Obesity Prevention and Control: Behavioral Interventions that Aim to Reduce Recreational Sedentary Screen Time Among Children

Summary Evidence Table – Economic Review

Study	Study and Population Characteristics	Intervention & Comparison	Effectiveness	Program Costs	Direct Medical Costs and Productivity Losses Averted	Economic Summary Measure
Author (Year): Wang et al. (2003) **Linked Study:** Gortmaker et al. (1999) **Design:** Model **Economic Method:** CER-(Program Cost – Averted Health Cost)/QALY Saved Net Benefit-Cost of Healthcare Averted + Productivity Gain – Cost of Program.	**Location:** Boston, MA **Sample size:** Original effectiveness RCT had 5 control and 5 intervention middle schools. **N=1203** randomized but only 310 girls and 331 boys completed f/u. Model based on 310 females **Time Horizon:** Baseline: Fall 1995 F/U Spring: 1997 2 Year intervention **Monetary Conversions:** Index year is 1996	Modeled based on Planet Health (Gortmaker et al., 1999) outcomes. **Intervention:** School-based program. Objective to reduce obesity in middle school youth. Infused into curriculum for Math, Social Studies, Language, Arts, and Physical Education. Targeted behavior change in TV viewing, consumption of vegetables and fruits, consumption of high-fat foods,	Outcomes from Gortmaker et al. (1999) evaluation of Planet Health RCT implemented in 10 middle schools in Boston area in 1995. Obesity defined by composite of BMI and tricep-skinfold greater than age-gender specific 85th percentile. Baseline adjusted prevalence of BMI reduced for girls: Odds ratio of 0.47 with CI 0.24 0.93 p=0.03.	**2-Year Cost Teacher Training:** Trainer for 1 day in each of 5 schools: $1462 Assistant for 1 day in each of 5 schools: $1115 Teacher Time 3 hrs in each of 2 years for 101 teachers: $15,150 Time for 9 PE teacehrs for 5 hrs in year 1 and 3 hours in year 2: $1800 Food: $2200 **SubTotal: $21,727** **Wellness Activities:** Teacher time for 6 1-hr sessions in each of 5 schools: $900 Fitness fund incentive for school programs: $5000	Averted costs and QALY saved over 25 years from age 40 through 65. Estimates based on difference in lifetime cost for those overweight and not overweight, due to CHD, DM, HTN, Osteo-arthritis, gallstones. Per Averted Overweight Lifetime Healthcare Cost (discounted to age 14) base was $2737 and range from $1476 to $3527. Productivity	Averted healthcare cost, productivity gains, and QALY saved based on averted cases of overweight at after 40 due to reduced overweight at age 14. QALY based on morbidity and mortality from Healthy people 2000 and 1990 NHIS data and literature. QALY Saved per Averted Overweight=0.71 Cost per QALY Saved= (Program Cost-Healthcare Cost Averted)/QALY Saved=$33,677-$15,887)/(5.805*0.71)=$4305 Net Benefit=(Program Cost-Healthcare Cost Averted-Productivity Loss Averted)=$33,677-$15,887-$25,104=$7313 Multivariate sensitivity with 10K simulations: 95% of CERs between $1612 and $9010 per QALY saved

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		and physical activity. **Comparison:** 5 schools in control and 5 in intervention. Controls received usual curricula and physical education.	No significant change for boys. Only effect for girls considered for the model. Intervention effect of averted overweight cases from age 40 through 65 estimated from probabilities from literature, NHANES, and NHIS for being overweight at age 40 given overweight status at age 14. Number of cases of overweight averted 5.805	Teacher copy of Planet Health book: $6050 **SubTotal: $11,950** **Total: $33,677** **Per student per year cost=33677/1203= $14** Cost of instructions assumed to be zero since curriculum is embedded in regular courses.	gains based on NHIS work absence data for overweight and not overweight and mortality. Base productivity gain per averted overweight was $4325.	Net benefit between a net cost of $8579 to a net saving of $53,392 (80% were net saving) **Limitations:** Single source for many parameters Program cost is retrospective Weight loss relapse not considered Effect on girls only Need research on transition from overweight in childhood to overweight in adulthood
Author (Year): Segal (2005) **Linked Study:**	**Location:** 10 schools (6th and 7th grade) in Massachusetts in 1995	Objective 2 hours a day of TV, increase PA, reduce high fat foods and increase 5+	Benefits of intervention assumed to occur only for duration of intervention	**Incremental Cost per Person (2 Years)** Program Cost $69	No averted healthcare cost in base case** No productivity effects	**Cost per hour reduction in TV viewing per week** Girls $118 Boys $172 **Cost per averted case of**

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Gortmaker (1999) Adapted Wang 2003 Model **Design:** RCT **Economic Method:** CER-(Program Cost – Averted Health Cost)/QALY Saved	**Sample Size:** Interv-641 Control-654 Age 11.7, Female 48% **Modeling based on 310 females** **Time Horizon:** 24 months intervention **Monetary Conversions:** Index year is 2003.	fruit and vegetables per day. 16 45-minute lessons per year (32 total) in language, maths, arts, social studies, and physical education Goal-based physical activity lessons. Fitness-Funds of $400-$600 were available for proposals at intervention schools Two week campaign to reduce television viewing.	**Trial Results** Girls showed significant decrease in caloric intake and increase in fruits/veggies. Obesity prevalence decreased 5.5 pct pt for girls, interv versus controls. Obesity did not change significantly for boys.		included in analysis. ** Very conservative	**obesity** Girls $3384 Boys Dominated by control **Cost per QALY Model Assumptions** (Compare to Wang 03) Boys and girls effects combined Downstream cost impacts excluded** Cost of intervention Australian $68.63 per person (based on described resource use) 5% discount rate Relapse rate of 50% by year 7 after trial end **Incremental QALY per Person** 0.001 **Incremental Cost per Incremental QALY** $50,091 ** Very conservative
Study (Year): Segal (2005) **Linked Study:** Robinson 1999	**Location:** 2 elementary schools (3rd and 4th grade) in California in 1996 **Sampe Size:** Interv-92 Control-	School-based interv to improve PA/Diet 18 (30- to 50-min) lessons on TV viewing and video	Benefits of intervention assumed to occur only for duration of intervention?? Effect based	**Incremental Cost per Person (7 months)** Interv $757.25 Control $590.26 Incremental Program Cost $166.99	No averted healthcare cost in base case. Alternate scenario considers healthcare averted.	**Cost per hour reduction in TV viewing per week** $30 **Cost per QALY Assumptions** Reduction in percent overweight ranges from 5% to

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Adapted Wang 2003 Model **Design:** RCT **Economic Method:** CER- (Program Cost – Averted Health Cost)/QALY Saved	100 Age 8.9 to 9.5, Female 44% to 49% **Time Horizon:** 7 month intervention **Monetary Conversion:** Index year is 2003.	game use. Children advocates for reducing media. 10 day television turn-off followed by 7 hour per week limit TV managers budgeted viewing by controlling the power socket use Newsletters advice to parents about reducing viewing and video game use Used assumed data to model Robinson trial.	on intent to treat BMI decreased 0.45 and significantly, interv versus control. Robinson does not report proportion becoming normal weight. Hence, modeling looks at scenarios of 5% to 20% reduction in those overweight. Critical components of the model are the effect of intervention on behavior and the persistence of the change.		No productivity effects included in analysis.	20% 50% relapse Downstream cost impacts excluded in base case. **Incremental QALY per Person** 0.0006 to 0.002 **Incremental Cost per Incremental QALY (For 5%, 10%, 20% reduction in overweight/obese)** ($74,600, $149,745 to $298,600) with relapse and no healthcare averted ($61,405, $136,561 to $285,445) with relapse and with healthcare averted ($24,119, $61,424 to $136,032) with no relapse and with healthcare averted

CER, Cost-effectiveness Ratio
CHD, Chronic Heart Disease
HTN, Hypertension
QALY, Quality adjusted life year
RCT, Randomized Controlled Trial