Economic modelling of scaling up implementation

DELIVERABLE 7.3

SCALING UP PSYCHOLOGICAL INTERVENTIONS WITH SYRIAN REFUGEES

STRENGTHS

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Lead authors: David McDaid, A-La Park (LSE)

Other contributing partners:

Anne De Graaf, Marit Sijbrandij, Pim Cuijpers, Anke B. Witteveen (VUA)
Nana Wiedemann, Pernille Hansen (DRC)
Christine Knaevelsrud, Sebastian Burchert (FUB)
Claire Whitney, Ahmad Y. Bawaneh (IMC)
Barbara Kieft (IPSY)
Egbert Sondorp, Aniek Woodward (KIT)
Bayard Roberts, Daniela C. Fuhr (LSHTM)
Mark J.D. Jordans, Felicity L. Brown (WCH)
Annelieke Drogendijk, Saara Martinmaki (ARQ)
Ceren Acarturk, Zeynep Ilkkursun (KU)
Peter Ventevogel (UNHCR)
Richard Bryant, Aemal Akhtar (UNSW)
Naser Morina, Julia Spaaij (UZH)

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1. Executive summary

Worldwide by mid-2022 there were more than 103 million forcibly displaced people. This includes 6.8 million refugees from Syria, more than any other country. Protecting and strengthening the mental health of refugees fleeing conflict is a pressing global mental health issue, further exacerbated by 5.8 million Ukrainians now seeking refuge. Refugees and internally displaced people are at heightened risk of developing many common mental health conditions including depression, anxiety and post-traumatic stress disorder. Poor mental health, if untreated in refugees, can have long term mental and physical health consequences that may persist even many years, as for instance seen in conflict-affected people in the former Yugoslavia many years after that conflict ended. Early intervention to meet their needs may help to avoid some of these initial and longer-term impacts, but evidence on cost effectiveness is limited.

Having a better understanding of the strength of the economic case for action is important when making the case to national governments, as well as international donors and relief agencies/non-governmental organisations, for more investment in measures to support the psychosocial health of refugees and other displaced people. These stakeholders, in making these investment decisions, will want to know as much as possible about the mid to longer term benefits of intervention, alongside the costs of development, and the budgetary and human resource consequences of any scale up of access to and coverage for effective interventions to support the mental health needs of refugees.

This deliverable sets out the methods used within the STRENGTHS project to model the impact on cost effectiveness and return on investment of making changes to the way in which the WHO Problem Management Plus intervention, individual or group formats (iPM+ and gPM+), as well as the Step by Step (SbS) brief psychological interventions are delivered and potentially scaled up among Syrian refugees. In addition, we also look at how the costs of implementing the EASE intervention can change if modes of delivery change.

To do this we have delivered an Excel tool that can be downloaded from the STRENGTHS website which can be used to look at how the economic case and budgetary impact of these interventions can change within the settings where they have been implemented within STRENGTHS. The modelling tool makes use of the results of economic analysis from pilot PM+ studies in the Netherlands, Switzerland and Türkiye, as well as analyses from the main PM+ studies in Jordan, Netherlands, Switzerland and Türkiye and SbS studies in Egypt, Germany and Sweden.

In our economic evaluation report D7.2 we observed that the economic case for intervention, comparing the costs and consequences of intervention with impacts on quality of life (the primary outcome in health economic studies), varies considerably across settings. We noted that if costs of implementation could be reduced, for instance through lower training costs or any quality of life gains being sustained beyond 3 month follow up, then the economic case for investment may be strengthened considerably in many settings. We also noted that there may also be longer term impacts on health and social care utilisation that are not visible at 3-month follow up. The Excel modelling tool developed for STRENGTHS allows some of these potential scenarios to be examined, as assumptions, for example around the level of quality of life gains and their sustainability, can be varied. Equally, the costs of implementation and assumptions around coverage, uptake and sustained engagement rates with interventions can be varied.

In this report we describe the process used to develop our modelling tool, and describe the model's functionality. We provide examples on how parameters in the model can be varied and how results of the varied analyses can be displayed. It should be stressed that the modelling results shown in this report, while based on available data, are illustrative at this stage. The various STRENGTHS reports linked to the implementation trials, as well as our economic evaluation results in D7.2 have shown heterogeneity in findings so far. Interventions appear to vary in the levels of effect at 3 month follow up and there are settings where no impact on quality of life or costs has been found, e.g. for iPM+ in Switzerland.

Further analyses, not yet in the public domain, as well as additional data that has been collected by STRENGTHS over the longer 12 month follow-up time frame will further inform the modelling tool. The model ultimately will be dependent not only on the 3-month follow-up results of individual studies within STRENGTHS, but also information from 12-month follow-up. In addition, report D7.4 sets out the approach being taken to pool the results of both the five pilot randomised controlled trials (RCTs) and seven definitive RCTs conducted within STRENGTHS within a meta-analytic dataset. These results of this analysis will also further inform the modelling tool, and potentially lead to changes in assumptions for default model parameters as well as the likelihood of any impacts being sustained. An option to use a pooled rather than country specific dataset may be added to the model, where the economic results are reported using a common currency such as purchasing power parity adjusted international dollars. Therefore an updated version of this report, and revised and extended version of the Excel model will become available from the authors once the results of all the individual studies and the meta-analyses have been accepted for publication.

2. Background to model development

The Syrian conflict has been major cause of population displacement, with some neighbouring countries having become safe havens for millions of conflict-affected refugees. Almost 7 million refugees have sought refuge, primarily in neighbouring countries, as well as in Europe. For example, Türkiye, the country that hosts the highest number of refugees worldwide (3.7 million refugees), had given “under temporary protection” status to 3.5 million Syrians, nearly all of whom live in the community, while Jordan now hosts more than 676,000 Syrian refugees, of which more than 133,000 live in refugee camps (United Nations High Commission for Refugees, 2022c). This can present great logistical and financial challenges for host countries; in Lebanon, relative to the national population, refugees and displaced people make up 1 in 6 of the population (United Nations High Commission for Refugees, 2022b).

The conflict in Syria is just one reason why protecting and strengthening the mental health of refugees fleeing conflict is a pressing global mental health issue (Patanè et al., 2022).These challenges internationally have been exacerbated further in 2022 by the conflict in Ukraine; by mid-2022 5.4 million Ukrainians had to seek refuge in other countries, mainly in Europe(United Nations High Commission for Refugees, 2022b). Globally, by mid 2022, 103 million people had been forcibly displaced from their homes (United Nations High Commission for Refugees, 2022b), more than doubling the number a decade earlier (United Nations High Commission for Refugees, 2022a), including 40% who have fled to other countries. 74% of refugees are hosted in low and middle-income countries (LMIC)s.

Refugees and internally displaced people are at heightened risk of developing many common mental health conditions including depression, anxiety and post-traumatic stress disorder. Poor mental health, if untreated in refugees, can have long term mental and physical health consequences that may persist even many years. Meta-analytic evidence shows rates of common mental disorders (CMDs) as high as 32% for depression and 31% for posttraumatic stress disorder (PTSD) among refugees and asylum seekers (Blackmore et al., 2020; Hoell et al., 2021). Prevalence rates among Syrian refugees in Türkiye were 34.7% and 19.6%, respectively. (Acarturk et al., 2021).

Early intervention to address mental health conditions, if effective, may help to avoid some long-term health and wider impacts such as exclusion from work, all of which have avoidable economic costs. One potential way to expand access to services is to move away from a reliance on specialist mental health service providers to services that can be provided through primary care and other community health services, including delivery by lay practitioners.

This approach has been used to implement the use of brief psychological interventions to address multiple mental health conditions. One such intervention is Problem Management Plus (PM+), a five-session programme developed by the World Health Organization (WHO) to address poor mental health in individuals affected by adversity, such as conflict (Dawson et al., 2015). It is a transdiagnostic intervention, intended to reduce many different common mental disorders, through a common approach and can be delivered in individual or group formats in five weekly sessions. It can be delivered under supervision by peer lay facilitators after 8-days of training. Studies on PM+ in non-refugee samples in Pakistan and Kenya previously have shown its effectiveness in reducing depression, anxiety, PTSD, functional impairment, and self-identified problems (Bryant et al., 2017; Rahman et al., 2019). Another potential intervention is an online delivered brief programme, Step by Step (SbS), focused on addressing depression(Carswell et al., 2018). Online interventions, if effective, potentially may be easier to scale up than face to face interventions. Brief psychological interventions targeted at adolescents are also being developed. The Early Adolescent Skills for Emotions (EASE) brief intervention is another face to face intervention intended to address depression and anxiety, as well as other internalising disorders.(Dawson et al., 2019)

It is important to generate more evidence on the implementation of such interventions in a range of different contexts and settings. In response to the challenges of refuge mental health the STRENGTHS consortium has been assessing the effectiveness, cost-effectiveness, and implementation of brief psychological interventions for Syrian refugees in countries in Europe and the Middle East, including group and individual versions of PM+, SbS and EASE (Sijbrandij et al., 2017).

Our report D7.2 set out the results of the economic evaluations of STRENGTHS interventions. Having a better understanding of the strength of the economic case for action is important when making the case to national governments, as well as international donors and relief agencies/non-governmental organisations, for more investment in measures to support the psychosocial health of refugees and other displaced people. These stakeholders, in making these investment decisions, will want to know as much as possible about the mid to longer term benefits of intervention, alongside the costs of development, and the budgetary and human resource consequences of any scale up of access to and coverage for effective interventions to support the mental health needs of refugees.

This deliverable builds on the findings of both Deliverable 7.1 and 7.2 and sets out the methods used within the STRENGTHS project to model the impact on cost effectiveness of making changes to the way in which the WHO PM+, gPM+ and SbS brief psychological interventions are delivered and potentially scaled up among Syrian refugees. In addition, we also look at how the costs of implementing the EASE intervention can change if modes of delivery change. To do this we have delivered an Excel tool that is available for download

on the STRENGTHS website which can be used to look at how the economic case and budgetary impact of these interventions can change within the settings they have been implemented in within STRENGTHS. The modelling tool makes use of results of economic analysis from pilot PM+ studies in the Netherlands, Switzerland and Türkiye, as well as analyses from the main PM+ studies in Jordan, Netherlands, Switzerland and Türkiye and SbS studies in Egypt, Germany and Sweden.

In our economic evaluation report D7.2 we observed that the economic case for intervention comparing the costs and consequences of intervention with impacts on quality of life (the primary outcome in health economic studies) varies considerably across settings. We noted that if costs of implementation could be reduced, for instance through lower training costs, or quality of life gains being sustained beyond 3 month follow up, then the economic case for investment may be strengthened considerably in many settings. We also noted that there may also be longer term impacts on health and social care utilisation that are not visible at 3-month follow up. The Excel modelling tool developed for STRENGTHS allows some of these potential scenarios to be examined, as assumptions, for example around the level of quality of life gains and their sustainability, can be varied. Equally the costs of implementation and assumptions around coverage, uptake and sustained engagement rates with interventions can be varied.

In this report we describe the process used to develop our modelling tool, and set out the model's functionality. We provide examples on how parameters in the model can be varied and how results of the varied analyses can be displayed. It should be stressed that the modelling results shown in this report, while based on available data, are illustrative at this stage. The various STRENGTHS reports linked to the implementation trials, as well as our economic evaluation results in D7.2 have stressed the heterogeneity in findings so far. Interventions appear to vary in the levels of effect at 3 month follow up and there are settings where no impact on quality of life or costs has been found, e.g. for individual PM+ in Switzerland.

Further analyses, not yet in the public domain, as well as additional data that has been collected by STRENGTHS over the longer 12 month follow-up time frame will further inform the modelling tool. The model ultimately will be dependent not only on the 3-month follow-up results of individual studies within STRENGTHS, but also information from 12-month follow-up. In addition, report D7.4 sets out the approach being taken to pool the results of both the five pilot randomised controlled trials (RCTs) and seven definitive RCTs conducted within STRENGTHS within a meta-analytic dataset. These results of this analysis will also further inform the modelling tool, and potentially lead to changes in assumptions for default model parameters as well as the likelihood of any impacts being sustained. An option to use a pooled rather than country specific dataset may be added to the model, where the economic results are reported using a common currency such as purchasing power parity adjusted international dollars. Therefore an updated

version of this report, and revised and extended version of the Excel model will become available from the authors once the results of all the individual studies and the meta-analyses have been accepted for publication.

3. Aims

Our overarching aim is to build an Excel modelling tool that can be used by an end-user who may not be knowledgeable either about refugee mental health or economic analysis to look at how the return on investment from iPM+, gPM+ and SbS may change if we change some of the assumptions around implementation resource use and costs, as well as quality of life impacts seen in the STRENGTHS specific intervention implementation trials. In addition, we also look at how the costs of implementation for EASE might vary and how this potential could impact on the budgetary costs of implementation. We provide a tool in Excel as it is a relatively widely available software package. Our modelling tool is designed to be used with only very limited basic knowledge of how to use Excel: essentially how to open and close the software package as well as how to print and/or save files. The final version of the tool will be available to download from the STRENGTHS website.

Outputs of the model show how the return on investment changes over time for each intervention, and also what the budgetary impacts will be for funders, and how this varies depending on coverage and the number of people in the target group, in this case Syrian refugees, reached. We also aimed to be able to identify particular factors that may have greatest bearing on the economic case for investment in these brief psychological interventions. These for example could include components of implementation costs, assumptions around the effectiveness of interventions and care as usual, utilisation of health services, productivity losses and different assumptions on the monetary value placed on quality of gains in different societal contexts.

Model users can vary multiple assumptions used in the model, as well as change the country setting, and see how this will impact on the return on investment. As well as providing country specific results, the model will also, when data become available, provide an option to use a non-country specific dataset where model parameters drawn on the results of this meta-analysis (See D7.4 for more on the meta-analysis).

4. Methods

We created an Excel tool which provide models for each of the iPM+, gPM+, and SbS and EASE interventions in each of their different country contexts. Details on how to use the tool are provided in section 5 of this report. The primary sources of information for the model are the economic analysis from pilot PM+ studies in the Netherlands, Switzerland and Türkiye, as well as analyses from the main PM+ studies in Jordan, Netherlands, Switzerland and Türkiye, SbS studies in Egypt, Germany and Sweden and EASE study in Lebanon. At present, the modelling tool mainly uses data from 3-month follow up analyses shown in D7.2. We also make use of other data on aspects of the implementation trials, such as data on the levels of uptake and completion of the short five-week courses of iPM+, gPM+ or SbS. We also make use of use of information collected on the implementation costs of the different psychological interventions set out in reports D7.1 and also D 7.2, as well as other published literature on the implementation of these interventions.

Our primary reported outcome is return on investment, which is reported from the perspective of a service funder, such as a governmental health care system or a non-governmental international agency, when comparing investment in brief psychological interventions with care as usual/enhanced care as usual. This is reported at different time points post intervention: 3-months, 6-months, 9-months, 12-months, 18-months, 24-months and 30 months. Return on investment is an approach increasingly used to aid policy makers in health and other sector decisions in both high, middle and low-income settings, and has been looked at specifically in the context of mental health policy making (Chisholm et al., 2016; McDaid, Park, & Knapp, 2017).

We define return on investment as the net monetary value of resource use consumed and other economic impacts such as time out of role compared to the costs of investing in the brief psychological interventions we have evaluated. Returns greater than one generate net positive returns to the economy. For example, if the return on investment is €1.20 after three months, then for every €1 spent policy makers can expect an economic return of €1.20 within a three-month period. The modelling tool also shows in which sectors the benefits lie; currently this is restricted to the health and general welfare sectors, but other sectors may be added if evidence becomes available, for example, on rates of participation in education for refugees.

In D7.2 we compare costs with outcomes measured in terms of quality adjusted life years gained (QALYs). In our modelling tool we attach a monetary value to QALYs gained, reflecting different country accepted cost effectiveness thresholds per QALY gained. Our societal return on investment calculations additionally include

the net monetary benefit/loss of any QALYs gained/lost, in order to take account of this outcome change. Other outcomes, such as recovery rates may be added to an updated version of the model when 12-month data become available.

Parameters used in each model, for instance on the costs of intervention and care as usual delivery, health service costs, changes in quality of life and intervention drop out rates are defined at country specific level and draw on data from the individuals STRENGTHS trials and pilot studies. Once the specific intervention and country used by the model has been chosen, the predefined country specific model parameters will be loaded from Excel tables. Some of these values can changed by the end user (see section 5). Unit costs used in the economic analyses for each country/intervention shown in report D7.2 are also used here; we also upload mean service utilisation for the intervention and care as usual as observed at 3-month follow up in each of the definitive trials.

We use country specific currencies in calculating return on investment: Turkish Lira, Swiss Francs, Jordanian Dinars, Egyptian and Lebanese Pounds, Euros in Germany and the Netherlands and Swedish Krona. All monetary values are in 2020 prices unless otherwise stated. In line with conventional health economic practice, we apply discounting to costs and benefits beyond one year; rates of discounting can be varied in models.

We again stress that the modelling results shown in this report, while based on available data, are illustrative at this stage. Further analyses, not yet in the public domain, as well as additional data that has been collected by STRENGTHS over the longer 12-month follow-up time frame will further inform the modelling tool. In addition, data from the meta-analytic dataset pooling data across trials as described in report D7.4 will also further inform the modelling tool, and lead to changes in assumptions for default model parameters as well as the likelihood of any impacts being sustained. An updated version of the report, and revised and extended version of the Excel model will become available from the authors once the results of the individual studies and the meta-analyses have been accepted for publication.

5. Making use of the tool

5.1. Getting started

A welcome page provides some brief background on the tool. The tool has been designed so that it always will show this welcome page when the tool is first opened. Two options are then possible: clicking on a link to download a brief version of a manual with instructions on how to use the tool or alternatively clicking on the link to '**proceed to the interventions menu'**. Most of the cells of the tool in protected to avoid accidental change; but interventions examined, countries of implementation and many specific parameters can be varied for each of the four models in the tool: iPM+, gPM+, SbS and EASE.

5.2. Intervention Choice Menu

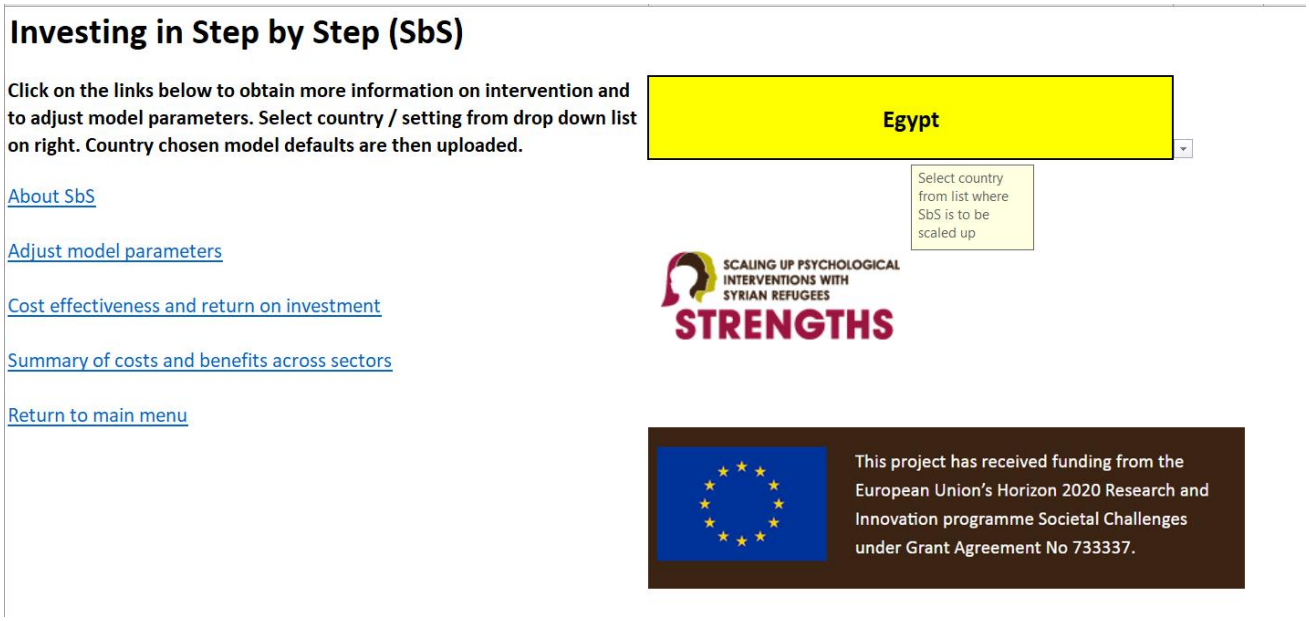
The intervention choice menu is shown in Figure 1. It shows the four different interventions for which the return on investment relative to care as usual/ enhanced care as usual (or costing analysis in the case of EASE) can be calculated. To select any one intervention to look at simply the end user simply has to **click on the name of the intervention**. This will take the end user to a separate menu for that specific intervention. The date of last update on the model is provided as well as a link to the STRENGTHS website.

Figure 1: The Intervention Choice Menu

5.3. Intervention Sub-Menus

The options and structures of each of these intervention sub-menus are identical. As illustrated in Figure 2, each of these menus provides an option to first choose the country where the intervention is to be delivered in addition to listing five options. There is an option to see further information about the intervention, in this case Step by Step, including information on sources of assumptions in that model, as well as an option to return to the intervention choice page.

Figure 2: Example of intervention-sub menu for Step by Step (SbS)



The first thing to decide for each model is which country to select. You will see that there is a yellow box which shows which country is selected. Clicking on this box shows a drop-down list. In the case of the SbS intervention there are three potential countries to choose from: Egypt, Germany and Sweden. At present the geographical area used in all models **can only be changed from these specific intervention choice menus,** as the different interventions have all been assessed in different countries. So, for example, for the gPM+ intervention choice menu, the user must choose between Jordan and Türkiye, while for iPM+ the choice is between Switzerland and the Netherlands. If the country is changed then results of the specific intervention model will also change instantaneously reflecting different default parameters that are set for each country and specific intervention. We now go on to briefly describe each of the menu options.

5.4. Finding more out about the intervention

Each model has an option which shows some brief information on the different interventions. An example for iPM+ is shown in Figure 3. This provides brief information on the target population, and describes in brief the five different individual sessions of iPM+. Information on the background of the people delivering interventions is also provided, as well as something on what we know about the strength of the evidence base. The different potential elements of the economic impacts of poor mental health are also noted.

Figure 3: Example of brief information on iPM+ intervention

What do we know about iPM+?

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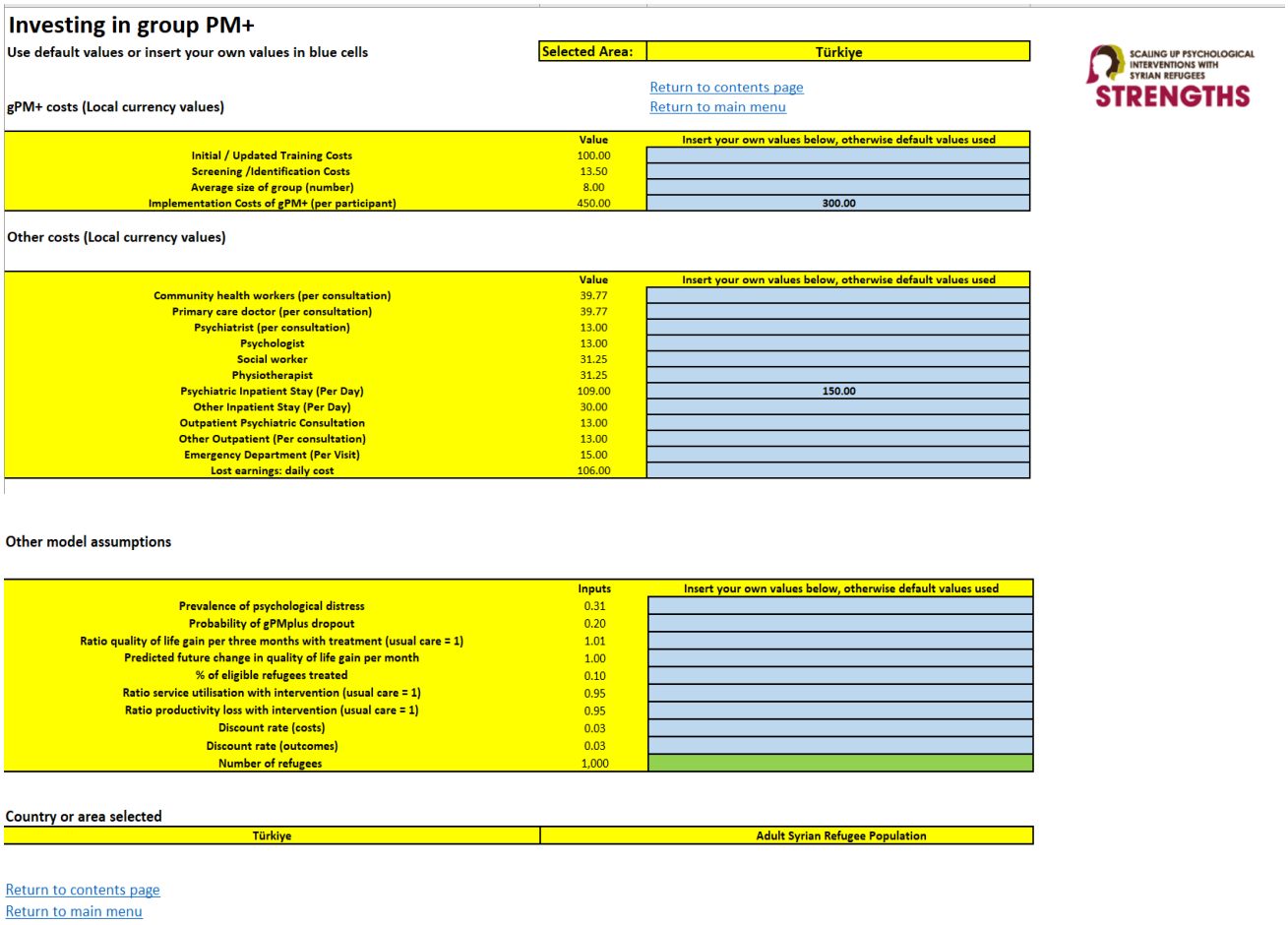
Who is it for?	1) arrival in host country after the outbreak of the Syrian civil war in 2011, 2) being 18 years or older, 3) having elevated psychological distress (Kessler Screening Scale for Psychological Distress (K 10) > 15), and 4) impaired psychosocial functioning (WHO Disability Assessment Schedule (WHODAS 2.0 > 16).
What is iPM+?	Individual PM+ consists of five 90-minutes, weekly in-person sessions with a non-specialist helper. It integrates four evidence-based behavioural strategies: stress management using diaphragmatic breathing (session 1), problem-solving (session 2), behavioural activation by re-engaging with pleasant/task-oriented activities (session 3), and accessing social support (session 4). Homework practice is scheduled following each session and reviewed in the next session. Psychoeducation is delivered in session 1 and relapse
Who is it delivered by?	The intervention has been delivered by Arabic-speaking Syrian non-specialist helpers who received 8 days of training followed by weekly face-to-face group supervision by PM+ trainers/supervisors. Training involved education about common mental disorders, basic counselling skills, delivery of intervention strategies and selfcare. Supervision included discussion of individual cases and difficulties experienced by helpers, practice of skills and self-care . Helpers had at least high school education, a background in social work, teaching or another related field. Trainers/supervisors were mental health care professionals who underwent 5-day training covering elements of the training of helpers, as well as training and supervision skills.
What do we know about effectiveness?	Studies on PM+ in non-refugee samples in Pakistan and Kenya previously have shown its effectiveness in reducing depression, anxiety, PTSD, functional impairment, and self-identified problems
What do we know about impacts of poor mental health?	Poor mental health in refugees has been associated with increased risk of long term physical and mental health problems. Long term poor mental health is also associated with increased risk of exclusion from work and education. Stigma may also persist around poor mental health. All of these impacts are associated with higher costs to governments, individuals and society.

5.5. Checking or adjusting model parameters

A key feature of the modelling tool is the ability to check or change some of the assumptions used to calculate the return on investment for each intervention in different country settings. The assumptions that can be changed vary a little between models, but the way in which these values can be changed work in the same way in each model. Figure 4 provides an example of how this works in practice, with an illustrative excerpt from the parameter adjustment worksheet of the gPM+ model. The first thing to note on Figure 3 is the geographical area that has been selected is clearly shown: in this case it is Türkiye. Selected Turkish default values used in the model are shown, in this case for example, the cost per participant in gPM+ is estimated to be 450 Turkish Lira, while screening/identification of refugees who would benefit from

intervention is assumed to be 13.50 Turkish Lira. The end user could change one or more of the default values in the Turkish model if they want to. In Figure 4, they have decided to reduce the costs of delivery of gPM+ to 300 Turkish Lira while increasing the cost of any psychiatric inpatient stay to 150 Turkish Lira per night. The model now run using these amended values. If the blue cells remain empty, then default Turkish model assumptions will be used. The population value would also be automatically changed to any specific target population in the selected geographical catchment area. In this case we have not entered overall estimates of population numbers at the moment, but have assumed a default situation of 1,000 Syrian refugees for illustrative purposed. This can be updated to reflect estimates of refugees in different settings.

Figure 4: Checking and / or adjusting model parameters: illustration from the gPM+ model



Investing in group PM+

Use default values or insert your own values in blue cells

Selected Area:	Türkiye

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gPM+ costs (Local currency values)

	Value	Insert your own values below, otherwise default values used
Initial / Updated Training Costs	100.00	
Screening /Identification Costs	13.50	
Average size of group (number)	8.00	
Implementation Costs of gPM+ (per participant)	450.00	300.00

Other costs (Local currency values)

	Value	Insert your own values below, otherwise default values used
Community health workers (per consultation)	39.77	
Primary care doctor (per consultation)	39.77	
Psychiatrist (per consultation)	13.00	
Psychologist	13.00	
Social worker	31.25	
Physiotherapist	31.25	
Psychiatric Inpatient Stay (Per Day)	109.00	150.00
Other Inpatient Stay (Per Day)	30.00	
Outpatient Psychiatric Consultation	13.00	
Other Outpatient (Per consultation)	13.00	
Emergency Department (Per Visit)	15.00	
Lost earnings: daily cost	106.00	

Other model assumptions

	Inputs	Insert your own values below, otherwise default values used
Prevalence of psychological distress	0.31	
Probability of gPMplus dropout	0.20	
Ratio quality of life gain per three months with treatment (usual care = 1)	1.01	
Predicted future change in quality of life gain per month	1.00	
% of eligible refugees treated	0.10	
Ratio service utilisation with intervention (usual care = 1)	0.95	
Ratio productivity loss with intervention (usual care = 1)	0.95	
Discount rate (costs)	0.03	
Discount rate (outcomes)	0.03	
Number of refugees	1,000	

Country or area selected

Türkiye	Adult Syrian Refugee Population

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5.6. Overview of parameters that can be adjusted in models

Here we provide a brief overview of the different model parameters that can be adjusted by the end user. The approach is broadly similar although there some minor differences, e.g. to take account of the impact of group size on the costs of gPM+ implementation.

There are three broad groups of parameters that can be adjusted: 1) impacts on the costs of implementation, 2) health service costs and productivity losses 3) assumptions on effectiveness, levels of uptake, coverage and impacts on resource utilisation.

1) Impacts on the costs of implementation

End users have the option in all models to change the mean cost per service user of the intervention. They can also change the estimated cost per service user for training and supervision. We also recognise that there are costs associated with the identification of refugees and assessment of their mental health needs. These costs may vary considerably depending on health service model. If refugees are already in contact with health services, then these costs may be modest and potentially could even be part of a routine mental health assessment upon arrival in the host country. These costs could be more substantial if it is difficult to find/contact refugees; this could affect any ambition to increase coverage rates. In the case of the online intervention SbS, there are also costs to be considered, for instance those associated with social media campaigns or gaining the support of well-known bloggers etc. For group interventions the size of the group will also influence costs; if optimum group size can be achieved then costs per service user reached will be lower.

2) Health service costs and productivity losses

Our assumptions on costs of contact with various primary and specialist health services, as well as inpatient stays, are all taken from data collected iteratively as part of the pilot studies and definitive trials in STRENGTHS. In our modelling tool, the unit costs of those most frequently used, or most expensive, services can be adjusted. We have valued productivity losses of adults in each setting using some form of minimum wage rate, but the productivity losses of individuals can vary greatly. The daily costs of productivity losses can also be varied. We assume that the value of productivity losses is the same for both the person with lived mental health experience and any family members who also incur productivity losses.

3) Assumptions on effectiveness, levels of uptake, coverage and impacts on resource utilisation

It is essential that our estimates of difference in quality of life between intervention and care as usual groups can be varied. Estimates of impact on quality of life are taken from trial data at 3 month follow up for iPM+, gPM+ and SbS. These differences in quality of life, as we noted in our D 7.2 economic evaluation report, are small and not always statistically significant; we are analysing data that is now becoming available at 12 month follow up to see how these impacts may change .

Scaling-up any intervention implies making a decision about the level of coverage to achieve within any target population group. This coverage rate can be varied; this has implications immediately for the

budgetary costs of implementation but in the longer term will also determine the magnitude of costs and benefits seen. There may also be economies of scale associated with interventions as they are scaled up, that we will consider in the final version of the modelling tool.

The end user can vary our assumptions on the overall rate of difference in health service utilisation and productivity losses between intervention and control groups. These are currently based on observed differences seen in the trials at 3-month follow up. In our economic evaluation report D7.2 we identified almost no significant differences in either of these impacts at 3 month follow up in any setting. However, we might expect these differences to become more visible over a longer time period. There may also be great variation in service use for some groups of refugee groups which is being explored further; this may also lead to further model refinement.

5.7. Displaying return on investment results

There are two ways of displaying results. Clicking on the option **Cost effectiveness and Return on Investment** from any of the intervention sub-menus will take the end user to a screen which provides a breakdown of results, including costs of intervention, costs that may be avoided and some outcome information for each time period that the model covers.

Figures 5a and 5b show the results of a return on investment analysis for the implementation of iPM+ in the Netherlands compared with usual care. Again, we emphasise that this is illustrative as model assumptions will be further updated when further data become available. Here we have used the default population of 1,000 and assumed that the goal was to reach 50% of this population and provide access to iPM+ for all those who met screening criteria. In our illustrative model this is assumed to be 31% of the group assessed. We have assumed here that all those who are offered the service accept this, but this assumption can also be varied in the model.

The top line of the ROI table in Figure 5a shows the total budgetary costs of screening the target population and the providing iPM+ services, including initial training and ongoing support /supervision for the helpers providing iPM+. This is estimated to be €71,327, all incurred during the implementation period, with no subsequent iPM+ intervention beyond this timepoint. The table also shows the number of people who were assessed for mental health need (500), as well as the eventual number of service recipients being 155.

The table then shows the overall impact on health service utilisation over time, and in this illustrative model assumes that the benefits are maintained over the entire model period. The model indicates, for example,

that there are net costs averted to primary and community care services of €603 at 3 months, while productivity losses avoided in the first 3 months are €1,196 when valued using Dutch minimum wage rates. The total column on the right of the table shows cumulative costs averted over the entire 30-month period, for each cost component. There is also a summary of '**Total cost consequences (Saving if negative value**)'. As this value is -€20,778 this means that costs averted estimated to be €20,778.

Cumulative return on investment is collected comparing the value of total payoffs from costs avoided (or incurred) over different time periods with the costs of intervention. At the end of 3 months the return on investment is €0.04, as this is calculated as the total cost consequences value at 3 months, savings of £3,186, compared to a total investment in iPM+ in the first 3 months of €71,327. Over the next 3 months return on investment increases to £0.09, which is the sum of the return on investment in both the first and second three-month periods. At the end of the 30-month period there is an overall return on investment of €0.29 for every €1 invested in the intervention. This seems a modest return, but reflects the very limited difference in health service utilisation seen at 3 month follow-up, which in this scenario we have assumed to be maintained over the rest of the model. When 12 month follow up data have been analysed this assumption may change, impacting longer term return on investment.

The table in Figure 5a also looks at the impact of changes in quality of life on return on investment. This is done by valuing each quality adjusted life year (QALY) gained, in the Dutch case at a value of €20,000. This is the most conservative value that is used in the Netherlands for determining whether interventions are considered to be cost effective, although there are thresholds of up to €80,000 for more severe conditions (Schurer et al., 2022). The model indicates that over the 30-month period 3.92 additional QALYs may be gained in the iPM+ group compared to usual care. The row **Total cost (saving) including net monetary benefits of QALYs gained** shows how the economic value of investing in iPM+ changes when including these benefits. The modest 3% gain in QALYs per 3 month period see in the Netherlands if maintained over 30 months would be associated with total costs averted of €148,985, using a cost effectiveness threshold of €20,000 per QALY gained.

We then estimate the '**Social return on investment**' taking into account the willingness of Dutch society to pay for improvements in quality of life. From this full societal perspective the return on investment is positive at 30 months, with €2.09 generated for every €1 invested in iPM+. In fact, the intervention generates a positive return on investment of €1.27 by 12 months. We do again stress caution here however, as further 12-month data will establish whether positive QALY gains are maintained or even strengthened, rather than weakening over time. The model will be updated when these data become available, but it is clear that the model is sensitive to marginal changes in quality of life over time.

Figure 5b provides information on costs and outcomes for the iPM+ and care as usual groups. Total estimated costs, including the cost of intervention but excluding the monetary value of QALYs gained, are €469,058 in the PM+ group compared to €418,665 in the care as usual group. 220 QALYs are gained in the iPM+ group compared with 214 in the usual care group. The monetary benefits of QALYs gained over the model time period are €4,401,776 and €4,273, 569 in the iPM+ and usual care groups respectively.

This is just one illustration of the return on investment that may be associated with iPM+. As we have noted model parameters can be varied and the change on impact on return on investment seen. For example, if there is a 5% rather than 3% higher number of QALYs gained in the iPM+ group in this example then the possible social return on investment at 12 months increases from €1.27 to €2.01, and the possible social return on investment at 30 months increases from €2.09 to €3.29. If the costs of implementation change this will also have some impact on the return on investment, but this is more modest. For example, if implementation costs delivery and training costs could be reduced by 50% as the service matures then the social return on investment would be positive after 6 months, but the return on investment excluding quality of life benefits would be €0.54 after 30 months. Alternatively, without any change in implementation costs, if health service use and productivity losses were both lower by 28% in the iPM+ group then the intervention would break even after 12 months, even without taking account of the positive impacts on quality of life, and the other direct benefits to mental health and functioning that have been reported in earlier STRENGTHS reports. Again, as more longer-term data become available, it will be possible to assess whether such changes in service use are plausible.

Information on the return on investment can also be broken down by sector over time. This can be done by clicking on the option **Summary of costs and benefits across sectors.** This analysis does not include the monetary value of QALYs gained. This is shown in Figure 6, using the same example for iPM+ implementation in the Netherlands, but this time assuming that there is indeed a 28% net difference in health service utilisation and productivity losses in the iPM+ group. In Figure 6 we can see that the intervention breaks even by 12 months with a return on investment of €1.

This breakdown by sector can be especially helpful if multiple stakeholders may be involved in the funding and delivery of interventions. In our case, the model currently just looks at the health system, in addition to benefits to all of society through reduced productivity losses (time out of or unpaid activities that contribute to the economy). Further versions of the model can also consider the impact to refugees living with mental health needs and their families, for instance through changes in levels of out of pocket costs incurred, and the avoidance of time travelling to and waiting to receive health services.

Figure 5a: Summary of return on investment: iPM+ in the Netherlands

Summary of return on investment and cost effectiveness

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Costs, costs averted (national currency 2020 values) **Selected Area: Netherlands**

	3 months	6 months	9 months	12 months	18 months	24 months	30 months	Total
Cost of delivering iPM+	71,327	0	0	0	0	0	0	71,327
Number of refugees assessed	500							
Number of refugees receiving service	155							
Use of primary and community health care services	-603	-586	-569	-552	-520	-490	-462	-3,782
Use of secondary inpatient health care services	-845	-820	-796	-773	-728	-686	-646	-5,294
Use of secondary outpatient health services	-407	-395	-383	-372	-351	-330	-311	-2,550
Loss of paid/unpaid activity - service user	-1,196	-1,161	-1,127	-1,094	-1,031	-971	-915	-7,497
Loss of paid/unpaid activity - family/ friends	-289	-281	-272	-264	-249	-235	-221	-1,811
Total cost (saving if negative value)	-3,186	-3,243	-3,148	-3,055	-2,879	-2,712	-2,556	-20,778
Return on investment	**0.04**	**0.09**	**0.13**	**0.18**	**0.22**	**0.26**	**0.29**	**0.29**
Total cost (saving) including net monetary benefits of QALYs gained	**-23645.64**	**-23102.80**	**-22425.42**	**-21767.89**	**-20510.12**	**-19325.02**	**-18208.40**	-148,985
Social Return on Investment	**0.33**	**0.66**	**0.97**	**1.27**	**1.56**	**1.83**	**2.09**	**2.09**
Quality Adjusted Life Years Gained	**1.02**	**0.99**	**0.96**	**0.94**	**0.88**	**0.83**	**0.78**	**3.92**
Net Monetary Benefit	**20,460**	**19,860**	**19,278**	**18,713**	**17,631**	**16,613**	**15,653**	**128,207**

Figure 5b: Summary of return on investment: iPM+ in the Netherlands

Costs for iPM+ group

	3 months	6 months	9 months	12 months	18 months	24 months	30 months	Total
Cost of delivering iPM+	71,327							71,327
Use of primary and community health care services	11,466	11,130	10,804	10,487	9,881	9,310	8,772	71,851
Use of secondary inpatient health care services	16,052	15,581	15,124	14,681	13,833	13,033	12,280	100,584
Use of secondary outpatient health services	7,731	7,504	7,284	7,070	6,662	6,277	5,914	48,442
Loss of paid/unpaid activity - service user	22,733	22,066	21,419	20,791	19,590	18,458	17,391	142,447
Loss of paid/unpaid activity - family/ friends	5,491	5,330	5,174	5,022	4,732	4,458	4,201	34,408
Total cost	**134,799**	**61,611**	**59,805**	**58,051**	**54,697**	**51,536**	**48,559**	**469,058**
Quality Adjusted Life Years Gained	**35.12**	**34.09**	**33.09**	**32.12**	**30.27**	**28.52**	**26.87**	**220**
Monetary Benefit	702,460.00	681,863.60	661,871.09	642,464.78	605,342.46	570,365.11	537,408.79	**4,401,776**

Costs for usual care group

	3 months	6 months	9 months	12 months	18 months	24 months	30 months	Total
Usual care costs	0	0	0	0	0	0	0	0
Use of primary and community health care services	12,070	11,716	11,372	11,039	10,401	9,800	9,234	75,632
Use of secondary inpatient health care services	16,897	16,401	15,920	15,453	14,561	13,719	12,927	105,878
Use of secondary outpatient health services	8,138	7,899	7,667	7,442	7,012	6,607	6,225	50,991
Loss of paid/unpaid activity - service user	23,929	23,227	22,546	21,885	20,621	19,429	18,307	149,945
Loss of paid/unpaid activity - family/ friends	5,780	5,610	5,446	5,286	4,981	4,693	4,422	36,218
Total cost	**66,813**	**64,854**	**62,952**	**61,107**	**57,576**	**54,249**	**51,114**	**418,665**
Quality Adjusted Life Years Gained	**34.10**	**33.10**	**32.13**	**31.19**	**29.39**	**27.69**	**26.09**	**214**
Monetary Benefit	682,000.00	662,003.50	642,593.30	623,752.21	587,711.13	553,752.54	521,756.11	**4,273,569**

Figure 6: Summary of costs and benefits across sectors: Illustration using iPM+ in the Netherlands

Investing in individual PM+: costs and benefits across sector

Selected area
Netherlands

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Total cumulative costs and costs averted by sector

	3 months	6 months	9 months	12 months	18 months	24 months	30 months	Total
Costs of the programme	71,327	0	0	0	0	0	0	71,327
Health Service	-10,389	-10,084	-9,789	-9,502	-8,953	-8,435	-7,948	-65,100
								0
								0
Society	-8,319	-8,075	-7,838	-7,608	-7,168	-6,754	-6,364	-52,126
Total costs	-18,708	-18,159	-17,627	-17,110	-16,121	-15,190	-14,312	-117,226
Total costs (savings if negative)	52,619	-18,159	-17,627	-17,110	-16,121	-15,190	-14,312	-45,899
Return on investment	**0.26**	**0.52**	**0.76**	**1.00**	**1.23**	**1.44**	**1.64**	**1.64**
Quality Adjusted Life Years Gained	**1.02**	**0.99**	**0.96**	**0.94**	**0.88**	**0.83**	**0.78**	**3.92**

6. Conclusions

Here we have developed an Excel tool covering the economic impact and potential scaling up of STRENGTHS interventions drawing on data from the definitive and pilot implementation studies at 3 month follow up only. The model can be used to determine the budgetary impact of scaling up implementation of services. The overall return on investment over time is calculated in two ways, one based on changes in service utilisation and productivity losses only, and the second also taking account of the monetary value of quality of life changes between the two groups. It also reports impacts broken down by sector over time. Our Excel tool uploads country specific default information into each model, drawing on information from the STRENGTHS trials. The end user can vary key parameters, either individually or in combination, and see how these impact on budgetary impact and return on investment.

In section 5 of this report, we described one illustrative example in the model, the implementation of iPM+ in the Netherlands. Using default values from the definitive trial in the Netherlands at 3 month follow up, and on the assumption that these impacts will persist beyond 3 months, our tool indicates a very modest return on investment. Intervention remains more costly than care as usual, as the trial did not reveal any significant change in health service utilisation or productivity losses but quality of life gains were marginally greater in the iPM+ group. This 3% difference in quality of life gains, nonetheless if maintained, will lead to a positive social return on investment within 12 months. Similar findings are seen for other iPM+, gPM+ and SbS trials as they reflect the trial findings; but it should also be noted that if there are no quality of life gains, e.g. as seen in the underpowered trial in Switzerland, the default model results do not suggest there is an economic case for investment.

In the absence of longer-term evidence, our modelling tool allows policy makers and other end users, such as international agencies and advocacy organisations, to look at the potential longer-term impacts of intervention, if longer-term impacts on service utilisation and quality of life are seen. They can also see what the magnitude of benefit or resource use averted are needed in order for the intervention to have a positive return on investment. They are then better informed to make judgements on how plausible it is to realise these benefits of intervention. They can also adjust key elements of the model to reflect their own implementation circumstances.

A key limitation however of the current modelling tool is the reliance on data from 3 month follow up only. Country specific model parameters will be updated when using 12 month follow up data when this becomes

available. In addition, in STRENGTHS we are also undertaking an analysis pooling data within a meta-analysis bringing together data from across the different trials of iPM+, gPM+ and SbS, as described in D7.4. With this larger pool of data our conclusions on the magnitude of effect of intervention may become more robust, and the model can also provide an option to make use of parameters drawn from this pooled dataset.

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8. Research outputs

In preparation

Paper on how a modelling tool can be used to explore the economic impacts of scaling up access to brief psychological interventions for refugees to inform policy making (Lead: LSE)