BACCH-BACAPH
Improving Services Series

# Life course pathways – the life course approach

## A practical framework for structuring interventions implementing a life course approach.

### Purpose

The purpose of this paper is to explore the causation of health or disease in ways that can inform the development, delivery and evaluation of interventions to improve population health.

### Introduction

There is accumulating evidence that both health and ill health in adulthood is determined by a combination of genetic potential and then subsequent exposure to positive and negative factors throughout life. Generally these factors have most influence throughout pregnancy and childhood when both mind and body are still developing.

This is the basis of the "life course approach" that recognises the cumulative effect of these factors and in health policy terms seeks to influence them in ways to build resilience, health and thereby improve life chances.

Influencing life course trajectories is a complex process that requires consistent, congruent and long-term strategies to create alignment and synergy between public, private and voluntary sectors. Creating this congruence between different sectors within wider society requires a shared understanding of the causation of disease and promotion of health.

This paper will briefly review:

- public health approaches
- occupational health approaches
- life course pathways
- policy intervention-next steps

### Public health approaches

Traditionally public health has used the concepts of an interaction between an agent (causing the problem), the host (experiencing the problem) within the wider physical and social environment, as a model for understanding and structuring interventions to tackle health problems. This conceptualisation has been applied to both infectious disease and non-communicable disease (for example agent: air pollution, host: children, environment: traffic density and proximity, condition:

asthma). Interventions may be targeted on the agent, the host or the environment, but generally interventions to control the agent, backed by legislation, are the most effective PH strategies.

Traditional epidemiological research has tended to focus on the negative (pathogenic) explanation for disease or illness, for example, exposure to tobacco smoke causing lung disease. Increasingly there is interest in studying assets i.e. positive (salutogenic) factors that contribute to health and well-being, for example, healthy diets or increasing social capital. The traditional model therefore needs to be expanded to include both positive and negative factors linked to the agent, the host and the environment (see figure 1)

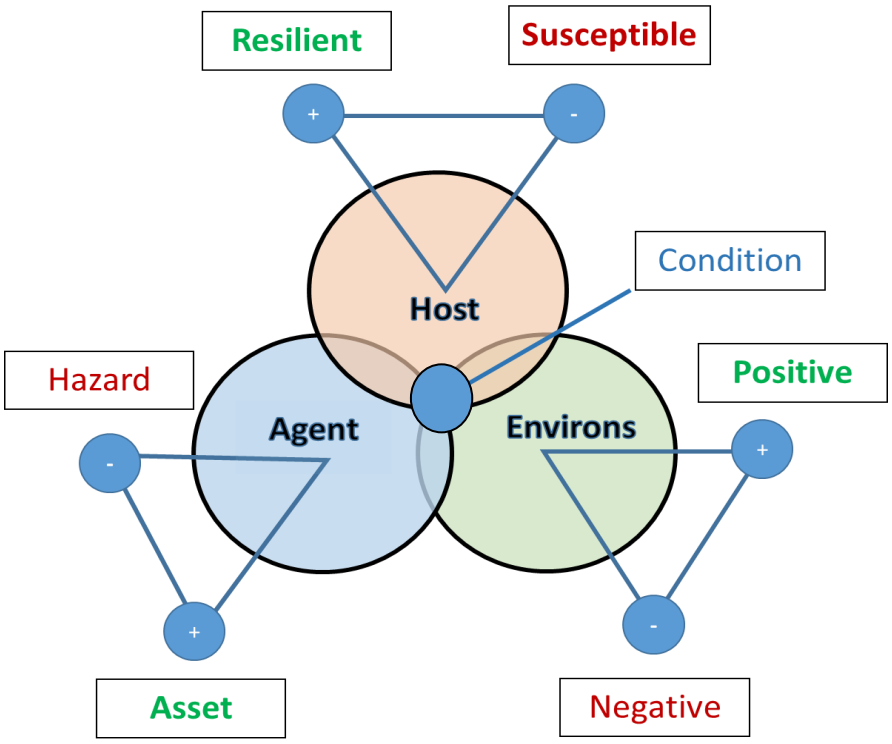



*Figure 1: Venn diagramme illustrating the interaction between positive (beneficial) and negative (harmful) factors relating to the host, the agent and the environment that are relevant to the creation of disease or promotion of health.*

This relatively straightforward model must sometimes be expanded to include additional elements such as vectors (vectors carry the agent e.g. mosquitoes and malaria, cars and kinetic energy). Expanding the concept of "environment" into both social and physical can include an element of expectation or responsibility - lifestyles factors are generally the responsibility of individuals, whereas determinant factors could be defined as being outside the immediate control of individuals.

Since children generally live within families, family and child related determinants are often grouped together, but there are specific determinants that relate predominantly to outcomes for children (e.g. folate supplementation in pregnancy, reading and language exposure throughout infancy). Likewise families live in communities in which there are many factors that influence health for example quality of housing, access to nature and social relationships.

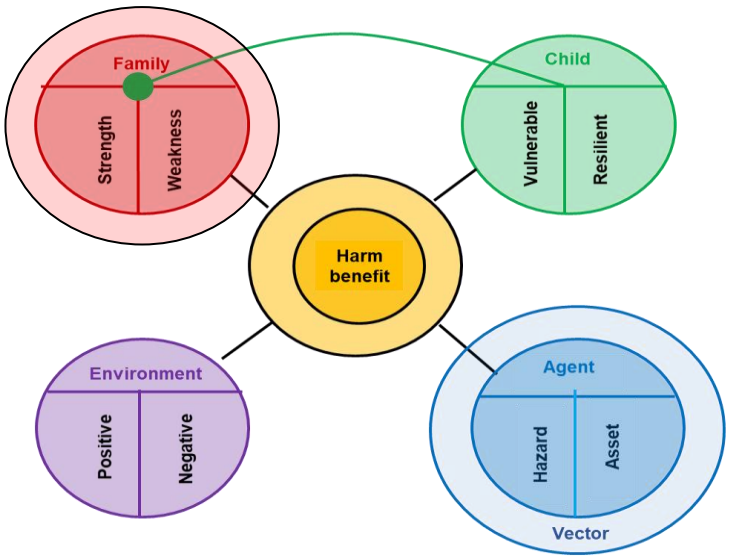



*Figure 2: expanded Venn diagram of factors involved in the creation of health or disease.*

**The Haddon matrix.**

The Haddon matrix was originally used first to understand and then intervene in injuries related to road traffic using the same concepts behind the formation of disease outlined above, but this time including a timeline of preinjury, injury and post injury.

| Haddon matrix | | | |
|---|---|---|---|
| | **Human (host)** | **Vehicle (agent)** | **Environment (physical/social)** |
| **pre-injury** | child behavior<br>e.g. parental control | Vehicle condition<br>e.g. braking capacity | visibility<br>e.g. parked cars |
| **injury** | resistance to injury<br>e.g. helmets | vehicle design<br>e.g. sharp edges | street design<br>e.g. road surface |
| **post injury** | Threat to life<br>e.g. hemorrhage airway | Vehicle inspection<br>(RTA investigation) | emergency response<br>e.g. first aid abilities of passers by ambulance |

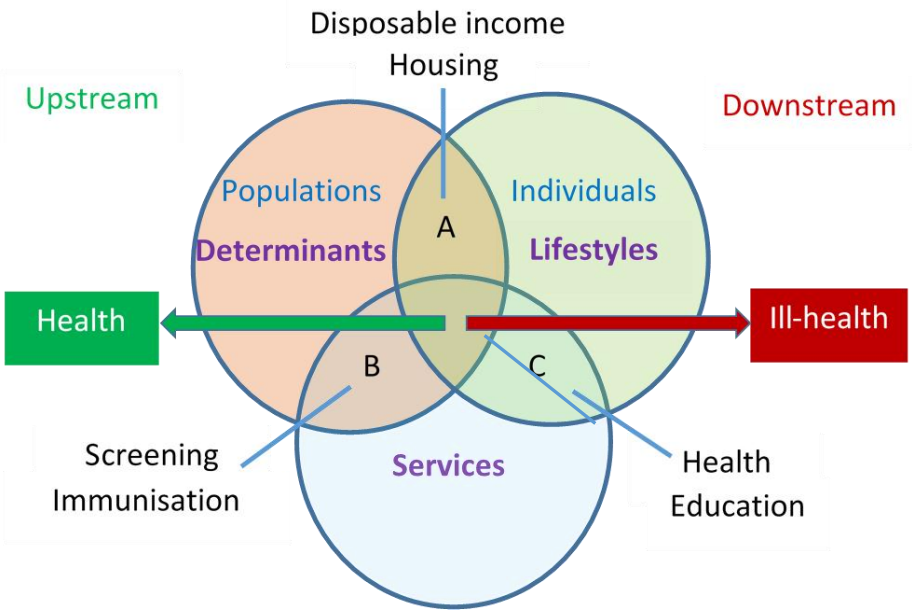
By examining the content of each cell a number of generic strategies can be derived that in turn can inform the prevention agenda as follows:

- Prevent the hazard
- Reduce the hazard
- Prevent the release of a hazard that exists
- Separate the hazard and the victim in time
- Separate the hazard and the victim in place
- Modify the hazard
- Protect the victim
- Counter the damage
- Repair the victim

Each of these interventions can then be grouped into 3 categories:

1. those that relate to individuals and their behaviour (lifestyles),
2. those that operate on a population basis (health determinants) and are outside the immediate control of individuals and
3. those that relate to services.

This allocation to either individuals (in this case parents to use safety equipment) or say populations represented by vehicle/road design (for road safety) or to health services (for injury repair) is helpful when developing strategies to either prevent harm or promote health.




This model helps to define who is responsible for interventions for example interventions which are the responsibility of public health (e.g. fluoridation of water, residential traffic speeds) or the NHS (e.g. screening, child health promotion). The concept of "host" can also be expanded to include a child and their family, the local community where they reside or the wider society in which they live and some determinants factors, such as poverty, operate at more than one level.

This public health model can be distilled to create a simple 3 x 3 framework to aid the planning and organisation of public health related interventions. The relevant determinants (both positive and negative) can be inserted into the relevant cell when creating either an aetiological framework, or, an interventions framework.

| | | Environment | | |
|---|---|---|---|---|
| | | **Lifestyle** | **Determinants** | **Services** |
| **Host** | **Child and family** | | | |
| | **Community** | | | |
| | **Society** | | | |

*Table1: a nine cell matrix illustrating the interaction between host and environment for structuring PH intervention programmes.*

This simple 3 x 3 matrix therefore merely acts as an aide memoir which can be expanded or contracted to provide greater or lesser detail, as required, when writing policy papers.

### Occupational health approaches

The occupational health literature provides a helpful model to understand the interaction between hazards, exposure and harm. Hazards all have the potential to cause harm, then there is the risk of exposure which needs to be considered and following exposure there is the likelihood of harm.

Interventions may be orientated to protecting (decreasing exposure) for individuals, communities or societies against harmful determinants (hazards) or promoting increasing exposure to positive determinants (assets) which can promote the health and well-being of individuals, communities or whole societies.

While this generic framework is generally helpful, it must be remembered that some agents can be both positive and negative, for example, sunlight is vital for vitamin D metabolism and the prevention of rickets, but overexposure is harmful in terms of sunburn and development of melanoma. Likewise there is overlap between determinants of health and lifestyles, for example, poverty may be part of macroeconomic policy and increasing inequalities but individuals may also use their own limited resources unwisely.

## Life course pathways

This simple matrix models the interaction of host, agent and environment at one moment in time, is particularly relevant for acute conditions, for example, an injury or infectious disease. The life course pathway approach is more relevant to long-term conditions, particularly non-communicable disease and recognises that health and ill-health, is created through a series of cumulative exposures to both positive and negative lifestyles and determinants throughout life from conception through to adulthood, illustrated in figure 3.

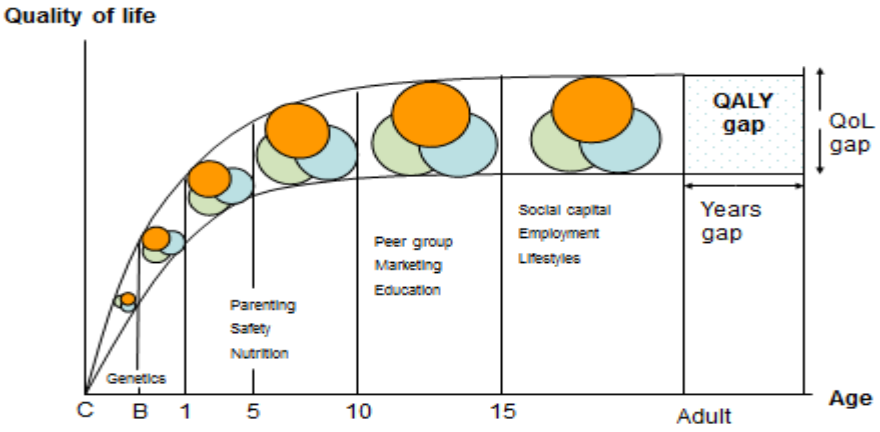



*Figure 3: illustrating accumulating health/ill-health over time through different exposures to lifestyles, determinants or PH programmes creating a QALY gap between the best and worst exposures over time.*

Figure 3 has age on the horizontal axis and quality of life on the vertical axis. Three overlapping circles represent interventions relating to lifestyles, determinants and services. Two trajectories for life course pathways are illustrated, the upper line represents greater exposure to positives, the lower line represents greater exposure to negatives and the long-term difference between the two illustrated by the QALY gap. The desired public health outcomes would be both to improve health and quality of life, duration and improve equity to narrow the gap.

This concept of accumulating health or ill-health depending on exposure to either assets or hazards throughout life can be expressed as a diagram (figure 4) with the orange triangle representing the needs of the child, family or community, while the green triangle represents the outcomes (measures of health, inequity and sustainability) with lifestyles (assets and hazards) and determinants (assets and hazards) influencing the sequential life stages.

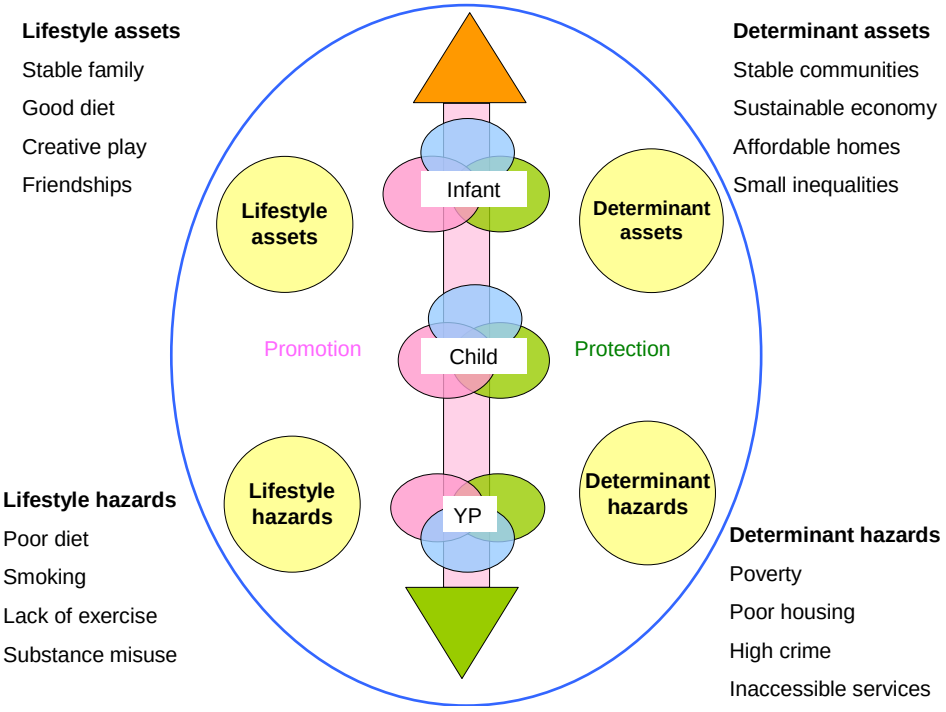



*Figure 4: the central vertical line represents the life course of the child from infancy to young person (YP). On the left-hand side are the lifestyle assets and hazards, on the right side assets and hazards relating to the wider determinants.*

***Age***. The dominant factors/agents which have influence are very different in the antenatal period compared to those acting during school age or the period of young adulthood. The model therefore may need to be expanded to include different ages/stages of development. The obvious choices would be:

- Antenatal/perinatal
- Preschool children
- School-aged
- Young person

***Social environment***. Children do not live in isolation from their families, who have a major influence on their health and well-being. Poor parental mental health, domestic violence, learning difficulties and substance misuse have a huge negative influence on the outcomes for individual children. Conversely good parental mental health, employment and stability provide the basis for resilience and good health. Interventions orientated towards parents, siblings and extended family members must be included in a more comprehensive model.

- Parents
- Siblings
- Extended family
- Societal culture

***Physical environment.*** The "physical" environment includes all the non-social (people) elements that have an influence on health and illness and would include physical resources such as housing, air quality, heating, security, access to play space, school, fiscal policy etc. Conceptually these may be organised around the themes of:

- Home
- Neighbourhood
- School
- Society

Interventions can be helpfully be divided by who is predominantly responsible, as this then can help structure recommendations.

- ***Lifestyles*** - actions individuals and families can take or have control over.
- ***Determinants*** - generally outside the control of the individual, actions that communities/society can make sometimes divided into local and national determinants.
- ***NHS*/Public Health services** - interventions that are the responsibility of the public/health service.

These then can then be further divided into interventions to promote and protect health. *Promotion* being the process of increasing exposure to assets that have positive health effects and *protection* being the process of decreasing exposure to hazards that have a negative health effects.

An example of this structure is illustrated in table 3 focusing on tobacco control, linking interventions that act synergistically and have the greatest likelihood of success in practice.

| | | **Lifestyles** | **Determinants** | **Services** |
|---|---|---|---|---|
| **Child** | ***Preschool*** | | Parental smoking<br>Smoking in media | Asthma services |
| | ***School*** | | | Health education in schools |
| | ***Young person*** | Health education<br>Smoking enquiry in clinical consultations | Access to cigarettes near schools | Smoke stop services |
| **Family** | ***Parents*** | Tackling smoking in pregnancy | | Nicotine replacement |
| | ***Siblings*** | | Access to cigarettes | |
| | ***Extended family*** | Smoking cessation advertising | Tobacco taxation | Nicotine replacement |
| **Community** | ***Home*** | Smoke-free homes | Quality of housing | SUDI information |
| | ***Neighborhood*** | Smoke-free cars | No advertising<br>Smoke free shops + leisure | |
| | ***Society*** | Smoke-free public places | Legislation increasing age of access<br>Control of illegal imports | Health services |

*Table 3: A worked example thinking interventions to reduce exposure to tobacco and manage the consequences.*

### Policy interventions -tackling local and national determinants

Policy is a set of ideas or plans that are used to inform decision-making and while traditionally associated with politics, it is equally relevant to agencies, organisations and businesses. Policy can be enacted in many different ways ranging from legislation (and regulations to interpret legislation), resource allocation, including fiscal measures, public education, professional education (including curriculum development and professional development), organisational change, research priorities and quality improvement.

Improvement of health and well-being is dependent on social, environmental and economic determinants all interacting with human biology. Each element requires a different approach and successful public health programmes are dependent upon bringing together evidence of what works relevant to local communities. Creating alignment and synergy between different policy strands is extremely important for public health programme success.

Tobacco control is a good example of where legislation (age of smoking, import regulations) must align with societal expectations (health promotion), lifestyle advice (health education) and services to help manage nicotine addiction as well as the health impacts of smoking (clinical services).

Table 3 illustrates the multiple policy interventions required to reduce the harm caused by tobacco consumption, using a life course pathway approach.

### Policy intervention-next steps

Policy does not implement itself! Policymakers within government are best lobbied by alliances of interested parties who can both present a problem and the solutions requiring Ministerial endorsement to enable action or legislation. Sometimes awareness of the issue followed by discussion about possible actions must be presented to the public before there is sufficient opinion to change practice. Campaigns or programmes require an understanding of where decision-makers stand and the variety of methods will be needed to effect change. National and local actions require similar steps, but the organisations and individuals involved will necessarily be different, as illustrated below.

### National

1. Problem recognition and evidence based solutions.
2. Prioritise interventions for national implementation.
3. Create an alliance with other interested organisations.
4. Develop a strategy to implement national interventions.
5. Create a metrics framework with which to measure effect of the strategy.
6. Learn from the process.

### Local

1. Assemble a local partnership of committed local stakeholders.
2. Review what services/programs currently exist and their effectiveness.
3. Assemble local data on the incidence/prevalence and local inequalities.
4. Prioritise and implement interventions.
5. Evaluate the impact of local strategies.
6. Share best practice.

### References

http://www.bacch.org.uk/policy/BACCH%20Family%20Friendly%20Framework%20final.pdf