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Cost-Effectiveness Model for Youth EFNEP Programs: What Do We Measure and How Do We Do It?

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1 **Introduction**

2 The Expanded Food and Nutrition Education Program (EFNEP) is one of USDA's hallmark nutrition
3 education programs. The goal of EFNEP is to assist limited resource audiences in "acquiring the knowledge,
4 skills, attitudes, and changed behavior necessary for nutritionally sound diets, and to contribute to their
5 personal development and the improvement of the total family diet and nutritional well-being."¹ EFNEP uses
6 a unique and effective peer-education model in which para-professionals of the same socio-demographic
7 community, usually indigenous to the target population, to perform health education services. Begun in the
8 late 1960s, EFNEP operates in all 50 states and the six US territories, and has benefited over 25 million
9 individuals in its history. In 2009, EFNEP was appropriated \$66.15 million dollars.² EFNEP has adult and
10 youth components. For the adult component, EFNEP is delivered as a series of six or more lessons. At one
11 time, EFNEP was delivered to the homemaker in her home and to small groups of 2-4 adults. Today, adults
12 are taught individually in their homes, in neighborhood groups, or even large groups of up to 35 adults at
13 cooperating agencies. For the youth component, EFNEP varies from location to location and state to state.
14 Education is delivered in group settings through school enrichment, before or after school programs, day
15 camps, community centers, and neighborhood groups. Lesson topics include nutrition, food management,
16 food preparation, food safety, fitness, and maintaining a healthy weight. As a result, it is difficult to study the
17 impact of youth EFNEP, which may explain why there has only been one published effectiveness study of
18 youth EFNEP.³ No economic evaluations of youth EFNEP have been conducted. The effectiveness of EFNEP on
19 participants' behaviors have been relatively well-studied for adults,⁴⁻⁷ including several cost-benefit and cost-
20 effectiveness analyses for EFNEP.⁸⁻¹¹

21 The purpose of this study was to gather and document opinions from experts in EFNEP, economics,
22 nutrition, physical activity, behavioral interventions, and evaluation research in order to create a cost-
23 effectiveness model and accompanying online software. These tools would ideally enable state and national
24 level Extension faculty, administrators, and researchers to calculate and communicate the cost-effectiveness
25 of their respective youth targeted nutrition education programs as they relate to overweight and obesity
26 prevention.

27 **Background Information: Why Cost-Effectiveness?**

28 Cost-Effectiveness Analysis. A cost effectiveness analysis (CEA) calculates the cost of achieving some
29 measureable effect. In this study, investigators seek to determine the economic or financial cost of producing
30 an impact as a result of participation in youth EFNEP. The key formula in a CEA is called the incremental cost
31 effectiveness ratio (ICER):

$$32 \quad ICER(p) = (C_1(p) - C_2(p)) / (E_1(p) - E_2(p))$$

33 where p denotes the program, C(p) is the cost of the programs 1 (treatment or new intervention) and 2
34 (control or "old" intervention), and E(p) is the effect (impacts) of programs 1 and 2. In general, the ICER is
35 used to compare the cost and effectiveness of new and old(er) devices, techniques, drugs, or interventions.
36 Since this study will not compare youth EFNEP programs to a control or other program, the CER is defined as:

$$37 \quad CER(p) = \frac{C(p)}{E(p)}$$

38 CEA versus CBA. Cost-effectiveness analyses differ from cost-benefit analyses (CBA). Existing studies for the
39 adult EFNEP programs focus more on cost-benefit analyses (CBA).⁸⁻¹¹ The CBA is

$$40 \quad NB(p) = B(p) - C(p)$$

41 where p, again, denotes the program, NB(p) net benefit of the program, B(p) total benefits, and C(p), total
42 costs, all measured in dollars. Benefits include both direct benefits, such as increases in life expectancy, and
43 indirect benefits, such as increased productivity at work. Correspondingly, the CBA conversion requires a
44 multitude of decisions and assumptions, such as: diseases avoided by following an optimal diet; incidence of
45 the disease/condition that is attributable to diet; optimal nutritional behavior; and cost of disease/condition
46 avoided. As a result, the Panel on Cost-Effectiveness in Health and Medicine (PCEHM) highly recommends
47 the CEA:

48 [The] health sector has traditionally favored economic analyses that assess cost
49 per unit of health effect, resisting the use of the closely associated technique of
50 cost benefit analysis (CBA), where both costs and benefits are measured in
51 dollars. A number of ethical difficulties ranging from macro issues, such as the
52 effect of valuing the time people spend pursuing medical treatment according to
53 their wages, are already embedded in CEA. CBA adds an additional difficulty in
54 that it presumes to put a dollar figure on the value of human life and uses
55 controversial methods to do so. The panel has shared the dominant bias of the
56 health sector-that monetizing the price of life in these ways introduces ethical
57 concerns that are avoided by CEA, albeit at the sacrifice of generalizability.¹²
58

59 Though none of the CBA EFNEP studies considered youth, it is clear that the difficulties associated with CBAs
60 would be exacerbated in a youth study, because of the increased uncertainties in dealing with a longer life
61 span. As a result, it was determined that CER would be utilized rather than CBA.

62 **Methodology**

63 Participants. The expert workshop panel consisted of 12 state and national experts: seven females, five males
64 (n=12); average age of 51.5 (n=11); 21.3 years of related work experience (n=11); and were predominantly
65 white and non-Hispanic (n=12) with one individual being Native American Indian and another
66 Latina/Hispanic. The panel had expertise in EFNEP (including state coordinators), health economics,
67 nutrition, physical activity, behavioral interventions, and evaluation research. All participants attended an
68 expert panel workshop in Blacksburg, Virginia, on May 11 and 12, 2009. All participants provided informed
69 consent, with the proposed research approved from the Virginia Polytechnic Institute and State University
70 Institutional Review Board.

71 Workshop Overview. Each workshop participant received meeting materials two weeks prior to the
72 workshop, containing background information on relevant topics (EFNEP, cost effectiveness ratio),
73 biosketches of all workshop participants, and workshop objectives. The two main objectives of the workshop
74 (see figure 1) were:

- 75 • Conceptualization – Determine (based on consensus) the conceptual constructs that need to be
76 measured in terms of the costs of the program and the effects (impacts) of the program based on
77 justified arguments and with an emphasis on overweight/obesity prevention
- 78 • Instrumentation – Determine (based on consensus) the instruments that can be utilized in measuring
79 the conceptual constructs for costs and effects (impacts) of the program based on justified
80 arguments.

81
82 The first day was devoted to content with keynote presentations on: EFNEP; youth EFNEP evaluation; cost-
83 effectiveness; and the Virginia youth EFNEP curriculum proposed, as a case study, to be used to gather data
84 for the creation of a model. The second day focused on discussion of the conceptualization and instruments
85 for determining costs, followed by conceptualization and instruments for determining effects.

86 Analysis. A stenographer (certified court reporter) transcribed each panelist's comments and non-verbal
87 communication (nodding, shaking of head). The workshop was also tape recorded using two digital audio-
88 recorders placed on separate tables. Two panelists took notes during the meeting to document major

89 viewpoints and decisions, affirmed by both verbal and non-verbal communication. The stenographer's
90 transcripts were converted directly into two separate Microsoft Word (2007) documents for each day of the
91 workshop (126 and 198 pages, respectively) from .txt files. Where the stenographer indicated that comments
92 were inaudible, two members of the expert panel compared the transcripts to the audio recording and
93 workshop notes for completeness. Required clarifications were discussed between the two panelists until
94 consensus was reached, with any missing information added and highlighted in the transcript. The two
95 panelists then independently reviewed the complete transcripts manually, using the constant comparative
96 analytic framework outlined by Krueger.¹³ Data were grouped together by discussion points and themes,
97 identified by frequency and extensiveness of their respective discussions compared to other topics, and
98 placed in categories. Descriptive summaries of the points and counterpoints, including extracted quotes, and
99 the final decision made by group consensus were also generated. The two reviewers then compared,
100 contrasted, and discussed their respective findings to generate a final report. Selected quotes that best
101 described the viewpoints were chosen; they are highlighted in italics in the results. All members of the expert
102 panel reviewed the final results and discussion to ensure that they fully represented the panel's opinions and
103 the context of the discussion and recommendations.

104

105 **Results**

106 **GENERAL**

107 Target Audience of Cost-Effectiveness Model. Workshop attendees felt it necessary to explicitly define the
108 target audience for any cost-effectiveness model that was developed. In this regard, a number of EFNEP
109 stakeholders were identified including state and national legislators. However, workshop participants
110 indicated that the key target audience for the cost-effectiveness model would be State EFNEP Coordinators.
111 Consensus was that State Coordinators could, in turn, share cost-effectiveness data with their key
112 stakeholders to demonstrate success or to be used as a metric to encourage quality improvement. For the
113 remainder of the workshop, the discussion focused on identifying costs and effects that would be appropriate
114 and available at the state level.

115 **CONCEPTUALIZATION**

116 Costs C(p). For the most part, consensus was obtained easily for the cost side of the CEA (tables 1 and 2) with
117 the exception of a few items. The central idea that emerged is to use cost categories from accounting and
118 economics for classifying and collecting cost data. It was noted however, that in some states, data are entered
119 at the local level by the educator teaching the classes. In other states, the data entry is done at the state level.
120 Further, the administrative structure of EFNEP varies from state to state. For example, some have multi-
121 county supervisors, others do not.

122 Direct costs will be divided between adult and youth components with the educator's percent
123 appointment to youth EFNEP being used to calculate labor, utilities, and capital costs for that respective site
124 (table 1). Finally, cost data should only be gathered and collected for programs that consist of a series of six
125 or more lessons, not for one-time presentations.

126 Behavioral Effects E(p). A significantly greater portion of the workshop was devoted to effects (impacts) than
127 costs. Several challenges were noted in evaluating youth EFNEP, including: the high degree of variation in
128 programming; age-dependent curricula to accommodate a wide range of cognitive developmental levels; a
129 wide age range (pre-K to 12th grade); and focus, ranging from knowledge gains, skills learned, and behaviors
130 changed. A great deal of discussion revolved around what effects could be expected from youth EFNEP (table
131 2), including: What is the evidence supporting the effectiveness and efficacy of EFNEP? Does behavior change
132 take place? What are the long-term impacts? What instruments have been tested with youth EFNEP? The
133 panelists also discussed using Quality Adjusted Life Years (QALYs) as the measure of the effect. QALYS
134 involves translating knowledge, skills, attitudes, and behavior (the actual stated goals and desired effects of
135 the program) into number of life years saved (as mentioned earlier under CEA versus CBA). The expert panel
136 felt that there was insufficient evidence in the literature for making this translation with any reasonable level
137 of confidence, particularly among youth. Given the state of evidence and the "political" importance of EFNEP
138 as a program that elicits behavior change, the panel ultimately decided that the final cost-effectiveness model
139 should allow for the calculation of cost-effectiveness for knowledge, skills, attitudes, and behavioral effects as
140 these are the stated goals of the program. The State Coordinator then has the flexibility to determine which
141 effects to ultimately include in the model. Ideally, all effects would be aligned with the following youth EFNEP
142 indicators related to nutrition and health,¹⁴ along with an impact indicator on physical activity:

- 143 1. Youth now eat a variety of foods
144 2. Youth increased knowledge of the essentials of human nutrition
145 3. Youth increased their ability to select low-cost, nutritious foods
146

147 **INSTRUMENTATION**

148 Costs C(p). While one goal of the workshop was to identify instruments to measure cost, the collection of cost
149 data was viewed as being rather simple and straightforward and founded on basic accounting and economic
150 principles which did not lend themselves to measurement concerns like reliability, validity, and sensitivity.
151 No specific instruments were identified per se to collect cost data – outside of cost-sharing spreadsheets that
152 are routinely collected for the Supplemental Nutrition Assistance Program – Education Program (SNAP-ED)
153 program.¹⁵ Therefore, corresponding cost instruments will be developed with flexibility to allow for
154 differences in collection procedures across states.

155 Behavioral Effects E(p). There was collective agreement that measuring program effects would be the most
156 difficult challenge in this endeavor. It was recommended that the project coordinators reach out to the
157 broader research arena, as well as to the EFNEP/SNAP-ED youth evaluation project database,¹⁶ to identify
158 appropriate instruments that are ideally reliable, valid, and sensitive (i.e. ability to measure appropriate
159 change). The panel identified several possible survey instruments to gather effects data: National
160 Longitudinal Survey of Youth¹⁷; California Youth EFNEP WalkFit evaluation^{18,19}; California Youth EFNEP
161 EatFit evaluation;²⁰ California Youth EFNEP Kids Kartoons (cartoon-style evaluation booklet)³; Texas School
162 Physical Activity and Nutrition (SPAN) Project (4th, 8th, 11th grade);²¹ Coordinated Approach to Child Health
163 (CATCH)(3-5 grade);²²⁻²⁵ the Youth Risk Behavioral Surveillance System (9th-12th grade);²⁶ and the Quality
164 of Well-Being Scale.²⁷ A subset of the workshop participants will serve as an advisory panel to provide
165 feedback on instruments that are developed.

166

167 **ADOPTION AND IMPLEMENTATION OF MODEL**

168 Characteristics of a Cost-Effectiveness Model. While participants agreed that a cost-effectiveness model was
169 invaluable, they also stressed the importance of the following characteristics in order to enhance its adoption:

- 170 • Doable – *“make the assessment as easy as possible”*

- 171 • Believable – *“the personal confidence of whether or not I actually believe that is the contribution our*
172 *work is making”*
- 173 • Explainable – *“I, as a state coordinator, need to be able to take this formula and be able to explain it to*
174 *anybody that says, ‘How did you arrive at that number?’ I think you really need to have it not only*
175 *verbally; but you have to hand it to them one, two, three, step-by-step how to explain it so that they can*
176 *feel credible.”*
- 177 • Clear - *“Able to answer, ‘So what? What do I get out of this?’”*
- 178 • Adoptable – *“And relatively easy and relatively soon.”*
179

180 A suggestion was made to target select states to adopt and implement the model, understanding that
181 some states will be early adopters and others laggards, aligned with the Diffusion of Innovations theory.²⁸
182 Further, for the cost-effectiveness model to be utilized, it was suggested that sample evaluation instruments
183 be posted online and accompany the final model and software for state EFNEP coordinators to use.

184 **COST-EFFECTIVENESS MODEL AND SUSTAINABILITY OF EFNEP** 185

186 Importance of a Cost-Effectiveness Model. There was consensus that a cost-effectiveness model for youth
187 programs was critical for supporting, advocating for, and sustaining EFNEP, as stated by one workshop
188 participant: *“We need to do a better job of proving this (EFNEP cost-effectiveness) value so that we build or*
189 *maintain our political capital.”* Additionally, the model can help identify programs that are more or less cost-
190 effective, which can, in turn, lead to productive discussions about *why*.

191 Several concerns were raised about youth EFNEP that clearly affected cost-effectiveness
192 interpretations and overall sustainability of youth EFNEP. For example, the next generation of federal youth
193 program reporting software should include physical activity indicators, particularly given the significance of
194 physical activity in overall health and weight maintenance. Perhaps EFNEP should consider nationalized,
195 standardized curricula and evaluation to help promote consistency across states. It will be critical to assess
196 the public value of EFNEP. In addition, longitudinal and randomized control trials assessing program
197 effectiveness should be conducted.

198 **Discussion** 199 200

201 While there is a significant need for information on the cost-effectiveness of youth EFNEP, one of the
202 barriers to providing critical data is a lack of consensus on the appropriate outcomes that should provide the

203 basis for such an analysis. For example, is it enough to demonstrate that the programs significantly change
204 children's nutrition knowledge or attitudes towards healthful eating at a reasonable cost? Or changed
205 behavior? Or change objectively assessed body composition? Or show long-term health benefits? The results
206 from this expert panel workshop helped identify inputs and outcomes needed for the development of a cost-
207 effectiveness model and software program that can be used by EFNEP state coordinators to analyze their
208 respective youth programs. However, several concerns were raised, beyond the scope of the study, namely
209 the lack of longitudinal and randomized control trials, along with reliable, valid, and sensitive (i.e. ability to
210 measure appropriate change) survey instruments, to determine the program's overall effectiveness. As noted
211 by one workshop participant, "We would do well to remember the advice of Voltaire: *'The perfect is the*
212 *enemy of the good.'* We are trying to make progress here. We're trying to create something that would be useful
213 out in the field. It is not going to be perfect. We are going to have to make compromises. We are going to have
214 to make tradeoffs, so let's recognize that we have to make improvements and we are not going to end up with
215 something perfect, but can we get something that is better than what we have now...which is nothing."

216

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