implementation of the program promotes ongoing use and support of what was taught to participants.

Fourth, to assure that the program could be scaled to reach individuals with ID across the state of Kansas consistent with the focus of the KDHP, it was designed to be delivered via a train-the-trainer model after the initial evaluation. This feature is especially important in a largely rural state where travel by KDHP staff to deliver the program in remote areas would not be feasible. We specifically plan to train DSPs in the use of the program through webinars to build capacity to promote the health of adults with ID across the state.

Specific resources used in the program were drawn from several sources, beyond the Stoplight Diet. Materials from the Partnerships in Wellness program at the Research & Training Center on Community Living, Institute on Community Integration, University of Minnesota were utilized with permission, including: (a) pictorial foods cards that were laminated for use in activities, (b) a brief video on the role of social support in being healthy, and (c) a poster demonstrating healthy portion sizes (Anderson et al., 2016). Videos about shopping for fruits and vegetables and about warming up for physical activity from the National Center on Health, Physical Activity and Disability (National Center on Physical Activity and Disability, 2017) were included in the program. KDHP staff also purchased a Sugary Drinks Display from Oral Health Kansas (2019) to demonstrate sugar levels in commonly consumed drinks. Placemats displaying the U.S. Department of Agriculture's (2018) "MyPlate" image were purchased from a commercial vendor and used to teach participants how to assemble a healthy meal (see Figure 1).

The *Stoplight Healthy Living* program was designed to be delivered in 1 to 1.25 hour sessions over six consecutive weeks, with specific and targeted content during each session. There were five overall goals that were introduced at the start of each session: (a) be healthy, (b) have fun, (c) value self-determination in making healthy changes, (d) support each other, and (e) make small changes every day. Each session then featured a variety of didactic and interactive

activities utilizing the resources described previously that provide learning and practice opportunities for healthy behaviors. These include: (a) using the Stoplight method of identifying healthier foods; (b) increasing physical activity in daily routines; (c) gaining social support for healthy living; (d) replacing sugary beverages with water; (e) learning and exercising portion control; (f) shopping for healthy foods; and (g) making healthier choices when eating out.

During each session, the following format was utilized: (a) an introductory activity for participants to introduce themselves; (b) information about healthy eating (e.g., Stoplight food groups, what is a balanced meal, portion control) and increased physical activity; (c) activities to reinforce the information (e.g., assembling a balanced meal using laminated food cards, playing guess the healthier snack, role-play ordering healthier foods from a fast food menu); (d) brief physical activity; and (e) provision of a healthy snack to demonstrate that healthy foods can be delicious. Further detail about specific session content is provided in Table 1. To reinforce session content, participants received various incentives, such as pedometers to record movement, water bottles to encourage water consumption, and Stoplight-logo T-shirts to remind about green, yellow and red food groups.

### **Evaluation of the *Stoplight Healthy Living Program***

#### **Evaluation Groups and Selection**

The complete Stoplight Healthy Living program was delivered with two separate groups to evaluate its feasibility and impact to inform decisions about scaling up across the state through a train-the-trainer model. All participants were recruited by a disability service provider that partnered with KDHP to evaluate the program, given the identified need by the provider for a focus on health and wellness supports. Seven individuals with ID participated in the first evaluation group, which took place at the residence of several participants with other participants

coming to the residence for the sessions. Five participants identified as male and two as female. Their ages ranged from 39 to 72 years, with a mean of 61 years. All reported their race as White and none reported being Hispanic.

Seventeen individuals with ID participated in the second program evaluation group, which was conducted in a large activity room at the headquarters of the collaborating service provider. These participants had been meeting twice monthly as part of a staff-led health and wellness group. For this evaluation, they agreed to meet more frequently and to devote their meetings to *Stoptlight Healthy Living* activities for six sessions. Participants' ages ranged from 30 to 68 years, with an average of 50 years. Nine participants identified as female, and eight as male. Fourteen reported their race as White, and two reported it as African American; and one participant reported being Hispanic.

Although formal data describing co-occurring disabilities were not collected, KDHP staff learned from observation and conversations with participants that several in each group experienced disabilities in addition to ID, including visual impairments, mobility impairments, diabetes, and breast cancer.

## **Measures**

For the first group, the primary focus was on piloting activities and evaluation methods. For the second group, additional assessments were completed including assessments of health knowledge and behaviors before, during, and after the program. Additionally, participants were taught and supported to engage in self-monitoring of their health and wellness behaviors and these documents were collected. Staff questionnaires were also utilized to get feedback from participating DSPs to inform further program development. Additionally, KDHP staff used debriefing forms after each session to assess implementation and record informal observations.

On the assessment of health knowledge and behavior change, 10 questions were presented in three different formats: (a) multiple choice items with pictorial responses, (b) fill-in-the-blank items, and (c) yes/no items. An example of a multiple-choice question is, “What did you do to move your body in the last week?”, with pictorial response choices of walking, riding a bike, swimming, and lifting weights, and an additional option of writing in an activity. An example of a fill-in-the-blank question, is “How many glasses of water did you drink today?” An example of a yes/no question is, “Did you eat any fruit or vegetables today?” These tests were administered at the beginning, mid-point and end of the program, in the second group.

Participant self-monitoring forms included space for recording check marks on five days of the week, Monday to Friday, for the following four behaviors: (a) drink water all day; (b) eat fruits and vegetables each day; (c) minutes of activity each day (walk/steps, dance/movement, weights/stretching, sports/swimming); and (d) no sugary drinks. These forms were distributed during the second session and collected from participants during sessions 3, 4, 5, and 6. For movement, participants were asked to record the numbers that they retrieved each day from the pedometers they received during session 2 to track and support walking as a form of exercise, as targeted during a program session.

DSP questionnaires were paper and pencil surveys that included items querying: (a) how/if the staff members reinforced program content between the sessions, (b) what changes in participant behaviors they observed, (c) what was most challenging about assisting the participants to use the information they learned in the sessions, and (d) any suggestions for improving *Stoplight Healthy Living*.

### **Evaluation Findings**

Across the two evaluation groups, attendance was high and consistent with 85 and 90% of participants in group one and two, respectively, attending all six sessions. The focus of the first group was to ensure feasibility of materials and activities, and overall the feedback was highly positive necessitating few changes prior to initiating the second group. In the second group, when the assessments aligned with the program were collected, there were generally positive changes in behavior and knowledge acquisition (see Table 2 for complete findings). Of the 17 participants, 14 completed the survey of health knowledge and behaviors before, during, and after the program. All participants with ID improved on at least one evaluation item from baseline to the end of the program. Fruit and vegetable consumption on the previous day was reported to increase (43% to 64%) as did healthy food purchases on the last shopping trip (50% to 100%). Further, knowledge of healthier fast food choices increased (57% to 79%). Participants also reported a significant reduction in soda consumption on the previous day (57% to 29%) and a small increase in the average number of glasses of water drank on the previous day (2.35 [range of 0-8] to 3.31 glasses [range of 0-10]). Participants were also more likely to be able to identify a healthy balanced meal plate (71% to 79%). However, two items showed decreases in knowledge, as fewer participants identified foods high in fat and sugar (43% to 38%), and the most healthy “green” group food (100% to 92%) at post-test. However, results for these two items showed mid-point scores that were stable or increased; perhaps reflecting errors in completing the items although further evaluation is needed.

Regarding physical activity items, however, the results are less robust. All participants indicated that they did physical activity during the previous week on the post survey; however, the number reporting physical activity in addition to walking during the previous week declined

(36% to 29%). These items may indicate that participants reported their typical daily walking as exercise and that engagement in other types of physical activity declined from pre- to post-test.

The participant self-monitoring forms were completed too rarely to provide useful data on participant adoption of healthy behaviors, suggesting a need to reconsider the use or form utilized to collect and support self-monitoring data.

The staff questionnaires provided anecdotal information on: (a) efforts to reinforce session content (e.g., discussing green, red and yellow food groups at the grocery store), (b) observed behavior changes (e.g., participants ordering water instead of soda when eating out as a group), (c) challenges in assisting participants to implement the knowledge gained (e.g., eating well on a budget), and (d) suggestions for program changes (e.g., provide Stoplight-logo t-shirts at the first program session versus the last to build group identity; and incorporate dancing for physical activity during sessions as most participants enjoyed dancing).

Some of the most useful evaluative information was gained from discussion with participants during the sessions. For example, participants in the first evaluation group reported they had switched from soft drinks to water with their dinner each night. The DSP who oversaw meal preparation confirmed this report. One participant reported that he now bought wheat bread instead of white bread when grocery shopping for the group. Participants enjoyed both the fresh fruit that was served as a snack and trying foods such as hummus and dips made from fat-free yogurt instead of sour cream. Several married couples, including one participant with diabetes, mentioned several times how they would support each other at home in changing their eating habits. However, the maintenance of these behaviors was not evaluated and there is a need for long-term follow-up of behavior change. It does appear through, that the social component was a critical component for many of the participants in terms of implementing behavior change.

## Discussion

Overall, participants in the evaluation provided positive feedback on the *Stoplight Healthy Living* program, reported some short-term behavior changes, and sustained participation over all six sessions. This information and the feedback received from participants and DSPs will be used to enhance future iterations of *Stoplight Healthy Living*, inform scaling-up and implementation of a train-the-trainer model, and inform ongoing efforts to engage people with ID in health promotion in Kansas and beyond.

Several key areas were identified for improvement as a result of the evaluation activities. First, increased emphasis will be placed on physical activity, given the limited change in this area during program delivery. Participating DSPs reported that several participants said that they could not exercise because they are “disabled.” *Stoplight Healthy Living* used accessible exercise video segments and other activities to demonstrate that physical activity is important and possible for everyone, and that many kinds of movement are useful. However, additional work to counter stereotypes and environmental barriers appears to be needed. KDHP staff will embed more resources for physical activity (i.e., more video dance segments and emphasis on other types of activity such as stretching) and more prompts to use these resources outside of the weekly sessions in future iterations of *Stoplight Healthy Living*. Additionally, inexpensive activity monitors in the form of bracelets (like Fitbits), instead of pedometers which were used during the initial program deliveries, will be distributed during the next delivery. These devices are more durable and easy-to-wear, since they are easily placed on the wrist versus clipped to clothing. The widespread use of bracelet-type devices (e.g., Meola, 2016) and their successful use in other studies with persons with ID (e.g., Evmenova, Graff, Gennaro Motti, Giwa-Lawal, & Zheng, 2018) indicate that they may be more motivating to participants and therefore more

successful in promoting physical activity. Still, research on the impact of these changes will be needed.

Second, future program deliveries will include more robust evaluation. Overall, participant evaluation of the program was challenging for several reasons. Completion of the pre- and post-tests took significant time out of the relatively brief sessions. Participants appeared to dislike the process of completing “tests,” and the content may not have been easily understood by several participants. Many did not want to complete the forms independently, even when it appeared that they possessed the ability to understand the material. For those who requested support from a staff member to complete the forms, time and space limitations made it impossible to prevent other participants from overhearing responses and recording them on their own forms, likely to determine the “correct” response. Similarly, Bergstrom and colleagues (2013) noted that participants with ID in a health promotion intervention sometimes resisted completing evaluations. One data collection strategy noted by these researchers was to read the items out loud to participants in a secluded area instead of trying to administer the tests in a group setting. Additionally, Bostrom, Johnels, Thorson, & Broberg (2016) and Ptomey et al. (2016) successfully used computers to collect data from participants with ID in health-related studies. Boström and colleagues administered a questionnaire to adolescents with ID using a tablet PC. They noted some benefits of the tablets, including using audio and visual support for those with limited reading skills, and presentation of one question at a time. KDHP staff will explore using tablets PC for future administration of pre- and post-tests. And, unfortunately, self-monitoring forms were completed and submitted by few program participants. Because they could select a small prize, such as a pack of sugar-free gum, pens or stickers when they submitted their completed forms, some hurried to fill in the forms during the meeting; others

simply failed to bring their forms to the sessions. For these reasons, there were substantial missing data and questionable validity of the data that were received. In future iterations, the impact of placing more emphasis more structured involvement of DSPs in supporting the use of self-monitoring strategies will be explored. Heller, McCubbin, Drum & Peterson (2011) concluded a scoping review of health interventions for people with ID by noting a need for programs that address issues of staff training, knowledge, and motivation of people with ID regarding health promotion. Future program deliveries will allow more time for evaluation and explore varying methods to collect data. Additionally, as a six-week program may produce only minimal behavioral change, therefore, a later follow-up measure may be added to evaluate long-term change.

The third improvement to explore as a result of initial data collection is to facilitate additional opportunities for social support. Social support has been established as a key component of health behavior change (e.g., Prochaska & Velicer, 1997), and has been noted as important in promoting environments that facilitate health-related changes for people with ID, such as better nutrition (Humphries, Pepper, Traci, Olson, & Seekins, 2009) and increased physical activity (Heller, Hsieh, & Rimmer, 2004). Although the *Stoplight Healthy Living* program includes a video about social support that targets people with ID, as well as a discussion of people in the participants' lives who can provide support, participants were not asked to name a specific supporter or to identify how that person might provide support. Adding this opportunity to identify a supporter and working to identify specific ways that the person can ask for support might enhance this program component.

A fourth improvement will be made by assessing usefulness of a color-coded shopping list. This list was created to support participants make healthier food choices while grocery

shopping. It is based on a grocery shopping checklist provided by the sponsoring organization that includes food categories of fruits and vegetables; canned foods; meats and proteins; breads/starches; dairy, baking, and spices; frozen foods; and beverages. In consultation with a dietician, KDHP staff color-coded each item on the list as belonging to the green, yellow or red food group. So, for example, while shopping in the dairy aisle, the user can learn that skim milk is in the green food group, low fat sour cream is the yellow food group, and butter is in the red food group. While the sponsoring organization gave input on the creation of the list, we had insufficient time to test its use during the second evaluation. Thus, it will be assessed in subsequent program deliveries.

Overall, KDHP staff found positive results in recruiting participants for *Stoplight Healthy Living*, and in finding service providers interested in collaborating to evaluate the program. Efforts will continue to obtain feedback from participants to shape and improve the program with the goal of improving the health and wellness of adults with ID in Kansas and beyond, including exploring how DSPs can be trained to support people with ID in taking the steps toward healthier lives.

### **Conclusion**

As Scott and Haverkamp (2016) noted in their systematic review of health promotion programs focused on behavioral changes for people with ID, studies are needed to examine how best to balance the tension between the right to choose and the right to healthy lifestyles for people with ID. However, a choice is not real if those making it are not given an opportunity to learn about the implications of that choice. Through *Stoplight Healthy Living*, KDHP staff aim to increase the knowledge of adult with ID about the benefits of improved nutrition and increased physical activity, and about how they can make a choice to put this knowledge into practice to

improve the quality of their lives. This aim supports the vision of the *Surgeon General's Call to Action to Improve the Health and Wellness of Persons with Disabilities* (U.S. Department of Health and Human Services, 2005) that states, "With good health, persons with disabilities have the freedom to work, learn, and engage actively with their families and their communities." The *Call to Action* also sets a goal for persons with disabilities to promote their own health through healthy lifestyles. Despite efforts to improve the health of persons with ID in the 14 years since the *Call to Action* was published, significant health disparities still inhibit full inclusion of people with ID in health promotion activities. The goal of *Stoplight Healthy Living* is to provide program that can be widely disseminated to assist Kansans with ID in making informed decisions about healthy behaviors. Ultimately, the program aims to eliminate some of the barriers to inclusion for this population.

### References

- Anderson, I., Mapel-Lentz, S., Hallas-Muchow, L., & Gulaid, A. (2019). Wellness matters: Supporting health and wellness in adulthood. In A. S. Hewitt and K. M. Nye-Lengerman, (Eds) *Community living and participation for people with intellectual and developmental disabilities* (pp. 169-179). Silver Spring, MD: American Association on Intellectual and Developmental Disabilities.
- Anderson, L. L., Salmi-Bydalek, M., Mahoehney, J., Flowers, J., Boyke, L., & Salmi, P. (2016). *Partnerships in wellness manual*. Minneapolis, MN: Research and Training Center on Community Living, Institute on Community Integration, University of Minnesota.
- Bergstrom, H., Hagstromer, M., Hagberg, J., & Elinder, L. S. (2013). A multi-component universal intervention to improve diet and physical activity among adults with intellectual disabilities in community residences: A cluster randomized controlled trial. *Research in Developmental Disabilities, 34*, 3847-3857. doi: 10.1016/j.ridd.2013.07.019
- Boström, P., Johnels, J.A., Thorson, M., & Broberg, M. (2016). Subjective Mental Health, Peer Relations, Family, and School Environment in Adolescents with Intellectual Developmental Disorder: A First Report of a New Questionnaire Administered on Tablets PCs. *Journal of Mental Health Research in Intellectual Disabilities*, DOI: 10.1080/19315864.2016.1186254
- Centers for Disease Control and Prevention (CDC). (2019). *State disability and health programs* [website]. Retrieved from <https://www.cdc.gov/ncbddd/disabilityandhealth/programs.html>
- Epstein, L., & Squires, S. (1988). *The Stoplight Diet for children: An eight-week program for parents and children*. Boston: Little Brown & Company.

- Evmenova, A., Graff, H.J., Genaro Motti, V., Giwa-Lawal, K., & Zheng, H. (2018). Designing a Wearable Technology Intervention to Support Young Adults with Intellectual and Developmental Disabilities in Inclusive Postsecondary Academic Environments. *Journal of Special Education Technology*. doi.org/10.1177/0162643418795833.
- Havercamp, S. M., & Scott, H. M. (2015). National health surveillance of adults with disabilities, adults with intellectual and developmental disabilities, and adults with no disabilities. *Disability and Health Journal*, 8, 165-172. doi:10.1016/j.dhjo.2014.11.002
- Heller, T., Hsieh, K., & Rimmer, J.H. (2004). Attitudinal and psychosocial outcomes of a fitness and health education program on adults with Down syndrome. *American Journal of Mental Retardation*, 109(2), 175-185.
- Heller, T., McCubbin, J.A., Drum, C., & Peterson, J. (2011). Physical Activity and Nutrition Health Promotion Interventions: What is Working for People with Intellectual Disabilities? *Intellectual and Developmental Disabilities*, 49(1), 26-36.
- Humphries, K., Pepper, A., Traci, M.A., Olson, J., & Seekins, T. (2009). Nutritional intervention improves menu adequacy in group homes for adults with intellectual or developmental disabilities. *Disability and Health Journal*, 2(3), 436-444.
- Kansas Department of Health and Environment (KDHE) Behavioral Risk Factor Surveillance System (BRFSS). (2017). Retrieved from [kdheks.gov/brfss](http://kdheks.gov/brfss)
- Krahn, G. L., Walker, D. K., & Correa-De-Araujo, R. (2015). Persons with disabilities as an unrecognized health disparity population. *American Journal of Public Health*, 105, S198-S206. doi:10.2105/AJPH.2014.302182

Meola, A. (2016). Wearables and mobile health pp usage has surged by 50% since 2014.

*Business Insider*. Retrieved from <https://www.businessinsider.com/fitbit-mobile-health-app-adoption-doubles-in-two-years-2016-3>

National Center on Physical Activity and Disability. (2017). *The awesome Mary show: Shop the rainbow*. Retrieved from <https://www.youtube.com/watch?v=13KasWCWdIE>

Neumeier, W.H., Grosso, C., & Rimmer, J.H. (2017). *Obesity and individuals with intellectual and developmental disabilities: A research to policy brief*. Retrieved from <http://rrtcadd.org/2017/09/27/obesity-and-individuals-with-intellectual-and-developmental-disabilities-a-research-to-policy-brief/>

Oral Health Kansas. (2019). *Sugary drink displays*. Retrieved from <http://www.oralhealthkansas.org/SugaryDrink.html>

Palmer, S. & Wehmeyer, M. (2019). *What is self-determination and why is it important?* [website]. Retrieved from [https://buildingalife.ku.edu/sites/default/files/Self-Determination\\_Wehmeyer.pdf](https://buildingalife.ku.edu/sites/default/files/Self-Determination_Wehmeyer.pdf)

Prochaska, J.O., & Velicer, W.F. (1997). The Transtheoretical Model of Health Behavior Change. *American Journal of Health Promotion*, 12(1), 38-48.

Ptomey, L. T., Saunders, R. R., Saunders, M., Washburn, R. A., Mayo, M. S., Sullivan, D. K., . . . Donnelly, J. E. (2017). Weight management in adults with intellectual and developmental disabilities: A randomized controlled trial of two dietary approaches. *Journal of Applied Research on Intellectual Disabilities*, 31, 82-96.  
doi:10.1111/jar.12348

Ptomey, L.T., Sullivan, D.K., Lee, J., Goetz, J., Gibson, C., & Donnelly, J.E. (2014). The use of technology for delivering a weight loss program to adolescents with intellectual and

- developmental disabilities. *Journal of the Academy of Nutrition and Dietetics*, 15(1), 112-118.
- Reichard, A., Saunders, M. D., Saunders, R. R., Donnelly, J. E., Lauer, E., Sullivan, D. K., & Ptomey, L. (2015). A comparison of two weight management programs for adults with mobility impairments. *Disability and Health Journal*, 8, 61-69.  
doi:10.1016/j.dhjo.2014.08.002
- Saunders, R. R., Saunders, M. D., Donnelly, J. E., Smith, B. K., Sullivan, D. K., Guilford, B., & Rondon, M. F. (2011). Evaluation of an approach to weight loss in adults with intellectual or developmental disabilities. *Intellectual and Developmental Disabilities*, 49, 103-112.  
doi:10.1352/1934-9556-49.2.103
- Scott, H. M., & Haverkamp, S. M. (2016). Systematic review of health promotion programs focused on behavioral changes for people with intellectual disability. *Intellectual and Developmental Disabilities*, 54, 63-76. doi 10.1352/1934-9556-54.1.63
- Shogren, K. A., Wehmeyer, M. L., Reese, R. M., & O'Hara, D. (2006). Promoting self-determination in health and medical care: a critical component of addressing health disparities in people with intellectual disabilities *Journal of Policy and Practice in Intellectual Disabilities*, 3, 105-113. doi:10.1111/j.1741-1130.2006.00061.x
- U.S. Department of Agriculture. (2018). *What is my plate?* Retrieved from <https://www.choosemyplate.gov/MyPlate>
- U.S. Department of Health and Human Services. (2005). *The Surgeon General's call to action to improve the health and wellness of persons with disabilities*. Washington, DC: Author.

Webber, C., & Cobigo, V. (2014). What should service providers know when measuring how they impact consumers' freedom to make choices? *Journal on Developmental Disabilities, 20*, 8-19.

Willems, M., Hilgenkamp, T. I. M., Havik, E., & Waning, A. (2016). Use of behavior change techniques in lifestyle change interventions for people with intellectual disabilities: A systematic review. *Research in Developmental Disabilities, 60*, 256-268.

doi:10.1016/j.ridd.2016.10.008

Table 1

*Stoplight Healthy Living Session Themes, Topics, Activities and Incentives*

<b>Session Themes</b>	<b>Topics</b>	<b>Activities</b>	<b>Incentives</b>
Introduction to Stoplight Healthy Living Program	<ul style="list-style-type: none"> <li>• Stoplight foods—green, yellow and red groups</li> <li>• Reducing sugar, fat and salt in diets</li> <li>• My Plate for nutritious meals</li> </ul>	<ul style="list-style-type: none"> <li>• Review pictorial Stoplight foods lists</li> <li>• Discuss groups categories (green, yellow, red) for foods participants eat often</li> <li>• Use My Plate placemats &amp; pictorial food cards to assemble healthy meals</li> <li>• Plan to put green, yellow &amp; red stickers on foods at home</li> </ul>	<ul style="list-style-type: none"> <li>• My Plate refrigerator magnet</li> <li>• Apple-shaped stress ball</li> </ul>
Get Moving	<ul style="list-style-type: none"> <li>• Importance of physical activity</li> <li>• Using social support for change</li> </ul>	<ul style="list-style-type: none"> <li>• Check in on what foods participants placed stickers on at home</li> <li>• Discuss importance of PA and various ways to increase</li> <li>• Exercise to NCHPAD warm-up video</li> </ul>	<ul style="list-style-type: none"> <li>• Pedometer</li> </ul>

Session Themes	Topics	Activities	Incentives
		<ul style="list-style-type: none"> <li>• Watch and discuss social support video</li> <li>• Distribute and train how to use pedometers</li> <li>• Distribute tracking sheets and train on use</li> </ul>	
Healthy Drinks and Snacks	<ul style="list-style-type: none"> <li>• Replacing sugary beverages</li> <li>• Choosing healthy portions</li> <li>• Choosing healthy snack</li> </ul>	<ul style="list-style-type: none"> <li>• Check-in on tracking sheet entries with peer feedback</li> <li>• Guess the amount of sugar in beverages using Oral Health Kansas Sugary Drink display</li> <li>• Go Bananas movement activity</li> <li>• Guess the healthier snack using laminated food posters</li> <li>• Discuss Healthy portions</li> </ul>	<ul style="list-style-type: none"> <li>• Water bottle</li> <li>• Tooth brushing</li> <li>• Timer</li> <li>• Tooth-shaped stress ball</li> </ul>

Session Themes	Topics	Activities	Incentives
Healthy Drinks and Snacks	<ul style="list-style-type: none"> <li>Using more foods from the green group in meal preparation</li> <li>Having water as a beverage with meals</li> </ul>	<ul style="list-style-type: none"> <li>Check in on tracking sheet entries with peer feedback</li> <li>Movement activity using different types of beans</li> <li>Discuss how to incorporate more foods from the Green group in common meals</li> </ul>	<ul style="list-style-type: none"> <li>Cell phone pocket</li> <li>Post-it note pad</li> </ul>
Shopping for Health	<ul style="list-style-type: none"> <li>Choosing healthier foods when grocery shopping</li> </ul>	<ul style="list-style-type: none"> <li>Check-in on tracking sheet entries with peer feedback</li> <li>Warm up video</li> <li>Putting pictorial food cards in correct green, yellow or red shopping bags</li> <li><i>Awesome Mary Shopping the Rainbow</i> video</li> <li>Distribute and discuss grocery shopping list</li> </ul>	<ul style="list-style-type: none"> <li>Shopping bag</li> </ul>

Session Themes	Topics	Activities	Incentives
Eating Healthy while Eating Out & Celebration		<p>with foods color-coded (green, yellow, red)</p> <ul style="list-style-type: none"> <li>• Check-in on tracking sheet entries with peer feedback</li> <li>• Discuss and role-play ordering healthier foods using fast-food restaurant menus</li> <li>• Recognize individual achievements</li> <li>• Dance party with healthy snacks</li> </ul>	<ul style="list-style-type: none"> <li>• T-shirt with Stoplight logo</li> <li>• Certificate of achievement</li> <li>• Individual and group photos</li> </ul>

Table 2

*Session 2 Evaluation Results (n = 14)*

	Percent of respondents answering yes or correctly		
	Pre	Mid	Post
<b>Behaviors</b>			
Ate fruit and/or vegetables in last day	42.9%	64.3%	64.3%
Did physical activity in the last week	100%	100%	100%
Did physical activity in addition to walking in last week	35.7%	28.6%	28.6%
Drank soda in the last day	57.1%	35.7%	28.6%
Identified 2 healthy food purchases from last grocery store visit	50.0%	71.4%	100%
<b>Knowledge</b>			
Correctly identified foods high in fat/sugar	42.9%	71.4%	35.7%
Correctly identified a healthy, balanced meal plate	70.9%	80.0%	78.6%
Correctly identified the most healthy, fast food meal choice	57.1%	64.3%	78.6%
Correctly identified the most healthy, “green” food	100%	100%	92.9%

