REFLECTING ON THE DEVELOPMENT OF A LOGIC MODEL FOR AN 'EARLY YEARS' PROGRAM TO REDUCE HEALTH INEQUALITIES IN NHS LANARKSHIRE, SCOTLAND[1]

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Abstract

A simple logic model was developed as a planning and evaluation tool for a program to reduce health inequalities in NHS Lanarkshire in Scotland. The logic model developed was a comprehensive and graphic way to identify the relationships among the resources available to operate the program, plan activities, and identify the changes or results hoped to achieve in the short, medium and long terms. This paper presents the purpose and functions of the logic model, the planning and development of the logic model and reflects on the usefulness of the process in team building, partnership working and communication within the 'early years' team. Limitations perceived included the speed of implementation in practice, the number of ongoing activities, the format of the logic model and the changing priorities for resources.

Keywords: *logic modelling, logic model benefits, logic model limitations, evaluation tool*

[1] UWS/NHS Lanarkshire collaboration.

1. Introduction

Health inequalities exist across the world and are often closely linked with degrees of social disadvantage. The fundamental drivers of health and health inequity relate to where people are born, grow, live, work and where they age [10,19]. This exists both between and within countries and leads to premature death and people living restricted lives [2,19,20]. In Scotland, health inequalities remain a major challenge with every generation, past and present, having experienced poverty and inequalities [7,11,13]. Scotland has now set a clear challenge to reduce poverty, and social and health inequalities across Scotland. The key theme is to tackle and reduce inequalities to ensure that every child and young person has equal access to opportunities and health improvements [11,12,13]. This is supported by a series of national guidelines and policy drivers to focus the development of relevant 'early years' services [14-18]. In October 2012, NHS Lanarkshire, in collaboration with the University of the West of Scotland, launched an innovative program to address health inequalities in the 'early years'. This has been the most challenging and ambitious approach in the redesign of service provision across Lanarkshire. The magnitude of the approach was recognized by the team who anticipated a long-term commitment to changes in behavior and outcomes.

The program team developed a simple logic model as a planning tool to evaluate the effectiveness of the program. This paper presents an overview of the development of the logic model and reflects on the usefulness of the process in team building, partnership working and communication within the 'early years' team.

2. The Logic Model

The Logic Model is a tool that has been commonly used for several decades to clarify and describe the effectiveness of a program, project or initiative within an organization [1,5,8,9,21]. It is rooted within theories of change and is a relatively simple graphic plan reflecting how and why a program will work [1,4]. It is defined as being a systematic, and visual way to present and share understanding of the relationships among the resources available to operate a program, plan the activities, and the identify the changes or results hoped to achieve [1,5,8,9]. The visual step by step plan is often supported with additional narrative to provide further explanation of the components of the plan [1,4].

The logic model is often described as a road map showing the route travelled to reach a destination. At various points on the map, progress needs to be reviewed with adjustments made as necessary. In this respect the logic model is a flexible live tool. Most importantly, a logic model keeps participants moving in the same direction by providing a common language and point of reference. There are many types of logic models with versions used for different purposes with the most common formats being flow charts, maps, or tables. The different range of formats can be located on the NHS Scotland website [21]. NHS Scotland encourages regional health boards to construct logic models for major health outcome objectives to ensure that objectives contribute to the ultimate improvements in national Health Goals.

3. Functions of Logic Models

The logic model has three key functions including effective communication, clarification of logical connections, and the identification of performance measures [6]. The tool can be used effectively to systematically convey the often complicated relationships among services and other contributing factors. It is also a succinct way to keep all of the health services committed to the ultimate health status goals for the population [6]. The

graphics often used in logic models are useful for *reducing* an overwhelming volume of information down to relevant and critical 'bite-size' chunks of information necessary for a particular purpose [6]. Individuals in health using this model, keep focused on both their own immediate achievements and also the ultimate goals. In addition to communication, other key uses of the logic model reported include clarification, management, evaluation planning, the determination of evaluation questions, documentation, as well as problem solving [3-8].

Team working is enhanced through developing logic modeling [3]. Both program developers and program evaluators need to be engaged in the process with this effective team involvement having the outcome of promoting collaborative learning [3,6]. This learning evolves when team members are engaged in discussions about development of the model, respective meaningful definitions and coming together in a consensus about the building process of the model [3,6]. Timing is also important [3]. It has been argued that while early development of a logic model may be beneficial, further contribution is also important at any time, if it is relevant, well thought through and that all individuals involved understand the iterative nature of the logic modeling process [3,6]. The logic model should always be revisited and revised as program demands irrespective when the model was initially developed [3-8]. This ongoing revisiting the model pays specific attention to the fidelity of program implementation, progress toward goal achievement, and outcome assessment.

4. Planning Process

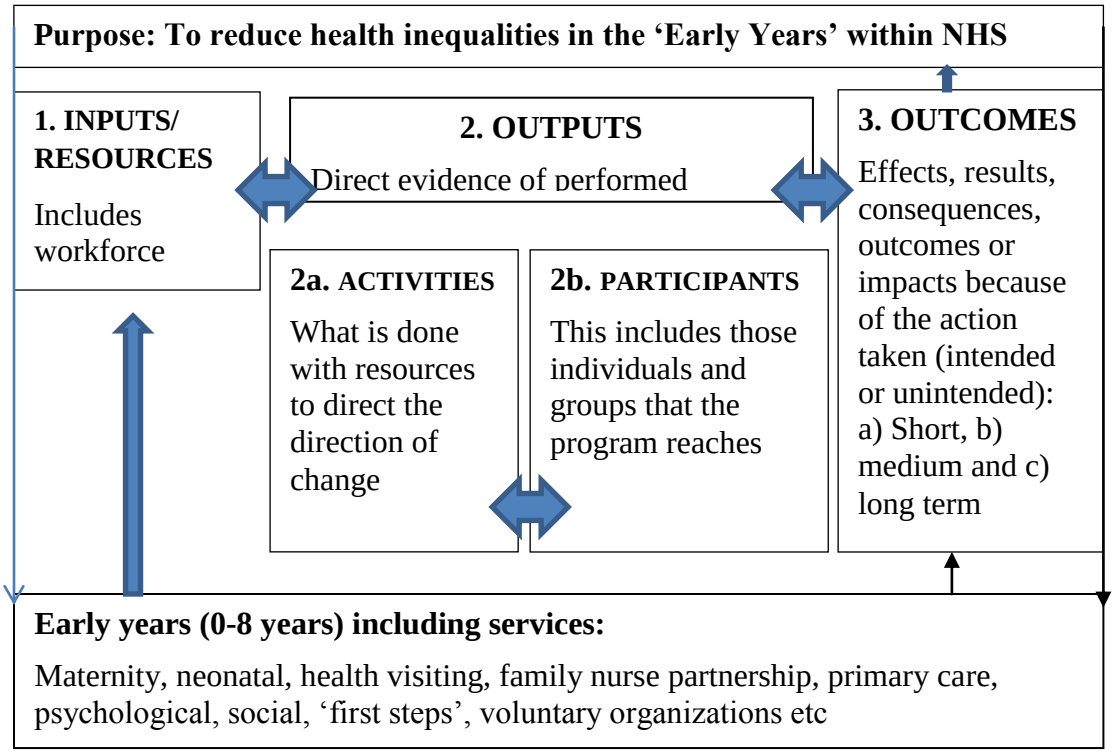
Initially the team had to spend time to determine the implications of meeting the aims of the program. This included the resources available, workforce issues to provide the redesigned services planned and overall an explicit understanding of the challenges ahead. This initial process helped the team to focus on the full scale of the program in hand as well as the component parts. Following initial training, the team proceeded to construct and develop a simple linear and graphic logic model. This process involved a series of meetings of discussion, commitment, and reflection with the tool revisited on a regular basis.

The basis of the logic model was to provide a succinct plan of activities, outcomes and evaluation for the program to reduce health inequalities in babies and children (0-8 years) in line with the guidance from the national 'early years' policies and guidelines [14-18]. One of the benefits of logic modeling is that it allowed the program team to question 'the logic' and to identify things that might go wrong. An impact assessment was also conducted on the final program with input from the NHS Lanarkshire Equality and Diversity Officer.

Assumptions and external factors were all carefully considered in the planning phase. This related to the following aspects - the program; the size, relevancy and significance of the problem; the availability, reliability and sustainability of the resources; the outcomes as whether they were realistic, measurable and achievable; and the potential risk factors occurring over the duration of the program for the short term goals and beyond for the medium and long term outcomes.

The basic elements of the logic model as a structured, framework for the evaluation adopted for this 'early years' program is presented in Figure 1. Reading the logic model from left to right provides the chain of reasoning and the connection amongst 1) inputs/resources, 2) activities/participants- outputs and 3) outcomes. Two alternatives include context and impact and relate to intended or unintended changes occurring at various levels.

Figure 1 Basic elements of the logic model used for the 'Early years' program



The following issues were addressed in the early planning stages.

- Clear identification of the scope of the program's influence and determine the current situation where the impact of the program was intended.
- Setting logical and related short, medium and long term outcomes reflecting the changes required at designated time periods by considering what the situation will look like when the desired situation or outcomes are achieved.
- Identification of the services and behaviors needed to change for the range of outcomes to be achieved.
- Identification and mapping of the knowledge or skills that people need before the services and behavior would change.
- Identification of the range of activities (minor to major) needed to be performed to cause the necessary learning and situational changes.
- Determining the resources required to achieve the desired outcome which also took account of the adequacy of resources available and what would be required to proceed as planned by the Organization.
- Ongoing review and validation of the logic model by the Program Steering group.

5. An Overview of Building this 'Early years' Logic Model

Reading left to right along 6 columns:

Column 1: Inputs → Activities → **Column 2 Outputs** → Participants → **Column 3 Outputs** → **Columns 4-6** Short, medium and long term outcomes

Inputs: this included everything invested in the program or will be brought to the program.

- Details of NHS Lanarkshire workforce, input from the university, primary care, local authorities, third sector (Voluntary).
- Funding streams though Best Possible Start, the Refreshed Framework for Maternity Services, Maternal and Infant Nutrition, Family Nurse Partnership etc.
- National strategies for maternity, health visiting and maternal and infant nutrition [14-18].
- Parenting strategy, Scottish Government targets for antenatal access to services and evidence based practice.

Outputs: Activities related to what the program does and who it reaches.

- Develop safe and effective person-centred universal and vulnerable families pathways from preconception to age 8 years.
- Implementation of the 27-30 month universal child health review [18].
- Implement GIRFEC practiced model appropriate clinical intervention / requests for assistance and notification of concern [17].
- Provision of tailored, accessible, and asset based support, information and advice to affect behavior changes.
- Implementation of the Family Nurse Partnership Programme.
- Expand and develop the First Steps Programme.
- Review and develop workforce knowledge, skills and capability*.
- Develop and implement appropriate IT and data collection systems to facilitate regular and systematic measurement of improvement and outcomes.
- Undertake research to further develop the midwifery/neonatal and public health nursing professions.

Outputs: Participants- Who do we reach?

- Women of child-bearing age / Pregnant women.
- Parents/carers of babies, infants and children.
- Children from 0-8 years.
- All health and key agency staff working in the early years.
- Communities / Employers / Third sector.
- 'Early Years' Programme Board.

**The programme has a particular focus on targeting hard to reach/high risk groups including those experiencing: Deprivation/Poverty, Substance Misuse, Obese Parents and Children, Mental Health issues, Domestic Abuse, Homeless, BME communities, Teenage Parents, Looked after Children.*

Figure 2 presents the three columns depicting the short term, medium term and long term outcomes of the 'Early Years' program.

Figure 2 'Early Years' Program Outcomes: short term, medium term and long term

Short term results: *(0-2 years)*	***Medium term results:*** *(2-5 years)*	**Long term results:** *(10+ years)*
Reduction in self-reported smoking during pregnancy	Reduction in self-reported smoking during pregnancy	Reduced maternal, infant and child morbidity and mortality
Reduction in self-reported alcohol consumption during pregnancy	Reduced harm to children from exposure to second hand smoke	Reduction in still births
Reduction in self-reported drug use during pregnancy	Reduction in self-reported alcohol consumption during pregnancy	Reduced inequalities** in maternal, infant and child health
Improved nutrition in pregnancy	Reduced harm to infants from maternal alcohol consumption	***Inequalities in physical, mental, and social health and wellbeing*
45% of babies are breastfed at birth	Reduction in self-reported drug use during pregnancy	****Capability goes beyond competence: it includes the ability to apply knowledge, skills and attitudes across a range of complex and changing settings*
35% of babies are breastfed at 10 days	Reduced harm to infants from maternal drug use	
Early assessment of pregnant women and children using GIRFEC practice model	28% of babies are breastfed at 6-8 weeks	
At least 80% of pregnant women in each SIMD quintile will have booked for antenatal care by the 12th week of gestation by March 2015	Improved parenting capability***	
Integrated care planning and integrated service planning	Improved parent-child attachment	
Improved engagement of vulnerable women and their families	Women have improved control of their reproductive health	
Increased LARC in vulnerable patient groups	Reduced maternal obesity	
Recognition and management of psychosocial need in pregnancy, labour and in the postnatal period	Reduced child obesity	
Every woman is seen by no more than three midwives during planned antenatal care	More infants have healthy birth weight	
Women and their families use information and services to support positive behaviours	Improved mental health and wellbeing during pregnancy and postnatally	
Electronic patient records are in place in maternity, NNU and public health nursing	85% of all children reach all of the expected developmental milestones at the time of the child's 27-30month review by end 2016	
Parents delay weaning to stage of appropriate developmental readiness	Positive experience for women and their families	
More parents choose healthy food and drinks for all the family		
Increased play and physical activity for children		
1:1 care during labour		
Person centred, safe and effective care is provided to all women and families		

6. Planning of Evaluation

An evaluation framework was developed format to assess the program in line with the outcomes of the logic model. The evaluation framework was in three distinct phases:

1) A minimum data set was agreed. This was derived from the key health outcomes and behavior changes identified from the national strategies and guidelines. In total 56 distinct measurable data were identified and where this data could be directly sourced was noted. A data quality officer was seconded from the Quality Assurance department to collate, monitor and report on this data.

2) A program of research related activity was implemented to gain insight into more qualitative data. This included person-centred care, strength based approaches to care, positive parenting, motivational interviewing of professionals to promote lifestyle changes etc. A further stream of activity focused on workforce perceptions and views on support and preparation for implementation of the service redesign.

3) Describing outputs allowed the program team to establish and monitor linkages between the problem or situation identified and the impact of the program on the planned outcomes. Dissemination included: launch events, conference presentations, poster presentations briefing workshops, annual reports and published reports on activities and progress, DVDs, fact sheets, publications and other forms of dissemination. As a result of the program, the good practice of influencing leadership and building research capacity has been monitored and published. Further planned activity is to review the effectiveness of the collaboration and any external situations that affected the program.

7. Reflections on the benefits and limitations of using the logic model

The numerous meetings to tease out the inputs, outputs and program outcomes did stimulate indepth discussion and debate. Several benefits highlighted through this process included further clarity around issues, putting these into context within the whole picture of what the program was trying to achieve, and getting consensus with colleagues and others involved around the intended short. It was important to develop a user-friendly and comprehensive logic model for the program. The logic model was approved by the program steering board. Once approval was obtained then the model became a tool to communicate the plan or road map of activity with others involved in the program.

There is no doubt that team building, and communication was enhanced through this planning process. This included strengthening partnerships with other professions and services. The program's team perceived benefits of developing and applying the logic model are summarised in Figure 3. Many of these benefits support the well-established findings previously highlighted from similar papers on using logic models [1,3-6]. The logic model also acted as a learning tool. A range of activities had to be implemented in clinical areas to set the course of action to meet short term outcomes. This involved the workforce developing new skills and knowledge, promoting opportunities for leadership, and building research capacity to both integrate evidence based practices from prior research and to contribute new findings from studies. The logic model has already been clearly recognized as being a powerful tool for learning, critical thinking, and problem-solving.

It was also found that the logic model was consistently used as a reference document to keep the program team focused and reminded of the initial agreement with managers and stakeholders. The tool was revisited and refined several times over the duration of the

program in light of issues arising that influenced the plan. Revisiting the tool was a worthwhile and essential process. Further financial resources were successfully negotiated to support the development of the workforce and test out new ways of working within the services. The logic model is a live working tool and should always be revisited, refined and updated in line with changing resources, allocation of resources, and internal and external factors influencing the status of the program.

Figure 3 Benefits of using a logic model

Benefits	The process of building the model improved clarity and focused thought processes
	Contributed to effective team building
	Connected inputs, activities and effects
	Mapped out resources and inputs and highlighted areas that needed to be addressed
	Highlighted where data was already available to measure outcomes and areas to be addresed
	Defined shared vision, direction and terminology
	Enhanced collaboration. interprofessional working and partnerships with agencies including communication
	Enhancde accountability by keeping the team focused on outcomes
	Built research capacity for evidence based practice

Figure 4 presents some perceived limitations and challenges of this ambitious program. One key challenge related to the speed at which the program was implemented within practice with numerous levels of activity required to prepare the workforce and services. This resulted in time constraints for the team to revisit and refine the logic model. Another limitation related to the changing priorities for resources.

Figure 4 Limitations of using a logic model

Limitations	Pace of program implementation versus time to review logic model
	Challenges presented when dealing with multilevels of staff, wide range of services and external agencies
	Changing priorities for resources
	Lack of familiarity with the format of the logic model used

8. Conclusion

The logic model has been an important and valuable tool in sharing information, facilitating the planning of the 'early years' program and providing direction to process and outcome evaluations. The time spent in the planning stage demystified and brought clarity to the purpose of the program for the team and stakeholders. This included defining the shared vision, direction and terminology for use across all services. Detailed planning was useful in teasing out the elements of the program most likely to produce meaningful and relevant evaluation data. In turn, this enhanced the development of realistic and measurable outcomes.

Reflections on the development of the logic model reinforced and contributed to the existing body of knowledge on the benefits and usefulness of logic models. This included influencing team building, partnership working, workforce development, leadership opportunities and building research capacity. The development of the logic model was also a powerful learning tool generating learning through critical thinking and problem-solving. Limitations perceived included the speed of implementation in practice, the number of ongoing activities, the format of the logic model and the changing priorities for resources.

The logic model is a live working tool regularly updated to reflect changing resources, and influencing internal and external factors. This provided leverage to successfully negotiate further financial resources to contribute to achieving the outcomes of the program. There is no doubt that revisiting and refining the logic model tool was an essential and worthwhile process.

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