
Treatment and Innovation: Description and Evaluation of New Programs Currently Available for Your Patients

Immersion Programs for Treating Pediatric Obesity: Follow-Up Evaluations of Wellspring Camps and Academy of the Sierras, A Boarding School for Overweight Teenagers

¹Daniel S. Kirschenbaum, Ph.D., ²Ryan D. Craig, J.D., ²Kristina Pecora Kelly, M.A.,
³Julie N. Germann, Ph.D.

¹ Northwestern University Medical School & Healthy Living Academies' Division of CRC Health

² Healthy Living Academies' Division of CRC Health

³ La Rabida Children's Hospital

Introduction

The substantial adverse impact of the current epidemic of childhood obesity^{1,2} versus the relatively weak effects of current outpatient treatments^{3,4,5} indicate that alternative interventions warrant close scrutiny. Immersing children in nearly ideal weight controlling environments may prove surprisingly effective. Some may argue that changes produced in such unusual environments will not generalize when children go home. Our obesogenic culture and their biological resistances may trump the impact of such immersion experiences.⁶ However, the converse may apply. Removal of that negative cultural influence may allow children and their families to see and experience the possibilities for change in an especially potent way, maybe for the first time. Also, immersion should produce more dramatic initial weight losses than those typically seen in outpatient programs. These factors could generate heightened self-efficacy ("Now I see that I can do this!"), commitment, and behavioral adherence for long-term changes.⁷



Daniel S. Kirschenbaum,
Ph.D.



Ryan D. Craig, J.D.



Kristina Pecora Kelly, M.A.



Julie N. Germann, Ph.D.

Prior Immersion Programs

Only three programs known to the authors (including a search of Medline, PubMed, FirstSearch, WorldCat, and PsychInfo) immersed overweight children in a healthy living environment and published an evaluation of the effects. Braet and Winckel⁸ evaluated a brief (10-day) summer camp for a small number of campers (n=36 over 2 years). This camp included 12 professionally administered cognitive-behavior therapy (CBT) sessions (e.g., self-monitoring and problem solving), relevant educational materials, and monthly family sessions for 1 year. At a 3.6 year follow-up, campers averaged a significant differ-

ence in percent overweight (-15% overall; from 60% to 45%). Campers did not lose additional weight after their year of treatment, but they did not regain it either.

A Leeds University (UK) group conducted a series of studies on the impact of their weight-loss camps, primarily focused on the Carnegie International Camp, UK. In their longest follow-up, the group found that their campers averaged significant weight losses when assessed 10 months after camp.⁹ However, these campers regained weight significantly during the follow-up (from -13% of initial M body mass index (BMI) at post-camp to -8% at follow-up). Campers also improved significantly in fitness, blood pressure, and psychological states, with degree of improvements directly related to amount of weight loss. These camps provided four educational sessions per week and parent workshops, but they did not include some key elements of CBT (*e.g.*, professional counseling, goal setting by campers, and self-monitoring of activity levels).

Immersing children
in nearly ideal weight
controlling environments
may prove surprisingly
effective.

Braet also described a 10-month inpatient program conducted in Belgium at the Zeepreventorium Pediatric Health Center.^{11,12} During 1996 through 1999, the Belgian researchers randomly selected groups of obese participants in their inpatient treatment clinic to participate in an evaluation study. The 122 participants averaged 76% overweight and 12.7 years of age at admission. They received 22 weekly CBT sessions in small groups and also participated in an average of 2 hours of exercise per day. The dietary plan restricted total caloric intake to about 1500 calories per day. They used a high protein (100g minimum) and low-fat (13.6% of total energy) approach; children were allowed to choose whether they wanted small or large portions of the fruit or vegetables served at every meal. Parents received bi-weekly counseling focused on how to support their young weight controllers after discharge.

A 14-month follow-up was conducted at the clinic for 110 participants (73% of original attendees) who com-

pleted treatment and who came to the follow-up assessment. On average, children decreased their percentages overweight dramatically from pre-treatment (76%) to post-treatment (27%); they regained weight during the follow-up, but remained significantly reduced relative to baseline (44% overweight). Their eating behaviors remained improved at follow-up (*e.g.*, decreased binge eating), as did their psychological states based on validated self-report measures (including perceived academic competence).

These follow-up evaluations provide support for the efficacy of immersion programs, especially when compared to the pattern of relatively modest weight losses and recidivism frequently observed in outpatient programs.^{3,4,5} This paper describes the initial evaluations of immersion programs developed by Healthy Living Academies (HLA; see <www.healthylivingacademies.com>), which currently serve more overweight children and families than any other entity in the United States or abroad (seven summer camps, two boarding schools). The immersion approach used by HLA not only includes a focus on CBT but also utilizes some alternative emphases and techniques (*e.g.*, Internet based after-care, substantial control by participants of amounts and types of food consumed, focus on consistency of self-monitoring, and the development of a healthy obsession, very-low-fat diet).

Description of the Present Programs

Camps. The key components of HLA's seven camps (Wellspring Camps) were selected based on the developers' understanding of the science of long-term weight control. This perspective emphasized the primacy of consistent self-monitoring of food and activities,^{13,14,15} the development of a healthy obsession,¹⁶ the use of a very-low-fat diet (essentially targeting zero fat consumption and accepting <20 g fat per day),¹⁷ and the importance of long-term support (via program staff on the Internet and family adoption of the program at home).¹⁸ Those components, more specifically, include:

- *Diet:* Three meals per day and two snacks that are very low in fat (target = 12 g fat per day; about 7% of total intake), low in caloric density,¹⁰ moderately high in protein (>50g per day), high in fiber (>30 g per day), very kid-friendly and appealing (*e.g.*, buffalo burgers, baked French fries, fat-free pizzas, egg substitute omelets, Asian-styled stir fries cooked without oil, and frozen yogurt). At every meal, campers can consume as much or as little of certain foods ("uncontrolled foods") as they wish: fruits; salads with several fat-free dressings; very-low-fat soups; fat-free sources of protein (tuna salad, egg white salad, and yogurts); condiments.

- *Activities*: Pedometers worn to self-monitor levels (10,000 steps per day minimal goal); every day begins with a several mile walk or jog (camper option); usual camp games and sports (including color war competitions); dances; Dance Dance Revolution and other active video games; personal training; martial arts; yoga; canoeing; kayaking; rafting; swimming; hikes; and outings to local attractions.
- *Clinical*: Four sessions of CBT (two small group, two individual) conducted primarily by masters and doctoral-level therapists; focused on goal setting, self-monitoring, journaling, decisional counseling, rational emotive therapy, stress management, and planning for long-term modifications in lifestyle.
- *Elaborate Token Economy*: A reward system in which tokens (beads, Wellspring Bucks) are earned for high levels of effort and engagement, including weekly summit meetings at campfires that honor those who achieve significant milestones (process oriented, not weight related at all) with special privileges.
- *Educational*: Nutritional and culinary classes.
- *Family Involvement*: Two-day family workshops; focused on simulating the Wellspring lifestyle (e.g., use of pedometers and self-monitoring); educational sessions; presentations about the science of weight loss; role plays about critical parenting techniques (cueing versus nagging, limit setting, and behavioral contracting).
- *Aftercare*: Internet based self-monitoring with interactions with therapists and discussion boards for peer support for 3-months or longer post-camp.

Variations. The camps vary based on several factors. Several camps emphasize outdoor adventures, the sort that improve bonding and support and may promote weight loss.¹⁹ One of the camps (Wellspring Adventure Camp California) has campers engaged in outdoor adventures almost the entire summer (sleeping in tents most of the time). Two of the camps attract very diverse international participation (Wellspring Hawaii, Wellspring United Kingdom). The largest camp, Wellspring New York, includes only girls and young women (ages 12-24). The camps that are not primarily adventure camps are located on college or private high school campuses.

Boarding Schools. In 2004, HLA opened the first boarding school devoted exclusively to overweight teenagers, Academy of the Sierras (AOS). This first school was opened in the Central Valley of California and a second AOS was opened in February, 2007, in North Carolina (near Asheville). AOS follows exactly the same program as Wellspring Camps, with two major exceptions. First, it incorporates a full academic program that attempts to integrate and focus on weight control throughout the course of

study. Second, the duration of the intervention is longer at the boarding schools compared to the camps. Minimum stay at AOS is one semester (4 months) and average stay is closer to two semesters (8 months). Longer interventions generally produce better outcomes in weight control.³ In a related vein, such a longer intervention and a more comprehensive one was expected to develop a stronger peer culture oriented to successful weight control, relative to a 4 to 8 week camp environment.

Evaluations

Wellspring Camps

Three follow-up studies have been completed to date. Two examine the impact of the program on weight change and related issues in 372 overweight children and adolescents who participated in the 2004 and 2005 camps. The third evaluation followed-up campers from the 2005 summer for 18 months.

In the 2004 6- to 9-month follow-up, 113 overweight campers were evaluated (97 girls and 16 boys, M age = 15.5 years old). Seventy percent of the initial participants in camp were followed via e-mail and telephone surveys. Ninety percent of the heights and weights reported were verified by parents or healthcare providers. The campers who did not participate in follow-up did not differ significantly on any dimension evaluated versus those who participated.

The 2004 evaluation showed that campers had increased percentage overweight (based on BMI norms²⁰) in the year prior to camp (Ms=56.4% overweight, to 67.4%); lost weight rapidly during camp (Ms=67.4% to 52%; 1.8kg/wk); and lost significantly more weight during the 6 to 9 month follow-up. (Ms=52% to 45.9%; -21.5% total). Standardized self-report and parental report of moods showed significant improvements. Greater consistency of self-monitoring during camp was associated with weight loss during the follow-up.

The 2005 results parallel the 2004 findings. In this study, 259 campers participated (M age of 15.5; 213 female, 46 male) and 90% of campers participated in this follow-up. Non-participants did not differ from participants in this follow-up and, as in the 2004 evaluation, no differences emerged when comparing the two groups based on participation. The 2005 campers showed the pattern observed in the 2004 data in that they gained weight significantly in the year prior to camp (Ms=58% to 65%). They also lost weight rapidly during camp (Ms=65% to 47%; 1.9kg/wk) and also lost significant additional weight during the follow-up (Ms=47% to 43%; 22% in total). Figure 1 illustrates these results. Significant improvements in fitness and moods were also observed and, as in the 2004

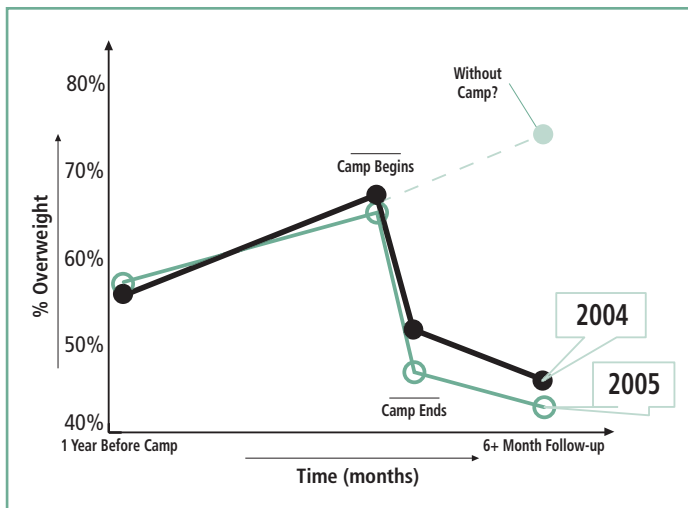


Figure 1. Changes in Percentage Overweight of 2004 and 2005 Wellspring Campers from 1 Year Prior to Camp to 6-9 Month Follow-up

data, consistency of self-monitoring during camp was associated with better long-term outcomes.

An 18-month follow-up was obtained for 50% of the 2005 campers. A series of contacts via U.S. mail and numerous e-mails and phone calls still resulted in 50% of the campers failing to participate in this longer term follow-up. However, as in previous follow-up evaluations, follow-up participants and non-participants did not differ on any variable that was obtained, including initial weight loss, initial percent overweight, and consistency of self-monitoring during camp. Figure 2 shows that the significant weight loss observed during the initial follow-up

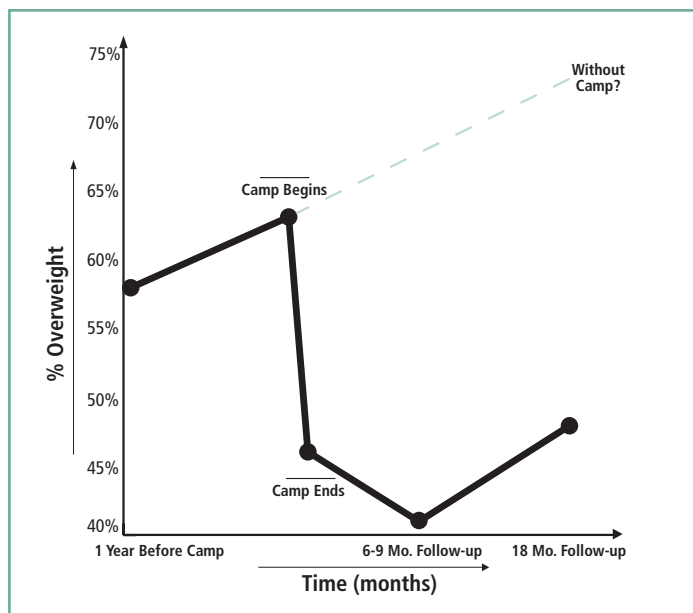


Figure 2. Changes in Percent Overweight of 2005 Wellspring Campers over an 18-month Follow-up

period was erased at this longer-term follow-up, but participants still remained significantly and substantially reduced relative to the beginning of camp. In all three evaluations (2004 and 2005 6- to 9-month follow-up and 2005 18-month follow-up), the inclusion of non-participants in the follow-ups in the data (*i.e.*, “intent to treat” analyses) still resulted in significant average weight losses at the various follow-up points.

Academy of the Sierras

The first class of students who attended Academy of the Sierras (AOS) for at least two semesters consisted of 15 students (eight boys, seven girls) admitted fall 2004, averages: 14.9 years old; BMI=43.1; weight=124.7kg; 100% overweight (relative to 50% BMI). Heights and weights were obtained from parents or healthcare providers for 100% of the students 10 months after discharge. On average, students had gained weight significantly in the year prior to treatment, lost substantial amounts of weight at AOS, and maintained those losses 10 months after discharge. Upon admission, they averaged 100% overweight. At follow-up 60% of them were 30% overweight or less. These students also improved significantly ($ps < .01$) in fitness (timed mile, resting pulse, chest press) and emotional functioning (pre-post parent and child versions of the Children’s Depression Inventory²¹). Correlational analyses showed that students who engaged the program with the most effort lost more weight at AOS, improved timed miles most (correlated with self-monitoring consistency), and lost the most weight from admission to follow-up.

Figure 3 shows the 10-month AOS follow-up, the 18-month Wellspring follow-up, and the 14-month follow-up reported by Braet and her colleagues about the program at Zeepreventorium (Belgium).^{11,12} This figure also allows comparison of the effects of these three immersion programs with the effects obtained in the extant studies of the treatment of pediatric obesity; Goldfield et al.⁵ examined data on 25 studies that included control groups and the present authors included data from two controlled studies that met their criteria for inclusion published since their review was compiled.^{8,22}

Discussion

Participants in the present versions of an immersion program lost weight rapidly during the intervention and seemed to maintain or continue losing weight on average during the various follow-up periods. Certainly it would have been best to have objective measurement of weight changes obtained in person and for greater numbers of AOS participants over much longer periods of time. On the

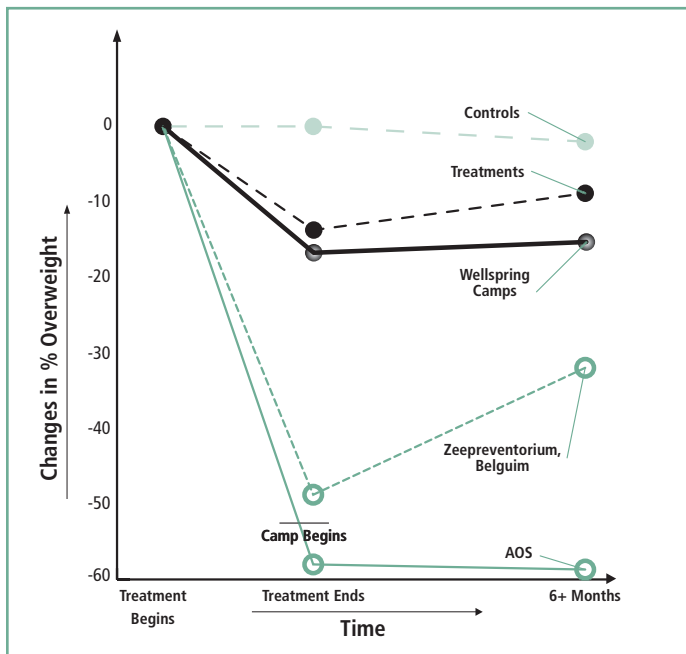


Figure 3. Decreases in Percent Overweight in Controlled Treatments of Childhood Obesity⁵ versus Wellspring Camps, Zeepreventorium (Belgium), and Academy of the Sierras (AOS)

other hand, the corroborated self-report data showed relatively few differences between participants and non-participants in these various initial follow-ups. Also, the consistency of the results across several follow-up studies is noteworthy. In addition, the magnitude of changes in percent overweight exceeds the magnitude typically obtained in outpatient programs, especially for the longer-term Belgium and AOS interventions (as shown in Figure 3).

Analysis of the processes that affected these outcomes indicates a clear trend for more significant effects for those who participated for longer durations (*e.g.*, 8-week participants in camp fared better long-term relative to 4-week participants; AOS and Zeepreventorium participants lost more weight than 8-week or 4-week campers). This apparent effect of the benefits of longer-term treatment accords well with prior studies.^{3,4,5} Also, in accord with prior research on self-monitoring,^{13,14,15,19} more consistent self-monitoring was associated with better long-term outcomes.

Consistent self-monitoring increases self-regulated behaviors in a variety of domains, including athletic, academic, and weight loss.^{13,14,15,19} This occurs because self-monitoring can potentially increase commitment and focus on goals, adaptively modify self-evaluations and self-reinforcements, improve affect and coping responses and, more generally, promote a healthy obsession.¹⁹ In all of HLA's programs, this focus on tremendous consistency of self-monitoring and the development of a healthy obsession is a primary objective. For example, campers

and students are prompted to self-monitor throughout the day and staff model consistent self-monitoring at every meal and by wearing pedometers, and this pattern of behavior is reinforced within the elaborated token economies at all programs.

Correlational analyses in these evaluations show that more consistent self-monitors tended to be older, less overweight initially, less psychologically distressed initially, and more likely to use the after-care program. These correlations indicate that consistent self-monitors are probably better prepared to take advantage of the opportunities provided in these programs. These participants may have had a more mature approach to their weight problem and fewer physiological and psychological barriers to overcome. Sjöberg and Persson's²² view of self-regulatory resources and Baumeister, Heatherton and their colleagues'²³ similar notion of strength of self-regulation is consistent with this perspective. In other words, when weight controllers have fewer barriers to overcome, then they will have more resources (strength) available that they can use to focus on self-monitoring, CBT, and long-term success.

The rapid rate of weight loss demonstrated by the participants in these immersion programs may have helped produce the significant results seen in the follow-ups. Several prior studies have shown the benefits of producing relatively rapid weight losses in CBT programs over

More consistent
self-monitoring was
associated with better
long-term outcomes.

time, including an assessment 4 years after the intervention.²⁴ Perhaps the initial, very favorable results improved the self-efficacy of the participants and their parents (meaning that they now believed they could succeed). These positive expectations may have prompted greater efforts to change, in accord with self-efficacy theory.⁷ In addition, the significant weight regain in the Leeds camp and the Belgium program at follow-up, despite weight losses during interventions that were comparable to those in the present HLA programs (Wellspring and AOS, respectively), may indicate the active role over time played by HLA's differential emphasis on self-monitoring, healthy obsession, very-low-fat diet, family involvement, after-care support, and perhaps other elements.

Taken as a whole, this evaluation underscores the promise of immersion programs that incorporate empirically based elements. Such programs may provide viable options for successful treatment of pediatric obesity in many cases that prove empowering to children, teens, and their families, without the compromises in lifestyle and risk of complications of surgical interventions. Further studies may provide additional bases for expanding and refining such efforts. ■

References

1. World Health Organization. Obesity: Preventing and managing the global epidemic. Geneva, Switzerland: 1998.
2. Epstein LH. New developments in childhood obesity. In: Stunkard AJ, Wadden TA, editors. Obesity: Theory and Therapy. 2nd ed. New York: Raven Press; 1992. p. 301-312.
3. Haddock CK, Shadish WR, Klesges RC, Stein RJ. Treatments for childhood and adolescent obesity. *Ann Behav Med.* 1994;16:235-244.
4. Kirk S, Scott BJ, Daniels SR. Pediatric obesity epidemic: Treatment options. *JADA.* 2005;105:S44-51.
5. Goldfield GS, Raynor HA, Epstein LH. Treatment of pediatric obesity. In: Wadden TA, Stunkard AJ, editors. Handbook of Obesity Treatment. New York: Guilford; 2002. p. 532-55.
6. Brownell KAD, Horgen KB. Food Fight. Chicago: Contemporary Books; 2004.
7. Bandura A. Human agency in social cognitive theory. *Amer Psychol.* 1989;44:1175-84.
8. Braet C, Van Winckel M. Long-term follow-up of a cognitive behavioral treatment program for obese children. *Behav Ther.* 2000;31:55-74.
9. Gately PJ, Cooke CB, Butterly RJ, Mackreth P, Carroll S. The effects of a children's summer camp programme on weight loss, with a ten month follow-up. *Int J Obes.* 2000;24:1445-53.
10. Rolls BJ, Drewnowski A, Ledikwe JH. Changing the energy density of the diet as a strategy for weight management. *JADA.* 2005;105:S98-103.
11. Braet C, Tanghe A, Decaluwe V, Moens E, Rosseel Y. Inpatient treatment for children with obesity: weight loss, psychological well being, and eating behavior. *J Ped Psych.* 2004;29:519-529.
12. Braet C. Patient characteristics as predictors of weight loss after an obesity treatment for children. *Obesity.* 2006;14:148-155.
13. Boutelle KN, Kirschenbaum DS, Baker RC, Mitchell ME. How can obese weight controllers minimize weight gain during the high risk holiday season? By self-monitoring very consistently. *Health Psychol.* 1999;18:364-368.
14. Salaens BE, McGrath AM. Self-monitoring adherence and adolescent weight control efficacy. *Child Health Care.* 2003;32:137-152.
15. Kirschenbaum DS, Germann JN, Rich BC. Treatment of morbid obesity in low-income minority adolescents: Participant and parental self-monitoring as determinants of initial success. *Obes Res.* 2005;13:1527-1529.
16. Kirschenbaum DS. The Healthy Obsession Program: Smart Weight Loss Instead of Low-Carb Lunacy. Dallas, TX: BenBella Books; 2006.
17. Kirschenbaum DS. Very low fat diets are superior to low carbohydrate diets. *Patient Care.* 2005, 39: 47-55.
18. McLean N, Griffin S, Toney K, Hardeman W. Family involvement in weight control, weight maintenance and weight-loss interventions: a systematic review of randomized trials. *Int J Obes.* 2003;27:987-1005.
19. Jelalian E, Mehlenbeck R, Lloyd-Richardson EE, Birmaher V, Wing RR. 'Adventure therapy' combined with cognitive-behavioral treatment for overweight adolescents. *Int J Obes.* 2005;30:31-39.
20. National Center for Health Statistics. Prevalence of overweight and obesity among adults: United States, 2000. <www.cdc.gov/nchs/products/pubs/pubd/hestats/obese/obse99tab2.htm>. Accessed October 17, 2007.
21. Covacs M. Children's Depression Inventory. Toronto: Multi-Health Systems; 1992.
22. Epstein LH, Paluch RA, Kilanowski CK, Raynor HA. The effect of reinforcement or stimulus control to reduce sedentary behavior in the treatment of pediatric obesity. *Health Psychol.* 2004;23:371-380.
23. Sjoberg L, Persson L. A study of attempts by obese patients to regulate eating. *Addict Behav.* 1979;4:349-59.
24. Schmeichel BJ, Baumeister RF. Self-regulatory strength. In: Baumeister RF, Vohs KD editors. Handbook of Self-Regulation: Research, Theory, and Applications. New York: Guilford; 2004. p. 84-98.
24. Kramer FM, Jeffery RW, Forster JL, Snell MK. Long-term follow-up of behavioral treatment for obesity: Patterns of weight regain among men and women. *Int J Obes.* 1989;13:123-136.