AstraZeneca

Young Health Programme

Social Return on Investment (SROI)

October 2017

Powering Partnerships

Foreword

We were delighted to be asked by AstraZeneca to carry out a Social Return on Investment (SROI) analysis on some of the behaviour change activities of the Young Health Programme (YHP). We were also just a little daunted.

Whilst behaviour change is vital to the prevention of non-communicable diseases (NCDs) - such as respiratory and heart disease, diabetes and cancers - its effects can be difficult to measure. There are particular problems with assessing 'dropoff' (the number of people who change behaviour, for example undertaking more physical activity, and then revert to their old ways); 'deadweight' (people who were never likely to take up the risk behaviour anyway); and 'duplication' (the interrelationship between the behaviours such as smoking and misuse of alcohol). These are compounded when the subjects are young people at a period of considerable change in their lives, with many of them living in hard-to-reach communities for which data are often either unavailable or unreliable. We had the additional challenge that the programmes were not set up with this sort of analysis in mind and so even the available programme data were not greatly suited to the task.

All SROI analyses include assumptions, and many include proxy data where reliable and relevant data are not available; our analysis follows the same path and we have worked to make our assumptions and proxies clear and open to scrutiny. Having weighed the evidence we estimate the social benefit to be 6 to 9 times the financial cost of the activities. This number is by no means definitive, but we think is broadly indicative of the value of prevention as executed through these YHP programmes.

So, given these limitations, how can SROI analysis add value to the programme, what can it reveal about the activities, what can it tell us about how and where value is created?

This style of analysis can provide enhanced clarity about the Theory of Change: the process by which the initial investment is turned into social benefits. In this case each programme enrolled young people; encouraged them to change behaviour through some level of peer-education and motivation; with the anticipated outcome that they would go on to be less likely to suffer from illness and premature death. It became clear that the level and durability of behaviour change was likely to vary widely according to the various groups involved in the process, and perhaps this raises questions over whether it is more effective to focus attention more intensely on a small number of individuals or work at a lower intensity with larger numbers.

The work also brought into focus the interrelationships between the young people's risk behaviours. For example if young people stop smoking are they more likely to improve their diet, or conversely if they improve their diet are they more likely to give up smoking? Both these and the other risk factors are likely to tie in to wider psychological issues. What role also does gender equality play? How can this be tackled more effectively?

The analysis does not provide answers to these questions but it does shine a light on the data that are available, and that can be developed, to advance understanding and inform future programmes both within and outside the YHP.

The YHP has been a great catalyst for activity into understanding and changing young people's behaviour through its wide-ranging and often ground-breaking initiatives. We hope that this SROI analysis goes some way to quantifying its success and pointing to possible future areas of development and how the projects can be planned, implemented and evaluated with greater confidence.

Oli Griffiths,
Director, Powering Partnerships

David Aeron-Thomas,
Metrics Specialist, Powering Partnerships

Contents

Executive Summary

The AstraZeneca Young Health Programme (YHP) is a philanthropic initiative that aims to improve the health of young people both globally and locally through research, advocacy and programmes. To date the activities have been very diverse in their geography, type and focus. They have ranged from global research studies such as the Well-Being of Adolescents in Vulnerable Environments Study (WAVE), a two-stage study to understand the physical, social and environmental factors that hinder disadvantaged adolescents from obtaining the resources they need to secure good health; to national research such as the Depaul study (AstraZeneca, Depaul UK, 2012) into the physical and mental health needs of young homeless people in the UK; and to small specialist behaviour change programmes, such as that in Hamburg, Germany which aimed to improve the life chances of young people sleeping rough. Increasingly the programmes have focused on disease prevention - encouraging adolescents to change their risk behaviours such as smoking, alcohol misuse, poor diet and under-exercising to avoid noncommunicable diseases (NCDs) such as cancer, heart diseases, respiratory diseases and diabetes in later life.

The YHP has two phases: the first ran from 2010-15 and the second includes commitments through to 2020. The practical programmes reach 21 countries, with many more activities at regional, continental and global scale. The purpose of this analysis was to identify the benefits of the YHP to wider society and, as far as possible, to ascribe a financial value to its positive social impacts. This has been undertaken using a Social Return on Investment (SROI) valuation, based on the Guide originally published by the UK Cabinet Office (Cabinet Office; Office of the Third Sector, 2009) and draws on data from the earlier years of the programme.

YHP has, from its inception, been ground-breaking; testing a range of approaches to assess their relative effectiveness and progressively improving practice for the programme and for its partners. This SROI evaluation forms part of this continuing assessment and effort to improve practice.

In reviewing the data it proved very challenging to ascribe a reliable social value to the research and to the national and international advocacy. We believe that both research and advocacy have provided real social benefits but these are extremely difficult to quantify, due to the inherent difficulties of measuring such activities and because changes tend to take some time to be realised.

For the country programmes there are considerable differences between activities, which can make comparison difficult, but our primary challenge was the small scale of some of the programmes and the insufficiency of useful data. None of the activities were set up with an SROI evaluation in mind and so relevant data are limited. As a result we decided to focus on four of the larger programmes for which relatively robust data were available both in terms of the health characteristics of the country and in the statistics of the programmes. The chosen 'Focus' programmes were Brazil, Canada, India and Romania.

The YHP Brazil and YHP India were large-scale initiatives run with global partner Plan International UK with many common characteristics; both took a broad view of adolescent development, aiming to change behaviours in smoking, alcohol and substance misuse, violence, and sexual and reproductive health. They targeted marginalised communities, were run with substantial numbers of young people and were delivered primarily through peer-educators - people of a similar age who were trained in the subjects and equipped and encouraged to help their friends and peers to change behaviour. The Brazil programme was run in conjunction with schools and the Indian programme through more informal networks and youth-friendly Health Information Centres.

The Romania and Canada programmes were quite distinct. Romania, run in conjunction with NGO partner Junior Achievement, was a schools-based programme aimed at reducing the risk factors associated with cardiovascular disease through lessons, self-organised sports clubs and a national competition.

In Canada, the 'Flex Your Head' programme was developed with the Boys and Girls Clubs of Canada, run through the clubs and offered more widely. Its basis was a set of twelve modules of group activities

led by a young person and a staff member aimed at providing the knowledge, skills, and strategies to cope with stress and distress and promote positive mental health and wellness. These modules could be run in sequence or used in an ad hoc fashion depending on the needs and available resourcing of each club.

Our analysis was based upon a simplified Theory of Change that could be applied to all four Focus programmes. This identified four distinct audiences applicable in each:

- people targeted to be 'educated' directly ('direct' effect),
- peer-educators themselves ('superdirect'),
- parents and teachers involved ('indirect'), and
- wider community who might only be reached remotely e.g. through social media ('broadcast').

From feedback from the Brazil programme the likely immediate effect was that 70%+ of those likely to take up the risk behaviour would elect not to as a result of the programme – but we expected this to drop very markedly over time, with perhaps only 5% of these people (4% of the total) retaining the behaviour into the long term. We have taken this as our basic measure and estimated that the groups would be 'converted' to risk avoiding behaviour in these proportions:

Conversion rate	
Direct	4%
Superdirect	20%
Indirect/ influencer	4%
Broadcast	0.02%

Table 1 Conversion rates by audience group

Using these basic assumptions and the national statistics for the incidence of the risk behaviour, and its health impact, from the WHO Global Burden of Disease (WHO, 2017) study we were able to construct a model of the number of lives changed by each programme and the health impact of each changed life. This is measured in Disability Adjusted Life Years (DALYs), a consistent metric for the associated morbidity and mortality. Adjustments have been made for the incidence of the behaviour in each country and for the socio-economic status of the groups affected.

For each risk behaviour we have applied a financial measure of the direct (medical) and indirect (wider social) costs of the associated behaviour based on academic and other studies and we have assumed that the overall impacts are broadly similar as a percentage of GDP. This enables us readily to compare impacts and costs between countries and programmes.

In assessing the SROI it is important to establish the actual level of financial investment. By comparing these costs to the estimated social benefits we have estimated the SROI ratio. A ratio of 1 shows that the social value arising from the activity was equal to the financial value invested in it. A ratio of higher than 1 shows that the social value was greater than the financial value invested.

The ratios of the four Focus programmes are below:

	Investment ($'000)	Costs Avoided ($'000)	SROI Ratio
Brazil	781	6,599	8.4
India	540	3,531	6.5
Canada	655	4,359	6.7
Romania	200	1,759	8.8

Table 2 SROI ratio summary by country

On the basis of this analysis there is a considerable variation in the SROI ratio per programme (a higher ratio indicates a superior level of return). It should however be stressed that the returns are much influenced by the variation in the prosperity of the groups treated.

The assumptions underlying the data are in the Appendix. We are very conscious that other assumptions, and indeed other data, could lead to different conclusions. We have aimed to provide a conservative estimate of the outcomes. We hope that this study will inform the activities of others and help to focus investment even more effectively in future.

Introduction

This document provides an overview of the Social Return on Investment (SROI) of some key elements of the AstraZeneca Young Health Programme (YHP). The first phase of this philanthropic programme ran from 2010 to 2015, a second phase (2015-20) is currently in progress (2017).

The YHP has been experimental in many of its approaches and techniques and, in its focus on areas of young persons' health and non-communicable diseases (NCDs), has worked on subjects that many consider to have been relatively neglected in terms of scientific research and health funding. The YHP has been run in 21 countries at varying scale. It was not developed with the expectation that it would be subject to this style of analysis, As such, data are often limited in availability, relevance and reliability and so only some of the core programme activities can be evaluated in significant detail. Even for these core areas and activities there are many uncertainties and gaps in the data, and the assumptions made have been broader than would be ideal due to the lack of published studies undertaken, the overlapping nature of many of the benefits and varying definitions and methodologies. Many of these may be unavoidable due to the nature of the interventions and the circumstances within which they occur, but the sharing of more information and methodologies between practitioners, for example, could perhaps lead to some of the uncertainties being reduced in the future.

That said, the YHP has, from its inception, been ground-breaking; testing a range of approaches to assess their relative effectiveness and progressively improving practice for the programme and for its partners. This SROI evaluation forms part of this continuing assessment and effort to improve practice.

YHP Programme Overview

The Young Health Programme was started in 2010 as a philanthropic initiative funded by AstraZeneca. The YHP was reviewed and renewed in 2015 and the current phase runs until 2020. It is based upon three pillars:

- research
- advocacy
- programmes

and comprises two distinct elements:

- Centrally directed work undertaken with global NGO partners focusing on global research and advocacy, and some major on-the-ground behaviour change programmes
- Locally directed work to address national concerns and needs, set up and run by AstraZeneca companies with local NGO delivery partners with varying levels of central support

To date the YHP has financially supported:

- Work in 21 countries on 26 distinct behaviour programmes
- Over 30 national and international events
- Seven ground-breaking research publications
- Five global partners and 22 local delivery partners

The YHP, from the start, has been a collaborative venture aimed at improving outcomes for youth health and youth risk behaviour and for those organisations that work in the sector. This has involved considerable numbers of AZ staff in supporting the programmes and initiatives and has enriched the programmes and raised the profile of the issues throughout the company.

This SROI analysis is intended to help organisations working with the YHP, and other organisations working in similar fields, to learn from the work undertaken to date.

The SROI Concept

Social Return on Investment is a way of measuring the impact of an activity and comparing that impact with the resources (or Investment) used to deliver it.

Straightforward financial return on investment, such as how quickly an investment in industrial machinery will 'pay out', is well-understood and has been practiced at scale for centuries. This approach is, however, limited to assessing the direct financial returns and therefore misses the wider direct and indirect benefits to society of activities - such as improvements to health and life expectancy; or indeed externalised costs such as environmental degradation.

Social Return on Investment (SROI) provides a framework for measuring and accounting for this much broader concept of value. It can measure social, environmental and economic outcomes and ultimately uses monetary values to represent them; allowing a ratio of benefits to costs to be calculated. For example, a ratio of 3:1 indicates that $3 of social value has been delivered for each financial investment of $1.

The benefits being assessed can be diverse, and so SROI analyses can take many different forms; be assessed by very different bodies; and of course depend on varying data and assumptions. Whilst the general principles are set out in documents such as Guide to Social Return on Investment originally published in 2009 by the UK Cabinet Office, there is a rich variety of interpretation.

Central to the SROI concept is the Theory of Change (TOC), which identifies the causal links between the investment and the outcomes. These can be quite complex and the TOCs relating to the YHP programme are discussed below.

SROI models can be retrospective or prospective.

> **Retrospective** SROI models analyse activities and impacts that have already happened, and so in theory are more accurate. Retrospective SROI models often also have a 'prospective' element – in that hoped-for impacts may continue into the future and well past the specific project's end.
>
> **Prospective** SROI models are based upon an estimation of what will happen, this is clearly more speculative, but are useful as planning and projection aids.

SROI valuations should always be treated with caution. They are indicators of value not precise calculations of it. Varying the data and especially the assumptions used in developing an SROI can lead to markedly different valuations and conclusions and it is important to be able to scrutinise these factors to understand the applicability of the results.

This SROI evaluation is intended to be transparent so that the data that we have used, and the assumptions and calculations that we have made, can be reviewed. Significantly different results can be achieved by changing any of these elements, allowing other interventions and interpretations to be tested against our data. We hope that this evaluation will stimulate further activity in this area and be of assistance to others working on these issues.

Valuing Lives

The key outputs for this SROI are financial – in this case denominated in US dollars. These values are derived from the avoidance of harms to human beings, whether this is premature death (mortality) or ill health (morbidity) and the resultant avoided treatment and wider societal costs.

There are several well-established protocols for the valuation of a human life used in economics, insurance, policy development, health and safety and a series of other work areas. The Value of a Statistical Life (VSL) approach can, for example, ask people to put a value on reducing the risk of their dying, or deduce this from, for example, the premia in wages paid to people in higher risk occupations. Other approaches examine the treatment costs required to prevent the mortality or morbidity.

The results are, however, usually contextual, the life of a billionaire being valued in financial terms more highly than that of a subsistence farmer, due to their ability to pay more to avert morbidity or mortality and the loss of economic output occasioned by their death. This effect can be experienced more widely between countries with the life of an average person in a high-income country being valued more highly, in financial terms, than that of an average person in a low-income country.

In this study we have sought to balance the economic value, in dollars, with the human value of avoidance or morbidity and premature mortality using the metric of Disability Adjusted Life Years (DALYs), which are universal and discussed in more detail below.

Sources of Information

The data used in this report come from four principal sources:

- Interviews with managers involved in the programme both from AstraZeneca and the YHP's strategic and delivery partners.These have been very useful in providing context and pointing to further sources of information.
- Self-reported data from the partners delivering the programmes that have been evaluated. These are usually the result of surveys of participants and include estimates of the numbers of participants and their level of engagement.
- Health and demographic data from national and international sources, the detail of which is discussed below.
- Economic data from national and international sources.

The assumptions we have made in working with this data comes from:

- Published academic papers, wherever possible peer-reviewed in respected journals.
- Institutions, especially the World Health Organisation.
- And, where these are insufficient, 'grey literature' from other interested bodies .

A bibliography is included in the Appendix.

Evaluating the YHP

Evaluating Research and Advocacy

Two of the three strands of YHP activity (research and advocacy) are particularly difficult to evaluate.

Research

The benefits of research, in its widest sense, have been categorised by the European Union and can be summarised as:

1. Increasing the stock of useful knowledge. This is primarily achieved by publication.
2. Training skilled people. This is a critical means for the transfer of knowledge from research to other organisations that apply it.
3. Creating new scientific instrumentation and methodologies.
4. Collaborating in research projects and networks with users. This leads to coproduction of knowledge.

Quantifying the financial relationship between the economic cost and return of research has been a significant concern for institutions, and especially universities, working to demonstrate the effectiveness of their use of funds. The more direct the association between economic return – such as an improved technology or process – and the investment; the simpler and more reliable the calculation.

The UK's Research Assessment Exercise, operating since 1986, and replaced by the Research Excellence Framework in 2014, produced quality assessments for research by universities and other places of higher education. This produced quality ratings for 'units of assessment', or broadly university departments, and proved to be useful, if controversial, in focusing funding on areas of perceived excellence.

Even this concerted and prolonged analysis of research has not led to a widely accepted measurement of wider societal or financial value, nor have other initiatives in other countries, and so evaluating the benefits of research has been ruled out of scope in this assessment.

Advocacy

Much of the benefit from the YHP activities is likely to come from changes in funding and practice in healthcare providers, local and national governments, and wider international institutions. These changes are likely to be the result of advocacy by YHP stakeholders, often working in concert with others, and informed by the research and programmes funded by it.

The effectiveness of advocacy can be measured through, for example, changes in:

- Awareness about an issue among the general public, or more likely, a discrete group of opinion-formers.
- The number of people active in promoting an issue.
- The language used by opinion-formers and policy deciders.
- The desired regulation, budget or service provision.

Clearly no advocacy works in a vacuum, and so it is quite possible that any or all of the above could be the result of independent factors, adding to the uncertainties of accurate attribution.

It should be noted, however, that whilst the aim was to equip and encourage advocacy on young health at all levels to improve understanding and engagement, no key performance indicators or specific policy objectives were set for the YHP at the start of its activities. As a result there were no specific baseline data and interim objectives provided against which to measure progress, and so the assessment of advocacy is also out of scope of this review.

Evaluating YHP Programmes

The third strand of YHP activity is programme activity to tackle barriers to health and wellbeing, focused on disadvantaged groups. These are run with, and for, local communities and have been developed in response to local needs and priorities and so are diverse in timing, geography, audience, scale, and initially, purpose.

The programmes were also run with, and through, in-country delivery partners with a range of different experiences, insights and methodologies to bring to them. This has allowed the YHP to experiment and innovate to find solutions that are appropriate and effective.

The YHP activities have ranged from impacting a limited number of individuals, such as that undertaken with YHP Germany, to the major programmes run with Plan International and their local delivery partners.

The German programme was based around local NGO basis & woge e.V's expertise in counselling – helping homeless adolescents sleeping rough near Hamburg's railway station to resolve their challenges and reintegrate with society. The interventions were very personally tailored, but the impact of the programme is challenging to identify statistically as the client base is primarily homeless and transient and so difficult to track, and too small (c. 100 individuals) for meaningful analysis.

The two largest activity strands have been run with Plan International – in Brazil and India – with further programmes in Zambia and Kenya. In both Brazil and India the programmes have run through two different phases with the focus shifting increasingly from a general view of improving adolescent health to a greater focus on combating non-communicable disease risk behaviours. A third phase is under way in both countries.

This SROI evaluation is part of the overall assessment for these, and other, activities and the conclusions from the report will be considered in future programme design and execution.

Young Health Issues

The healthy development of young people is a crucially important, complex and relatively neglected area in health policy and research.

Behaviours acquired in adolescence often have a major impact on the life chances and course of the individual. These can range from suicide, the second most likely cause of death for 15-34 year-olds, to unhealthy behaviours such as smoking, unhealthy diet or lack of exercise that lead to noncommunicable diseases in later life such as cancer, heart disease, diabetes and respiratory disease.

These issues are largely related to the considerable physical and psychological changes that occur in young people as they mature. Low self-esteem, for example, could lead to heavy drinking, obesity or suicide; or a combination of these and other factors. These can be strongly conditioned by the society in which the young people live and the options available to them. For example, in some strictly religious societies prohibitions on alcohol are likely to remove problem drinking as a risk factor.

Sexual and reproductive health can have a major impact on the life chances, especially of young women, and can be strongly influenced by the availability of information and technologies. If these are not available, or accessed, the result can be unintended pregnancies, unsafe abortion, maternal death and disability, sexually transmitted infections (STIs), gender-based violence, and other related problems.

Taken together these challenges require both a context-specific approach, which addresses the underlying psychosocial issues; and a more general one, which encompasses a range of behaviours and risk factors.

Whilst adolescence is a period of considerable challenge, both immediate in terms of the consequences of violence or pregnancy, and long-term in the acquisition of problem behaviours, it is also in many countries the development period with the smallest proportion of healthcare expenditure allocated to it. This is a particular

problem in developing countries with a relatively large proportion of young people in the population. In Afghanistan, for example, 64% of the population is estimated to be aged under 25 (CIA).

Populations seem relatively healthy at this life stage, however, more than 33 percent of the disease burden and almost 60 percent of premature deaths among adults can be associated with behaviours or conditions that began or occurred during adolescence—for example, tobacco smoking and alcohol misuse, poor eating habits, sexual abuse, and risky sex (Lule E. Rosen J., 2006).

As the YHP has progressed so the general focus of the programmes has centred increasingly on preventing the NCD risk behaviours. This has, however, been moderated by the interests and approaches of the various AZ country operations and delivery partners and the interrelated nature of the challenges as outlined above.

It has also evolved through a variety of types of intervention into a more cohesive model based around the concept of peer education. This has particularly been part of the preferred theory of change for the programmes run with Plan International.

Several of the outcomes above are difficult to measure statistically and so for this SROI we have focused on the areas for which there are reasonable quality data, both from the programmes and the wider national and international health statistics.

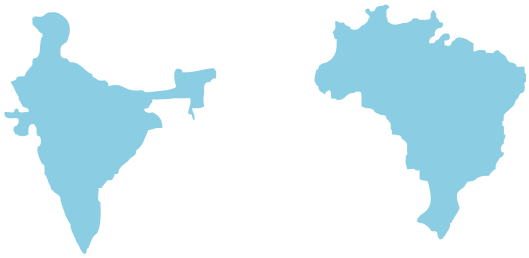
Of the 21 national YHP programmes that have been run, four have been selected for analysis as they have reasonable quality data, scale, and similarities in their TOCs. These 'Focus' programmes are:

- Brazil
- Canada
- India
- Romania

A considerable number of YHP programmes thus fall outside this assessment – such as the Swedish programme on the development of the adolescent brain. This in no way diminishes the value of these programmes but the diversity of the activities makes a single TOC that covers them impractical.

Photographer: Bahaa A. Shawqi

The YHP SROI 'Focus' Programmes



YHP India and Brazil (2010-15)

The YHP India and YHP Brazil programmes run through Plan International[1] were large, structured activities affecting many thousands of young people (see below) with standardised report writing and record keeping. It should be emphasised that the record-keeping was not set up with an SROI evaluation in mind and that the long-term effectiveness of the programmes on individuals' behaviours and health outcomes specifically was not measured. Retrospective measurement of these effects was not regarded as practicable due to the informal nature of many of the interactions, the limited availability of the participants and the relatively short time span between the programme and follow-up.

The programmes were designed and run to similar methodologies - both were peer educator-based behaviour change programmes run in very disadvantaged areas of the country; five distressed neighbourhoods around Delhi and five in Maranhão, the most deprived region of Brazil. Both were large scale and run over a five-year period and were aimed at young people aged 10-24 years old. Both addressed the wider concerns over adolescent health and behaviour, as noted above, before becoming more focused on the specific risk factors that relate to NCDs. The Brazilian programme was run in conjunction with schools, whereas the Indian version was run more informally, largely with 'street children.'

Both programmes formed the basis for further engagement and capacity-building activity. YHP India created and sustained a number of health information centres (HICs) and cooperated closely with the Government on the development of the Rashtriya Kishor Swasthya Karyakram[2] (RKSK) national health programme for adolescents. This is to be rolled out to 243 million adolescents nationally as and when funds are available and has the potential to make a considerable contribution to the improvement of the welfare of adolescents at scale. However, at the time of writing the RKSK had yet to be implemented. The contribution that YHP India has made to this development is difficult to evaluate as is the effectiveness of a scheme that has yet to launch. As a result this potentially very significant, and possibly transformative, contribution to adolescent health cannot be included in this evaluation.

YHP Brazil led to the cooperation between a number of the peer-educators and the State Government of Maranhão on the development of the state-wide Adolescent Health Work and Evaluation plan. Maranhão has a population of approaching 7 million and so the effect could be substantial – although again the impact of the plan, and the role of the YHP consultation within it, is impossible to quantify at this stage.

1 Plan International is a development and humanitarian organisation that advances children's rights and equality for girls. In 2016 it was active in 71 countries and its work reached over 30 million girls and boys.

2 The Rashtriya Kishor Swasthya Karyakram was launched on 7th January, 2014. The key principle of this programme is adolescent participation and leadership, equity and inclusion, gender equity and strategic partnerships with other sectors and stakeholders. The programme envisions enabling all adolescents in India to realize their full potential by making informed and responsible decisions related to their health and well being and by accessing the services and support they need to do so…[it] will comprehensively address the health needs of the 243 million adolescents. It introduces community-based interventions through peer educators, and is underpinned by collaborations with other ministries and state governments. http://nhm.gov.in/rashtriya-kishor-swasthya-karyakram.html

YHP Canada (2011-16)

The 'Flex Your Head' programme was developed with the Boys and Girls Clubs of Canada, and run through the clubs and offered more widely. Its basis was a set of twelve modules of group activities led by a young person and a staff member aimed at providing the knowledge, skills, and strategies to cope with stress and distress and promote positive mental health and wellness. These modules could be run in sequence or used in an ad hoc fashion depending on the needs and available resourcing of each club.

Unlike the other three programmes the investment in 'Flex your Head' was in setting up a self-running programme which will continue to operate into the future without further YHP investment.

Unlike the India and Brazil programmes this activity was not tied to any defined policy outcome, although it does have a lasting legacy as one of the core programmes run, and made available, by the Boys and Girls Clubs of Canada[3].

YHP Romania (2011-16)

The Romanian programme was significantly different. It was run with Junior Achievement Romania[4] and the Romanian Heart Foundation through, and with, schools, in association with the Ministry of Health. The materials were integrated into the curriculum, with half hour sessions being run once a week throughout the year. Increases in physical activity were generated by helping pupils to set up and run sports clubs in many of the schools – with the added attraction on nationwide competitions ('I heart sport'). There was no wider government or other advocacy work included as part of this programme.

3 The Boys and Girls Clubs of Canada was officially established in 1929. In 2016 it had 96 Clubs serving 200,000 children and youth at 625 service locations across the country. The Clubs employ 5,000 staff members and have over 15,000 volunteers.

4 JA Romania is part of JA Worldwide an NGO engages young people in experiential learning. Each year its network of over 470,000 volunteers serves more than 10 million students in over 100 countries

Focus Programmes Overview

Data have been drawn from programmes as below:

	Brazil	India	Canada	Romania
Location	5 Maranhão districts	5 Delhi Districts	Nationwide	Nationwide
Duration	2010-15	2010-15	2011-16	2011-16
Lead Partner	Plan International	Plan International	Boys and Girls Clubs of Canada	Junior Achievement
Clients	Marginalised and disadvantaged adolescents	Marginalised and disadvantaged adolescents	Youth in formal and informal groups	Youth in schools
Age group	10-24	10-24	10-19	15-19
Intervention	Peer educators	Peer educators	Professionals, mentors and peers	Taught modules
	Public policy campaigns	Plays, art, songs, poetry	BGCC clubs	School sports clubs
		Adolescent friendly clinics		Youth leaders and schools
Key partners	Schools	Local NGOs		Schools
Peer educators	527	2,200	158	19,904
Direct reach				
Target group (youth)	93,000	197,000	1,200	54,000
Influencers (teachers, parents etc.)	3,600	14,700	864	18,000
Broadcast	628,000	105,000	834,000	0
Investment (US$ '000s)	781	540	655	200

Table 3 Focus country activity summary

Focus Countries' Theory of Change

All of these 'Focus' programmes have a common organisational strand of peer support and encouragement, although this is used in a variety of different ways:

- India, peer-led in informal settings
- Brazil, peer-led largely in school settings
- Canada, peer-led in a variety of settings e.g. Boys and Girls Clubs of Canada and schools
- Romania, peer encouragement through peer-run sports clubs

It is clear from talking to programme managers in the countries that the peer-educators both play a key part in the delivery of the programmes and related activities, and are the most affected by the activity. They have a much greater understanding of the subjects that they have imparted to others and are more likely to have adopted the behaviours that they have promoted. The influence of the programme is thus likely to be the greatest for them, but also to extend to the other adolescents, and probably family members, ('downstream' and numerous) and to opinion-formers and policy-makers ('upstream' and less numerous).

Due to the uncertainties outlined above only the impacts on the peer-educators and those 'downstream' have been calculated.

The basic underlying theory of change for the four assessed programmes can be summarised as:

- Programme developed locally with local partners to meet local needs.
- Young people recruited locally and trained as peer educators in awareness of harmful behaviours and in communicating how these can be avoided to their peers (other young people). These would encompass a variety of techniques and approaches.
- The peers beneficially change their behaviour as a result of the peer educator interventions, resulting in reduced morbidity and premature mortality.
- Other audiences also change behaviour through their association with the programme (teachers, parents and others affected indirectly through social and other media).

The two Plan International programmes share a similar approach and broad range of potential benefits. The Canada and Romania programmes are more narrowly focused on mental heath and overweight/obese as below:

	Brazil	India	Canada	Romania
Alcohol				
Tobacco				
Violence				
Sexual and Reproductive Health				
Mental Health				
Overweight/obese				

Table 4 Focus country risk factors

The diagram below seeks to summarise these interactions. The size of each layer indicates schematically how numerous each audience is; many peers and families, few national opinion-formers. The peer-educators are the key means of transmitting the information 'down' to peers and families etc. and 'up' to the opinion-formers, with their influence reducing the further that they get away from the key participants in the programme – the peer educators themselves. To the right of the diagram is an indication of the desired change to be undertaken by each group. Thus for peers, families etc. this is for them to change their own risk behaviours; for national opinion-formers this is for them to change policy and infrastructure.

It should be emphasised that this TOC represents an assessment of only a part of the overall effect of the YHP programme as advocacy and research activities, at local and wider levels, are out of scope for the reasons noted above, as are most of the smaller and more specialised programmes (see below). This is a key point as some of the most promising parts of the programme have been the personal development of the peer educators, the addition of their authentic voices to policy debates and their role in setting up and helping to run local medical advice facilities in some locations. The greatest benefits are also likely to come from the structural changes in education and facilities, which the YHP may influence, encourage and develop.

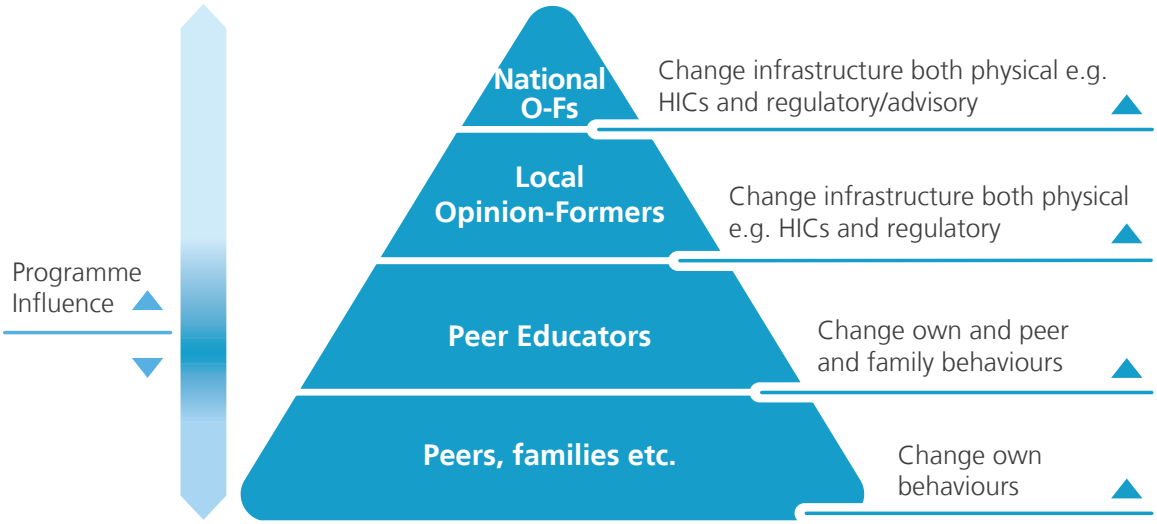


Figure 1 Focus Influence Model

Behaviour Change Programme Effectiveness

Arguably the gold standard of behaviour change programmes was the Finnish North Karelia project. This was one of the first NCD intervention programmes run at scale to be successful. In the early 1970s Finnish middle-aged men had the highest rate of mortality from cardiovascular disease in the world. Between 1972 and 1992 the observed decline in mortality from ischaemic heart disease was 55% for men and 68% for women.

About three quarters of the decline was attributed to changes in known risk factors: use of saturated fats decreased by one third; the proportion of people using butter on bread declined from 90% to 10%; and vegetable consumption increased from 20kg to 50kg/person/year (Vartiainen E., 1994) (Puska, 2004).

There were a number of factors contributing to this success. It had considerable public support – and indeed was set up in response to a local petition; the framework was carefully constructed in association with the World Health Organisation; there was strong community involvement including health and other services, schools, NGO's, innovative media campaigns, local media, supermarkets, the food industry and agriculture; the programme worked with, and contributed to, national health policy; it benefited from strong leadership; and the effort was sustained over 25 years despite very conservative local attitudes and sustained efforts from the dairy industry to protect their economic interests (Puska, 2004).

Few behaviour change programmes have been so universal, sustained or successful, particularly those focused on young people. A particular feature of programmes aimed at changing the behaviour of adolescents is that whilst knowledge and awareness may increase this is not always accompanied by behaviour change. Relatively early prevention work in the USA on the ALERT (cigarette and marijuana) and DARE (drug use) programmes, both large-scale but narrowly-focused and schools-based, indicated that whilst awareness and knowledge increased markedly positive behaviour change was not sustained (Ellickson P.,1993)1993, (Ennett S., 1994).

A consensus began to develop that a successful transition to adulthood required more than avoiding drugs, violence, school failure, or precocious sexual activity. An influential review of US-based programmes found that 'the themes common to success involved methods to strengthen social, emotional, behavioural, cognitive, and moral competencies; build self-efficacy; shape messages from family and community about clear standards for youth behaviour; increase healthy bonding with adults, peers, and younger children; expand opportunities and recognition for youth; provide structure and consistency in program delivery; and intervene with youth for at least nine months or longer'. (Catalano R., 2004).

A more universal approach to youth behaviour change seems to have been significantly more successful in going beyond awareness and achieving real change in behaviour. These expanded beyond a single-problem-behaviour focus and across family, peer, school, and community environments. A review of youth-focused programmes found that many that took this approach led to positive reductions in negative youth behaviour including drug and alcohol use, school misbehaviour, aggressive behaviour, violence, truancy, high-risk sexual behaviour, and smoking. However, questions about how long these positive outcomes could be sustained persisted, not least due to challenges in data collection (Catalano R., 2004).

Results and Discussion

Calculating the YHP Social Return on Investment

The YHP SROI model calculates the total positive financial benefit per project by taking the Total Costs Avoided per Lifetime and multiplying it by the number of lives converted.

These DALYS and Costs Avoided can then be compared with the financial investment as below:

	Investment ($'000)	Costs Avoided ($'000)	SROI Ratio	DALYs Avoided	DALYs Avoided per $'000 invested
Brazil	781	6,599	8.4	3,706	4.7
India	540	3,531	6.5	7,653	14.2
Canada	655	4,359	6.7	335	0.5
Romania	200	1,759	8.8	2,584	12.9

Table 5 by Country Total Social Return on Investment

Discussion

It is important to stress that the YHP was not structured with a Social Return on Investment valuation in mind, and as a result we have had to use more assumptions and proxies in the analysis than would be ideal. This has increased the uncertainty in the results, and it should be stressed that the SROI numbers and ratios in the table above are indicators of value rather than precise calculations of it. For example, while all of the techniques have been judged to be equally effective in changing behaviour, this is clearly unlikely to be the case in reality.

The SROI investment to social benefit ratios ranged from 6.5 to 8.8 indicating that between approximately $6 and $9 were returned in social value for every $ invested. The analysis thus suggests that the four programmes we studied have generated considerably more social value than was invested financially in them and that their levels of payback were very similar across the programmes. This is especially striking as the programmes were mainly run with low-income disadvantaged groups, operated in very different geographies and with varying objectives.

This similarity distracts from the very different value of DALYs avoided per $'000 invested across the programmes. The DALYs avoided in Canada were 0.5 per $'000 invested compared to between 4.7 and 14.2 for the other three programmes. This in part reflects the greater relative prosperity of Canada, with higher costs to run activities, but it also reflects a different approach. In Canada the time period that was assessed was essentially the set-up phase of a longer-term self-running programme, and so young people will engage with the programme in future at minimal cost to the YHP reducing this differential.

There is a major difference between the Brazil and India programmes (run with Plan International) and the Canada and Romania programmes, in that the Plan International programmes addressed multiple risk factors whereas the others addressed a single factor (mental health or obesity). For the Plan International programmes there are thus multiple ways in which behaviours can be changed and, even allowing for duplication, a higher proportion of participants are likely to change one or more behaviours than is possible for a single focus

programme. As the various behaviours arise largely out of wider psychosocial issues this could be an argument for developing broader rather then more narrowly focused initiatives.

This exercise has highlighted the lack of reliable external data on, for example, the actual costs associated with particular risk behaviours. The complexity of the issues and the difficulty in collecting data suggest that these uncertainties will remain, at least in the short term. Whilst this remains the case, developing exact assessments of impact will be challenging.

Assessing the conversion of participation in a programme to lifetime behaviour change would clearly require a number of long-term tracking studies. Even were these to be initiated now, the delay between action (the programme) and the long-term behaviour change remaining into 50's, 60's or later (effect), the results would not be available, literally, for decades. Further work is required to establish short-term proxies that can provide an indication of the long-term outcome. This may be reflected in YHP supported research currently being undertaken by Imperial College London and due for publication in 2018.

Most importantly this evaluation highlights the need for common metrics; both between programmes run by, or for, a single entity, and across the sector. These could be developed as a small core set that can be applied to any size of programme – including those smaller programmes that are also part of the YHP – with a larger and more detailed set for more substantial initiatives.

This approach could include some form of external validation and provide common survey methodologies, although again this may be challenging due to the accessibility of some of the audiences.

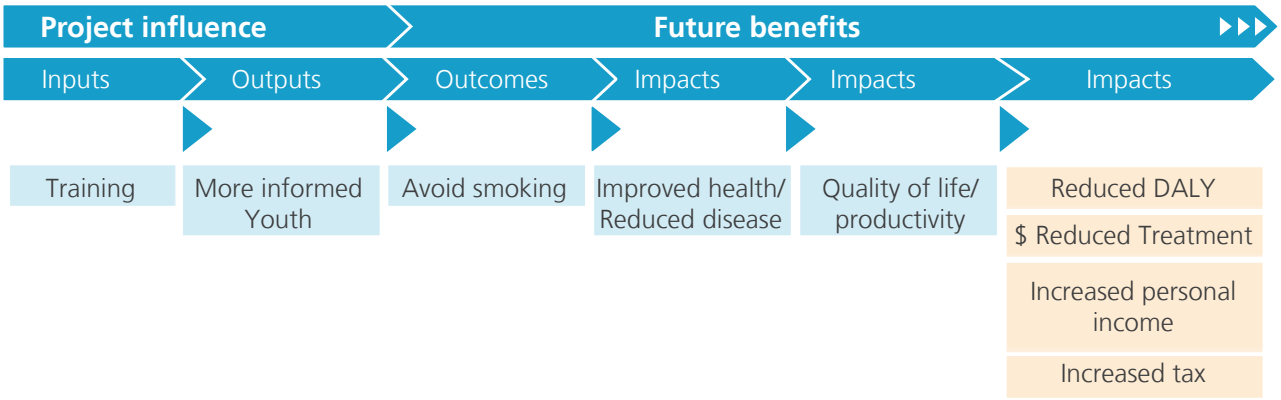
In developing this valuation we have sought to be as open as possible in the hope that this will assist others in developing programmes; and encourage them also to share their results and insights. This will help to improve the transparency and cost-effectiveness of programmes, and in turn this should help to encourage further funding and activity from the public, private and charitable sectors into effective interventions in the health of young people.

Photographer: Trinity Kubassek

Appendix – SROI Model and Data

YHP SROI Theory of Change Model

The TOC that forms the basis of this SROI evaluation can be seen as a series of steps, each dependent on its predecessor. The steps are indicated in the upper part of this figure (which relates to smoking behaviour as the example) with the metrics that can be applied to each step in the lower part.



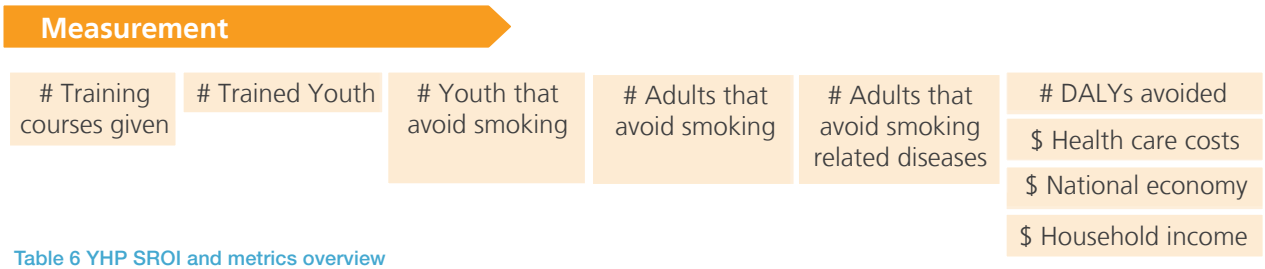


Table 6 YHP SROI and metrics overview

Data and assumptions are required to answer these three question clusters:

1		2	3	
How many training modules delivered?	How many adolescents reached ?	How many adolescents change behaviour and avoid smoking in adulthood?	What is the benefit gained by avoiding the risk factor?	Health?
				Economic?

Table 7 YHP SROI Key questions

#1 How many adolescents, or others impacted by the activity, were reached?

The number of adolescents reached, and how they were reached, can be derived from the statistical reports of the country programme managers.

These numbers are reported by the delivery partners and have not been subjected to an independent audit.

#2 What was the effectiveness of this interaction in changing behaviour?

There is no direct evidence of this effectiveness as the data were not collected and, even if they had been, they would have been inadequate as they could only represent behaviour change over a very few years rather than a lifetime.

The effectiveness is likely to vary according to the type of intervention, with the four Focus programmes each having different levels of interaction, and being delivered in different ways. These differences, however, are impossible to model due to lack of specific evidence.

The level of long-term behaviour change can be estimated using data from similar projects and research and from local, national and global data.

It is important that factors affecting the behaviours of the general population are taken into account so that the specific net impact of the programme can be evaluated – for example smoking and drinking rates vary considerably between countries. Again caution should be taken as these interventions may particularly affect atypical groups in the population – this is especially so in Brazil and India where particularly disadvantaged groups have been the beneficiaries of the programmes.

#3 What is the benefit gained from the behaviour change?

The health benefits of the behaviour change are in reduced morbidity and premature mortality. There are national data that provide some indication.

These benefits are then assigned a financial value, representing direct economic savings from avoided healthcare costs; and indirect economic benefits from increased economic productivity through avoiding disease.

Photographer: Marco Betti for YHP India

Key Metrics and Data

Assessing Programme Conversion Rates

Each of the programmes affected a variety of people at varying levels of intensity and, to some extent, with differing messages. The result is a variety of levels of likely impact and consequent long-term behaviour change ('conversion') as a result of each programme. The data on conversion rates is very limited but there is an indication in the Brazil report: "There was a reduction in the number of young respondents who reported using substances down to 13% in the end-line compared to nearly 50% in the mid-line evaluation". We have used this as a starting point for estimating the conversion rates of all of the Focus programmes.

In other words, 37% of the cohort were converted (50% with the Risk Factor at the start less 13% with the Risk Factor at the end); or 74% of those with the Risk Factor were converted (37% as a proportion of the 50% with the Risk Factor).

We are very conscious however that this does not account for Dropoff and Deadweight.

Dropoff

'Dropoff' represents the proportion of people who having initially changed their behaviour (in this case at the end-line of the project) later lapsed.

In the Maranhão example we know that 74% of those likely to take up the behaviour were able to avoid doing so during the period of their participation in the programme.

Clearly this change is unlikely to be sustained throughout their lifetimes as the, clearly considerable, effect of the course wears off and other influences come to bear. There are no authoritative data on Dropoff rates for this sort of programme although we know from the literature that the rates are likely to be very considerable. We have therefore estimated the average Dropoff to be around 95%.

This suggests that approximately 4% of the group that are likely to take up the behaviour (74%*5%) are likely to give it up permanently as a result of the intervention. We have called this the 'conversion' rate.

Deadweight

'Deadweight' represents the proportion of people unlikely to take up a behaviour irrespective of whether a programme is run or not and varies significantly according to the behaviour.

For the population in the Maranhão Brazil example above we can establish that 50% were unlikely to take up the activity anyway (midline evaluation).

This is the Deadweight for substance use in this particular instance. Deadweight for tobacco use for example was 85% (i.e. only 15% of Brazilians smoke regularly) (US National Cancer Institute and World Health Organization, 2016); and for alcohol misuse 94% (WHO, 2014) - note these are national averages and the deadweight is likely to be considerably lower in the disadvantaged local population addressed by the project. In using the national numbers for this and the other projects we are thus taking a very conservative approach.

Deadweight greatly reduces the number of people who are affected by the activity as we can, for example, count only the 15% who are likely to smoke who can be persuaded not to as a result of the programme.

Influence and reach

The estimates above are for the influence on direct participants in the programmes, but these only form one of four groups in our analysis. The participation counts are taken direct from the country reports and represent almost the total reach of people affected by the programme. The exception is the Indirect/Influencer group (see below) where we have assumed that they will talk about it at some length to people outside the programme itself. The groups divide as follows:

> **Direct (4% conversion rate) (2% for Romania** – see below) – this group is the adolescents directly targeted for behaviour change by the programme, they may hear the message multiple times in a structured intervention in a classroom - as in Romania - or a more variable number of times and ways for example through street theatre in Delhi. The conversion rate is as discussed above.

SuperDirect (20% conversion rate)(10% for Romania) - these were those most closely engaged in the programme, mainly Peer Educators, and heard and transmitted the messages many times. It is likely that a high proportion adopted these behaviours primarily out of personal conviction; we have therefore assumed that these SuperDirects would be five times as likely to change their behaviour permanently compared to the Direct participants. We used a lower conversion rate of 10% for the Romanian programme as the programme collected data that showed that there was a 10.4% positive increase in sport practiced per week following the programme – compared with the start of the programme. We followed this rate through to the other conversion rates.

Indirect/Influencer (4% conversion rate) (2% for Romania) – these people were not planned recipients of the message but were closely associated with its delivery – for example teachers working with the programme in Brazil, or parents of peer-educators hearing a great deal about the programme at home from their peer-educator children, or siblings in Canada. As these would have considerable contact and be in a position of some authority we have assumed that they would have a similar effect on another unconnected adolescent for example another pupil or child not formally covered by the initiative as if they had Directly participated (represented by a 2 in the multiplier column in the table below).

Broadcast (0.02% converted) (0.01% for Romania) – this group has the lowest level of association with the message as they encounter it through for example broadcast or social media. They are passive participants and they receive the YHP messages among many other, often conflicting, messages - which are likely to dilute its effectiveness. We have assumed that they are only 0.5% as likely to convert as Direct participants. The numbers given for this total group have been conservatively estimated from the data provided.

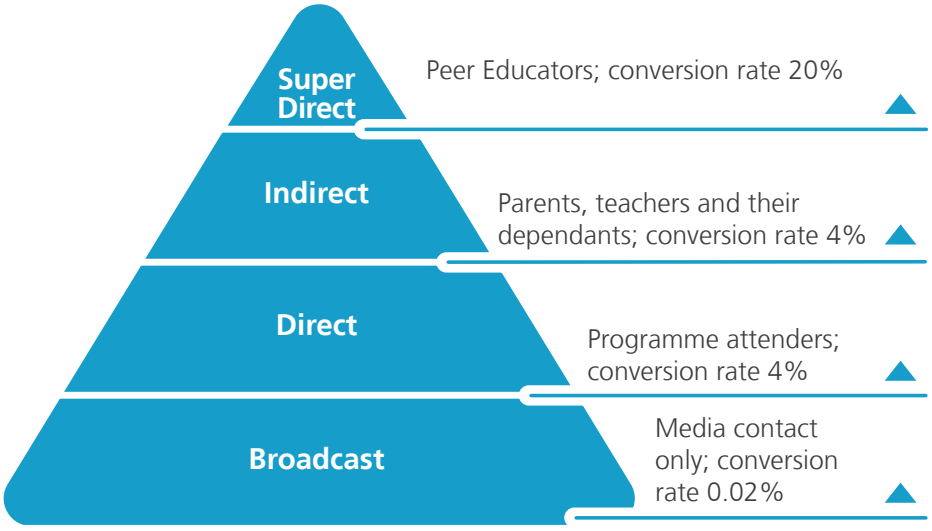


Figure 2 Conversion rate by audience group

Duplication

It is clear from the programme reports that there can be a significant overlap between the risk factors and their health effects; that these relationships are complex; and that they can change considerably with age. We have tried to avoid double-counting the benefits by allowing for this overlap.

Data from the GBD for Brazil show that the sum of DALYs attributed to each individual risk factor (19.09Mn) is greater than the total sum of risk factors (16.64Mn). This indicates that the 2.45Mn DALYs difference is duplication; and that a proportion of people (13%) have more than one risk factor.

Behavioural Risks Brazil 2015 all ages, both sexes (DALYs Mn)	
Alcohol & Drug Use	3.87
Child & maternal malnutrition	1.75
Dietary Risk	6.79
Low Physical Activity	1.40
Sexual Abuse & Violence	0.27
Tobacco smoke	3.72
Unsafe sex	1.29
DALYs due to Behavioural Risks - Added up individually (million)	19.09
DALYs due to Behavioural Risks - Total (million)	16.64
DALYs duplicated	2.45
Duplication	13%
Factor required to deduplicate	87%

Table 8

The same issue applies with the sum of the three main risk categories (Environmental, Behavioural, Metabolic).

Environmental, Behavioural and Metabolic Risks Brazil 2015 all ages, both sexes (DALYs Mn)	
Environmental/occupational risks	4.06
Behavioural risks	16.64
Metabolic risks	10.36
DALYs due to All Risks - Added up individually (million)	31.06
DALYs due to All Risks - Total (million)	22.49
Duplication	28%
Factor required to deduplicate	72%

Table 8a

Scaling Factor Calculation	
Behavioural risks deduplication factor	87%
Environmental, behavioural and metabolic risks deduplication factor	72%
Net deduplication factor	63%
Overall deduplication factor used	60%

Table 8, 8a and 8b Duplication scaling factor assumptions

Table 8 shows that when added together the DALYs attributed to the individual risk behaviour totals 19.09Mn DALYs; whereas the total for all of the individual activities is 16.64Mn. We can therefore assume that the difference between these two figures (13%) is the overall level of duplication, or put another way only 87% of the calculated effect of any behaviour change in any one area should be attributed in the Model.

The same calculation for the second table returns a duplication rate of 72%.

For conservatism we have multiplied the two values together, returning a value of 63%. Conservatively we have taken 60% as the overall deduplication factor.

External evidence for duplication

A longitudinal study based on the Finnish North Karelia project followed students over 13 years and found that smoking was related with both alcohol use and with leisure-time physical inactivity in each of the three surveys undertaken. However (Paavola M., 2004) also noted that the relationship could change with age, specifically:

- smoking prevalence increased strongly between the ages of 15 and 21 years, and stabilised after that, but the prevalence of alcohol use continued to increase between the ages of 21 and 28 years
- in adolescence the correlation between tobacco use and alcohol use is strong but this diminished with age as drinking became more universal
- the prevalence of leisure-time physical activity did not change much with age

Other researchers have identified the correlation between adolescent smoking and the assumption of other NCD risk behaviours. A Minnesota study (Larson N., 2007) demonstrated that students who smoked daily were less likely to undertake an hour or more vigorous physical exercise per week (71% vs 79.6%); or participate in team sport (46% vs 64.5%). Thus there would seem therefore to be a correlation between smoking and under-activity.

There is also a link with unhealthy eating habits. Daily smokers were found to be much less likely to have breakfast, lunch or dinner or participate in 'family meals'. Conversely they were more likely to eat three of more meals of 'fast food' per week (36.6% vs 19.7%). Their total daily energy intake was also around 13% higher (2368kcal vs 2104kcal) (Larson N., 2007).

	Nominal reach	Multiplier	Actual reach	Conversion rate	Converted (gross)
Direct	1,000	1	1,000	4%	40
Superdirect	100	1	100	20%	20
Indirect/ influencer	1,000	2	2,000	4%	80
Broadcast	100,000	1	100,000	0.02%	20
Total/average	102,100		103,100	0.16%	160

Table 9 Gross conversion rate (demonstration calculation)

Example of the Conversion Assumptions

The effects of Deadweight, Dropoff, Influence and Reach and Duplication are illustrated in the demonstration calculation below:

- The nominal reach of the programme was 102,200 and these people were divided into the four categories.
- The actual reach is a little higher (103,100) as a multiplier has been added for the Indirect/ Influencer group to represent the additional adolescents with whom they communicate. For Brazil, India and Romania the multiplier is 2 for the Influencers. For Canada we took a multiplier of 20 for the influencers to reflect the fact that the influencers were Boys and Girls Club of Canada staff who took the Flex Your Head programme and delivered it to their clubs. 20 is a conservative estimate for the number of youth each staff member worked with.
- The conversion rate e.g. 4% for Direct participants is derived from the overall conversion rate, with Dropoff as discussed above.
- The overall average Percentage Converted (0.16%) is thus the gross total proportion of the audience that we would expect to have their lifetime behaviour changed ('converted') as a result of the programme if all participants were likely to take up the behaviour in normal circumstances.
- Note this is 'gross' as there are further modifications to the number as described below.

The table opposite shows the effect of considering Deadweight i.e. the people who would be unlikely to take up the behaviour irrespective of the programme.

- The total number for gross converted (160) has been taken from the previous table.
- To adjust for Deadweight this is then multiplied by the % incidence of each of the risk behaviours in the adult population e.g. in this example 5% of adults misuse alcohol and 20% smoke tobacco.
- The resulting number is the total adjusted.
- This is then modified again to allow for duplication, by multiplying it by 60% the factor calculated above.
- The net lives converted is thus the number of lives in which behaviour is likely to have been permanently transformed fully allowing for Deadweight, Dropoff and Duplication.

	Total converted (gross)	Adult incidence of risk behaviour (%)	Total adjusted	Net conversion at 60% duplication
Alcohol	160	5%	8	5
Tobacco	160	20%	32	19
SRH – STI	160	10%	16	10
SRH – Teen Pregnancy	160	1%	2	1
Violence	160	5%	8	5
Total				40

Table 10 Net conversion (demonstration calculation)

Assessing Health Benefits

The Brazil and India programmes especially targeted disadvantaged and hard-to-reach groups, for whom accurate data is usually sparse at best and can be highly unreliable. These groups typically have lower life expectancy than average.

Generic national data are usually available on, for example, levels of obesity or tobacco use. Clearly some of these data are of limited quality as health service provision, let alone the collation of accurate health statistics, is far from universal. They are also likely to vary considerably across segments of the population and between sexes. As we have no clear data for how the programme participants vary from the norm we have taken national averages.

The core data and tools that we have used in assessing the health benefits are:

- The World Health Organisation's Global Burden of Disease study (Institute for Health Metrics and Evaluation).
  - » This is the most comprehensive worldwide observational epidemiological study to date. It describes mortality and morbidity from major diseases, injuries and risk factors to health at global, national and regional levels. This provides authoritative data from 1990 to the present on morbidity and mortality caused by specific risk factors e.g. tobacco smoking, and on specific diseases, e.g. lung cancer, by country.
- Disability-adjusted life years (DALYs)[5]
  - » This tool originated in the work by the Institute for Health Metrics and Evaluation (IHME) in creating the GBD and creates a metric to compare the health data. DALYs bring together morbidity and mortality:
- Years Life Lost (YLL) - the number of years that an individual would have been expected to live if they had not died at that point from that cause. This can extend to other individuals beyond the person with the disease or risk factor, for example those killed by an individual's dangerous driving whilst under the influence of alcohol.
- Years Living with Disability (YLD) – the number of years of life that are impaired by disease, adjusted by a weighting factor from 0-1 according to the severity of the impairment (0=not serious; 1=Fatal).

5 A fuller explanation of how YLL and YLDs are calculated and the underlying assumptions can be found at http://www.who.int/healthinfo/global_burden_disease/metrics_daly/en/

Figure 3 Description of Disability Adjusted Life Years

The GBD data and the DALY tool provide directly comparable information on the morbidity and premature mortality attributable to underlying risk factors by country and, from this, the average health benefit per person of avoiding that risk factor can be estimated, all other factors being equal.

This can then be multiplied by the number of people positively affected by the programme to avoid the risk factor (e.g. smoking) to identify the overall impact of the programme, whilst making suitable allowance for the proportion of people who will:

- not have taken up the behaviour anyway, irrespective of the programme (Deadweight)
- lapse at some stage, and take up the risk factor behaviour again (Dropoff)

Multiple negative behaviours e.g. smoking and physical inactivity can often be undertaken by the same individual. We have worked to avoid this double counting.


Photographer: Bahaa A. Shawqi

Assessing Economic Benefit

The economic benefits are calculated from the avoided impacts of ill health, and are essentially a way of expressing them in financial terms. The economic benefits can summarised into the following categories:

- Healthcare costs – medical, hospital and treatment costs
- Personal costs - decreased personal income through reduced ability to work
- Tax costs – reduced contribution from affected people
- Externalised costs – affecting third parties e.g. dealing with alcohol related crime, the effect on employers and on families

These are calculated in a variety of ways and with varying parameters according to the particular study but can broadly be categorised as the:

- 'direct' costs for the treatment of the condition (with varying proportions borne by the state, insurance and the individual)
- 'indirect' costs comprising some or all of the personal, tax and externalised costs

although again the categorisations into direct and indirect can vary considerably.

These costs are borne by a variety of stakeholders, who may vary considerably by country – for example in India healthcare costs are likely to be borne by the family; in Canada by the state through the tax system. Studies examining these costs often use differing assumptions and cost headings. This has made comparison between countries and time periods challenging.

An alternative approach taken by some health economists, e.g. as reported by the Disease Control Priorities Project (Musgrove P., 2006), applies a Value of Life to the Disability Affected Life Years averted. This approach is useful for comparing different treatment methods and their costs across a range of diseases and a relatively homogeneous population, and has an attractive simplicity. It does, however, become problematic with wide variations in the population under scrutiny leading to wide differences in the valuation of lives between those living in richer and poorer countries, and can be unhelpful.

Some studies have expressed the total direct and indirect costs as a percentage of GDP at a national, regional, or global level. Although the proportion of GDP spent on direct treatment by the state varies considerably between countries according to their level of economic development and healthcare funding regime we have assumed that the costs are broadly comparable.

Where individual country data is available we have used that in preference to regional or global data.

Assessing Economic Impacts

We have shown the methodology for estimating the number of people whose lives have been transformed by the programmes, through avoiding some adolescent health related morbidity or premature mortality, in the previous section. In this section we apply a financial value to this benefit.

This valuation varies between countries due to the differing levels of economic prosperity, but can be benchmarked by using the measure of the proportion of GDP that is lost due to the risk factor. These data are summarised in the Appendix.

Calculating the value per person

The percentage of GDP value represents the sum of the direct (healthcare) and indirect (economic) costs in any given year.

- Direct costs
  - » Healthcare costs – medical, hospital and treatment
- Indirect costs
  - » Personal - decreased personal income through reduced ability to work
  - » Tax – reduced contribution from affected people
  - » Externalised – affecting third parties e.g. dealing with alcohol related crime or effect on employers of staff with health issues

This is an average cost across genders and age groups that will be incurred annually over the lifetime of the person with the Risk Factor.

In order to determine the value per person the table below sets out:

- **Direct** and **Indirec**t and therefore **Total** costs as a % of GDP, the assumptions for this are in Financial Data and Assumptions section
- The **Total GDP** has been added from **World Bank data**
- By multiplying the GDP by the **Total Costs Percentage** we derive the **Total Costs $**
- By dividing the **Total Costs $** by the number of people affected by the risk factor (incidence of risk factor multiplied by the total population) we havwwe derived the **Costs per Person per Year**
- The **Costs per Person per Year** is a g**ross value** as it will be modified (see below)

	Country	Direct Costs	Indirect Costs	Total Costs	GDP	Costs	People Affected	Costs/ person/ year (gross)
		%GDP	%GDP	%GDP	$Bn	$Bn	Mn	$
Alcohol	BR	0.5	1	1.5	2,478	37	8.5	4,376
	IND	0.5	1	1.5	1,864	28	21.8	1,281
SRH - P	BR	0.01	0.09	0.1	2,478	2	1	2,581
	IND	0.01	0.09	0.1	1,864	2	3.7	511
SRH - STI	BR	0.1	0.1	0.2	2,478	5	50	100
	IND	0.1	0.1	0.2	1,864	4	316	12
Tobacco	BR	1	1	2	2,478	49	28.8	1,720
	IND	1	1	2	1,864	37	133.8	278
Violence	BR	0.02	5	5.2	2,478	124	38.4	3,240
	IND	0.02	5	5.2	1,864	94	243.2	385
Mental Health	CDN	1.3	1.7	3	1,778	53	6.9	7,735
Obesity	RO	1.30%	0.50%	1.8	183	3	5.3	616

Table 11 Conversion value per person per year (gross)

Adjusting for Inequality

The Plan International programmes in Brazil and India, and the programme in Canada, specifically targeted some of the most marginal groups with the lowest socio-economic status. For the purposes of the SROI we have assumed that they are in the two lowest income quintiles (40%) and that health resources are allocated to them in proportion to their income.

World Bank statistics indicate that in 2014 the lowest two quintiles in Brazil earned 12% of total income; Canada 20%; India 20%; and Romania 23% (World Bank Development Research Group).

The Romania programme, however, was aimed more broadly at the general population and so we have assumed that the contribution and health costs are at the national average.

Country	Adjustment for Inequality
Brazil	12%
Canada	20%
India	20%
Romania	n/a

Table 12 Inequality adjustment

The effect of adjusting for inequality is as below:

Adjusting for Life Expectancy

To identify the total financial benefit per person we must establish for how many years the benefit will be sustained i.e. the difference between the anticipated age of onset and the average age of death. To identify this duration we have taken the period in which 80% of the DALYs have been incurred.

For example, if 80% of alcohol related DALYs in Brazil occur between the ages of 40 and 80, we can assume that to be the range that 80% of costs will have been incurred. This varies by country (Institute for Health Metrics and Evaluation).

This value has been discounted at 3% per annum for future years to allow for future uncertainty and the erosion of the value of money over time, through inflation. This is a standard accounting convention and represents the uncertainty in the assumptions – for example if a cure for cancer became universally available this would have a dramatic effect in reducing the costs related to cancer treatment. This convention is the subject of some specialist debate, but has been conservatively included here.

The discount adjustment is based on applying the 3% discount rate to each of the years between the 'age at onset' and the 'age at end' – both with a starting date of aged 15 (to allow for the average age at which participants leave the programmes).

	Country	Costs/ person/ year (US$)	Inequality (%)	Net cost/ person/ year (US$)
Alcohol	BR	4,376	12	525.12
	IND	1,281	20	256.2
SRH - P	BR	2,581	12	309.72
	IND	511	20	102.2
SRH - STI	BR	100	12	12
	IND	12	20	2.4
Tobacco	BR	1,720	12	206.4
	IND	278	20	55.6
Violence	BR	3,240	12	388.8
	IND	385	20	77
Mental Health	CDN	7,735	20	1,547
Obesity	RO	616	-	616

Table 13 Conversion value per person per year (net)

In the table below:

The Average Lifetime with Costs is calculated by subtracting the Age at Onset from the Age at End (death)

The Discount Adjustment is then applied. This represents the 3% applied cumulatively through the period to calculate the Discounted Years

Note that the further into the future (e.g. age at onset being 40 rather than 20) the greater the discount that will be applied.

By taking the discounted years and multiplying this by the net cost per person per year (see below) we have derived a cost per person per lifetime.

Risk Activity	Country	Onset age	End age	Average Lifetime with Costs	Discount Adjustment	Discounted Years
Alcohol	BR	40	80	40	0.28	11
	IND	20	60	40	0.51	20
SRH - P	BR	15	30	15	0.80	12
	IND	15	30	15	0.80	12
SRH - STI	BR	25	60	35	0.46	16
	IND	15	65	50	0.52	26
Tobacco	BR	20	65	45	0.47	21
	IND	35	79	44	0.30	13
Violence	BR	15	45	30	0.67	20
	IND	15	60	45	0.56	25
Mental Health	CDN	15	60	45	0.56	25
Obesity	RO	55	80	25	0.20	5

Table 14 Discounted years of conversion effect

	Country	Net costs/ person/ year (US$)	Discounted years	Lifetime costs/ person (US$)
Alcohol	BR	525	11	5,776
	IND	256	20	5,124
SRH - TP	BR	310	12	3,717
	IND	102	12	1,226
SRH - STI	BR	12	16	192
	IND	2	26	62
Tobacco	BR	206	21	4,334
	IND	56	13	709
Violence	BR	389	20	7,776
	IND	77	25	1,925
Mental Health	CDN	1,547	25	38,675
Obesity	RO	616	5	3,080

Table 15 Cost per person per lifetime

In the following Appendices we have set out the details of how the costs have been modelled.

Programme Costs

The investment taken for each programme is the direct AstraZeneca funding for the programme for the relevant period. Where a programme is set up to achieve several objectives, for example behaviour change and advocacy, we have only included the investment relevant to the objectives that we have tracked – so that the investment is matched to the return in the SROI.

Calculating the YHP Social Return on Investment

The YHP SROI model calculates the total positive financial benefit per project by taking the Total Costs Avoided per Lifetime and multiplying it by the number of lives converted.

These DALYS and Costs Avoided can then be compared with the financial investment as below:

	Investment ($'000)	Costs Avoided ($'000)	SROI Ratio	DALYs Avoided	DALYs Avoided per $'000 invested	Cost to avoid one DALY	Investment per life changed ($)
Brazil	781	6,599	8.4	3,706	4.7	211	458
India	540	3,531	6.5	7,653	14.2	71	158
Canada	655	4,359	6.7	335	0.5	2,190	5,797
Romania	200	1,759	8.8	2,584	12.9	77	350

Table 16 by Country Total Social Return on Investment

Photographer: Paolo Black for YHP India

Appendix – Health Impact Data and Assumptions

This section demonstrates how the average value of premature mortality and morbidity in Disability Adjusted Life Years have been calculated.

The core reference dataset is:

- Global Burden of Disease study 2015, which contains DALYs, Deaths, YLD and YLL for the various Risk Factors.
- Population data have been taken from UNSD Demographic Statistics (UN Data, 2017).

Specific paper and other information sources are cited in the 'Source' column of the tables as appropriate.

The underlying calculation is as follows:

- **DALYs Attributable to the Risk Behaviour** in thousands of DALYs from the GBD
- The duplication factor (60%) is then applied to find the number related solely to this risk factor **(Duplication Adjusted DALYs)**
- **Number of people suffering from the condition** is then derived by multiplying the **Percentage Incidence** of the risk factor with the total national population
- The DALYs Attributable per Person is calculated by dividing the **Duplication Adjusted** figure by the Number of People with the condition
- These have been rounded down for conservatism.

Photographer: Isabella Mendes

Brazil and India Risk Factors (Plan International Programmes)

Alcohol (Brazil and India)

	Unit	Source	Brazil	India
DALYs Attributable to Risk Behaviour	'000	GBD	3,424	14,748
Duplication Adjusted Attributable DALYs	'000 DALY		2,056	8,849
Incidence of age 15+ population (alcohol use disorders)	%	(WHO, 2014)	5.6%	2.6%
No. people suffering from the condition age 15+	Mn		8.5	21.8
Average DALY attributable per person	DALYs/'000 people		242	406

Table 17 Alcohol

Sexual & Reproductive Health (Brazil and India)

Our analysis is based on teenage pregnancy and sexually transmitted infections (STIs).

Teenage Pregnancy (SRH-P)

Total DALYs for Maternal Disorders of 10-19 year olds were18,000 in Brazil and 500,000 in India (WHO, 2017).

Sexually Transmitted Infections (SRH-STI)

We have taken a rounded figure of 26%

	Unit	Source	Brazil	India
DALYs Attributable to Risk Behaviour	'000	GBD	823	12,781
Duplication Adjusted Attributable DALYs	'000 DALY		494	7,669
Incidence in population	%	(Centers for Disease Control and Prevention/National Center for HIV/AIDS Viral Hepatitis STD, and TB Prevention 2013)	26%	26%
No. people suffering from the condition	Mn		50	316
Average DALY attributable per person	DALYs/'000 people		10	24

Table 18 STI, DALY attributable per person

Note: CDC result rounded to 20%.

Tobacco (Brazil and India)

	Unit	Source	Brazil	India
DALYs Attributable to Risk Behaviour	'000	GBD	3,717	26,229
Duplication Adjusted Attributable DALYs	'000 DALYs		2,230	15,737
Incidence in population	%	(US National Cancer Institute and World Health Organization 2016)	15%	11%
No. people suffering from the condition	Mn		28.8	133.8
Average DALY attributable per person	DALYs/'000 people		77	118

Table 19 Tobacco, DALY attributable per person

Violence (Brazil and India)

	Unit	Source	Brazil	India
DALYs Attributable to Risk Behaviour	'000	GBD	3,286	2,095
Duplication Adjusted Attributable DALYs	'000 DALYs		1,971	1,257
Incidence in population	%	(National Center for Injury Prevention and Control, 2011)	20%	20%
No. people suffering from the condition	Mn		38.4	243.2
Average DALY attributable per person	DALYs/'000 people		51	5

Table 20 Violence, DALY attributable per person

Note: NCIP result rounded to 20%.

Canada Risk Factors

Mental Health

	Unit	Source	Canada
DALYs Attributable to Risk Behaviour	'000	GBD	759
Duplication Adjusted Attributable DALYs	'000 DALYs		455
Incidence in population	%	(Mental Health Commission of Canada)	20%
No. people suffering from the condition	Mn		6.9
Average DALY attributable per person	DALYs/'000 people		66

Table 21 Mental health, DALY attributable per person

Note: MHCC result rounded to 20%.

Romania Risk Factors

Obesity

	Unit	Source	Canada
DALYs Attributable to Risk Behaviour	'000	GBD	1,612
Duplication Adjusted Attributable DALYs	'000 DALYs		967
Incidence of age 15+ population (alcohol use disorders)	%	(WHO Media Centre, 2016)	25%
No. people suffering from the condition	Mn		5.3
Average DALY attributable per person	DALYs/'000 people		181

Table 22 Obesity DALY attributable per person

Note: WHO uses figures for global overweight of 39% and obesity of 13%. Result rounded to 25%.

Summary of Risk Factor estimates

Risk Factor	Country	DALYs lost per '000 people	Number of people (millions)
Alcohol	Brazil	242	8.5
Alcohol	India	406	21.8
SRH	Brazil	10	50
SRH	India	24	316
Tobacco	Brazil	77	28.8
Tobacco	India	118	133.8
Violence	Brazil	51	38.4
Violence	India	5	243.2
Mental Health	Canada	66	6.9
Obesity	Romania	181	5.3

Table 23 DALY per person attributable by risk factor


Photographer: Paolo Black for YHP Brazil

Appendix – Economic Data and Assumptions

Financial values are calculated in a variety of ways, from multiple sources and with varying parameters according to the particular study. GDP values are from the World Bank (World Bank International Comparison Program).

For simplicity and comparison we have calculated costs as a % of GDP wherever possible. We are fortunate to have an overview (Scarborough P, 2011) of total UK direct health costs against which to compare for a sense check.

	£ billion	% GDP
Poor Diet	5.8	1.4
Physical inactivity	0.9	0.2
Smoking	3.3	0.8
Alcohol	3.3	0.8
Obesity and overweight	5.1	1.2
GDP Q1 2007 £423.5Bn		

Table 24 Direct (healthcare) costs comparison (2006/7) by risk factor (Scarborough)

The costs can summarised into Direct and Indirect although the specific inclusions as can vary considerably:

- Direct costs
  - » Healthcare – medical, hospital and treatment costs (with varying proportions borne by the state, insurance and the individual)
- Indirect costs
  - » Personal - decreased personal income through reduced ability to work
  - » Tax– reduced contribution from affected people
  - » Externalised costs – affecting third parties e.g. dealing with alcohol related crime or effect on employers of staff with health issues

Photographer: Paolo Black for YHP Brazil

Brazil and India Economic Data (Plan International Programmes)

Alcohol

	Source	Direct	Indirect	Total
UK Cabinet Office - Total	(Cabinet Office Strategy Unit, 2003)			7%
As above - crime related £ removed		0.50%	2%	2.50%
HITAP	(Thavorncharoensap M., 2009)	0.50%	1%	1.50%
Rehm et al	(Rehm J, 2009)		1.7%	2.1%
Estimate for SROI Model		0.5%	1.0%	1.5%

Table 25 Alcohol costs as % of GDP

Tobacco

A U.S. National Cancer Institute and World Health Organization study of studies (US National Cancer Institute and World Health Organization, 2016) summarised studies from a variety of high medium and low income countries including Canada and India and we have calculated averages for the categories from their findings as below.

Country	Country Category	Cost as % of GDP
India	Low and medium	1.2%
Canada	High	1.5%
Average (calculated for Model)	Low and medium	1.06%
Average (calculated for Model)	High	1.17%

We have taken an average direct cost for the SROI Model conservatively to be 1%, with an equivalent figure for Indirect Costs.

% of GDP	Direct	Indirect	Total
Estimate for SROI Model	1.0%	1.0%	2.0%

Table 26 Tobacco costs as % of GDP

Violence

Social and Economic Costs of Violence: Workshop Summary Source (Forum on Global Violence Prevention, 2012) identifies global figures as follows:

	Direct $Bn	% of GDP
Direct costs - short term medical expenses (1994)	1.8	0.02%
Indirect costs*	507	6.50%

* Lost earnings, psychological costs and the opportunity costs of victims' time, in addition to the costs of policing, incarceration and life insurance

We have taken a slightly more conservative estimate of Indirect costs as below:

% of GDP	Direct	Indirect	Total
Taken for SROI Model	0.02%	5.0%	5.02%

Table 27 Violence costs as % of GDP

Sexual and Reproductive Health (SRH)

We have taken as the key measures, the cost of teenage pregnancy and of sexually transmitted infections (STI).

Teenage pregnancy

We have used UK data to identify Direct and Indirect costs, as a % of GDP, for the UK and compared these to published studies which include GDP estimates.

	Source	Direct	Indirect	Total
Cost per unintended pregnancy	(Thomas CM.)	£1,663	£1,259	£2,922
Number of Teenage Pregnancies	(Development Economics, 2013)	91,834	91,834	91,834
Total cost £'000 {calculation}		**152,720**	**115,619**	**268,339**
Cost as % of GDP {Calculation*}		0.01%	0.01%	0.02%

*GDP calculation based on 2011 GDP of £1,537 Bn

Summary of estimates from studies - costs of teenage pregnancies as % of GDP:

	Source	Direct	Indirect	Total
Thomas Cameron	(Thomas CM.) adapted as above	0.01%	0.01%	0.02%
Development Economics	(Development Economics, 2013)	0.01%		
The National Campaign	(The National Campaign to Prevent Teen and Unplanned Pregnancy, 2013)			0.06%
World Bank Policy Research	(Chaaban J., 2011)			0.1%
Estimate for SROI Model		0.01%	0.09%	0.1%

Table 28 Teenage pregnancy costs as % of GDP

Sexually Transmitted Infections

A US study (Incidence, Prevalence, and Cost of Sexually Transmitted Infections in the United States (p1)) (Centers for Disease Control and Prevention/ National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, 2013) estimated the direct costs of STIs at $16bn (2010) (or 0.1% of GDP – calculated from US GDP = $15,538 Bn (2011)). We could allow a further 0.1% of GDP for indirect costs.

We have estimated average conservative costs for the SROI Model as follows:

% of GDP	Direct	Indirect	Total
Estimate for SROI Model	0.1%	0.1%	0.2%

Table 29 STI costs as % of GDP

Canada Economic Data

Mental Health

A study from the UK Centre for Mental Health identified three main cost headings (2009/10 prices and based on UK GDP of £1537Bn in 2011):

The Indirect Canadian costs for lost productivity appear very low, although the total Direct and Indirect costs appear similar.

	Source	Direct	Indirect	Direct	Indirect	Total
UK (GBP Bn)	(Centre for Mental Health)	21.3	30.3	1.4%	2.0%	3.4%
Canada(Group) CAN$ Bn)	(Mental Health Commission of Canada)	42.3	6.4	2.8%	0.2%	3.0%
Estimate for SROI Model				1.3%	1.7%	3.0%

Table 30 Mental health costs as % of GDP

Note: Output losses to the UK economy from reduced ability to work are included in the above but not the more intangible 'quality of life' costs (in the UK valued at £53.6Bn).

Romania Economic Data

Obesity

For simplicity we have used the:

- incidence of obesity as a proxy for the effects of poor diet and physical inactivity given the close relationship between these causal two factors
- diabetes costs as an indicator of the costs associated with obesity.

The direct and indirect costs of diabetes are set out in the tables below from Bommer's 2017 paper: The global economic burden of diabetes in adults aged 20–79 years: a cost-of-illness study (Bommer C.).

The Indirect costs include absenteeism, presenteeism, labour force drop and mortality.

	Source	Direct	Indirect	Direct	Indirect	Total
UK (GBP Bn)	(Centre for Mental Health)	21.3	30.3	1.4%	2.0%	3.4%
Canada(Group) CAN$ Bn)	(Mental Health Commission of Canada)	42.3	6.4	2.8%	0.2%	3.0%
Estimate for SROI Model				1.3%	1.7%	3.0%

Table 31 Diabetes costs as % of GDP

Summary of Economic Estimates

Risk Factor	Direct (healthcare)	Indirect (economic)	Total % GDP
Alcohol	0.5	1.0	1.5
SRH - Pregnancy	0.01	0.09	0.1
SRH - STI	0.1	0.1	0.2
Tobacco	1.0	1.0	2.0
Violence	0.02	5.0	5.02
Mental Health	1.3	1.7	3.0
Obesity	1.3	0.5	1.8

Table 32 Cost by risk behaviour as % of GDP


Photographer: Marco Betti for YHP India

Acknowledgments

This Social Return on Investment Report was commissioned and funded by the AstraZeneca Young Health Programme (YHP) and produced by David Aeron-Thomas and Oliver Griffiths of Powering Partnerships Ltd.

The authors would like to thank:

Helen-Marie Seibel at AstraZeneca Young Health Programme

Liam Sollis, Josie Parmee, Jeske Paijmans, Ben O'Hanlon and Sunanda Mavillapalli at Plan International UK

Denise Raquel Dunning PhD, MPA, MA at Rise Up Together, an initiative of the Public Health Institute

Jonathan Klein MD, MPH, FAAP; Kiran Patel MPH; and Terrell Carter MHS at NCD Child

Professor Robert W. Blum MD, PhD at Johns Hopkins Bloomberg School of Public Health

Toshiko Kaneda PhD at Population Reference Bureau

Stephanie Robertson at SiMPACT Strategy Group

Rachel Nugent PhD and David Watkins of RTI

Professor Majid Ezzati of Imperial College, London

for their insightful review and helpful comments.

The authors also thank:

Mohit Ahuja at Plan India

Poliana Cozzi at Plan Brazil

Aybike Yurtsever Guşa at TOÇEV, Turkey

Verna Luer and Selina Kruger at YHP Germany

Loredana Poenaru at YHP Romania

Carla Fernandes at YHP Portugal

Vladica Jovanovic at YHP Serbia

Camila De Barros Fagundes and Maria C Balro at AstraZeneca Brazil

Vici Zhao at AstraZeneca China

Varsha Das at AstraZeneca India

Gulin Seremet at AstraZeneca Turkey

Irina Berechet at AstraZeneca Romania

for providing detailed descriptions and data on in-country programmes.

Without their input and insights this report would not have been possible but any errors or omissions are ours.

Bibliography

UN Data. (2017, May 22). *Population by age, sex and urban/rural residence*. Retrieved August 18, 2017, from http://data.un.org/Data.aspx?d=POP&f=tableCode%3A22

US National Cancer Institute and World Health Organization. (2016). *The Economics of Tobacco and Tobacco Control. National Cancer Institute Tobacco Control Monograph 21*. Retrieved July 7, 2017, from https://cancercontrol.cancer.gov/brp/tcrb/monographs/21/docs/m21_complete.pdf

WHO. (2017). *Global Burden of Disease Project*. Retrieved August 19, 2017, from http://www.who.int/healthinfo/global_burden_disease/about/en/

WHO. (2014). *Global Status Report on Alcohol and Health 2014 (Country Appendix)*. Retrieved August 7, 2017, from World Health Organisation: http://www.who.int/substance_abuse/publications/global_alcohol_report/en/

WHO Media Centre. (2016, June). *Obesity and Overweight Fact Sheet.* Retrieved August 18, 2017, from http://www.who.int/mediacentre/factsheets/fs311/en/

WHO Media Centre. (2017, February). *Physical Activity Fact Sheet.* Retrieved August 15, 2017, from http://www.who.int/mediacentre/factsheets/fs385/en/

World Bank Development Research Group. (n.d.). *Income share held by lowest x%.* Retrieved August 10, 2017, from http://data.worldbank.org/indicator/SI.DST.FRST.20

World Bank International Comparison Program. (n.d.). *International Comparison Program (ICP)*. Retrieved June 27, 2017, from http://www.worldbank.org/en/programs/icp

World Health Organisation. (2017). *World Health Statistics 2017: Monitoring Health for the SDGs. Geneva.*

World Health Organisation. (2001). *Mental Disorders Affect One in Four People.* Retrieved from http://www.who.int/whr/2001/media_centre/press_release/en/

Vartiainen E., P. P. (1994). *Changes in Risk Factors Explain Changes in Mortality From Ishaemic Heart Disease in Finland*. BMJ, 309.

Buvinic M., M. A. (1999, March). *Violence in Latin America and the Caribbean: A Framework for Action.* Retrieved July 2017, from http://www.juconicomparte.org/recursos/Violence_in_Latin_America_and_the_Caribbean__A_Framework_for_Action_prC2.pdf

Biro FM, W. M. (2010). Childhood obesity and adult morbidities. *American Journal of Clinical Nutrition*, 91 (5), 1499-1505.

Bommer C., H. E. The global economic burden of diabetes in adults aged 20–79 years: a cost-of-illness study. *The Lancet Diabetes and Endochrinology*, 5 (6), 423-430.

Cabinet Office Strategy Unit. (2003, September). Retrieved August 3, 2017, from *Alcohol Research UK:* http://alcoholresearchuk.org/wp-content/uploads/2014/01/strategy-unit-alcohol-costs-2003.pdf

Cabinet Office; Office of the Third Sector. (2009, April). *A Guide to Social Return on Investment. Retrieved* August 18, 2017, from http://neweconomics.org/2009/05/guide-social-return-investment/

Canada, M. H. (n.d.). *Making the Case for Investing in Mental Health in Canada.* Retrieved August 4, 2017, from https://www.mentalhealthcommission.ca/sites/default/files/2016-06/Investing_in_Mental_Health_FINAL_Version_ENG.pdf

Catalano R., B. M. (2004). *Positive Youth Development in the United States: Research Findings on Evaluations of Positive Youth Development Programs.* Annals of the American Academy of Political and Social Science, 591 (98).

Centers for Disease Control and Prevention/ National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention. (2013, February). *Incidence, Prevalence, and Cost of Sexually Transmitted Infections in the United States.* Retrieved July 27, 2017, from https://www.cdc.gov/std/stats/STI-Estimates-Fact-Sheet-Feb-2013.pdf

Centre for Mental Health. (n.d.). *The economic and social costs of mental health problems in 2009/10.* Retrieved July 27, 2017, from https://www.centreformentalhealth.org.uk/Handlers/Download.ashx?IDMF=6a98a6da-b9f5-4a07-b88a-067976a0bf5b

Chaaban J., C. W. (2011, January 8). *Measuring the economic gain of investing in girls : the girl effect dividend.* Retrieved from http://documents.worldbank.org/curated/en/730721468326167343/Measuring-the-economic-gain-of-investing-in-girls-the-girl-effect-dividend

Ellickson P., B. R. (1993). Preventing adolescent Drug Use: Long-Term Results of a Junior High Programme. *American Journal of Public Health*, 83 (6).

Ennett S., T. N. (1994). Hoe Effective is Drug Abuse Resistance Education? A Meta-Analysis of Project DARE Outcome Evaluations. *American Journal of Public Health*, 84, 1394-1401.

Development Economics. (2013, January). *Unprotected Nation The Financial and Economic Impacts of Restricted Contraceptive and Sexual Health Services.* Retrieved August 15, 2017, from http://www.fpa.org.uk/sites/default/files/unprotected-nation-sexual-health-full-report.pdf

Dee A., K. K. (2014). The direct and indirect costs of both overweight and obesity: a systematic review. BioMed Central Research Notes, 7 (242).

Forum on Global Violence Prevention. (2012). *Social and Economic Costs of Violence: Workshop Summary (2012).* Retrieved July 27, 2017, from https://www.nap.edu/catalog/13254/social-and-economic-costs-of-violence-workshop-summary

Group, W. B. (n.d.).

Institute for Health Metrics and Evaluation. (n.d.). Global Burden of Disease Study 2015. Retrieved August 11, 2017, from *Global Burden of Disease Study 2015* (GBD 2015) Data Resources: http://ghdx.healthdata.org/gbd-2015

Lule E. Rosen J., S. S. (2006). Chapter 59 Adolescent Health Programs . In B. J. Jamison DT, *Disease Control Priorities in Developing Countries 2nd edition (2nd edition ed.)*. Oxford University Press.

Larson N., S. M.-S. (2007). Are Diet and Physical Activity Patterns Related to Cigarette Smoking in Adolescents? Findings From *Project EAT. Preventing Chronic Disease*, 4 (3).

National Center for Injury Prevention and control. (2011, November). *National Intimate Partner and Sexual Violence Survey 2010 Summary Report.* Retrieved August 17, 2017, from https://www.cdc.gov/violenceprevention/pdf/nisvs_report2010-a.pdf

Musgrove P., F.-R. J. (2006). Chapter 15 Cost-Effectiveness Analysis for Priority Setting. In B. J. Jamison DT, *Disease Control Priorities in Developing Countries. 2nd edition*. Washington, DC, USA: OIxford University Press.

medibank. (2008, October). *The Cost of Physical Inactivity.* Retrieved July 7, 2017, from http://www.medibank.com.au/client/documents/pdfs/the_cost_of_physical_inactivity_08.pdf

Mental Health Commission of Canada. (n.d.). *Making the Case for Investing in Mental Health in Canada.* Retrieved July 2017, from https://www.mentalhealthcommission.ca/sites/default/files/2016-06/Investing_in_Mental_Health_FINAL_Version_ENG.pdf

Organisation, W. H. (2017). *Minitoring Health for the SDGs.* Retrieved August 17, 2017, from http://apps.who.int/iris/bitstream/10665/255336/1/9789241565486-eng.pdf?ua=1

Puska, P. (2004). Successful Prevention of Non-Communicable Diseases: 25 Year Experiences with North Karelia Project in Finland. *Public Health Medicine*, 4 (1), 5-7.

Paavola M., V. E. (2004). Smoking, Alcohol Use, and Physical Activity: A 13- Year Longitudinal Study Ranging from Adolescence into Adulthood. *Journal of Adolescent Health*, 35, 238–244.

Policy Development and coordination Unit A6 – Science Policy, foresight and data. (2015, June). *Value of Research.* Retrieved July 19, 2017, from European Commission: https://ec.europa.eu/research/innovation-union/pdf/expert-groups/rise/georghiou-value_research.pdf.

Scarborough P, B. P. (2011). The economic burden of ill health due to diet, physical inactivity, smoking, alcohol and obesity in the UK: An update to 2006-2007 NHS costs. *Journal of Public Health*, 33 (4), 527-535 .

Rehm J, M. C. (2009). Global burden of disease and injury and economic cost attributable to alcohol use and alcohol-use disorders. *Lancet,* 27 (373), 2223-33.

Thavorncharoensap M., T. Y. (2009). The economic impact of alcohol consumption: a systematic review. *Substance Abuse Treatment, Prevention, and Policy*, 4 (20).

The World Bank Human Development Network. (2011, August). *Policy Research Working Paper 5753; Measuring the Economic Gain of Investing in Girls - The Girl Effect Dividend.* Retrieved July 27, 2017, from http://documents.worldbank.org/curated/en/730721468326167343/pdf/WPS5753.pdf .

The National Campaign to Prevent Teen and Unplanned Pregnancy. (2013, December). *Counting It Up: The Public Costs of Teen Childbearing: Key Data.* Retrieved July 27, 2017, from https://thenationalcampaign.org/resource/counting-it-key-data-2013

Thomas CM., C. S. Can we reduce costs and prevent more unintended pregnancies? A cost of illness and cost-effectiveness study comparing two methods of EHC. *BMJ Open 2013*, 3e.

About Powering Partnerships

Since 1997 we have helped clients to understand and enhance the value of their stakeholder relationships, particularly those between sectors. We have all worked on the staff of corporations and non-governmental organisations and charities, and believe that contributes to our deep understanding of their different cultures and priorities and how they can get the best out of each other. Our corporate clients are usually well known 'blue-chips' such as HSBC or SKY, and our NGO clients rank among some of the biggest 'brands' in the sector such as CARE International and WWF .

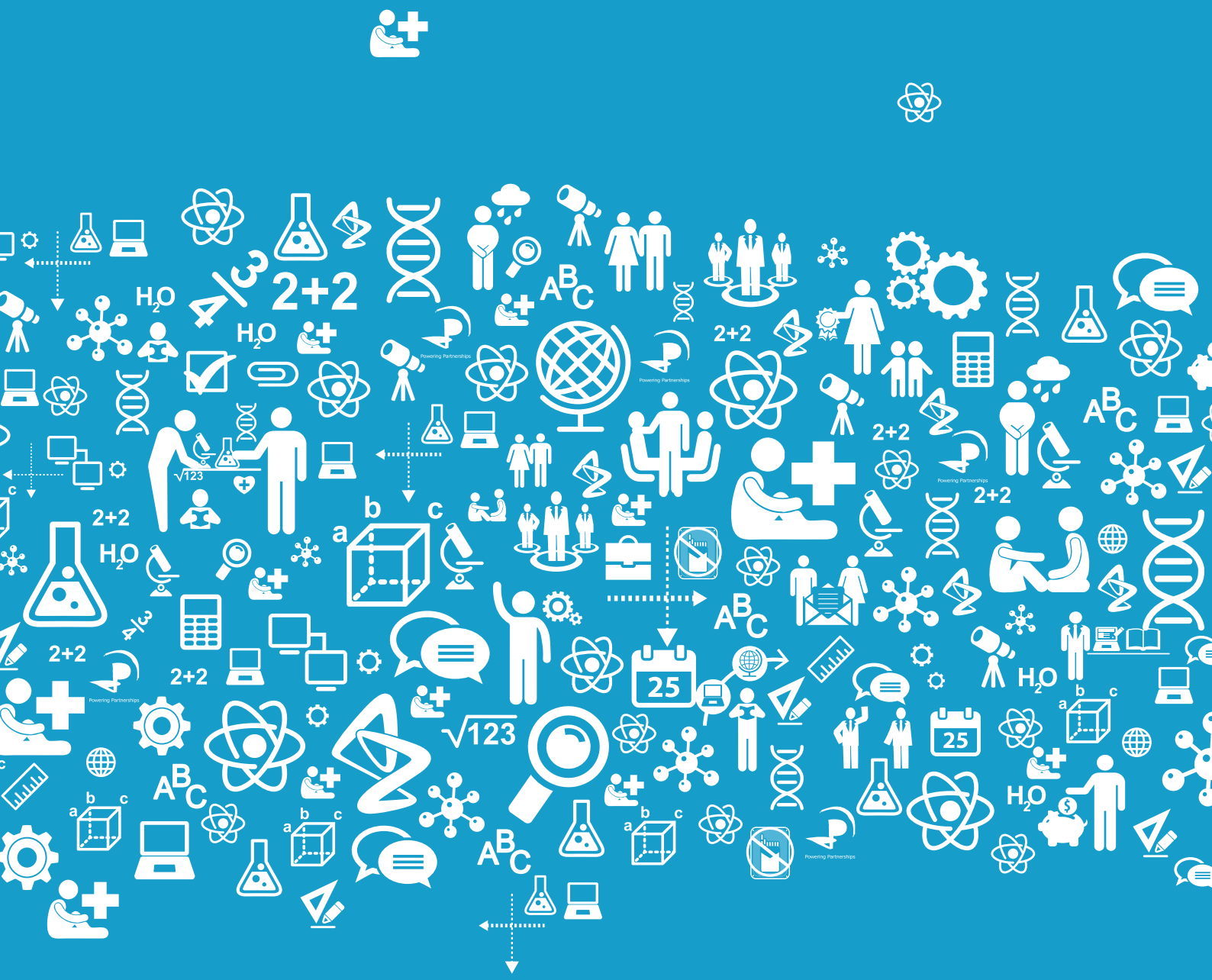
Our work spans four areas: Research, Strategy, Metrics and Communication

This analysis was led by **David Aeron-Thomas**

David is a metrics expert, and a qualified chartered accountant and engineer. David set up KMPG's stakeholder reporting in the UK and developed their approach to capturing social value with the London Benchmarking Group. At the New Economics Foundation he developed the concept and practical use of Social Return on Investment (SROI) for the UK, and investigated and piloted the delivery of SROI analyses for clients. This ground-breaking work was described in "Social Return on Investment: Valuing what matters: Findings and recommendations from a pilot study".

David went on to help formulate global SROI standards with practitioners from Europe and the USA. As Head of Metrics at the Forum for the Future he developed further specialist sustainability measurement and valuation tools in addition to consulting for some of the UK's most successful and inspiring companies such as Boots, Co-operative Group, SKY, Tesco and Unilever.

David has a Masters in Engineering Science from the University of Oxford, an Advanced Diploma in Sustainability from the University of Cambridge Institute of Continuing Education, and is a Fellow of the Institute of Chartered Accountants in England and Wales.



Powering Partnerships: 30 Percy Street, London W1T 2DB www.poweringpartnerships.com
Research I Strategy I Metrics I Communication