

Down East Partnership for Children:
A Systems Approach to Improving Community Health

by
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Abstract

Improving community health is a highly complex endeavor that requires extensive analysis of and effective response to a wide array of factors. Utilizing a systems approach to improve community health is the most effective way to respond to these factors and lays a strong foundation for sustaining community health improvement.

The Down East Partnership for Children (DEPC) in Rocky Mount, NC provides a model for delivering an assets-driven, evidence-based and community-centered systems approach to addressing health challenges faced by children and their families. This report provides an overview of the systems approach, an analysis of DEPC's systems based approach to community health improvement, an analysis of why this model has proven successful, and recommendations for moving forward.

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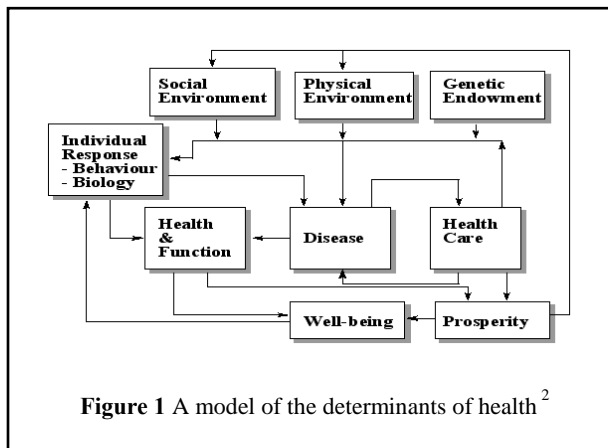
I share the credit of my work with DEPC's strategic planning committee. Taking part in the committee's work to develop and promote the mission and vision for the various health-promoting components, groups, and policies at the Partnership guided my understanding of how to practically apply the systems approach to improving community health. Committee members Pat Allen, Alice Thorp, Angela Nieves, Emily Bell, Jamie Wilson, Jason Rochelle, Melissa Lowry, Patrick Curry, and Wendy Price provided valuable information needed to develop the DEPC Menu of Health Promotion Services, understand program design and evaluation, effectively describe community contexts, and understand the steps necessary to sustain success in the future. This paper would not have been possible without their participation on this committee, and I consider it an honor to have worked with them.

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I. Introduction

Improving community health is a highly complex endeavor that requires extensive analysis of and effective response to a wide array of factors. For both an individual and a community as a whole, health depends on access to health care, individual behavior, genetic makeup and social and economic conditions for individuals and communities.¹



The health field model (Figure 1) presents the dynamic nature of these multiple factors. Analyzing the relationships among these feed-back loops calls attention to the necessity to develop and apply intricate solutions to community health problems.

In addition to these varied influences on health, there is a diverse array of stakeholders who have a vested interest in improving health at the community level. These stakeholders come from a variety of public and private entities, health service organizations, non-profits, faith-based organizations, local families and justice agencies, to name a few. Many have a local base and focus, and each has varying degrees of expertise and subjects of interest. Engaging each of these voices, which is necessary for success, adds another layer of complexity to effectively improving community health.³

Though daunting, each of the pieces portrayed in the health field model must be analyzed, planned for, monitored, and evaluated in order to effect change. Utilizing a systems approach to improve community health brings order to these ever-changing

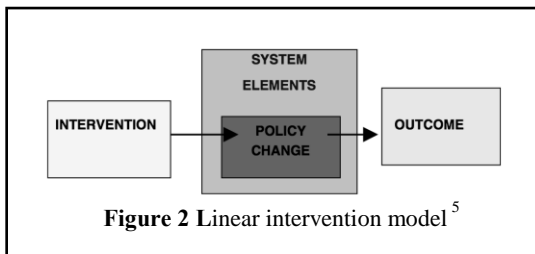
factors, contexts, stakeholders, and research findings in a way that lays a strong foundation for sustaining community health improvement.³

The Down East Partnership for Children (DEPC) in Rocky Mount, NC provides a model for delivering an assets-driven, evidence-based and community-centered systems approach to addressing health challenges faced by children and their families. Their model enables DEPC to effectively respond to complex political and social realities in the local community in a way that shows measurable, demonstrable impact on often underserved children and families.

This report provides an overview of the systems approach, an analysis of DEPC's systems based approach to community health improvement, an analysis of why this model has proven successful, and recommendations for moving forward.

II. Overview of the Systems Approach

Generally, program planners and researchers alike agree that reductionist approaches to improving community health are inadequate.⁴ Too often, health-promoting programs limit their scope to a set of pieced-together targeted interventions that apply to a specific health problem, making it more likely that important variables, people, and



needed linkages are going to be misinterpreted or left out entirely. Too often, these programs are guided by conceptual models that view the relationship between

programmatic interventions and outcomes as entirely predictable, uni-directional, and sequential, as portrayed in Figure 2.⁵ This is often an attractive option to groups working

to improve community health, as it is straightforward, simple, and easy to follow. It is not, however, likely to guide group members in planning and implementing an effective intervention that takes into account all relevant information.

Utilizing a systems approach contrasts greatly with this more limited view. In a systems approach, “concentration is on the analysis and design of the whole, as distinct from total focus on the components or the parts.”⁶ This approach views health problems in their entirety, taking into account all known facets, variables, parameters, potential limitations, needs, assets, contexts, and behaviors, even if these present themselves in contrast with one another. Figure 3 highlights the reality that most effective systems “contain a complex web of interdependent parts.”⁵ Program planners should utilize this proposed model of systems change in order to be effective. Leveraging change in one part must happen with concurrent shifts in the relational and compositional elements of that same system to be successful, logical and sustainable.⁵

This approach requires an interconnected, comprehensive, collaborative analysis and utilization of many stakeholders, tools and subsystems that are linked together by shared vision.

This provides complex, carefully planned solutions for real-world problems.⁶

III. Model Example: Health Initiative at Down East Partnership for Children

Down East Partnership for Children (DEPC) of Nash and Edgecombe Counties is a non-profit organization located in Rocky Mount, North Carolina. DEPC is committed to

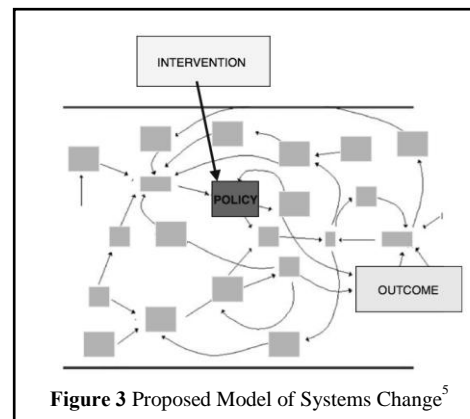


Figure 3 Proposed Model of Systems Change⁵

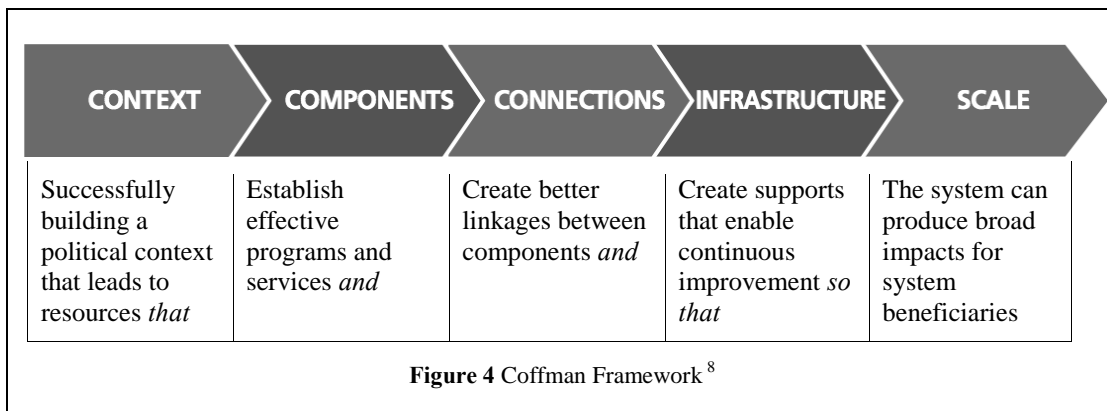
launching every child as a healthy, lifelong learner by the end of the third grade. Its mission is to build a strong foundation for children and families by advocating and supporting both high quality early care and education and a coordinated system of community resources. Since it was incorporated in 1993, DEPC has worked to achieve this mission by building a community system that supports the unique needs of each child and family in an effort to make sure all children have the experiences they need to thrive, grow, and learn.⁷

Since 1993, DEPC has continuously expanded its system of supportive programming, evaluation, and community leadership development. These expansions provided an opportunity to increase attention to research and assessments of community needs. The role of early childhood health in predicting later success and wellbeing became apparent throughout this process. The findings were clear - healthy children are more successful learners. Additionally, it became obvious that local families desired to live healthier lives, but did not feel that they had adequate access to healthy foods or places to be physically active. To achieve its mission, it was necessary for DEPC to incorporate more health-promoting evidence-informed and evidence-based programs, practices and policies into their system of supports.

The health problems faced by children in Nash and Edgecombe counties are not unlike those faced in other limited-resource communities throughout North Carolina. One-third of the 19,542 children age 0-8 in these counties are living in poverty. Rates of food insecurity among children are increasingly high and physical activity levels are inadequate for optimal health and growth. As a result, approximately one-third of these children are overweight or obese. Because health during childhood lays the groundwork

for a lifetime of well-being, a plan to accelerate effective, enduring systemic change that will support the health of young children living in this two-county region needed to be developed.

Improving community health is no small endeavor, even for regions with abundant funding and resources. As described above, improving community health is a highly complex task that requires extensive analysis of and effective response to a wide array of complex, ever-changing factors. How DEPC responds to these complexities sets it apart as an innovative game-changer in improving rural health. Utilizing a systems-promoting organizational framework adapted from Julia Coffman and The Build Initiative has enabled DEPC to effectively determine what actions are - or are not - essential to moving forward in reaching its mission. This framework focuses on five interconnected elements of a system that, when developed and advanced, produce a coordinated system of programs, policies, and services.⁸ (See Figure 4) How DEPC approaches these five elements - context, components, connections, infrastructure, and scale - is described below.



Building the Context

Initiatives focused on context attempt to change the political environment that surrounds and affects a system's development and ultimate success.⁸ (See Figure 5)

DEPC builds context by improving the local political environment so it produces the policy and financial resources needed to create and sustain progress in improving the health status of families in the region. Specific activities include educating families about the return on the ongoing investment in early education and health promotion, building the knowledge and skills of community leaders, and

engaging local political leaders in fundraising and advocacy efforts. This leads to increased issue awareness, public engagement and mobilization, and demand for change at the policy level by community members. DEPC, as a result, facilitates the sustainable efforts of a critical mass of leaders working toward a commonly shared vision.

CONTEXT
Activities: Improving the political context that surrounds the system so it produces the policy and funding changes needed to create and sustain it
Outcomes: <ul style="list-style-type: none">•Recognition of system need•Shared vision•Leadership•Public engagement•Media coverage•Public will•Political will•Policy changes

Figure 5 Building the Context

Establishing Effective Components

Initiatives focused on components concentrate on putting in place high-quality and high-performance programs, services, or interventions for the system's intended beneficiaries.⁸ (See Figure 6) DEPC establishes effective components by making strategic investments in evidence-based and evidence-informed programs and services that promote health among community members. This requires balancing expert knowledge of what has already been validated with community members' descriptions of

what they want to see implemented. Making the strategic decision to only do things internally when there is not someone else to do it at the same level elsewhere in the community, ensures that limited resources are used wisely.

Data shows that over half of children five and under in NC have one or both parents in the workforce. This makes it necessary to promote health in child care centers,

COMPONENTS
<p>Activities: Establishing high-performance programs and services within the system that produce results for system beneficiaries</p>
<p>Outcomes:</p> <ul style="list-style-type: none"> •New system programs or services •Expanded program reach or coverage •Improved program quality •Increased operational efficiency •Beneficiary outcomes that precede impacts

Figure 6 Establishing Effective Components

where many of these children are receiving early care. Shape NC, a program developed through a partnership between Blue Cross and Blue Shield of North Carolina Foundation and the North Carolina Partnership for Children, is one example of an effective program component housed in DEPC that responds to this reality. This component builds upon the success of existing programs by bringing together three evidence-based strategies to reduce

childhood obesity: improving nutrition and physical activity policies and practices in child care, increasing active play by creating outdoor learning environments for children attending child care centers, and utilizing existing programs to increase healthy physical activity. This leads to an increase in trained early childhood professionals, creation of engaging outdoor learning environments, and more children participating in daily physical activity and consuming healthy meals and snacks on a daily basis.

Creating Connections

System initiatives that concentrate on connections focus on what makes a system a system - the integration, linkages, and alignment between its parts.⁸

(See Figure 7) DEPC operates under the assumption that creating strong and effective linkages across system components is necessary to further improve results for families in Nash and Edgecombe counties. Without these linkages it is difficult to get the critical mass of people necessary to effect change. Resources and personnel are not likely to be distributed as efficiently as possible (a necessity in any resource-limited area) and it is

CONNECTIONS
<p>Activities: Creating strong and effective linkages across system components that further improve results for system beneficiaries</p>
<p>Outcomes:</p> <ul style="list-style-type: none"> •Shared goals •MOUs across systems •Shared standards •Cross-system training •Shared competencies or skills standards •Shared data systems •Referrals/follow ups •Seamless services

Figure 7 Creating Connections

more difficult to move forward at a rate fast enough for people in the community to see that change is possible. At DEPC, the Healthy Kids Collaborative (HKC) facilitates these needed connections by bringing together stakeholders in the two counties who have the influence and authority to promote and sustain a commonly shared long-term vision and mission of preventing childhood obesity by improving the nutrition and physical activity habits

of young children. This increases communication among community leaders, leads to sharing of resources and personnel, and prevents “recreating the wheel” and duplicating services.

The purpose of the HKC is threefold: help individual organizations and agencies in the two counties identify and implement small shifts that influence the desired impact; connect organizations and agencies to achieve greater impact by working together; and launch and support new initiatives requiring multiple partners for success. Additionally, the HKC has identified six enabling conditions that facilitate discussion among these connected stakeholders: parents/guardians must value nutrition and physical

activity; child care providers must offer healthy food and options for physical activity; medical providers must talk about the importance of a healthy diet and physical activity; families must be able to conveniently access safe and affordable places designed for age-appropriate physical activity; healthy food must be both affordable and accessible; and the entire community must value physical activity and healthy eating habits. HKC has been purposeful in bringing people together and facilitating discussions about these principles - not providing it. This promotes transformational leadership among local community members that is sustained and expanded well beyond the walls of DEPC and drives the community toward a greater impact than one organization could have achieved on its own.

Developing Infrastructure

Initiatives focused on infrastructure make changes that facilitate a system’s development and functioning, ensuring that systems have the supports they need to function effectively and with quality.⁸ (See Figure 8)

DEPC develops infrastructure in the region by providing community leaders and local organizations with needed supports, which include organization, program and leadership development, sharing data, community engagement and planning, and resource development. Every time a community member or organization is moved forward by a combination of these supports provided by DEPC, they develop the skills and qualities necessary to be a force for

INFRASTRUCTURE
<p>Activities: Developing the supports systems need to function effectively and with quality</p>
<p>Outcomes:</p> <ul style="list-style-type: none"> •Cross-system governance •Less categorical and more flexible funding •Leveraged use of funding •Mechanisms for two-way communication •System-wide use of data •Practitioner supports

Figure 8 Developing Infrastructure

change. This creates an environment in which cross-system communication is maximized among leaders working in and outside of DEPC, funding is leveraged in an efficient and cost-effective manner, and research and data is understood and applied system-wide.

DEPC's strong relationship with faith-based partners highlights its ability to utilize existing community resources and assets to develop the local infrastructure. The HKC facilitates childcare, policy, food, and medical subgroups to guide its health promotion work, and collaborates with faith-based partners in each of these. Through this process, the HKC is able to provide a supply of health information, resources, and technical assistance that is accurate and evidence-based to churches throughout the region. It also provides a pathway for churches to communicate with DEPC about what work they are currently doing and the ways in which they desire additional support. As a result of this two-way communication and infrastructure building, church-goers and their local neighborhoods have reaped the health benefits of cooking and nutrition classes, healthy food policies, physical activity programs, exercise equipment, and improved playground facilities.

Developing Scale

Initiatives focused on scale ensure that a comprehensive and quality system is available to as many of its intended beneficiaries as possible.⁸ (See Figure 9) To ensure this, DEPC dedicates personnel to researching, monitoring, and evaluating the social and political context in the region and the impacts of each of its program components, connections, and infrastructure building activities. This enables DEPC to make strategic decisions on how best to build on the strengths of the region, determine what is effective at developing a universal acceptance of DEPC's mission and vision, and ensure sufficient

and evidence-based planning, design, and dosage. When each of these factors is accounted for, DEPC is able to develop a model that is relevant and accessible to every family in the community. It also enables DEPC to plan for the future and determine where additional supports are needed, whether there should be future shifts in who takes

ownership of certain initiatives, and what lessons should be learned from the past.

SCALE
Activities: Ensuring a comprehensive system is available to as many people as possible so it produces broad and inclusive results for
Outcomes: <ul style="list-style-type: none"> •System spread •System depth •System sustainability •Shifts in system ownership •Beneficiary outcomes that precede impacts

Other examples of services provided by

DEPC Health Initiative are described in Figure 10, organized by each level of Coffman’s framework.

DEPC program planners, through biweekly strategic planning meetings and a cooperative analysis of each

level of the framework, determine where each

subsystem and program piece fit into this framework. This allows them to continuously determine what gaps may exist in system supports and what services will be necessary to continue to support the health of children and families living in Nash and Edgecombe counties.

Figure 9 Developing Scale

Figure 10 Down East Partnership for Children Menu of Health Promotion Services

CONTEXT	COMPONENTS	CONNECTIONS	INFRASTRUCTURE	SCALE
<ul style="list-style-type: none"> •Identify and expand accessibility to fresh produce for families •Develop/ implement plan for healthy food options at corner grocery stores •Communicate with planners and government officials •Implement pilot programs at doctors' offices •Implement social marketing campaign •Establish two farmers market sites and share results with providers and consumers •Establish community garden in Discovery Park as exemplar model •Support joint use of school property by community members after-hours 	<ul style="list-style-type: none"> •Provide technical assistance to child care facilities related to establishing healthy eating practices and physical activity •Technical assistance for child care centers receiving food program subsidies •Provide nutrition education courses through EFNEP and Let's Move programs •Implement Let's Move checklist at local childcare centers •Technical assistance for education providers developing outdoor learning environments •Support family needs at doctors' offices through professional development for doctors, Reach Out and Read, and BMI assessments •Offer health related materials and resources 	<ul style="list-style-type: none"> •Serve on Parks and Rec planning committees in two-county region •Facilitate HKC subgroups •Identify additional sites for Farmers Market Nutrition Program WIC Vouchers •Connect school personnel and county facilities leaders to legal support to create joint use agreements •Connect external service providers with resources at health departments •Facilitate establishment of park watch groups •Connect providers with NAPSACC and Be Active Kids 	<ul style="list-style-type: none"> •General technical assistance and leadership development for Community Fellows •Program development and strategic planning •Promoting Discovery Park as a model outdoor learning environment •Professional development for health professionals, childcare providers, and educators •Secure funding to make park improvements throughout two-county region •Build human capacity through leadership trainings •Establish procedures for park maintenance 	<ul style="list-style-type: none"> •Allow community members access to programming, professional development opportunities, and events •Remove barriers to accessing opportunities for physical activity and health nutrition to attract as many people as possible •Prioritize funding to open up existing playgrounds, rather than build new ones •Shift ownership over various health initiatives to community leaders to increase sustainability and scale

IV. Why it Works

This system has been purposefully built to create an alliance among people and organizations from many sectors, both public and private, that includes local health providers, business owners, families, school leaders, educators, and government employees. These stakeholders work together to achieve DEPC's mission by improving the local political context, establishing high-performance programs and services, creating strong and effective linkages across all system components, developing supportive infrastructure and ensuring that this comprehensive system is available to as many families in Nash and Edgecombe counties as possible.⁸

By using both top-down (i.e. political advocacy led by legal experts) and bottom-up (i.e. grass-roots community organizing by local families) features, DEPC creates and sustains conditions that promote and maintain support for widespread health and well-being among families throughout this two-county region.⁹ This approach enables DEPC to achieve goals that could not be reached by any one individual or group working alone and ensures a diverse representation of expertise in program planning and implementation.⁹ The following strategies have been identified by DEPC program planners as key to the initiative's success, and are transferable to other organizations desiring to strategically develop and implement a systems approach to community health improvement.

1. Utilize a broad definition of health and a comprehensive conceptual model of how health is produced within the community. DEPC's view of health encompasses social, emotional, behavioral, and physical health, with an understanding that attention to all levels of the socio-ecological model is necessary, including individual, interpersonal, and environmental factors.³ (See Figure 11)

2. Develop a shared vision and mission among all subsystems and stakeholder groups involved in the system.

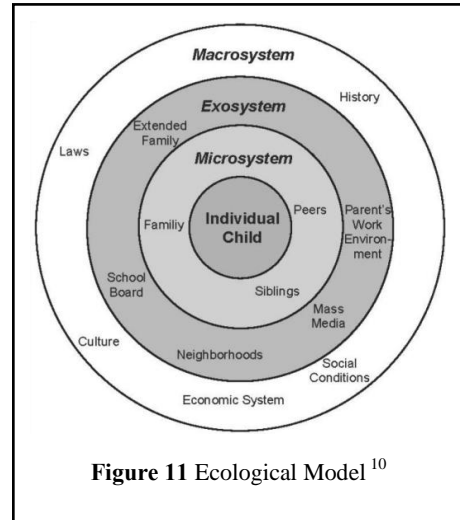
3. Facilitate collaboration across disciplines, sectors and organizations, to make sure everyone is at the table.

4. Focus all planning toward end goals, ensuring there is a driver and motivator for all stakeholder groups and leading to improved ability to respond to changes in the context or funding.

5. Provide only evidence-based practice and programming, with no stand-alone initiatives.

6. Dedicate personnel to research, monitoring and evaluation.

7. Bring people together and facilitate discussion, instead of leading it. By encouraging community members and stakeholders to drive the conversations, transformational leadership is developed and changes are more likely to be sustained beyond the scope of DEPC's ability.



8. Focus attention to all levels of a system. Coffman's framework describing context, components, connections, infrastructure, scale is one example.⁸ Other frameworks have similar aims and can be utilized by other organizations seeking to develop a systems initiative.

V. Community Impact

Using this approach, DEPC is beginning to see population-level change and a shift in context around the community. Since 2008, the Healthy Kids Collaborative has grown from four to 55 members, ten faith-based partners have adopted healthy food policies and/or hosted cooking classes and half of community partners have utilized information on childhood obesity to implement new strategies. In addition, 22 childcare providers have implemented physical activity and nutrition policies and practices. 86% of childcare centers participating in the Nutrition and Physical Activity Self Assessment for Child Care program (NAPSACC) demonstrated improvement in nutrition and physical activity practices, and families attending physical education, nutrition education, and Days of Play demonstrate increased knowledge of and desire to adopt healthier practices. The number of local farmers' markets has increased to seven, and both health departments in Nash and Edgecombe County are motivated to increase the redemption rate of their WIC Farmers Market Nutrition Program vouchers.

VI. Moving Forward

The broad aim of DEPC's Health Initiative is to improve population-level health outcomes for children and families living in Nash and Edgecombe counties. Measuring the initiative's contribution to these more distal health outcomes, like developing and

implementing a systems-based approach to community health improvement, is difficult and complex for several reasons. First, visible changes in health outcomes for the target population may not be detectable for as many as 10 years.⁹ Changes in health disparities and inequities associated with race or income may even take generations to achieve. Second, there is an absence of accurate, sensitive indicators for many community health problems that are relevant to the target population of DEPC. This makes it difficult to develop an adequate evaluation plan that directly connects the evidence-based practices and policies of the DEPC Health Initiative to changes in population-level childhood obesity rates, for example.⁹ The paucity of indicators is an expected reality when confronting community health challenges with a systems approach, rather than the linear version described previously.

Though connecting the DEPC Health Initiative directly to population-level changes may not be immediately feasible, studies have shown that using collaborative partnerships, such as DEPC, is an effective way to change community-wide behavior, due to their existing multi-component, collaborative approach to establishing and maintaining behaviors in the local environment.⁹ These behavior changes occur sooner than changes in population health outcomes, and are more accurately and appropriately measured through indicators of self-reported habits and direct observation. Increased monitoring of local behavior change, rather than population-level outcomes, should be prioritized.

It is clear that DEPC Health Initiative is positively influencing the lives of children and families in Nash and Edgecombe counties. To make an even greater impact, it is necessary to further build the system and increase the number of people in the target

population reaping the benefits of DEPC system supports. Demonstrating measurable, quantitative and qualitative evidence that the programs and policies of DEPC Health Initiative are directly influencing health behavior across the region will lead to increased attention by funders, community leaders, and influential agents of change throughout the state.

Expanding this evidence-base will require a deeper, rigorous analysis of how DEPC is directly responsible for changes in health behaviors, proving that their programs and policies are working to bring about desired health outcomes. An impact evaluation, developed and implemented internally or by an outside academic institution, is one option for demonstrating this causality. Considering the current infrastructure of DEPC, a study design assessing a “dosage response,” of place-based DEPC activities in one designated area in the two-county region is particularly feasible.⁹ The logic of a placed-based intervention is that “a higher dose of environmental change in a particular location will increase its effects”⁹ for those who live or work in that setting. Providing all or most of available DEPC Health Initiative system services to a smaller, highly targeted population, with assessments of health behavior before and after the onset of interventions, combined with increased community collaboration and assistance in that same geographic area, will provide a more accurate portrayal of the causal impact of the DEPC Health Initiative on community health.

VII. Conclusion

Improving health at the community level requires analysis of and response to a wide array of health factors, community contexts, and diverse stakeholders. Utilizing a

systems approach is necessary to adequately respond to each of these complexities in a way that will effectively implement necessary interventions and engage influential leaders across various domains and sectors.

The Down East Partnership for Children provides a model for implementing a systems approach to improving community health that is assets-driven, evidence-based and community-centered. Analyzing why this system is successful and developing plans for future research endeavors make it possible for replication to occur in other community collaboratives across the state.

VIII. References

1. Institute of Medicine. *Improving Health in the Community: A Role for Performance Monitoring*. Washington, DC: National Academy Press; 1997:2.
2. Evans RG, Stoddart GL. Producing Health, Consuming Health Care. *Social Science and Medicine*. 1990; 31:1347-1363.
3. Swanson C, Cattaneo A. Rethinking health systems strengthening: key systems thinking tools and strategies for transformational change. *Healthy Policy and Planning*. 2012; iv54-iv61.
http://heapol.oxfordjournals.org/content/27/suppl_4/iv54.short. Accessed November 3, 2012.
4. Foster-Fishman P, Nowell B. Putting the system back into systems change: a framework for understanding and changing organizational and community systems. *Am J Community Psychology*. 2007; 39:197-215.

5. Ramo S, St. Clair R. The Systems Approach: Fresh Solutions to Complex Problems Through Combining Science and Practical Common Sense.
<http://www.incose.org/productspubs/doc/systemsapproach.pdf>. Accessed November 3, 2012.
6. The Down East Partnership for Children: Improving the Education and Health of Children in Nash and Edgecombe Counties. www.depc.org. Accessed November 3, 2012.
7. Coffman J. A Framework For Evaluating Systems Initiatives. The Build Initiative. www.buildinitiative.org/files/BuildInitiativefullreport.pdf. Accessed November 3, 2012.
8. Roussos S, Fawcett S. A Review of Collaborative Partnerships as a Strategy for Improving Community Health. *Annual Review of Public Health*. 2000; 21:369-402.
9. Bronfenbrenner, U. *The ecology of human development: Experiments by nature and design*. Cambridge, MA: Harvard University Press; 1979.
10. Trochim W, Cabrera D. Practical Challenges of Systems Thinking and Modeling in Public Health. *American Journal of Public Health*. 2006; 96:538-544.
11. Laverack G. Improving Health Outcomes through Community Empowerment: A Review of the Literature. *J Health Popul Nutr*. 2006; 24(1):113-120.