Critical Indicators of Youth Development Outcomes for 4-H National Mission Mandates

- **Science, Engineering, and Technology**
- **Citizenship**
- **Healthy Living**

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Principal Investigator: Ben Silliman, Ph.D.
North Carolina State University

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EXECUTIVE SUMMARY

Youth in the 21st century face new challenges in preparing for the enduring tasks of work, community, and family life. The Cooperative State Research, Education, and Extension Service (CSREES) and 4-H professionals nationwide organized three national mission mandates to develop strategies that address the challenges facing youth:

1) Science, Engineering, and Technology (SET);
2) Citizenship;
3) Healthy Living (HL).

Each community and state faces diverse needs in these initiative areas. Each 4-H program brings unique resources and priorities to this work. In the *cooperative* spirit of the Extension Service, collaboration among state 4-H programs on curriculum, training, and evaluation will strengthen each program and enhance the outcomes of each initiative. Consensus on outcome indicators across diverse programs could produce several benefits: 1) greater focus in program planning, as collaborators "begin with [a shared] end in mind;" 2) greater richness in program development, as a variety of strategies are logically linked to a shared outcome; at the same time, 3) greater continuity in curriculum and training as they are aimed toward shared outcomes; 4) opportunities to compare delivery methods for specific audiences; and 5) more clear and powerful evidence for 4-H program impact as all efforts contribute to a single, larger impact statement. This report recommends outcome indicators for each national mission mandate. Recommendations are based on research in youth development and youth program development, as well as practical assets and limitations inherent in multi-state collaboration. Recommendations for short-, intermediate-, and long-term outcome indicators in each mandate area are as follows:

1) Science, Engineering, and Technology (SET) outcomes in the short-term should focus on increasing knowledge, positive attitude, skills, and aspirations for learning and careers (KASA) in specific 4-H juried curricula and activities. Long-term outcomes should focus on behavior changes such as sustained learning in SET disciplines as well as mastery of inquiry skills. Application of SET learning through peer teaching, community service, entrepreneurship, or other activity would also provide evidence of long-term impact.
2) Citizenship outcomes entail short-term KASA gains related to understanding civics, politics, community service, leadership, and youth-adult partnerships. Long-term involvement in YIG projects should produce continued engagement and more responsible roles on community projects and boards.
3) Healthy Living outcomes might include KASA growth in related areas such as nutrition, weight control, or safety in the short-term. Over the long term, behavior changes including sustained health practices and application of learning to health-related peer teaching and service provide exemplary evidence for impact.

Multi-state data collection should also incorporate descriptors of program traits, audience, and quality. These data would facilitate quality control as well as comparisons of diverse strategies for effectiveness relative to outcome indicators. Consensus on indicators will assist national initiative work groups in program development, data collection, curriculum development, training, partnerships, and research. Thus, this review and its recommendations represent a first step in a process of documenting and supporting how 4-H "makes the best better."

Principal Investigator: Ben Silliman, Ph.D., North Carolina State University

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Ben Silliman, Ph.D.
North Carolina State University

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This monograph reviews research on youth development and programming best practices, with emphasis on themes related to 4-H national mission mandates in Science, Engineering, and Technology; Citizenship; and Healthy Living. Recommendations are presented for multi-state data collection projects consistent with these mandates.

THE CONTEXT FOR EVALUATING NATIONAL MISSION MANDATES

Cooperative Extension Program Development

The mission of the Cooperative State Research, Education, and Extension Service (CSREES) is to advance knowledge for agriculture, the environment, human health and well-being, and communities…" The vitality and relevance of 4-H youth work in the Extension tradition flows from the symbiosis of research and practice. The CSREES Strategic Plan (2007) identifies objectives and strategies to fulfill that mission, including education (Goal 3), civic engagement (Goal 3), and health (Goals 3, 5) of rural youth. Many states in the land-grant university system extend these program commitments to all youth (Kellogg Commission, 2000). State plans of work mandated by the Agriculture Research, Education, and Extension Reform Act (CSREES, 2006) require participation in multi-state projects consistent with CSREES Strategic Plan goals. Program reviews of multi-state initiatives such as the Expanded Food and Nutrition Education Program (EFNEP) (2005) and Children, Youth, and Families at Risk (CYFAR, 2005) indicate that collaborative efforts produce greater impact with regard to both audience benefits and organizational capacity.

The educational foundation of 4-H lies in three mission mandates. This framework can also facilitate multi-state collaboration in programming and reporting. Priorities for each mandate area include:

1) Science, Engineering, and Technology (SET): agriculture and life sciences, family and consumer resource management, human development and nutrition (GPS, Tech Team, NASA, Growing in the Garden);
2) Citizenship: civic awareness, community service, leadership in youth organization and community agencies/organizations;
3) Healthy Living (HL): nutrition, physical health, safety (such as ATV), mental health. (Garrett, 2006).

These mandates reiterate the founding purposes of Extension (e.g., technology transfer, community leadership and quality of life) in the context of 21st century challenges and opportunities. Although 4-H professionals affirm the need for enhanced impact in these areas, many want greater clarity, resources, and support (NAE4-HA, 2006). This report

provides a first step toward that goal with a research review and recommendations for multi-state projects.

Program development and logic models are used by federal, state, and local partners to clarify and guide assessment and planning, program implementation, evaluation and accountability (Bennett & Rockwell, 1995; Boone, Safrit, & Jones, 2002; CSREES, 2006). Planning processes may also serve to engage youth and adults to improve their lives and communities (Villaruel, Perkins, Borden, & Keith, 2003). Within a program development or logic model, *outcomes* describe changes in knowledge, attitudes, skills, or aspirations ("KASA change") in the short-term that result in long-term (positive) changes in behavior or conditions attributable to the planned program (Bennett & Rockwell, 1995). Outcome *indicators* specify measurable characteristics that can be tracked over time, across participants or geographic units. Performance criteria serve as indicators in the CSREES Strategic Plan. Outcome *targets* name the degree of change that is expected. A comprehensive program may specify outcomes at several levels (e.g., individual, family, community) and types (skill, behavior, policy) or emphasize different outcomes with each phase of a project (e.g., community mobilization, family support for programs, child skill gain).

Economic and Social Trends

Leading public and private research organizations recognize that the vitality of America's civic and economic life in the 21st century depends upon a population that is healthy, technologically-competent, and actively engaged in leadership and service in their communities. A recent report of the National Academy of Sciences (2006), *Rising Above the Gathering Storm*, speaks to the urgent need to enhance academic and vocational experiences in science, engineering, and technology. American inventiveness and competitiveness in the global marketplace are at risk as student interest and performance in SET disciplines declines at the same time that SET literacy and mastery expectations rise (Business Roundtable, 2005). The increasing pace and complexity of life in a technological age demands engaged, innovative, and cooperating citizens. Some youth learn leadership, service, and partnership with adults, yet a majority do not participate in voting, volunteering, organizational membership or leadership (Michelson, Zaff, & Hair, 2002). Health concerns, including obesity, substance abuse, and spiraling costs, also represent a threat to quality of life and longevity into the foreseeable future (U.S. Surgeon General, 2001). Although popular attention focuses on the growing number of Americans over 65 years, the youth cohort also continues to grow (U.S. Census Bureau, 2005). Families with children under 18 years of age represent a broadening ethnic diversity and a narrowing economic diversity, with fewer families enjoying a middle class standard of living (U.S. Census Bureau, 2004). Technology, transportation, and trade continue to shape a "global village" in which youth and families everywhere are increasingly connected economically, politically, and environmentally.

Research on Youth Development Indicators

Monitoring and research on youth development issues and programs is more abundant than ever but remains fragmented, problem-focused, and under-utilized (Eccles & Gootman, 2002; Moore, Lippman, & Brown, 2004). Consensus among agencies on *social indicators*, or "quantitative measures of well-being that can be tracked over time and compared across social economic, and other relevant social subgroups" (Brown & Moore, 2001) could produce multiple benefits: 1) increasing consistency in mapping and monitoring; 2) mobilizing public opinion; 3) tracking program goal achievements; 4) focusing accountability; 5) informing program improvements; and 6) standardizing program evaluation. The Government Accounting Office (GAO, 2007) recommended that uniform national indicators would improve performance and reduce costs for a wide range of programs. Community-based programs that adopt best practices multiply the benefits of program research (Schorr, 1997). Consensus among state 4-H programs on youth outcome indicators and program descriptors for mission mandates would represent a significant step in realizing these benefits.

RESEARCH FOUNDATIONS FOR YOUTH DEVELOPMENT

Developmental Theory and Research

Lewin's (1935) often-quoted maxim, "There is nothing more practical than a good theory," is strongly affirmed in principle (National Professional Development Task Force, 2004) but not widely practiced by 4-H staff (Mulroy & Kraimer-Rickaby, 2006). Developmental and programming theories answer basic questions about what, how, and why youth programs produce *significant* results. (Theories on how to keep kids entertained are easy to craft.) Consistent application and refinement of theory enables practitioners to get better and better at what they do—creating the right conditions for youth to grow "clearer in thinking…greater in loyalty…effective in service…healthy in living" and enjoy other worthy outcomes. Flawed assumptions wither under the test of practice; accurate assumptions produce evidence that builds a "grounded" theory, enabling others to achieve positive results with less trial-and-error. Since the specific goals, conditions, and audience of 4-H programs are always changing, theories are constantly refined. Reviews of developmental theories and research (Eccles & Gootman, 2002; Lerner, 1995; Steinberg, 2001) are too extensive to discuss in this report. However, several conceptual insights supported by research illustrate the usefulness of theory in developing programs for 4-H national initiatives. Havighurst (1972) described tasks in all domains (e.g., physical, cognitive, social-emotional) during each stage of child development (e.g., infancy, early childhood, middle childhood, early and late adolescence) that were critical for maturation toward productive work, civic, and family roles in adulthood. In the psychosocial domain, Erikson (1950) identified Initiative in learning and relationships as the major theme of early childhood. Industry, or confident mastery of basic vocational and cultural skills, focused the emerging self from 8-13 years, while gaining an autonomous Identity in social, vocational, and civic roles was critical for 14-20 year-olds. From adolescence into adulthood, connectedness or Intimacy with co-workers, friends, and family balances and enriches the mature self. Piaget's

(1981) work on cognitive development revealed the emergence of concrete reasoning through school-age years and abstract thinking during adolescence as critical to learning and problem solving in academic, vocational, and social arenas. Vygotsky (1978), Dewey (1938), and Bandura (1977) emphasized the importance of readiness, hands-on experience, and social interaction in learning. Kolb (1984), Levine (2003) and others point to the variety of learning styles and capacities that enhance and inhibit learning. Bronfenbrenner (1979), Werner and Smith (1992), Hawkins and Catalano (1992) and others described the influence of risk and protective factors at all levels of the social ecology upon the successful completion of developmental tasks. For instance, family support and positive modeling diminishes risk behaviors and increased resilience even for youth growing up in high-risk neighborhoods. For developmental risks such as violence and underage drinking, however, law enforcement, positive community norms, and alternative opportunities reduce risk conditions in ways that youth and families often can not overcome on their own.

During the 1990s, insights on the prevention of risk behaviors spawned a growing appreciation for the role and importance of positive youth development. The Search Institute (Benson, Scales, Hamilton, & Sesma, 2004) found that youth with few risks and many developmental assets, both internal (e.g., personal abilities and positive values) and external (e.g., family, peer group, community, and cultural supports) were most likely to demonstrate positive developmental outcomes. These patterns also held true at the neighborhood and community level (Benson, 2003). Gambone and her colleagues (Gambone, Connell, & Klem, 2002), using the Community Action Framework, found that developmental outcomes in adolescence and into young adulthood can be predicted from available supports and opportunities across the social ecology. Moreover, they were able to specify threshold indicators for risk behavior and optimal growth on three critical elements of positive youth development: productivity, connection, and navigating the social environment. Extensive research in social psychology has demonstrated that life skills such as problem solving, communication, and teamwork are critical to the success of prevention programs (Roth & Brooks-Gunn, 2006; SAMHSA, 2007). Hendricks (1998) Targeting Life Skills Model, used widely in 4-H curricula and practice, defines several life skills concepts and research sources but lacks a coherent theory base and measurement tools. Despite widespread consensus on the significance of life skills, relatively little research tracks the development of such skills in naturalistic and programming environments. Moreover, measurement of life skills across time and contexts, whether by self-report or external observation, remains a challenging task. Building on research in positive youth development, Lerner and associates (2005) proposed a development-in-context model focused on five developmental outcomes: competence, connection, confidence, character, and caring/compassion, that emerge from asset-rich environments. As these 5 C's grow synergistically through childhood and adolescence, youth contribute (the sixth C) to their own and others' development and welfare. Longitudinal analysis (Jelicic et al., 2007) supports the model. However, research in youth engagement (see Citizenship below) suggests that for middle and high school youth, community service (contribution) often serves as a catalyst to competence and other assets. Consistent with Lerner's framework, Villaruel and his colleagues (2003) articulated a Community Youth Development model to emphasize the importance of

youth-environment interaction to the positive youth development process. Research on the importance of youth engagement in home (Kumpfer & Alvarado, 2003), school (Wilms, 2003; Yazzie-Mintz, 2007), group (Eccles & Gootman, 2002), and community (Kretzmann & McKnight, 1993; Michelson, Zaff, & Hair, 2002) validates the importance of contexts and interactions in understanding developmental pathways. Taken as a whole, these insights from theory and research point to the importance of developmentally-appropriate learning in supportive environments. Early learning that is experiential and engaging sets the stage for rewarding habits, accumulation of knowledge, and confident application of skills (Eccles & Gootman, 2002; Wagoner, 2004). However, pre-adolescent and early adolescent years are particularly sensitive periods in the development of attitudes and skills that influence science learning, leadership, and health habits into adulthood. A more detailed discussion of these trends follows.

Science, Engineering, and Technology in the Context of Youth Development

Mastery of the technologies for productive work is a significant theme in the formal schooling and informal learning of children in every culture. Science, engineering, and technology (SET) skills are necessary for productive work in the 21st century economy (Kane, Berryman, Goslen, & Meltzer, 1993) and for everyday survival in mainstream youth culture. Science, engineering, and technology represent a broad range of disciplines and careers built upon communication and mathematical literacy and applied to multi-disciplinary pathways (e.g., biomedical engineering, environmental GIS). In many of these fields, American youth are losing ground to peers in other nations (Business Roundtable, 2005).

Beginning with the groundbreaking reports, *Science for All Americans* and *Benchmarks for Science Literacy: Project 2061* (AAAS, 1989, 1993), standards for teaching, learning, and curriculum development in science, engineering, technology, and mathematics (STEM) have been continuously expanded and refined. Subsequent National Science Education Standards (NSES) (National Research Council, 2007, 2000, 1996) and the 4-H SET Abilities Model (Horton, Gogolski, & Warkenton, 2006) provide the most appropriate guidance for SET learning (Horton, 2006). Growth in science anchor disciplines (content knowledge) and science abilities (process skills) is synergistic, increasing exponentially with experience and maturation. Optimal outcomes result from early and continuous learning keyed to developmental capacities. Moreover, creative and critical thinking activities prepare youth as innovators and adaptive problem-solvers—roles in high demand in the New Economy (Kane et al., 1993). Upper elementary and middle school years are critical times for strengthening interests and abilities, especially for young women and ethnic minority youth (National Academy of Sciences, 2006). At all stages, factual knowledge is not as important as critical thinking skills, including: 1) knowing and applying scientific explanations to the natural world; 2) generating and evaluating scientific evidence and explanations; 3) understanding the nature and development of scientific knowledge; and 4) participating in scientific practices and discourse (National Research Council, 2007). Stage-specific indicators for science anchors and abilities are discussed in NSES publications and the 4-H SET brief report

(Horton, 2006). Many of these indicators appear in recommendations of North Central Region 4-H program leaders for science and technology (Walahoski, 2007). Developmental capacities for learning in content and process areas are specified in the National Standards. A sample of this schema for inquiry abilities (NRC, 2000: 19) follows:

Grades K-4

- Ask a question about objects, organisms, and events in the environment
- Plan and conduct a simple investigation
- Use data to construct a reasonable explanation

Grades 5-8

- Identify questions that can be answered through scientific investigation
- Design and conduct a scientific investigation
- Think critically and logically to make the relationships between evidence and explanations

Grades 9-12

- Identify questions or concepts that can be answered through scientific investigation
- Design and conduct scientific investigations
- Formulate and revise scientific explanations and models using logic and evidence

Citizenship in the Context of Youth Development

Youth gangs and guerilla movements recognize the capabilities of young people for leadership and sacrificial service. Citizenship must provide equally challenging, but constructive, opportunities to engage and extend youth capabilities in partnership with adults. Civic engagement, including citizenship learning, service, and leadership activities are well-suited to adolescent capacities for autonomy (Eccles & Barber, 1999) and abstract reasoning (Piaget, 1981), but can benefit 8-12 year-olds if developmentally appropriate. Recent reviews of research demonstrate that civic engagement fosters a wide range of developmental assets (Michelson, Zaff, & Hair, 2002; Brockman, Tepper, & Russell, 2004; Roebuck, Tepper, & MacNeil, 2004). For instance, middle and high school youth engaged in civics learning, community or political service, and leadership in organizations or community boards not only increased knowledge and skills in target activities but improved academic assets and performance (study habits, homework completion, grades), social assets (cultural competence, teamwork skills, health and safety, well-being), and educational aspirations. Participants in civic engagement showed increased interest in national and community news and more positive views of adults. Benefits were greatest for youth who lead groups (versus only participating) or reflected on activities (versus only acted), and for economically or behaviorally at-risk youth. Early (middle school) and continuous engagement in civics and service helped create a positive cycle of investment and reward. Fewer studies examine long-term outcomes but some point to outcomes of self-sufficiency, greater post-secondary education, continued service, community involvement in young adulthood, and positive parenting skills. Programs studied had different aims, achieved somewhat different outcomes, and did not

test for causality, but do show strong evidence of promoting positive developmental outcomes.

Community service programs serving middle and high school youth (Michelson, Zaff, & Hair, 2002; National Commission on Service Learning, 2002) suggest that, especially with at-risk youth, outcomes include increased personal and social development (competence, self-esteem, helping behaviors, reduced risk behaviors; trust, responsibility, empathy, cultural competence), civic responsibility (awareness of community needs, differences; understanding of political and moral decisions; understanding of how government works), and positive contribution (engaging with community organizations) as well as an increased sense of efficacy, or confidence in making a difference. Service activities also correlated with growth in academic skills and knowledge (achievement and problem solving skills), school engagement (attendance, motivation to learn, study habits, engagement), career aspirations and exploration, and personal behavior (reduced problem behaviors, pregnancy, increased efficacy, interest in helping, concern for others). Broader impacts included improved school and community climate (mutual respect, positive engagement, adult appreciation for youth). The National Youth Leadership Council (NYLC) study of Service Learning and Transition to Adulthood (NYLC, 2006) found that service participants were more satisfied with life, more likely to discuss or engage in politics and community issues, to vote, and to aspire to higher education and lifelong learning.

Youth experiences in governance cultivate understanding of citizenship and practice of leadership at any of three levels: event (e.g., Block Party committee), organizational (e.g., 4-H Club or County Council), or partnership (e.g., civic board or task force) Leadership development in the context of service and civic engagement (Brockman et al., 2004) cultivates life skills related to managing people and projects: goal setting, problem solving, decision-making, written communication and public speaking skills, as well as skills in persuading and motivating peers and adults. Leadership experiences can also foster teamwork (mutual respect, leader/follower roles, building on strengths, commitment to group input and expression), identity development (self/community, pride in larger benefit, self-awareness, responsibility), professionalism (tactfulness, practicing protocols, appropriate dress and action, work quality, self-presentation), and project management (goal setting, facilitation, reflection) (Brockman et al., 2002).

Youth-adult partnerships are also identified with a variety of benefits, including engaging in meaningful activities; exposure to the work world; interaction with diverse people; exercising responsibility; increased control; experiencing consequences; experimenting with new roles and identities; learning about communities; and developing compassion. In addition, partnerships energize and support adults, revitalize neighborhoods, and promote mutual respect. Some emerging research suggests that organizations doing civic engagement or activism work with youth do a better job at positive youth development (building skills, knowledge, and competencies) than those with a strict focus on youth development (Brockman et al., 2004).

North Central Region 4-H program leaders described several indicators for youth-in-governance/ civic engagement (Walahoski, 2007). The Civic Indicators Working Group of the National Conference on Citizenship (2007) identified indicators and research across the many domains and studies in Citizenship. The North Carolina Civic Consortium (2003) and CIRCLE (2007) identify indicators of civic awareness and engagement. America's Promise (2007) and the Corporation for National and Community Service (2007) regularly include youth volunteer activity in their research.

Healthy Living in the Context of Youth Development

At the turn of the 20th century, infectious diseases, unsafe conditions at work and home, and inadequate nutrition were significant health issues for children and youth. These conditions affect relatively few children today, but poor nutrition and fitness habits, unintended injuries, acute and chronic stress threaten to reduce the quality of life and longevity of today's children. Good nutrition promotes healthy growth and reduced risks of disease in childhood and adulthood (U.S. Surgeon General, 2001). Most youth and adults need to increase consumption of fruits and vegetables and reduce consumption of soft drinks, snack foods, and large portion sizes to meet research-based dietary guidelines (U.S. Department of Agriculture, 2005). Dietary behaviors, physical activity, and childhood weight control indicators are included in the health monitoring of USDA and partner organizations (Healthy People 2010, 2007; Centers for Disease Control, 2006). Both youth and adults also need to increase regular vigorous physical activity to achieve short- and long-term health benefits, including growth of bones and muscles, weight control, and mental health (Centers for Disease Control, 2005). Fitness and exercise also decrease risks for diabetes, heart disease, and hypertension in adulthood (Stephens, 2002). Many of these healthy lifestyles indicators are included in evaluation recommendations of North Central Region 4-H program leaders (Walahoski, 2007).

Although the incidence of unintended injuries declined in the past decade, they are still the leading causes of childhood morbidity and mortality (Deal, Gomby, Zippiroli, & Behrman, 2000). Safety training is critical for outdoor activities (e.g., swimming, water sports, target sports) and everyday settings (e.g., bike safety, ATV safety, cooking safety, fire safety). Red Cross first aid and swimming and state hunter safety programs provide specific certifications at several levels that may serve as indicators of competence. Other knowledge and skill indicators for safety are addressed in 4-H juried curricula.

Mental or emotional health is a significant contributing or resulting factor in a range of physical and behavioral health problems. Stress management is a key mental health skill in building efficacy and positive identity and in reducing risk behaviors such as overeating and substance abuse (Miller & Smith, 1995). Stress prevention and coping can be modeled and practiced in a variety of 4-H activities, thus providing a useful feedback indicator for adult leaders as well as an outcome indicator for programs.

Life Skills

Life skills describe learned capabilities that foster growth and adaptation in youth and into young adulthood. A wide variety of life skills are cited as critical for youth and young adult development in research, including health habits, critical thinking, decision-making, vocational awareness, cultural competence, self-regulation, coping, conflict resolution, mastery motivation, self-esteem, self-efficacy, goal setting and future planning, responsibility, optimism and mental health, positive identity, prosocial values, spirituality, moral character, time management, relationship skills, teamwork, connectedness to organizations and community, and civic engagement (Eccles & Gootman, 2002). Life skills most often identified as outcomes in informal science, civic engagement, and healthy living research include goal setting, critical thinking or problem solving, communication, and self-efficacy.

Diversity and Youth Development

The preceding reviews describe broad themes and conclusions about youth in general. Although a thorough review of individual differences is not possible here, it is important to note that social class, culture, gender, disability, and other factors significantly influence risk and resiliency in each mandate area. For instance, ethnic minorities and females tend to be underrepresented in SET courses and disciplines in secondary and tertiary education. Changes in teaching style and academic support can significantly increase their course grades and degree completion. Students with physical disabilities face special challenges for participating in community service and leadership, but appropriate adaptations can enable them to be fully-participating 4-H members (Emerson & Wheeler, 2004).

DEVELOPMENTAL OUTCOMES AND INDICATORS RELATED TO THE MISSION MANDATES

If “what gets measured gets done,” then indicating “what to measure” specifies where to begin. Moore, Lippman, and Brown (2004) recommend that a good system of social indicators should: 1) represent all domains (e.g., physical, cognitive, social development); 2) describe social context (e.g., community or delivery system); 3) be sensitive to developmental stages and; 4) linkages between stages; 5) include positive and risk factors; 6) address short-, medium-, and long-term sensitive factors. Such indicators should be equally understandable to citizens, practitioners, researchers, and policy-makers and consistent across program monitoring, research, and evaluation systems. Community-based programs require indicators that are relevant to volunteers (with easy-to-use measures) and broadly-defined, to incorporate a wide range of topics and strategies. At the same time, mandate indicators matched to national indices such as science standards, civic indicators, USDA and CDC health surveillance will facilitate comparison of 4-H results with similar data. Recommendations for outcome indicators that follow were guided by criteria noted in the paragraph above, the foregoing research review, and priorities stated in the Mission Mandates brochure (Garrett, 2006). Indicators directly related to youth outcomes are discussed first, followed by discussion on tracking

environmental factors that indirectly influence youth development. Environmental factors selected reflect those in which 4-H staff have the greatest potential to effect outcomes: family, organizational (county or state program), and community (local or state policy and support). Following the TOP model (Bennett & Rockwell, 1995), short-term outcomes reflect immediate changes in knowledge, attitude, skills, and/or aspirations; intermediate or mid-term outcomes represent behavior changes or application of short-term gains; and long-term outcomes describe cumulative results of knowledge and behavior changes. For youth, cumulative results become apparent as they enter college and careers. For organizations and communities, growth in capacity to challenge and support youth and sustain innovative activities often requires investments over the long-term.

In the outcomes table below, related indicators (e.g., knowledge and skills, science and technology) are merged for efficiency and ease-of-interpretation. Recommended youth outcome indicators are stated in terms of numbers of individuals since specific outcomes are likely to vary across states. Mission mandate teams following specific curriculum goals or partnership agreements, may want to identify a specific set of consensus indicators and qualifying program conditions (e.g., target audience, program intensity and duration, leader credentials), thus creating a more uniform evaluation design. An Appendix to this report suggests measurement tools or methods for these indicators that can be easily integrated with programming activities. Evaluation methods such as curriculum pre- and post-test assessments, rubric judging of public speaking, volunteer leader observations, and portfolio evaluations are quite compatible with the experiential learning process and well integrated into many 4-H programs. Such "authentic assessment" methods provide a practical approach for gathering data at a local level. Moreover, improvements in the accuracy and consistency of such measures and methods will likely improve program delivery as well. Recommended youth outcomes are as follows:

Science, Engineering, and Technology Targeted Indicators

Opportunities for learning from 4-H juried curricula and other activities are among the chief reasons for enrollment in and benefit from 4-H (Mulroy & Kraimer-Rickaby, 2006).

Short-term outcomes from these learning experiences include:

- Number of individuals increasing participation in science and technology-specific clubs
- Number of individuals increasing knowledge and/or skills in content and careers (across subject areas ranging from animal science to technology)
- Number of individuals increasing positive attitude and/or aspirations about SET learning and careers
- Number of individuals increasing science process skills, such as mastery of basic skills (observation, comparison, hypothesis), use of the scientific method, or systematic problem solving

Intermediate, or mid-term outcomes of engagement in SET activities include:

- Number of individuals demonstrating improved behavior in science learning, such as effective participation in school classes, independent study, career exploration, or volunteer experiences
- Number of individuals applying science process skills, including incorporation of science learning in community service, enrollment in SET-related post-secondary education, and/or entrepreneurship/career success

Long-term outcomes of extended involvement in SET activities include:

- Number of individuals who enroll in SET-related post-secondary education, enter SET-related career fields, demonstrate entrepreneurship/career success in a SET field, or attribute 4-H SET involvement to success in education or career
- Number of individuals who sustain 4-H SET involvement as volunteer leaders, community or corporate SET decision-makers, and/or adult sponsors of 4-H SET activities

Citizenship Targeted Indicators

Youth organizations such as 4-H represent primary contexts in which civics knowledge is gained, community service is learned, and leadership is mentored and practiced.

Short-term measures of progress for Citizenship could include:

- Number of hours in civic involvement
- Number of hours in community service
- Number of individuals increasing knowledge and/or skills in civic education, including the elections process
- Number of individuals gaining knowledge and/or skills related to volunteerism
- Number of individuals reporting positive attitude change and/or aspiration related to volunteering for civic activities, community service, and/or philanthropy
- Number of individuals indicating knowledge and/or skills learned related to leadership
- Number of individuals reporting positive attitude change and/or aspirations related to leadership
- Number of individuals indicating knowledge and/or skills gained related to effective youth-adult partnerships
- Number of individuals indicating positive attitude change and/or aspirations related to participate in youth-adult partnerships

Mid-term indicators reflecting extended civic engagement, are as follows:

- Number of individuals engaged in the political/governance process, including registering to vote, attending meetings or governmental or civic organizations, presenting to civic boards, writing to elected or civil service officials, meeting with legislators, seeking office in a club or school, publishing letter(s) to the editor, or participating in the election process

- Number of individuals who increase volunteer responsibilities, including leading a community service project
- Number of individuals engaged in youth-adult partnerships, such as serving on a policy-making and/or advocacy board

Long-term outcomes of extended involvement in Citizenship activities include:

- Number of individuals who enroll in a public service-related post-secondary education discipline, enter public-service-related career fields, demonstrate career success in a public service field, or attribute 4-H citizenship involvement to success in education or career
- Number of individuals who continue civic engagement as adults, including voting, working in the elections process, community or corporate service, and youth-adult partnership boards
- Number of individuals who serve as volunteers in youth civic engagement as leaders, community or corporate advocates for citizenship, and/or adult sponsors of citizenship activities

Healthy Living Targeted Indicators

Since its inception, 4-H has engaged youth in developing healthy habits in nutrition, fitness, safety, and mental health. As with SET and citizenship programs, HL short-term programs can initiate awareness and aspiration to new habits, but mid- and long-term lifestyle changes are critical to achieving lasting benefits from 4-H involvement.

Short-term indicators relevant to a wide range of programs include:

- Number of individuals increasing knowledge of and/or skills for selecting healthy foods, including understanding food labels, personal dietary habits, portion sizes, and preparation of foods with reduced fat and/or calories
- Number of individuals improving attitudes toward and/or aspirations to improve nutritional habits such as eating healthy foods, decreasing sugar-sweetened beverages
- Number of individuals increasing knowledge of and/or skills in physical activity and reducing risk behaviors such as excessive screen time
- Number of individuals improving attitudes toward and/or aspirations to improve physical activity habits and reduce risk behaviors
- Number of individuals increasing knowledge of and/or skills in practicing healthy habits, including adequate sleep, personal hygiene, dental care
- Number of individuals improving attitudes toward and/or aspirations to improve health habits related to sleep, hygiene, dental care
- Number of individuals increasing knowledge and/or skills related to safety, including ATV, bike, hunter, and water sports
- Number of individuals increasing stress coping skills
- Number of individuals increasing refusal skills related to substance abuse and violence

- Number of individuals increasing knowledge of personal and community resources for mental health including where to seek help when facing depression, anxiety, suicidal thoughts, violence, addiction, or eating disorders

Intermediate, or mid-term indicators of behavior change and application of knowledge or skill demonstrate impact of knowledge-based programs on daily practices, as follows:

- Number of individuals maintaining positive nutrition habits (identified via short-term indicators), with positive consequences such as weight control, reduction in health-related problems
- Number of individuals maintaining physical activity habits (identified via short-term indicators), with positive consequences as noted above
- Number of individuals maintaining safety practices (identified via short-term indicators) and decreasing injuries in targeted activities
- Number of individuals maintaining positive health habits (identified via short-term indicators) and decreasing risk behaviors

Long-term outcomes of extended practice of Healthy Lifestyles include:

- Number of individuals who enroll in Health-related post-secondary education, enter Health-related career fields, demonstrate entrepreneurship/career success in a Health field, or attribute 4-H Healthy Lifestyles involvement to success in education or career
- Number of individuals who maintain healthy lifestyles into adulthood, including good nutrition, weight control, regular exercise, good mental health habits, safety habits, and risk avoidance
- Number of individuals who sustain involvement with youth health programs as volunteer leaders, community or corporate health decision-makers, and/or adult sponsors of 4-H healthy lifestyles activities

Life Skills Indicators

Life skills learning applies to *all* mission mandates across diverse skill sets. A sample of short- and mid-term indicators for those life skills most often cited is suggested below.

- Communication
    - Number of individuals increasing skills in public speaking (short-term), then applying public speaking skills in another setting (long-term)
    - Number of individuals increasing skills in record-keeping (short-term), then applying writing skills to a more complex task (long-term)
    - Number of individuals increasing skills in interpersonal communication (short-term), then demonstrating competence in communicating as a leader (long-term)
- Goal-setting
    - Number of individuals increasing skills in setting and completing goals on a project (short-term), then applying skills to a self-directed or community leadership project or teaching skills to others (long-term)

- Critical thinking, Problem solving, Inquiry skills
    - Number of individuals increasing skills in reasoning on a project (short-term), then applying skills to a self-directed or group leadership project or teaching skills to others (long-term)
- Self-efficacy
    - Number of individuals increasing self-efficacy (confidence to perform), then attribute their confidence in a career or community service task to 4-H (long-term)
- Teamwork
    - Number of individuals increasing skills as a team member (short-term), then applying skills as a team leader (long-term)

Descriptions of Target Audiences

Data on indicators would be enhanced by demographic information (e.g., age/grade, gender, race, place of residence) and descriptive traits of the audience (e.g., attendance, 4-H experience, prior knowledge, role in program, extracurricular involvement) as well as information about the data set (e.g., individual or group data, method and timing of data gathering). Mulroy and Kraimer-Rickaby's (2006) review of research indicated that additional descriptive data would have greatly enhanced the clarity and contributions of many 4-H program evaluations.

Environmental Factors that Influence Developmental Outcomes

Youth development is influenced by environmental factors and influences the quality of the environment. Supports and opportunities for youth development offered by family, organizational, or community represent measures of progress toward youth outcomes that can be documented even before youth behavior changes are evident (Gambone, Connell, & Klem, 2002). Capacities to sustain supports and opportunities, including resources, systems development, policy development, training and mentoring skills represent foundational prerequisites and consequences of youth development. Recommendations for indicators related to family, organization, and community are presented below. Indicators related to program quality are discussed in the next section of this report.

Family, the first and most significant influence on youth at all stages of development, provides (or fails to provide) supports and opportunities for development in general as well as for mandate-specific outcomes. Indicators of these practices may include:

- Emotional support at each level of involvement (participation, learning, behavior change, and application of skills):
    - Number who esteem youth's interest(s), encourage growth;
    - Number of youth who report parent/family empathy for their difficulties and disappointments with challenging activities;
    - Number of parents who maintain high expectations of youth for persistence and mastery, belongingness, generosity, independence;
- Practical support at each level of involvement:

    - Logistical support, including scheduling, transportation, supplies to engage in a 4-H program;
    - Personal engagement as an active parent or volunteer leader;
    - Assistance with at-home learning and lifestyle changes (e.g., help with science fair projects, involvement in service events, family diet and exercise changes);
- Opportunities to support learning and development:
    - Initiate, expand upon, or apply 4-H experiences/programs, including sharing or applying knowledge with others, family projects and field trips;
    - Cultivate life skills in home and neighborhood settings;
- Enhance family capacities for support and opportunity, including resources, systems development, policy/rules, and technical and life skills:
    - Build family strengths of
        - Cohesion, balancing togetherness and independence;
        - Adaptability, balancing structure and flexibility;
        - Communication, including openness, clarity; optimism;
        - Connectedness to healthy families, schools, and community resources;
        - Faith and purpose;
    - Improve relational and/or technical skills such as parenting, teaching, mastery of a 4-H specialized area
    - Improve use of material and time resources, including budgeting, scheduling,
    - Learn and implement family rules (policies) that foster mastery, belongingness, generosity, and independence

4-H as a youth organization provides supports and opportunities, based on capacities to sustain programs that support positive youth development. In many ways, 4-H county programs are a microcosm of the larger community. Thus, organizational and community indicators for supports, opportunities, and capacities are merged in the following list:

- Number of youth who report supportive assets in organizations/communities
    - caring from specific adults;
    - respect for youth as community resources;
    - concern from adults in general;
    - staff and volunteer corps that can reach all youth;
    - relevant resources for youth during crisis or challenge;
    - adequate funding for programs; scholarships for individual activities;
    - norms that discourage risk behavior and encourage positive development (e.g., character, school success, citizenship and service, healthy eating)
    - adult advocacy for high quality youth programs and staff;
    - networking and collaborative efforts across organizations;
- Number of youth who report available resources and opportunities for:
    - communicating constructively with adults about their needs, community issues, program preferences;
    - making a difference through service and other meaningful roles;
    - learning and exercising leadership roles;
    - SET, citizenship and service, and/or healthy living activities;

- Organizational/community capacities for support and opportunity, including resources, systems development, policy/rules, and training and support:
  - Number of adult volunteers, the amount of time and diversity of talents shared with young people;
  - Number of adults trained; practical and emotional support for them;
  - Number and variety of efforts to strengthen families, schools, and youth groups that serve youth;
  - Number of citizens reached, positively influenced by communication about positive youth development;
  - Amount of fiscal and material resources available for positive youth development activities;
  - Number of youth organizations practicing effective resource management of human, fiscal, and practical resources;
  - Number of youth professionals and volunteers engaged in collaborative planning, programming, and/or evaluation of activities for youth;
  - Number of citizens supporting positive youth development activities (with their opinion, vote, time, and talents;
  - Number of organizational or community policies that support positive youth development practices.

Research Before and Beyond Program Evaluation

Multi-state collaboration on programming and data collection in three mission mandate areas represents a significant improvement in Extension accountability. These efforts may be limited by issues such as aligning multiple state plans of work or engaging and training large numbers of volunteers. Approaching evaluation as a pathway to learning (Woodwell, 2005), mandate teams should employ evaluation strategies matched to programming stage or organizational capacity. Indicators recommended in this paper fit best with formative evaluation of program quality and short-term outcomes or with summative evaluation of intermediate and long-term outcomes. Developmental evaluations may be most appropriate for 4-H activities without clear goals or uniform curricula. Cluster evaluation, examining common, contributing features across similar programs may provide descriptive data that leads to consensus on evaluation indicators. More in-depth research will be needed to examine exactly what is gained from specific curricula (e.g., GIS, Health Rocks!), topics (e.g., NASA science, youth-in-governance) or strategies (e.g., peer teaching, or settings (e.g., afterschool, club, camp) or how and why those outcomes were achieved. Quasi-experimental and experimental design studies may be of interest to internal partners such as the Experiment Station Regional Research Projects, external partners such as school districts or public health, or granting agencies. SET-related research might explore:

- Comparative benefits of experiential, didactic, and mixed methods for youth of different ages, genders, or learning styles
- Comparative advantages of delivery systems in fostering learning
- Effectiveness of youth mentors in teaching science as inquiry
- Incidental and cumulative effects of 4-H in informal learning experiences relative to subject matter learning, process skills, and career interests

Citizenship research might investigate:

- Patterns of participation and leadership in volunteerism and civic engagement
- Ecological factors that facilitate or inhibit volunteerism or civic engagement
- Understanding the effects of service on many youth outcomes

Healthy Living research could examine:

- Short-term or long-term strategies or programs that are particularly effective in reduction of risk behavior or promotion of health behavior
- Understanding readiness to change in physical and mental health promotion

RESEARCH FOUNDATIONS FOR YOUTH DEVELOPMENT PROGRAMS

Programming Theory and Research

Theory and research is important to the design and delivery of effective programs as to the promotion of youth outcomes. The Behaviorist tradition emphasizes positive reinforcement and modeling in developing positive habits such as healthy eating or following the scientific method. When rewards are not available or role models provide poor examples, behavioral programs are less likely to succeed. Likewise, Developmental and Cognitive theories would predict that experiential learning that offers action (e.g., fun activities) without appropriate reflection (e.g., critical thinking processes) would produce little learning. Change theory (Prochaska, Norcross, & DiClemente, 1994) identifies the importance of matching activities to cognitive and emotional readiness to facilitate behavior change step-by-step. Finally, ecosystems models (Bronfenbrenner, 1979; Gambone, Connell, & Klem, 2002) point to the importance of targeting family and cultural attitudes, such as acceptance of overeating and TV watching, as well as individual learning, as critical factors in nutrition programming. Significantly, lack of program fidelity, or implementation that is not consistent with or aided by a research-supported theory, represents the greatest threat to positive outcomes in youth programs.

Best Practices in Quality Youth Programs

Quality programming is a prerequisite for positive outcomes. A review of youth program best practices by the National Research Council (NRC, Eccles & Gootman, 2002) points to eight elements common to quality programs: 1) physical and emotional safety; 2) adult support; 3) appropriate structure; 4) positive social norms; 5) opportunities to belong; 6) opportunities to serve and make a difference; 7) opportunities for skill-building; and 8) connections to family, school, and community. These elements mirror those cited in the National Study of 4-H Impact (Peterson, 1999) and the Essential Elements of 4-H (Kress, 2005). National 4-H Headquarters (2007) describes specific ways in which programs can meet youth basic needs for Belongingness (caring relationships), Mastery (constructive learning), Independence (leadership), and Generosity (community service) in settings such as 4-H clubs, special interest activities, school enrichment, or camping. A program planning tool for Essential Elements is available from the University of Arizona (2006). Although much research is needed regarding how programs have impact and how impacts vary across individuals, existing research demonstrates that cumulative

experiences in quality environments increases positive and decreases negative outcomes for youth (Eccles & Gootman, 2002; Roth, Brooks-Gunn, Murray, & Foster, 1998; Hawkins & Catalano, 1992; Theokas et al., 2005). Quality rubrics developed by High Scope Foundation (2004), National Afterschool Association (Roman, 1997), National Youth Employment Coalition (2004), and American Camping Association (ACA, 2007) should enable trained observers to document program quality and organizational dynamics and describe more precisely how and why programs have impact.

Program Effectiveness Criteria and Measures

Youth program effectiveness describes a "good fit" between the quality of the program and the needs of a target audience. In a review of afterschool programs, the Harvard Family Research Project (Chaput, Little, & Weiss, 2004) identified three critical indicators of effectiveness: 1) intensity (frequency of training), 2) duration (length of exposure), and 3) breadth (diversity of components). These elements parallel traditional medical/prevention efforts to identify appropriate "dosage" or "treatments" and education standards based on structured coursework units. Extensive research to document program effectiveness generated the Substance Abuse and Mental Health Services Administration (SAMHSA, 2007) and Juvenile Justice Evaluation Center (JJEC, 2007) indices of evidence-based programs. SAMHSA Model Programs reflect replicated, control-group studies across diverse target audiences and conditions, while Effective Programs and Promising Practices demonstrate more limited evidence of impact. The Department of Health and Human Services requires that all funded programs use these evidence-based programs. The U.S. Department of Education recommends similar rigorous standards (Department of Education, 2004). Efforts by 4-H mandate teams to gather data on program intensity, duration, and breadth would contribute greatly to effectiveness research. Additional criteria identified for specialized programs are cited below.

Best Practices in Science, Engineering, and Technology Programs

National Science Education Standards (NSES) (National Research Council [NRC], 2007, 2000, 1996) and the 4-H SET Abilities Model (Horton, Gogolski, & Warkenton, 2006) support and extend overall research on youth program quality and effectiveness. Developed primarily to guide classroom practice, NSES are quite consistent with the experiential learning model. The centerpiece of NSES is a scope and sequence for developmentally-appropriate content and process learning. This schema incorporates skills from basic literacy for observation and classification through integrated skills such as making models and collecting data, as illustrated under "SET Skills in the Context of Youth Development" above. Essential elements of classroom inquiry at all stages include: 1) asking questions; 2) framing hypotheses; 3) gathering and interpreting evidence; 4) revising explanations to fit data (NRC, 2000: 29). Guided by research on how people, especially scientists, learn (Bransford, Brown, & Cocking, 1999), NASE describes effective learning environments as 1) learner-centered (build on prior knowledge, foster "teachable moments" through action and reflection); 2) knowledge-centered (accumulate, organize, and connect facts and insights from direct observation, instruction, experimentation, and problem-solving); 3) assessment-centered (continuous

self-monitoring, together with guidance of and feedback with a knowledgeable teacher); and 4) community-centered (collaborative, open to dialogue and discovery) (NRC, 2000: 121-126).

4-H SET programs may operate at two pedagogical levels: 1) Science by Inquiry, in which a certified teacher or other expert explains concepts in depth, fosters discovery, and cultivates science reasoning skills; and 2) Science as Inquiry, in which a less experienced leader facilitates science process skills with the help of structured curricula or experts (Walker, Wahl, & Rivas, 2005). 4-H resources that support development of science-as-inquiry skills include *Heads-on, Hands-on* experiential learning curriculum (Experiential Learning Design Team, 2000), *Nurturing Scientific Literacy Among Youth* (Horton & Hutchinson, 1994), and developmentally-appropriate experiential learning questions developed as a companion for 4-H curricula (Wagoner, 2004). Since 1983, the National Science Foundation consistently supported informal science education as a priority strategy in expanding literacy and mastery in science, technology, engineering, and mathematics (STEM)(NSF, 1983) and maintains an online library of successful program models (National Science Foundation, 2005).

Best Practices in Citizenship Programs

Youth volunteer and civic engagement programs enjoy a wealth of practice insight but little empirical foundation for program standards. However, program quality in service learning, civic engagement, and leadership is consistently identified with these elements: 1) meaningful responsibility that makes a difference rather than token service; 2) learning-by-doing, involving action (service, leading), reflection (planning, debriefing), and instruction (content training); 3) developmentally-appropriate opportunities and supports; 4) mutual respect and accountability with adults; and 5) involvement of friends, parents, and respected adults. In addition, youth-adult partnerships require: 1) organizational commitment; 2) roles for more than one youth on board/project; 3) adult mentor(s); 4) opportunities for discovering strengths; 5) appropriate challenges; 6) real decisions and meaningful impact; and 7) clear expectations and training (Brockman et al., 2002; Zaff et al., 2002).

Best Practices in Healthy Living Programs

Effective nutrition, weight control, and physical activity programs in school and community settings involve: 1) accurate information related to 2) personal goal-setting and monitoring, supported by 3) hands-on activities in food preparation, movement and exercise, extended to 4) school and home activities and policies (National Cancer Institute, 2007). Some programs like 4-H Health Rocks! programs also incorporate community education and service that engage youth as advocates for healthy living. Safety programs also depend on extensive modeling and practice, together with skill-building (e.g., safe swimming) and adequate supervision. Several of the SAMHSA Model Programs (2007) address stress management through a combination of relaxation, assertiveness, conflict resolution, and problem solving strategies, as well as healthy eating and fitness activities. Family involvement and community policies regarding issues such as bullying, extend and reinforce group learning activities.

Diversity and Youth Development Programming

Effective programming practices can be generalized for all youth audiences, but specific practices may be more critical to increase the success of youth from limited resource families or from diverse cultures. Adjustments in program practices may be appropriate for girls in traditionally-male areas or students with physical or mental disabilities.

Best Practices Across Delivery Systems

A variety of 4-H approaches are used to deliver 4-H programs, including clubs, afterschool, camps, special interest events, and school enrichment programs. Experiential learning and youth leadership are key elements of all approaches, although the effectiveness of these methods depends somewhat upon the age group and scope of the event. Not surprisingly, the intensity and duration of programming, rather than the particular format, seems the best predictor of outcomes across a variety of indicators. Professional standards for afterschool (Roman, 1998) and camping (American Camping Association, 2007) mirror those of youth development best practices (Eccles & Gootman, 2002). These standards might also prove effective for special interest and school enrichment programs.

PROGRAM QUALITY INDICATORS RELATED TO THE NATIONAL MISSION MANDATES

If outcomes answer the "so what" question about youth programming, then quality indicators state an emphatic "because." Data about program quality and characteristics would assist evaluators in describing typical programs and analyzing the relation between program traits and outcomes. Valuable indicators might include: 1) program quality (expert observations, youth consumer feedback); 2) descriptions of treatment conditions, including intensity (frequency), duration (length of time), and breadth (extent of topics addressed); 3) delivery systems (e.g., clubs, camps, afterschool, school enrichment, special events); 4) leader traits (e.g., age range, experience, role) and 5) practices (e.g., instruction, experimentation, discussion, demonstration). In addition, descriptions of experimental designs (treatment-only, treatment/control groups), stage of development (e.g., innovative), stage of implementation (e.g., formative, summative), measurement procedures (instruments, methods), timing of assessment (pre/post, post-then-pre) would also offer insights on typical patterns of evaluation and comparisons of their results.

Youth Program Quality Indicators

Arguably, all 4-H programs should reflect the 4-H Essential Elements (Kress, 2004) or National Research Council best practices (Eccles & Gootman, 2002), although programs in some settings may operate at lower standards (e.g., camp impact on home and community connections). In addition, program descriptors such as stage of development (formative, summative), stage of implementation (replicated, innovative), delivery system (e.g., club, afterschool, camp, school enrichment, special interest project), strategies (e.g.,

instruction, mentoring, guided inquiry, self-directed practice), leader traits (e.g., adult, youth; expert, practitioner, novice) would prove useful in analyzing outcomes. The most important quality-related indicators are intensity (moderated by attendance), duration, and breadth, since these represent investments in youth outcomes.

SET programs should consider monitoring indicators of the Essential Elements of Inquiry, Effective Learning Environments, and identified Science by Inquiry or Science as Inquiry. Citizenship program indicators should incorporate the scope or number of decision-making steps, and scale or depth of decision-making authority, at least in community service and youth in governance projects. A wide variety of Healthy Living curricula provide a research-based or professionally-certified protocol. Identification of juried curricula, model program, or certified programs provide some indication of the program quality associated with a given data set.

RECOMMENDATIONS AND IMPLICATIONS

Recommendations

The task of this report was to review research and recommend outcome indicators for multi-state data collection in the three 4-H mission mandate areas. Consistent with current CSREES reporting guidelines, short-term ("KASA"), intermediate, and long-term (behavior change and application) indicators and potential measures were recommended for Science, Engineering, and Technology, Citizenship, and Healthy Lifestyles. Data on program and audience traits would improve a state's capacity to profile, compare, and track impact over time. Targeted research on youth outcomes and program delivery would complement and extend results of monitoring indicators.

Implications for Mission and Strategies

Implementation of multi-state evaluation implies changes in all stages and components of the program development process. A review of key issues follows:

- **Program Development**. National and state teams using the Targeting Outcomes of Programs model need to clarify priorities and increase professional and program capacity. Teams may focus on short-term and program indicators for formative evaluation, intermediate, and long-term summative evaluation. A program development incubator developed by Cornell Extension following Jacob's Five-Step Model (Hertzog, 2006; Jacobs, 1988) provides for progressively more rigorous evaluation and cross-project control groups. At each level, cross-cutting and integrated programming will enhance the breadth and depth of impacts attained.
- **Measurement Systems**. Consensus on indicators and pooled data will be of little use unless the tools and techniques of evaluation are valid, reliable, and usable to everyday practitioners.
- **Data Systems**. Although community sites may report against the same indicators, no two programs are exactly alike. Data on program quality, participation, and program characteristics will enable evaluators to make generalizations and comparisons of

strategies and benefits. A larger database template, together with multiple options for data entry (online, spreadsheet, pencil-and-paper), will be needed to facilitate this more detailed level of analysis. Multi-state evaluation requires a more extensive data base than routine reporting systems.

- **Informed Consent**. Systematic data collection will also require parent consent for youth responses and/or staff and volunteer consent for adult estimates of youth growth. Mandate teams can facilitate state participation by developing simple consent forms and IRB proposals for state teams to adapt for their own use. Although procedures vary somewhat from state to state, parent consent is generally a priority for evaluation and presentation of results to larger public audiences.
- **Marketing**. In addition to promoting results of their own efforts, mission mandate teams can complement CSREES specialized reports such as Science and Education Impacts**.**
- **Curricula**. Many indicators listed in this report correlate with objectives in 4-H juried curricula and completion of lessons can provide evidence for subject matter or life skills learning. Review of relevant curricula may suggest additional indicators. Standard measures of progress at present include self- or leader-reported knowledge gain, record book or presentation judging. More rigorous assessment, as well as more creative formats for evaluation, will be needed to match standards of Federal (e.g., SAMHSA, 21st Century, JEP) prevention programs.
- **Training**. The success of multi-state projects will depend on training and support for staff at all levels in the program development process. However, consensus on outcome and program indicators should increase training focus and effectiveness. Training and mentoring in evaluation skills for multi-state mandates may do much to improve 4-H Professional Research and Knowledge Competencies overall. Training for volunteers will also be critical to gain reliable data and maintain best practices.
- **Partnerships**. Mission mandates should provide unprecedented opportunities to collaborate with CSREES partners including cross-disciplinary colleagues, university faculty, and experiment stations. Mission mandate teams can also collaborate productively with a variety of public and private organizations such as federal and state agencies, the National Governors Association, National Science Foundation, Centers for Disease Control, and other youth-serving organizations, such as America's Promise. Opportunities to share human and capital resources will maximize organizational capacity and foster organizational change.
- **Research**. Multi-state evaluations will *answer* many questions about 4-H outcomes and program quality. Yet these high-impact improvements in programming and reporting will also stimulate more in-depth questions about child development, program effectiveness, cost-benefit, and evaluation methods. Evaluation attests to the worth of programming. Research examines critical questions beyond program effectiveness to better understand the issues and dynamics within programs. For example, evaluation may find that some children increase social skills in camp or club settings and follow-up research might seek to explore which youth benefit most or what group dynamics promote skill learning. Increased use of theory-based designs will improve the effectiveness of both evaluation and research (Mulroy & Kraimer-Rickaby, 2006).

- **Organizational Capacity**. Multi-state projects require systemic changes in organizational infrastructure, management, communication, and support beyond the incremental improvements recommended for programming components. Criteria and metrics for these changes are evident in the CSREES Strategic Plan and the GAO National Indicators project. Recent work by the Edna McConnell Clark Foundation (2007) provides a useful Guide to Assessing Organizational Capacity in youth development.

Organizational Challenges

Mission mandate teams will face several challenges in developing and evaluating programs. Among the most significant are: 1) maintaining a core mission within innovative programs and partnerships; 2) integrating evaluation with experiential learning; 3) engaging families and communities in support of a youth-focused mission; and 4) using innovation to promote system-wide improvement. Mandate teams will succeed in meeting these challenges if they develop metrics to monitor their own development and effectiveness. Consensus on shared indicators for youth outcomes represents the beginning of an organizational change process, not an end in itself.

Benefits of Shared Indicators and Multi-state Projects

Consensus on outcome indicators across diverse programs could produce several benefits: 1) greater focus in program planning, as collaborators "begin with [a shared] end in mind;" 2) greater richness in program development, as a variety of strategies are logically linked to a shared outcome; at the same time, 3) greater continuity in curriculum and training as they are aimed toward shared outcomes; 4) opportunities to compare delivery methods for specific audiences; and 5) more clear and powerful evidence for 4-H program impact as all efforts contribute to a single, larger impact statement.

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APPENDIX:
POTENTIAL MEASURES FOR MISSION MANDATE INDICATORS

Science, Engineering, and Technology (SET)

Short-term Indicators (dot) and Measures (slash)

- Number of individuals increasing participation in science and technology-specific clubs
  /club participation records
- Number of individuals increasing knowledge and/or skills in content and careers (across subject areas ranging from animal science to technology)
  /4-H curricula self-report survey (curriculum) with volunteer leader validation
  /4-H presentation/demonstration/skill-a-thon contests; rubric judging
- Number of individuals increasing positive attitude and/or aspirations about SET learning and careers
  /SET learning, careers survey; record book portfolio and journal
- Number of individuals increasing science process skills, such as mastery of basic skills (observation, comparison, hypothesis), use of the scientific method, or systematic problem solving
  /basic literacy: observation-comparison-hypothesis mastery; rubric judging
  /problem solving knowledge→ application (levels of expertise rubric judging matched to developmental level on short-term event[s])

Mid-term Indicators (dot) and Measures (slash)

- Number of individuals demonstrating improved behavior in science learning, such as effective participation in school classes, independent study, career exploration, or volunteer experiences
  /self-report or adult survey of experiences; portfolio with rubric judging
- Number of individuals applying science process skills, including incorporation of science learning in community service, and/or entrepreneurship/career success
  /application examples in science project portfolio with rubric judging matched to developmental level; periodic interview judging; high-level contest judging
  /problem solving examples in long-term science project portfolio with rubric judging matched to developmental level
  /survey, interview, or portfolio documenting engagement in mentoring or training of others in SET skills (certification; hours, participants, content breadth)
  /survey documenting enrollment in SET-related secondary or post-secondary advanced project or academic program
  /self-report or adult survey of experiences; portfolio with rubric judging

Long-term Indicators (dot) and Measures (slash)

- Number of individuals who enroll in SET-related post-secondary education, enter SET-related career fields, demonstrate entrepreneurship/career success in a SET field, or attribute 4-H SET involvement to success in education or career
  /survey documenting enrollment in SET-related secondary or post-secondary education, career success, or views of 4-H role in education or career
- Number of individuals who sustain 4-H SET involvement as volunteer leaders, community or corporate SET decision-makers, and/or adult sponsors of 4-H SET activities
  /survey of former 4-H SET participants

Citizenship

Short-term Indicators (dot) and Measures (slash)

- Number of hours in civic involvement
  /service log, portfolio
- Number of hours in community service
  /service log, portfolio
- Number of individuals increasing knowledge and/or skills in civic education, including the elections process
  /4-H curricula and other sources for self-report survey, with volunteer leader validation
- Number of individuals reporting positive attitude change related to volunteerism
  /survey, journal, or record book indicating change
- Number of individuals reporting positive attitude change and/or aspiration related to volunteering for civic activities, community service, and/or philanthropy
  /community service attitude survey
- Number of individuals indicating knowledge and/or skills learned related to leadership
  /leadership survey
  /community service or leadership journal or record book; rubric judging
- Number of individuals reporting positive attitude change and/or aspirations related to leadership
  /leadership attitudes survey
- Number of individuals indicating knowledge and/or skills gained related to effective youth-adult partnerships
- Number of individuals indicating positive attitude change and/or aspirations related to participate in youth-adult partnerships
  /youth-adult partnership survey

Mid-term Indicators (dot) and Measures (slash)

- Number of individuals engaged in the political/governance process, including registering to vote, attending meetings or governmental or civic organizations, presenting to civic boards, writing to elected or civil service officials, meeting with legislators, seeking office in a club or school, publishing letter(s) to the editor, or participating in the election process
  /survey or portfolio documenting 4-H and non-4-H engagement in governance, citizenship activities
- Number of individuals increasing volunteering roles
  /survey or portfolio documenting 4-H and non-4-H volunteer roles
- Number of individuals engaged in youth-adult partnerships, such as serving on a policy-making and/or advocacy board
  /survey or portfolio documenting youth-adult partnership involvement

Long-term Indicators (dot) and Measures (slash)

- Number of individuals who enroll in a public service related post-secondary education discipline, enter public-service-related career fields, demonstrate career success in a public service field, or attribute 4-H citizenship involvement to success in education or career
  /survey documenting enrollment in citizenship-related secondary or post-secondary education, career success, or views of 4-H role in education or career
- Number of individuals who continue civic engagement as adults, including voting, working in the elections process, community or corporate service, and youth-adult partnership boards
  /survey of former 4-H citizenship participants
- Number of individuals who serve as volunteer leaders, community or corporate advocates for citizenship, and/or adult sponsors of 4-H citizenship activities
  /survey of former 4-H citizenship participants

Healthy Living

Short-term Indicators (dot) and Measures (slash)

- Number of individuals increasing knowledge of and/or skills in selecting healthy foods, including understanding food labels, personal dietary habits, portion sizes, preparation of foods with reduced fat and/or calories
  /health habits survey, checklist, or portfolio
- Number of individuals improving attitudes toward and/or aspirations to improve nutritional habits such as eating healthy foods, decreasing sugar-sweetened beverages
  /eating habits survey
- Number of individuals increasing knowledge of and/or skills in physical activity and reducing risk behaviors such as excessive screen time
  /health habits survey, checklist, or portfolio

- Number of individuals improving attitudes toward and/or aspirations to improve physical activity habits and reduce risk behaviors
  /health habits survey, checklist, or portfolio
- Number of individuals increasing knowledge of and/or skills in practicing healthy habits, including adequate sleep, personal hygiene, dental care
  /health habits survey, checklist, or portfolio
- Number of individuals improving attitudes toward and/or aspirations to improve health habits related to sleep, hygiene, dental care
  /health habits survey
- Number of individuals increasing knowledge and/or skills related to safety, including ATV, bike, hunter, and water sports
  /safety survey or demonstration; certification
- Number of individuals increasing stress coping skills
  /survey of stress coping skills; behavior checklist completed by teacher
- Number of individuals increasing refusal skills related to substance abuse and violence
  /survey or demonstration of refusal skills
- Number of individuals increasing knowledge of personal and community resources for mental health including where to seek help when facing depression, anxiety, suicidal thoughts, violence, addiction, or eating disorders
  /behavior change survey; community resources survey

Mid-term Indicators (dot) and Measures (slash)

- Number of individuals maintaining positive nutrition habits (identified via short-term indicators), with positive consequences such as weight control, reduction in health-related problems
  /nutrition habits checklist; portfolio of eating habits and outcomes
- Number of individuals maintaining physical activity habits (identified via short-term indicators), with positive consequences as noted above
  /physical activity survey; portfolio of activities and consequences
- Number of individuals maintaining safety practices (identified via short-term indicators) and decreasing injuries in targeted activities
  /safety survey or certification
- Number of individuals maintaining positive health habits (identified via short-term indicators) and decreasing risk behaviors
  /youth risk survey; portfolio of activities and life changes

Long-term Indicators (dot) and Measures (slash)

- Number of individuals who enroll in health-related post-secondary education, enter health-related career fields, demonstrate entrepreneurship/career success in a health field, or attribute 4-H HL involvement to success in education or career
  /survey documenting enrollment in health-related secondary or post-secondary education, career success, or views of 4-H role in education or career

- Number of individuals who maintain healthy lifestyles into adulthood, including good nutrition, weight control, regular exercise, good mental health habits, safety habits, and risk avoidance
  /survey of former 4-H HL participants
- Number of individuals who sustain involvement with youth health programs as volunteer leaders, community or corporate decision-makers, and/or adult sponsors of 4-H HL activities
  /survey of former 4-H HL participants

Life Skills

Short-term Indicators (dot) and Measures (slash)

Communication

- Number of individuals increasing skills in public speaking
  /public speaking contest or portfolio of opportunities with rubric judging
- Number of individuals increasing skills in record-keeping
  /rubric judging of 4-H project portfolio
- Number of individuals increasing skills in interpersonal communication
  /leader checklist or interview

Goal-setting

- Number of individuals increasing skills in setting and completing goals on a project
  /rubric judging of long-term 4-H project portfolio; interview judging of cumulative accomplishments

Critical thinking, Problem solving, Inquiry skills

- Number of individuals increasing skills in reasoning on a project
  /rubric judging of portfolio demonstrating problem-solving skills

Self-efficacy

- Number of individuals increasing self-efficacy
  /self-efficacy survey; leader interviews

Teamwork

- Number of individuals increasing skills as a team
  /leader checklist; portfolios

Long-term Indicators (dot) and Measures (slash)

Communication

- Number of individuals applying public speaking skills in another setting
  /cumulative portfolio
- Number of individuals applying writing skills to a more complex task
  /cumulative portfolio or project summary

- Number of individuals demonstrating competence in communicating as a leader
  /adult and peer observation rubric; interview judging of leader skills

Goal-setting

- Number of individuals applying skills to a self-directed or community leadership project or teaching skills to others
  /cumulative portfolio or project summary

Critical thinking, Problem solving, Inquiry skills

- Number of individuals applying skills to a self-directed or group leadership project or teaching skills to others
  /cumulative portfolio or project summary
  /observation rubric on leading or teaching activities

Self-efficacy

- Number of individuals who attribute their confidence in a career or community service task to 4-H
  /alumni survey

Teamwork

- Number of individuals applying skills as a team leader
  /observation rubric or cumulative portfolio rubric