

Informing Interventions to reduce health Inequalities (Triple I)

Frequently asked questions

Triple I: Informing • Inequalities • Interventions

Comparing the potential population impact of interventions on health inequalities in Scotland

Background	2
What does Triple I stand for?.....	2
What does Triple I do?.....	2
What is the purpose of Triple I?	2
Don't we already know what works to reduce health inequalities?	2
Triple I interventions	2
Which interventions are covered by Triple I?.....	2
How did you choose which interventions to include?.....	4
What evidence is used in Triple I?	4
Why haven't you modelled other important interventions?	4
Methods	5
How does Triple I work?	5
What data are needed for Triple I?	5
What is the baseline year for Triple I?	5
What results can Triple I give me?.....	6
Why do you only look at all-cause mortality and hospital admissions?.....	6
Should I compare the results of this phase of Triple I with the last phase?	7
Can Triple I model the impact of interventions at a local level?	7
Can Triple I produce results based on interventions being targeted in different ways?	7
How are local estimates produced?.....	7
Can Triple I model multiple interventions at once?	8
Limitations	8
What are the main limitations of Triple I?.....	8
How useful is Triple I in remote areas?.....	9
How much uncertainty is there around the results?	9
Practical application of Triple I	9
In what type of situations should Triple I be used?	9
What should Triple I not be used for?	10
Are there any examples of how it has been used before?	10
How can I run my own analysis for my own area?.....	11
Will Triple I tell us about the costs and savings of different interventions?	11
We don't have the authority to change a lot of these policies so why are you encouraging us to use it?.....	12
Can you provide support in how to use Triple I?.....	12

Background

What does Triple I stand for?

Triple I stands for Informing Interventions to reduce health Inequalities. It is a project led by [NHS Health Scotland](#) as part of the [Scottish Public Health Observatory](#) (ScotPHO) collaboration.

What does Triple I do?

Triple I models the potential impact of different interventions on overall population health and health inequalities in Scotland.

What is the purpose of Triple I?

Triple I provides national and local decision-makers with practical tools and intelligence about interventions that could improve health and reduce health inequalities in Scotland. The information from the tool can support discussion and debate about how to best invest public money.

Don't we already know what works to reduce health inequalities?

The evidence base describing the trends and underlying drivers of health inequalities is well developed, as is effectiveness evidence for what works at an individual or population subgroup level. However, there is a lack of quantitative evidence about the relative population impact of specific interventions and policies. Triple I aims to fill this evidence gap: it allows the impact and costs of different interventions to be compared using data for Scotland.

Triple I interventions

Which interventions are covered by Triple I?

Triple I includes a range of interventions that work either at an individual level to influence behaviour change or at a structural level to influence the wider determinants of health (or the environments and conditions that influence health). The interventions selected operate across the three types of action required to reduce health inequalities:

1. Changes to income, benefits and taxation policies that aim to **undo** the fundamental causes of health inequalities by redistributing income:

- Income Tax +1p
- Income Tax -1p
- Personal Allowance +£1,000
- Personal Allowance -£1,000
- Council Tax increase
- Means-tested benefits +50%
- Devolved benefits +50%
- Citizen's Basic Income
- Citizen's Basic Income Plus
- Local Income Tax
- 'Real' Living Wage

2. Changes to policy or legislative measures that aim to **prevent** environmental influences (e.g. housing, work, education or services) from reinforcing or widening health inequalities:

- 20 mph speed limits
- Tobacco taxation +10%
- Job provision
- Benefit uptake +1%

3. Health improvement programmes that aim to **mitigate** the negative impact of things that harm individuals' health and reinforce health inequalities:

- Computerised cognitive behavioural therapy for depression
- Individual guided self-help for depression
- Group physical activity for depression
- Lifestyle weight management service
- Pedometer-based intervention
- Physical activity brief intervention
- Smoking cessation service
- Alcohol Brief Intervention

How did you choose which interventions to include?

The interventions included in the tool were selected based on:

- consultation with experts in priority topic areas (e.g. physical environment or housing)
- being clearly defined
- having a sufficiently robust and relevant evidence base.

What evidence is used in Triple I?

In general, Triple I includes only those interventions that are clearly defined with a highly processed evidence base (e.g. National Institute for Health and Care Excellence (NICE) review or meta-analyses). While this improves how robust the data are, it has some limitations, such as:

- minimising the scope for modelling the impact of new, innovative interventions, for which a substantial evidence base may not be established
- focusing on individual-level interventions (known as ‘lifestyle drift’ or the ‘inverse evidence law’).

Therefore, to include a wider range of interventions we broadened the types of evidence used, while maintaining a rigorous approach to the assessment of this evidence (see Tables 1–4 of the technical report and the Evidence tabs in the Excel-based tools for more information: www.healthscotland.scot/triplei).

Why haven’t you modelled other important interventions?

As we relied on the existing evidence base, some interventions that may have population health benefits could not be included, and those that were included should not be considered to be the only interventions likely to have relevance for Scotland. We acknowledge that this may limit the scope of the tool to address issues of interest locally.

Methods

How does Triple I work?

Triple I is based on an approach known as scenario modelling, which is a form of policy appraisal that uses multiple data sources to predict likely outcomes of particular scenarios. It involves bringing together data and evidence from a variety of sources into a formal prespecified conceptual framework and applying explicit analytical techniques. **Figure 2** in the [technical report](#) provides a visual overview of how the tool works, alongside a detailed written description.

What data are needed for Triple I?

A wide range of data are needed to model the impact of an intervention. This varies according to the intervention, but generally the following types of data are used:

- mortality data (mortality is a key outcome)
- hospitalisation data (hospitalisation is a key outcome)
- population data (to calculate rates for the outcomes)
- survey data (to estimate the prevalence of a particular risk factor/exposure)
- exposure risk data (to estimate the association between the risk factor/exposure and the outcomes)
- effectiveness data (to estimate the effect size of the intervention)
- intervention cost data (to estimate the direct cost of delivering the intervention)
- relapse data (to estimate the extent to which intervention effects are maintained or decay over time).

What is the baseline year for Triple I?

The baseline year is 2016. This was the year for which we had the latest available data at the time of development. Across the follow-up period the model uses hospitalisation and death rates predicted for each year based on recent trends.

What results can Triple I give me?

Triple I can:

- estimate the impact of interventions on the absolute and percentage change in three health outcomes:
 - **Hospitalisation:** the estimated number of all-cause hospital admissions within the whole adult population.
 - **Premature mortality:** the estimated number of all-cause deaths within the adult population aged under 75 years.
 - **Years of life lost:** the total number of additional years that the adult population would have been expected to live if individuals had not died before their estimated life expectancy.
- estimate the impact on inequalities in these outcomes using four different measures:
 - **Absolute gap:** the difference between the most and least deprived SIMD quintiles (= rate in most deprived – rate in least deprived).
 - **Relative gap:** the relative difference between the most and least deprived SIMD quintiles (= rate in most deprived ÷ rate in least deprived).
 - **Slope index of inequality (SII):** A summary measure of absolute inequality, which takes into account differences across the whole gradient of inequality, not just the gap in health outcome between the most and least deprived.
 - **Relative index of inequality (RII):** The SII divided by the mean rate in the population
- estimate the direct costs of delivering interventions to achieve potential health impacts, as well as direct savings to the NHS from reduced hospital admissions. More detail on these results is provided in response to a later question (page 11).

Why do you only look at all-cause mortality and hospital admissions?

As Triple I is focused on population impact, it models outcomes which are consistent, meaningful and comparable at a population level. There are other outcomes which will be important to individuals and organisations (e.g. person-centred outcomes for recovery services) but are not suitable for modelling using Triple I. Similarly, other

outcomes will be more specific for particular interventions (e.g. lung cancer mortality rates for smoking cessation interventions).

Should I compare the results of this phase of Triple I with the last phase?

No. We have made a number of refinements to the modelling and also updated the underpinning data and evidence, so the results are not comparable.

Can Triple I model the impact of interventions at a local level?

Yes, our national commentary report presents findings for Scotland as a whole but the following types of area can be modelled using our interactive modelling tools: health boards, local authorities, Integrated Joint Boards or city regions.

It is not possible to model the impact of interventions below local authorities (e.g. localities). This is mainly due to the availability of reliable data for population subgroups for smaller geographical areas.

Can Triple I produce results based on interventions being targeted in different ways?

Yes, Triple I enables interventions to be targeted in four different ways:

- evenly across the population
- based on the prevalence of the exposure (e.g. smoking) in each population subgroup (age group, sex and deprivation category). This is also referred to as proportionate to need
- targeted to the most deprived 20% only (i.e. only those in Scottish Index of Multiple Deprivation (SIMD) quintile 1)
- targeted to the most deprived 40% only (i.e. only those in SIMD quintiles 1 and 2).

How are local estimates produced?

For all sub-national geographies, models are based on national rates (e.g. mortality). This is considered sufficient for modelling purposes but means that the data within the model will only approximate actual local figures and will not reflect geographical variations. The main reason for this is to avoid any data protection issues. Similarly,

for hospital admissions, local data on the overall number are used, but the number in each population subgroup is modelled based on national distributions.

Where possible, the population at risk for local areas was estimated using local area prevalence estimates. However, in some cases, the sample sizes were too small for robust estimates. In these cases we estimated prevalence based on amalgamated local authorities, in accordance with the Office for National Statistics local authority matching tables. More information is provided in appendix 9.3 of the [technical report](#).

Can Triple I model multiple interventions at once?

No, Triple I models the estimated impact of only one intervention at a time. The impact of a combination of interventions should not be assumed to equal the sum of the estimated impacts from each intervention.

Limitations

What are the main limitations of Triple I?

- The model only assesses the impact of interventions on all-cause mortality (from which premature mortality and years of life lost are derived) and all-cause hospital admissions. It does not consider cause-specific outcomes.
- It is only possible to model a selected number of interventions.
- Interventions are implemented in isolation and not combined in any way with other interventions or policies.
- Effects are modelled to occur immediately. For income-based policies and 20 mph speed limits the effects are assumed to be constant over time.
- For most interventions, it is assumed that the intervention effect does not vary by age group, sex (except in the case of smoking cessation services), calendar year, area or SIMD quintile (except in the case of income-based interventions).
- Our approach to estimating costs and benefits is narrow and the cost-effectiveness analysis is simplistic. This limits the scope of interpretation.

See the national overview report, technical report and income-based policies briefing for detailed limitations (which can all be accessed at www.healthscotland.scot/triplei).

How useful is Triple I in remote areas?

In addition to the issues noted above about how Triple I produces local results, there are particular challenges with producing results for remote areas. Triple I models the impact on health inequalities based on the national SIMD (2016) for Scotland.

However, the Orkney Islands, Shetland Islands and Western Isles have no residents living in the national SIMD quintile 1 which means that targeting to SIMD quintile 1 is not possible for these areas.

How much uncertainty is there around the results?

We have not estimated the uncertainty around the results using commonly reported statistics such as 95% confidence intervals. Such estimates can be useful but, in the context of this modelling work, uncertainty estimates could provide a false sense of confidence that the estimated results fall within a particular range. The largest sources of uncertainty are likely to be related to the key parameters and assumptions that inform the models. We therefore performed a range of sensitivity analyses to assess the impact of changing these on the results produced. These are summarised in the main report with a more detailed description provided in the [technical report](#).

Practical application of Triple I

In what type of situations should Triple I be used?

- As a discussion aid to inform inequalities-focused planning and decision-making.
- To model interventions for local areas using the interactive Triple I modelling tools.
- To compare the estimated population impact between undo, prevent and mitigate interventions.
- To assess the impact of changing the targeting strategy on the estimated impact of interventions on population health and health inequalities.

What should Triple I not be used for?

We would discourage users of Triple I in placing too much emphasis on the exact estimates of impact. This is because all modelling is subject to various assumptions and uncertainties, which can affect the results produced. We consider the data and evidence we used to be the most robust available for our purposes. However, our sensitivity analyses showed that some interventions are sensitive to certain changes in assumptions and model parameters even though the key messages were unaffected.

Also, improving population health and tackling health inequalities requires a blend of interventions that undo, prevent and mitigate poor health and health inequalities. Thus, in practice, interventions would not be delivered in isolation as modelled by Triple I.

Triple I will not be the right tool for every job. NHS Health Scotland and ScotPHO produce a range of decision-making tools that could complement Triple I or be more appropriate for specific needs (for example the [Scottish Burden of Disease Study](#), [Place Standard](#), [ScotPHO profiles](#), [Economics of Prevention](#), [Health Inequalities briefings](#), or Maximising the role of [NHSScotland](#) and [Health and Social Care Partnerships](#) in reducing health inequalities).

Are there any examples of how it has been used before?

Yes. The tool has been used in different ways by different stakeholders, for example:

- The Scottish Parliament took an interest in the 2014 phase of Triple I and this led to the work being used to inform various committee enquiries and political party work (both within the debates in the chamber and in policy documents, and across parties). Ministers repeatedly cited the work in their speeches and supported further work by ScotPHO on this.
- Inverclyde Health and Social Care Partnership used the 2014 Triple I tool alongside other evidence to influence Single Outcome Agreement delivery groups.
- The estimated impact of introducing a Citizen's Basic Income in Dundee was cited in the final report of the Dundee Fighting for Fairness Commission in

support of their recommendation that ‘Dundee Partnership makes a case to participate in the introduction of the Citizen’s Basic Income Scheme for Scotland’.

How can I run my own analysis for my own area?

We have developed a web-based tool that enables users to view results for their selection of intervention(s), geography, health outcome, and targeting strategy using drop-down menus. Key results are presented visually and there is an option to download the results in data tables. The tool is available at www.healthscotland.scot/triplei

For those who want more detailed results and more flexible options, we have also developed interactive Excel-based tools for each intervention which are also available from the link above.

Will Triple I tell us about the costs and savings of different interventions?

We have incorporated the direct costs of interventions in the Triple I model. This has enabled us to calculate the cost-effectiveness of different interventions by dividing the cost of the intervention by the percentage change in the intended outcome. This is a measure of how much resource needs to be invested for each percentage-point of improvement in the intended outcome. The lower the ratio, the better the investment in cost-effectiveness terms.

We have also estimated the direct savings to the NHS of fewer hospital stays. This crude analysis assumes that no other healthcare need arises if an intervention reduces the demand for services from a particular cause or mechanism. It does not account for the fact that there is unmet need in the healthcare system that may use any spare capacity that may be freed up if an intervention reduced hospital stays. No attempt was made to quantify savings in terms of fewer premature deaths or years of life lost, or wider savings arising from reduced prescription costs or sickness benefits, for example. Additionally, some interventions have wider benefits that have not been captured (e.g. the societal benefits of income-based interventions) and we

have not indicated who would be responsible for paying for an intervention and who receives the benefit/saving.

Our approach to estimating costs and benefits is narrow and has important limitations. We therefore recommend that the cost-effectiveness results are viewed as illustrative and that comparisons between different levels of action (undo, prevent, mitigate) are avoided.

We don't have the authority to change a lot of these policies so why are you encouraging us to use it?

We recognise that not all of the interventions included in Triple I will be relevant to all users. However, we have highlighted in our [income-based interventions briefing](#) and main report that there are actions that can be taken at both national and local level based on our findings. In addition, our [web-based Triple I results browser](#) allows users to select the interventions and scenarios that are most relevant to them.

Can you provide support in how to use Triple I?

Yes, we are very keen and willing to support analysts and decision-makers to understand the Triple I tool so that it can inform discussion and debate about interventions that are most likely to reduce health inequalities.

Please email nhs.triple.i@nhs.net if you would like to find out more about how we can help or if you have any other feedback on the Triple I project.

