

# THE ECONOMIC IMPACT OF POST TRAUMATIC STRESS DISORDER IN NORTHERN IRELAND

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A REPORT ON THE DIRECT AND  
INDIRECT HEALTH ECONOMIC  
COSTS OF POST TRAUMATIC  
STRESS DISORDER AND THE  
SPECIFIC IMPACT OF CONFLICT IN  
NORTHERN IRELAND

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# **TWO THIRDS OF THE ADULT POPULATION HAVE EXPERIENCED ONE OR MORE TRAUMATIC EVENT TYPES DURING THEIR LIFETIME**

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## **ACKNOWLEDGEMENTS**

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The research team gratefully acknowledge the financial support and guidance provided by Dr. Peter Warrian and the Lupina Foundation in the completion of this study.

The study draws upon primary data derived from the Northern Ireland Study of Health and Stress (NISHS). The support of the Research & Development Office of Northern Ireland in funding the original NISHS is gratefully acknowledged.

The UK's Big Lottery Fund provided the grant for the initial study of trauma related disorders published in 2008 (Trauma, Health & Conflict, Ferry et al, 2008). The Fund's support for this earlier study is gratefully acknowledged.

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## 02

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## PREFACE

The Lupina Foundation works with partners across the world to support innovative and progressive thinking in health care. In 2003 we established a relationship with the Northern Ireland Centre for Trauma and Transformation (NICTT) and have funded a number of international activities and research programmes undertaken by the Centre.

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We have been particularly pleased to be involved with the subject of this report, an investigation into the health economic impact of post traumatic stress disorder (PTSD) in Northern Ireland, undertaken by a partnership of the NICTT and the University of Ulster. Given the history of violence since the late 1960's, it was clear to the Foundation that this was an area worthy of enquiry with unique opportunities and obligations to understand better the needs of individuals who suffer PTSD, and the needs of their communities.

In this report the NICTT-UU research team have sought to provide the population or epidemiological context for PTSD looking at the wider need associated with the years of conflict. From there they have investigated the direct service costs and the indirect costs associated with PTSD, again looking more closely at the impact of the conflict. In approaching the issue from this perspective the economic arguments become available as an additional strand in considering and making judgments about policy, strategy and services.

A health economics approach to any health concern allows us to better understand the impact of illness and to make informed choices about interventions and treatment options. It also clarifies the costs of not taking action, or, as in this case, of relying on approaches, systems and services that are not addressing the identified needs as effectively as alternatives. More specifically, this type of analysis is highly relevant to the making of informed choices, where resources are limited (as they usually are) and allows judgements to be made about the benefits and costs of current provision and switching to one or more alternative approaches, including the costs of pump priming any changes.

The Foundation hopes that this study will be put to good use. Our aim is to leave behind resources and analyses that have real utility at both the political and personal levels, ultimately endeavouring by both means to improve the lot of those who suffer and who can be helped through progressive approaches to health care and improving interventions.

**Peter Warrion PhD**  
Managing Director  
The Lupina Foundation  
Munk Centre for International Studies

## **INTRODUCTION**

As outlined in a previous report by the research team, Northern Ireland presents a specific case study for the examination of the experience and impact of psychological trauma given its recent history of over 30 years of civil conflict.

A body of community studies and other literature on the Northern Ireland conflict point to the substantial mental health impact associated with many years of violence. One of the most striking findings to emerge from the 'Trauma, Health and Conflict' (TH&C) Report (Ferry et al., 2008) was in relation to the elevated rates of post traumatic stress disorder (PTSD) among the Northern Ireland population.

The current Report updates and extends the findings of the TH&C Report, focusing specifically on the societal economic impact of PTSD in Northern Ireland. As far as can be detected by the research team, this report represents the first ever economic cost-of-illness study that focuses exclusively on PTSD. The current Report therefore represents an important contribution to the international literature. Aside from its contribution to the literature, this report aims to increase awareness among policy makers, planners, commissioners, service providers, service users and the wider public of the extent of the public health burden of PTSD among the general population and the associated adverse economic implications.

- Direct Costs £33.0m (19%)
- Indirect Costs £139.8m (81%)

**Direct and Indirect Costs of PTSD (2008)**



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**SUMMARY OF THE KEY FINDINGS**

This study investigated the direct service costs (e.g. visits to family doctors and other health services, and prescribed medication) and indirect costs (e.g. costs of lost work productivity) associated with PTSD over a one-year period (2008), and also estimated the impact of the conflict-related PTSD. In addition the study considered the economic value of reduced health related quality of life associated with PTSD. The key findings from the current report are outlined as follows...

**THE PREVALENCE OF PSYCHOLOGICALLY TRAUMATIC EXPERIENCES AND PTSD**

- Two thirds of the adult population have experienced one or more traumatic event types during their lifetime.
- It is estimated that 39% of the adult population have had one or more traumatic experiences linked to the conflict.
- The study found that the estimated prevalence of 12-month PTSD in the adult population was 5.1%<sup>1</sup> while the estimated lifetime prevalence was 8.8%<sup>2</sup>.
- Northern Ireland has the highest level of 12-month and lifetime PTSD among all comparable studies undertaken across the world, including in other areas of conflict.
- Based on case-by-case examination, it is estimated that 27% of individuals with 12-month PTSD (approximately 18,000 adults) have PTSD linked to a conflict-related traumatic event.

**THE ECONOMIC COSTS**

- Direct service costs among individuals with PTSD arising from all types of traumatic experiences were estimated to be £33.0 million over 12 months (2008 prices).
- Indirect costs among individuals with PTSD arising from all types of traumatic experiences were estimated to be £139.8 million over 12 months (2008 prices).
- The total estimated costs of resources used and lost among individuals with PTSD (direct and indirect costs) were therefore estimated to be £172.8 million over 12 months (2008 prices).
- Assuming that 27% of 12-month PTSD is linked to conflict-related traumatic events, it is estimated that the total annual costs (2008 prices) among individuals with 12-month PTSD associated with conflict were £46.7 million.
- The economic value of the reduced quality of life or human costs associated with PTSD was also examined. This part of the study concluded that over 12,000 quality adjusted life years (QALYs) were lost among individuals with PTSD in 2008<sup>3</sup>.

1. 12-month PTSD describes the percentage of the population who met the criteria for the disorder in the previous 12 months.  
 2. Lifetime PTSD describes the percentage of the population who met the criteria for PTSD at any point in their life.  
 3. A Quality Adjusted Life Year is an index ranging from 0-1, which weights a given year by the health-related quality of life of an individual for that year.

## **BACKGROUND TO THE RESEARCH**

This research has been undertaken by a partnership of the Northern Ireland Centre for Trauma & Transformation (NICTT) and the Bamford Centre of Mental Health and Wellbeing, University of Ulster (UU) with funding from the Lupina Foundation of Canada. The study is based primarily on secondary analysis of data from the Northern Ireland Study of Health and Stress (NISHS) which is the largest representative population study of mental health in Northern Ireland.

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The NISHS is the first epidemiological study of mental health in Northern Ireland based on validated diagnostic criteria. The study is part of the World Mental Health (WMH) Survey Initiative, a series of standardised population (epidemiological) surveys of mental health, substance use, and behavioural disorders in over 30 countries throughout the world, coordinated and supervised by the Harvard Medical School (Kessler and Üstün, 2008a).

These studies allow the identification of individuals who met the criteria for a range of mental disorders according to the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) (American Psychiatric Association (APA), 1994). The NISHS, along with all other WMH studies also sought information on socio-demographic characteristics, use of health and related services, and medication and quality of life. A more detailed description of this study can be found in Appendix 2.

Based on a analysis of data from the NISHS, the NICTT-UU research partnership have previously provided the first representative estimates of the prevalence of traumatic experiences, PTSD and other mental health disorders associated with trauma among the Northern Ireland adult population (Ferry et al., 2008; Bunting et al., in press). These estimates reveal that PTSD and other disorders associated with trauma represent a significant public health burden in Northern Ireland. This burden of trauma and related disorders has major economic implications for individuals, families, the health service, employers, government and the wider community.

This particular study extends the previous analysis by estimating the economic burden of post traumatic stress disorder in Northern Ireland over a one-year period (i.e. 2008).

## WHAT IS POST TRAUMATIC STRESS DISORDER?

While a range of mental health disorders may develop as a consequence of exposure to traumatic events, PTSD is unique in that it is the only mental health disorder that must be preceded and directly linked to a traumatic stressor, i.e. for diagnostic purposes. The disorder describes a range of psychological and physical problems that can sometimes follow particular threatening or distressing events and was first classified as a disorder in 1980 (APA, 1980) under the umbrella of anxiety disorders.

Results in the current report are based on PTSD estimates according to the updated DSM-IV criteria (APA, 1994), which is outlined in detail in Appendix 1.

The current diagnostic criteria for PTSD stipulate that the individual must have experienced a traumatic event which involved actual or threatened death or serious injury, or a threat to the physical integrity of oneself or others. In addition the individual's immediate response must be characterised by intense fear, helplessness or horror. PTSD is characterised by three clusters of commonly observed symptoms or reactions that develop subsequent to this experience, namely:

1. Re-experiencing of the event such as nightmares or flashbacks;
2. Avoidance of things that remind the person of the event and numbing of emotions and responsiveness;
3. Hyper-vigilance symptoms such as jumpiness, irritability and sleep disturbance.

Following the first classification of PTSD in 1980, a body of research and related literature emerged in the area of trauma and trauma-related disorders and needs. Of particular interest are the population or epidemiological studies of trauma and PTSD.

Evidence from these studies has demonstrated that the experience of traumatic events is common, with two-thirds of the general population having experienced at least one significant traumatic event during their lifetime (Galea et al., 2005).

Estimates of the prevalence of 12-month PTSD among the general population range from 0.5% (Levinson et al., 2007) to 3.6% (Kessler et al., 2005) while estimates of the prevalence of lifetime PTSD range from 1.0% (Helzer et al., 1987) to 6.8% (Kessler et al., 2005).

## UNDERSTANDING THE CONTEXT

This current study is the latest in a series of research projects undertaken by the UU and NICTT partnership which have focused on the experience and impact of psychological trauma in Northern Ireland. The health economic costs presented within the report extends previous analyses on trauma and PTSD and associated disorders reported in 'Trauma, Health and Conflict' (2008) and other related publications (Bunting et al., in press). Collective consideration of sources provides an insight into the extent of the burden of traumatic experiences and PTSD as well as the mental health needs associated with PTSD and associated disorders.

### In summary:

- It is estimated that 61% of the Northern Ireland adult population have experienced a traumatic event at some point in their lifetime.
  - An estimated 39% of the Northern Ireland adult population have had one or more traumatic experiences linked to the conflict. This represents a distinctive and very significant stressor on individuals, families and communities.
  - It is estimated that 5.1% of the adult population (approximately 68,000 adults) are estimated to have had PTSD in the previous 12-months. An estimated 27% of this 12-month PTSD figure (approximately 18,000 adults) was linked to conflict-related traumatic events.
  - An estimated 8.8% (approximately 118,000) of adults have had PTSD at some point in their life. It is estimated that 29% of this lifetime PTSD figure was associated with conflict-related traumatic events.
  - Findings from the 'Trauma, Health and Conflict' Report (2008) show that individuals who met the criteria for PTSD were more likely to have a range of other mental health disorders and also a range of chronic physical conditions.
- Of those who met the criteria for PTSD only 61% ever sought help for their PTSD symptoms. Of this group only 59% received services that they considered to be 'helpful or effective'. (In short, just 36% of people who met the criteria for PTSD said they got help they considered to be 'helpful or effective').
  - Additionally, the NISHS revealed that whereas people with depression and other mood disorders on average seek help within 12 months of the onset of their symptoms, people with anxiety disorders (of which PTSD is an example) wait an average of 22 years following the onset of symptoms before seeking help

This series of figures provides a strong rationale for the examination of the economic consequences of psychological trauma and PTSD. The elevated rates of PTSD among the Northern Ireland population and the association between PTSD and other disorders represent a substantial public health issue.

Furthermore, given evidence of low levels of help seeking and lengthy delays, it is clear there are substantial levels of unmet need, which on the face of it probably have major economic implications for individuals, families, employers and wider society due to lost productivity and reduced quality of life. The current study seeks to cast more light on the scale of these costs

## WHAT OTHER STUDIES HAVE FOUND ABOUT THE COST OF TRAUMATIC EXPERIENCES AND PTSD?

Besides the number of individuals directly affected, mental health disorders have substantial economic implications for individuals and for the population and its institutions and services (McCrone et al., 2008; Greenberg et al., 2003; Thomas and Morris; 2003).

First, mental health disorders require treatment and medication and therefore are associated with specific healthcare costs. Second, given the debilitating nature of mental health disorders, individuals are often unable to carry out their normal daily activities at home or in the work place, which invariably results in economic consequences for individuals, families, employers and government (Almond and Healy 2003; Kessler and Frank, 1997).

Finally, and inextricably linked with the previous point, mental health disorders are associated with significant reductions in health related quality of life, with individuals enduring in some cases long-term pain and suffering associated with their illness (Linzer et al., 1996; Spitzer et al., 1995), to which we might add the impact on families and carers.

In recent years there has been an increasing body of research into the economic impact of mental health disorders. The majority of studies in this area have however focused on depression, broad categories of anxiety disorders or mental illness in general (McCrone et al., 2008; London School of Economics and Political Science, 2006; The Northern Ireland Association for Mental Health, 2004; Thomas and Morris, 2003; Rice and Miller, 1995; Stoudemeire et al., 1986).

In 2003 McCrone and colleagues however noted that there had been no health economic cost-of-illness studies specifically focusing on the economic impact of PTSD on the general population. The literature review for this study confirms that since 2003 no such studies have been published nor have there been any studies published on the economic burden of other trauma related disorders.

**NORTHERN  
IRELAND HAS THE  
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12-MONTH AND  
LIFETIME PTSD IN  
ADULT POPULATION  
IN COMPARABLE  
STUDIES ACROSS  
THE WORLD**

**THE ESTIMATED  
PREVALENCE OF  
12-MONTH PTSD  
IN THE ADULT  
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**IT IS ESTIMATED  
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INDIVIDUALS  
WITH 12-MONTH  
PTSD HAVE PTSD  
LINKED TO A  
CONFLICT-RELATED  
TRAUMATIC EVENT**

## **METHOD**

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### **OVERALL STUDY APPROACH**

The current study adopts a similar methodology to a previous study by Thomas and Morris (2003) in their estimation of the economic cost of depression in England, which represents a standardised approach to cost-of-illness analysis widely used in similar research.

A 'prevalence-based' approach was used to estimate the total direct and indirect costs among adults with PTSD in Northern Ireland within a one-year period. Specifically this cost-of-illness study estimates the economic burden among all prevalent cases of PTSD in Northern Ireland in 2008 given the available data.

The main body of this report considers two broad cost categories, namely 'direct' and 'indirect' economic costs. Direct costs incorporate the cost of visits to service providers and the cost of medication among the sub-group of individuals who met the criteria for 12-month PTSD. Indirect costs capture the cost of reduced productivity associated with incapacity days among this subgroup and also the cost of 'presenteeism' or reduced productivity while at work<sup>4</sup>.

Aside from these two major cost categories, the human costs associated with PTSD are also considered in Appendix 3. Human costs represent the burden of reduced health related quality of life among individuals with PTSD. While this additional category does not refer to resources used or lost or indeed money in real terms, an attempt has been made to capture the estimated economic value of reduced health related quality of life.

Where appropriate, average cost estimates (from the NISHS) were combined with PTSD prevalence rates and adult population figures to obtain an estimate of the overall cost among the Northern Ireland population.

### **DATA SOURCES**

Information and data from a variety of sources were utilised and merged to produce economic cost estimates. A detailed description of these data sources can be found in Appendix 2. The current study is based largely on analysis of the NISHS. The NISHS data was used to obtain estimates of the prevalence (or epidemiology) of 12-month PTSD among the general adult population.

This dataset also contained detailed information on units of service use, units of medication, work performance, rates of employment and reduced quality of life (measured in lost Quality Adjusted Life Years (QALYs)) among individuals with 12-month PTSD. The number of working days lost as a result of PTSD and other acute stress disorders was obtained from the Analytical Services Unit, Department for Social Development Northern Ireland (DSDNI, 2008). The relevant unit costs of service visits were derived from the Personal Social Services Research Unit (Curtis, 2008).

Medication costs were taken from Prescription Cost Analysis data provided by the Health & Social Care Board (HSC) Business Services Organisation (HSCNI, 2008). Gender and age specific wage rates were derived from the Annual Survey of Hours and Earnings (ASHE) conducted by the Department of Enterprise, Trade and Investment (DETNI, 2008). Finally, similar to previous studies, the cost of a QALY was assumed to be the cost-effectiveness threshold for economic evaluations, as recommended by the National Institute of Clinical Excellence (Appleby et al., 2007). Northern Ireland mid-year adult population estimates were obtained from the Northern Ireland Statistics and Research Agency (NISRA, 2010).

A more detailed overview of the data sources and methods of analysis used to produce this report is provided in Appendix 2.

### **HOW WAS PTSD ASSESSED IN THE STUDY?**

Estimates of the 12-month and lifetime prevalence of PTSD among the adult population of Northern Ireland were obtained from analysis of data from the NISHS. The survey instrument used to elicit information from NISHS participants included a detailed 'PTSD' section. At the beginning of this section, participants were presented with 29 types of traumatic events and asked whether they had experienced them during their lifetime.

If an individual endorsed a specific traumatic event, they were subsequently asked more detailed questions about the event including the age at which they first experienced this event. Individuals were also asked further questions about re-experiencing, avoidance and hyper-vigilance symptoms associated with a 'random event' and 'worst event' among those event types that participants endorsed. Responses to questions within this PTSD section were then processed using statistical algorithms or codes which identified those individuals that met the criteria for 12-month and lifetime DSM-IV PTSD.

4. Presenteeism in this context is the term used to refer to reduced productivity among individuals with PTSD while at work.

# RESULTS

## EXPERIENCE OF TRAUMATIC EVENTS AMONG ADULTS IN NORTHERN IRELAND

Overall 60.6% of the NISHS sample experienced at least one type of traumatic event during their lifetime. Combining this estimate with Northern Ireland's adult population for 2008 suggests that approximately 813,000 adults have experienced a traumatic event during their lifetime. This figure largely coincides with the estimate from international studies that two thirds of the general population will experience a traumatic event during their lifetime (Galea et al., 2005). Males were significantly more likely to have experienced a traumatic event than females.

In contrast to findings in relation to the experience of traumatic events, females were significantly more likely than males to meet the criteria for lifetime and 12-month PTSD. Case-by-case analysis of the sub-group of individuals who met the criteria for PTSD in terms of the qualifying event (i.e. the event linked to PTSD) reveals that approximately 29% of lifetime PTSD was associated with conflict-related traumatic events, representing an estimated 34,000 individuals. An estimated 27% of 12-month PTSD was associated with conflict-related traumatic events, which corresponds to approximately 18,000 individuals.

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**Table 1:**  
Lifetime experience of traumatic events

Lifetime experience of any traumatic event .....	%
Overall Sample*	60.6
Males	64.8
Females	56.9

\*X<sup>2</sup> test indicates significant gender differences at the 5% level of significance<sup>5</sup>.

## THE PREVALENCE OF PTSD AMONG ADULTS IN NORTHERN IRELAND

Analysis of data from the NISHS suggests 5.1% of the adult population met the criteria for PTSD in the last 12 months while 8.8% met the criteria at some point in their life (lifetime PTSD). If we combine these prevalence rates with Northern Ireland population figures, we can conclude that approximately 118,000 adults met the criteria for PTSD at some point in their lifetime. The 12-month figure, which represents the best estimate of current levels of PTSD among the population, suggests that approximately 68,000 individuals met the criteria for PTSD in the previous 12 months.

**Table 2:**  
Prevalence of post traumatic stress disorder among the Northern Ireland population

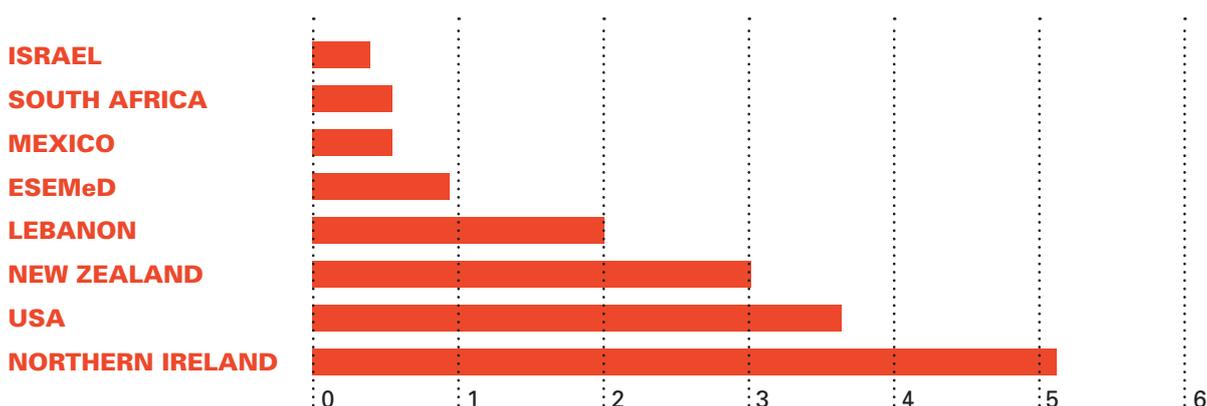
	Total %	Males	Females
12-month PTSD*	5.1	4.0	6.1
Lifetime PTSD*	8.8	6.4	11.0

\*X<sup>2</sup> test indicates significant gender differences at the 5% level<sup>5</sup>.

Figure 1 compares the 12-month rates of PTSD in Northern Ireland with rates from a selection of other WMH countries that have produced estimates. At 5.1%, the 12-month prevalence of PTSD in Northern Ireland is higher than estimates from all other WMH Survey Initiative countries including countries with a recent history of civil conflict.

The same is also true with respect to lifetime prevalence figures, with Northern Ireland again having the highest rates across all countries (Alonso et al., 2004; Kessler et al., 2005; Oakley-Browne et al., 2006; Herman et al., 2008; Levinson et al., 2008; Karam et al., 2008, Medina-Mora et al., 2008).

**Figure 1: The 12-month prevalence of PTSD in selected WMH Survey Initiative countries**



ESEMeD is a collaboration of six western European countries: Belgium, France, German, Italy, Spain and the Netherlands.

5. A chi-squared or X<sup>2</sup> test is a statistical test which examines if differences (in exposure to trauma for example) between two groups are likely to occur by chance.

## RESULTS

### THE ECONOMIC COST OF PTSD IN 2008

As described previously, estimates of mental health disorders provide a valuable insight into the level of need within a given population. An evaluation of the extent of the social and economic burden posed by these estimates however offers a more in-depth evidence base to inform the planning, provision, targeting and allocation of appropriate services. The subsequent series of results presents findings from an economic cost-of-illness study, focusing on individuals who met the criteria for PTSD in the 12 months previous to the interview. Given that NISHS data collection was completed in 2008, these costs are estimated based on 2008 prices or unit costs.

### DIRECT COSTS

#### SERVICE VISITS

In cost-of-illness studies, direct costs incorporate costs under two sub-categories: the cost of service visits or treatment associated with a particular illness or disorder and also the cost of medication taken by individuals with this disorder. In the service use section of the NISHS interview, participants were asked about their visits to various treatment providers in the previous 12 months for problems with their 'emotions, nerves or mental health'. Table 3 summarises the costs of service visits in 2008 among individuals with PTSD. Using PTSD prevalence information and total adult population data, an estimate was then made of the total number of visits to each service provider among individuals with PTSD.

For example, the most frequently visited service provider was the GP or family doctor with over 118,000 visits from individuals with PTSD in 2008. An estimate of the total cost of visits to a range of providers was then estimated by multiplying the total number of visits by the relevant unit cost using PSSRU information. Hospital stays (given their relatively higher unit cost) represent the highest cost among individuals with PTSD followed by GP visits and psychiatrist visits. The total estimated costs of service visits among this cohort were just over £27.3 million.

**Figure 2:**  
**Proportional breakdown of total service visit costs (£27.3 million) among individuals with PTSD in 2008**



Abbreviations : MH = Mental Health / HS = Health Service

■ Hospital 30%	■ Social Worker (MH) 2%	■ Other (MH) 2%
■ Psychiatrist 19%	■ Social Worker (HS) 1%	■ Other Health Prof 1%
■ GP / Family Doctor 23%	■ Counsellor (MH) 6%	■ Healer 1%
■ Psychologist 3%	■ Counsellor (HS) 12%	

**Table 3:**  
**Cost of service visits among individuals with PTSD in 2008**

Service provider	Total visits among individuals with PTSD in NI	Unit cost in 2008 (£)	Total costs among individuals with PTSD (£)
Hospital stay	37,458	219	8,203,409
Psychiatrist	16,735	316	5,288,240
GP/family doctor	118,341	52	6,153,707
Psychologist	10,415	72	749,893
Social worker (mental health)	7,125	89	634,096
Social worker (health service)	2,691	138	371,412
Counsellor (mental health)	37,602	40	1,504,093
Counsellor (health service)	79,027	40	3,161,071
Other mental health professional	10,627	57	605,751
Other health professional	8,999	42	337,451
Healer	7,335	37.5	308,061
			<b>27,317,184</b>

## MEDICATION

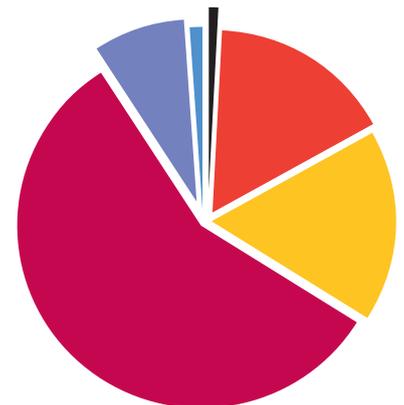
The second sub-category of direct costs is the cost associated with medication. Table 4 provides estimates of the costs of medication among individuals who met the criteria for PTSD in the previous 12 months. These costs are presented according to British National Formulary (BNF) categorisation of medication types<sup>6</sup>. The cost estimates provided in Table 4 represent an aggregation of these individual costs according to their relevant BNF category. The total cost of medication among individuals with PTSD in 2008 was estimated to be over £5.7 million. Considering both service use and medication costs, it is estimated that the total direct cost associated with individuals who met the criteria for PTSD was almost £33 million. Service visit costs accounted for 83% of total direct cost while medication accounted for 17%.

**Table 4: Costs of medication among individuals with PTSD in 2008**

Medication category <sup>7</sup>	Total costs among individuals with PTSD in 2008 (£)
Hypnotics and anxiolytics	911,311
Drugs used in psychoses and related disorders	958,521
Anti-depressant drugs	3,214,504
Central nervous system stimulants	74,352
Drugs used in nausea and vertigo	8,199
Anti-epileptics	430,885
Drugs used in Parkinsonism and related disorders	60,634
	<b>5,658,406</b>

**Figure 3:  
Proportional  
breakdown of total  
medication cost  
(£5.7 million) among  
individuals with PTSD  
in 2008**

- Hypnotics & Anxiolytics (16%)
- Drugs used in Psychoses & Related Disorders (17%)
- Anti-depressants (57%)
- Drugs used in Vertigo & Nausea (0%)
- Anti-epileptics (8%)
- Central Nervous System Drugs (1%)
- Drugs used in Parkinsonism & related disorders (1%)



## INDIRECT COSTS

### LOST PRODUCTIVITY FROM INCAPACITY DAYS

The second major cost category to be considered in estimating the economic burden associated with a disorder is indirect costs, namely the cost of lost productivity. As outlined in the methods section (Appendix 2), this was estimated by combining information on incapacity benefits relating to days lost due to PTSD and other acute stress reactions with age and gender specific wage rate information.

Data from the Department for Social Development suggests that 6278 individuals were in receipt of Incapacity Benefit as a result of PTSD or acute stress reactions (an early response sometimes experienced after traumatic events). Table 5 summarises estimates of the economic costs associated with this lost productivity.

Among males, the highest number of working days lost as a result of PTSD and other acute stress reactions was among the 40-49 age group while the 50-59 age group represented the highest number of days lost among females. Despite females being significantly more likely than males to meet the criteria for 12-month PTSD (as outlined in previous results), total work loss days and total cost associated with PTSD were higher among males.

These findings undoubtedly reflect gender differences in retirement age among other influencing factors. In total over two million working days were lost as a result of PTSD and other acute stress disorders, representing a total economic burden of £113.6 million, a figure which far exceeds the direct costs of medication and service use.

6. A more detailed outline of medication costs among individuals who met the criteria for 12-month PTSD will be provided on request by the research team. This includes estimates of the total number of prescriptions, unit costs and total costs of individual medication types rather than the broad categories presented in this report.

7. Categorisation of medication is based on the British National Formulary categorisation for 2008. This information was obtained from Prescription Cost Analysis data for Northern Ireland (HSCNI, 2008).

## RESULTS

**Table 5:**  
**Cost of lost productivity associated with PTSD and other acute stress reactions in 2008**

Age-group	NUMBER OF WORKING DAYS LOST DUE TO PTSD AND OTHER ACUTE STRESS REACTIONS		TOTAL COSTS (£)	
	Males	Females	Males	Females
Less than 21	52,925	48,860	1,618,780	1,129,827
22-29	139,065	119,700	6,306,312	4,728,970
30-39	226,960	193,480	12,539,385	9,057,514
40-49	312,020	335,365	20,536,900	14,778,111
50-59	296,720	413,545	19,153,479	17,103,768
60-65	144,490	-	6,611,704	-
	<b>1,172,180</b>	<b>1,110,950</b>	<b>66,766,560</b>	<b>46,798,191</b>
	<b>Total days lost: 2,283,130</b>		<b>Total cost: 113,564,751</b>	

### PRESENTEEISM

In addition to lost productivity associated with incapacity days, individuals with mental health disorders are also less productive while in the workplace compared to their 'healthy' counterparts (Alonso et al., 2010). This aspect of reduced productivity is known as 'presenteeism'. The level of presenteeism and associated economic cost was also estimated in the current study. As outlined in the methods section in Appendix 2, the NISHS included a question on work performance.

Table 6 summarises the levels of presenteeism among males and females with 12-month PTSD based on a comparison of these individuals with those who did not have 12 month PTSD. Males who met the criteria for PTSD were almost 2% less productive (presenteeism rate) compared to those who did not meet the criteria for PTSD.

The corresponding presenteeism rate for females who met the criteria for PTSD was just over 5.5%. Combining these estimates with gender specific wage rates for 2008 provides the average lost productivity among these individuals. Finally, combining these estimates with figures on employment rates and adult population figures, it is estimated that the total costs of presenteeism among individuals who met the criteria for PTSD and who were employed was approximately £26.2 million in 2008.

Considering both the cost of lost productivity as a result of incapacity and the cost of presenteeism, it is estimated the total indirect cost associated with PTSD were approximately £139.8 million in 2008. Productivity losses from days out of work accounted for 81% of these total indirect costs, while presenteeism accounted for 19%.

<b>Table 6:</b> <b>Cost of 'presenteeism' among individuals with PTSD in 2008</b>	Presenteeism rate (%)	Average productivity loss among individuals with PTSD in 2008 (£)	Total productivity loss in 2008 (£)
Males	1.78	374.22	6,831,316
Females	5.56	829.77	19,384,405
			<b>26,215,721</b>

### COST OF INCAPACITY BENEFIT (IB) PAYMENTS

In addition to these opportunity costs of lost productivity among individuals with PTSD, the economic implications of these incapacity days in terms of social security payments are noteworthy. As previously mentioned, an estimated 6278 individuals were in receipt of incapacity benefit as a result of PTSD or acute stress disorder. Combining the number of individuals on IB with the duration of their benefit and associated weekly benefit rate suggests that the total cost of these benefits were £27.5 million. Although inclusion of these costs does not fit with the human capital model upon which indirect cost estimates are based (see Appendix 2), these social security payments represent a real economic cost that could potentially be averted by investment in effective PTSD treatment (benefit estimates were provided by the DSDNI on request).

## DAYS OUT OF ROLE

Alonso and colleagues (2010) examined the effect of a range of physical and mental disorders on 'days out of role' based on merged data from 24 countries in the WMH Survey Initiative (including data from Northern Ireland). Specifically, the authors investigated how many days individuals were totally unable to carry out their work or normal activities. Results reveal that PTSD was the most disabling mental disorder among all high income countries included in the analysis (including Northern Ireland) with an average of 16.2 days additional days out of role per year. Assuming that this average figure applies to Northern Ireland the analysis suggests that in the region of 1.1 million days out of role may be lost per year as a result of PTSD.

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### TOTAL DIRECT AND INDIRECT COSTS

By combining direct and indirect costs this report provides an estimate of the total economic burden of resources used (service use and medication) and resources lost (productivity losses and presenteeism) among individuals with PTSD. These combined costs are estimated to have been £172.8 million in 2008 (19% direct costs and 81% indirect costs). Table 7 and Figure 4 provide a more detailed breakdown of these total costs in terms of each of the cost elements considered previously. Productivity losses accounted for the largest proportion of overall costs (66%) followed by service visits (16%), presenteeism (15%) and finally medication (3%).

### THE ECONOMIC BURDEN OF PTSD ASSOCIATED WITH CONFLICT IN NORTHERN IRELAND

One of the aims of this report was to consider the social and economic burden of conflict-related trauma and PTSD in Northern Ireland. As outlined in Appendix 2, the NISHS did not include a specific question about traumatic events associated with the Northern Ireland "Troubles". However case-by-case analysis of individuals who met the criteria for 12-month PTSD and specifically the qualifying event directly linked to PTSD, suggests that 27% of all 12-month PTSD is linked to a 'conflict-related' traumatic event.

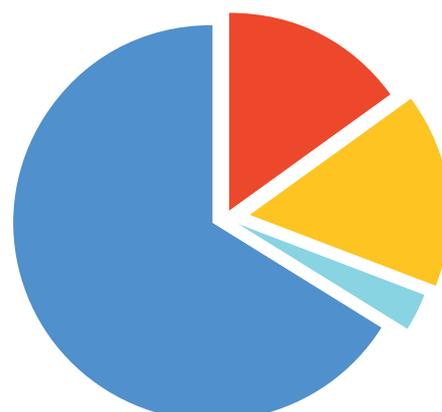
If we assume that the total economic cost associated with PTSD are uniformly distributed among all those with 12-month PTSD regardless of their profile of traumatic experiences, we can tentatively apportion £46.7 million of these total costs to conflict-related PTSD (see table 7). The limitations of this evaluation will be considered in subsequent sections.

**Table 7:**  
The total direct and indirect costs among individuals with 12-month PTSD in 2008

Cost category	Cost sub-category	Costs among all individuals with 12-month PTSD (£)
Direct costs	Service visits	27,317,184
	Medication costs	5,658,406
Indirect costs	Productivity losses	113,564,751
	Presenteeism	26,215,721
		<b>172,756,062</b>

**Figure 4:**  
Proportional breakdown of the total direct and indirect cost (£172.8 million) among individuals with PTSD in 2008

- Presenteeism (15%)
- Service Visits (16%)
- Medication (3%)
- Productivity Losses (66%)



**THE TOTAL  
ESTIMATED COSTS  
OF RESOURCES USED  
AND LOST AMONG  
INDIVIDUALS WITH  
PTSD (DIRECT AND  
INDIRECT COSTS)  
WERE ESTIMATED TO  
BE £172.8 MILLION IN  
2008**

**DIRECT SERVICE  
COSTS AMONG  
INDIVIDUALS  
WITH PTSD WERE  
ESTIMATED TO BE  
£33.0 MILLION IN  
2008**

**INDIRECT  
COSTS AMONG  
INDIVIDUALS  
WITH PTSD WERE  
ESTIMATED TO BE  
£139.8 MILLION IN  
2008**

## **IMPLICATIONS FOR POLICY, SERVICE AND PRACTICE**

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### **LIMITATIONS TO THIS STUDY**

The implications of findings presented in the current report should be drawn with a number of limitations in mind. First, given the constraints of the NISHS dataset, some cost estimates represent the economic burden among individuals with PTSD in Northern Ireland rather than the costs specifically linked to PTSD itself.

To expand on this point, individuals with PTSD often have other co-morbid mental health disorders and we would expect that these conditions will have an additional impact on cost estimates. A larger dataset would facilitate the isolation of costs specifically associated with PTSD through more sophisticated analysis that controls for co-morbid mental health disorders, social deprivation and other important factors. In due course an international collaborative health economics study could be undertaken, drawing upon a much larger dataset, to answer questions as to the costs associated purely and simply with PTSD.

That said, PTSD is seldom found alone particularly in its chronic state, and proper assessments of costs should take account of disorders that are to found in association with PTSD. The key point is that this study has isolated a distinctive group of participants, given the relatively high PTSD figures in Northern Ireland compared to findings from related studies in other countries. The findings therefore provide a basis for judgements about what measures could be taken to address the needs of PTSD sufferers in the population.

A further limitation relates to the exclusion of a number of cost categories in relation to PTSD: The NISHS did not include individuals who were living in institutions such as hospitals, prisons and care homes. In addition, the NISHS focused exclusively on the adult population. The prevalence of mental health disorders such as PTSD and associated costs among individuals living in institutions and those aged under 18 years are therefore not included. Due to the lack of available information on the proportion of suicides associated with PTSD, the cost of premature mortality associated with PTSD related suicide is not included.

For similar reasons, costs associated with short-term sickness absence due to PTSD are also excluded. Furthermore, this report does not provide an estimate of caregiver burden associated with PTSD. Those who suffer with mental health problems generally do not exist in isolation and rely on practical support from family, friends and caregivers. The aforementioned exclusions suggest that economic cost estimates herein represent a substantial underestimation.

Finally, the estimated proportion of 12-month PTSD associated with conflict did not include PTSD linked to 'sudden death of a loved one' or 'trauma to a loved one'. The international research instrument (the CIDI) did not have a specific question as to whether experience of these events was related to the Northern Ireland conflict and therefore it could not be inferred with reasonable confidence whether these traumatic experiences were directly linked to the conflict.

As a result, assessment of costs associated with PTSD linked to the civil conflict is also likely to be conservative.

### **DEVELOPING CLINICALLY EFFECTIVE AND COST EFFECTIVE SERVICES**

Recovery from chronic PTSD is very unlikely if sufferers do not have access to effective trauma focussed treatment (Kessler et al., 1995). This research-based insight is also borne out by clinical experience such as that acquired by the clinical team at NICTT between 2002 and 2011, which provided specialist trauma focussed cognitive therapy (Ehlers and Clark, 2000) for chronic trauma sufferers (Duffy et al., 2007).

The National Institute for Health & Clinical Excellence (NCCMH, 2005) and GAIN/CREST (CREST, 2003) recommend access to either trauma focussed cognitive behavioural therapy (CBT) or Eye Movement Desensitization and Reprocessing (EMDR) therapy for the effective treatment of PTSD. The DHSSPS Mental Health Services Framework, with reference to NICE, GAIN/CREST and the Bamford Report (2007), also requires that "People with post traumatic stress disorder (PTSD) should be treated by suitably qualified and supervised practitioners who have the experience and skills to provide evidence based psychological treatments for PTSD". (Overarching Standard 48, Service Framework for Mental Health and Wellbeing; DHSSPSNI, 2010).

Despite the limitations noted above, the results presented in the current report suggest that the economic burden associated with individuals with PTSD is substantial. As noted at the beginning of the current report, individuals who suffer from anxiety disorders such as PTSD, wait on average 22 years from disorder onset before they seek help for their symptoms (Bunting et al., under review). Furthermore, analysis of the NISHS also suggests that just 36% of people who met the criteria for PTSD said they got help they considered to be 'helpful or effective' (Bunting et al., under review).

This combination of lengthy delays in treatment seeking and the lack of access to effective treatments may help explain the substantial costs of productivity losses found in this report and, coupled with the elevated prevalence of PTSD among the adult population of Northern Ireland, point to substantial levels of unmet need in the community and the need for strategic service developments.

With a lack of readily accessible and effective services and treatments capable of curing PTSD and related disorders as early as possible (rather than just controlling and managing symptoms), the costs of PTSD and associated disorders are recurring year on year on year and are mounting as PTSD becomes more chronic and as individuals develop associated co-morbid mental health disorders.

In other words, people with chronic PTSD and associated multiple disorders are likely to have increasing needs and therefore increasing patterns of service usage (direct costs) with increased indirect costs as they seek to manage mounting and enduring distressing symptoms, unless they can access effective services which would cure their underlying trauma related disorders.

In relation to the civil conflict, the years of violence have, according to the findings of the NISHS and related studies, resulted in a distinctive and additional group of PTSD sufferers (and others with other trauma related disorders besides PTSD). As with trauma sufferers generally, their needs associated with PTSD are likely to increase over the years as a function of the chronic nature of this disorder.

This unique cohort of our population generally experienced their first conflict related traumatic event when they were relatively young, and those who developed PTSD from which they have not recovered will be chronic sufferers with more complicated and additional needs.

They are also ageing. The costs of providing ongoing services for this part of our community therefore, are likely to increase over the years, and will also aggregate, year upon year by at least the same amount, with inflationary increases; that is, unless readily accessible effective services are developed which are capable of addressing the underlying trauma disorders.

The choice is between funding an increasing demand for maintenance and illness-management services, or investing in curative services and therapies that will, in spite of short term investments, reduce the long term costs and demands on services, whilst improving the quality of life and social and economic contributions of sufferers.

The latter can be achieved by, amongst other things, supporting the development of evidence based effective services so that they are routinely and readily accessible across the community, through strategic cooperation across Government Departments, and with and between the statutory and voluntary sectors.

Building capacity at all levels to more effectively detect and address trauma related needs requires a graduated and a strategic workforce development plan.

Improved capability at primary and secondary care levels needs to be supported by centres of excellence, if a stepped care approach is to be enabled and knowledge and skills development are to be supported.

Adopting a similar approach to Layard and colleagues in The Depression Report (The London School of Economics, 2006), it can be argued that investment in effective treatments for PTSD and associated disorders will 'pay for itself'. Taking trauma focused CBT as an example of NICE approved effective treatment for PTSD, NICE recommends a course of 8-12 weeks of treatment for individuals with chronic PTSD (NCCMH, 2005).

It is estimated from the NICTT that an average course of CBT for an individual who suffers chronic PTSD is approximately £1,500, which means that it would cost approximately £102 million to treat all individuals with 12-month PTSD in Northern Ireland (68,000 individuals).

While treatment success rates and the costs of training also need to be taken into account, the costs of incapacity days alone exceeds this figure suggesting that economic gains can be made in the long run by developing effective services and treatments for PTSD such as CBT and EMDR.

The argument for an economic approach to trauma related needs, including those that have arisen as a consequence of the civil conflict, becomes another argument in the case for strategic service development to sit alongside the humanitarian goal of reducing suffering and improving the quality of life for individuals, families and the wider community.

## **APPENDIX 1**

### **DSM-IV CRITERIA FOR PTSD (APA, 1994)**

Diagnostic criteria for PTSD include a history of exposure to a traumatic event meeting two criteria and symptoms from each of three symptom clusters: intrusive recollections, avoidant/numbing symptoms, and hyper-arousal symptoms. A fifth criterion concerns duration of symptoms and a sixth assesses functioning.

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#### **CRITERION A: STRESSOR**

The person has been exposed to a traumatic event in which both of the following have been present:

1. The person has experienced, witnessed, or been confronted with an event or events that involve actual or threatened death or serious injury, or a threat to the physical integrity of himself/herself or others.
2. The person's response involved intense fear, helplessness, or horror. Note: in children, it may be expressed instead by disorganized or agitated behaviour.

#### **CRITERION B: INTRUSIVE RECOLLECTION**

The traumatic event is persistently re-experienced in at least one of the following ways:

1. Recurrent and intrusive distressing recollections of the event, including images, thoughts, or perceptions. Note: in young children, repetitive play may occur in which themes or aspects of the trauma are expressed.
2. Recurrent distressing dreams of the event. Note: in children, there may be frightening dreams without recognizable content
3. Acting or feeling as if the traumatic event were recurring (includes a sense of reliving the experience, illusions, hallucinations, and dissociative flashback episodes, including those that occur upon awakening or when intoxicated). Note: in children, trauma-specific re-enactment may occur.
4. Intense psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event.
5. Physiologic reactivity upon exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event

#### **CRITERION C: AVOIDANT/NUMBING**

Persistent avoidance of stimuli associated with the trauma and numbing of general responsiveness (not present before the trauma), as indicated by at least three of the following:

1. Efforts to avoid thoughts, feelings, or conversations associated with the trauma.
2. Efforts to avoid activities, places, or people that arouse recollections of the trauma.
3. Inability to recall an important aspect of the trauma.

4. Markedly diminished interest or participation in significant activities.

5. Feeling of detachment or estrangement from others.

6. Restricted range of affect (e.g., unable to have loving feelings).

7. Sense of foreshortened future (e.g., does not expect to have a career, marriage, children, or a normal life span).

#### **CRITERION D: HYPER-AROUSAL**

Persistent symptoms of increasing arousal (not present before the trauma), indicated by at least two of the following:

1. Difficulty falling or staying asleep.
2. Irritability or outbursts of anger.
3. Difficulty concentrating.
4. Hyper-vigilance.
5. Exaggerated startle response.

#### **CRITERION E: DURATION**

Duration of the disturbance (symptoms in B, C, and D) is more than one month.

#### **CRITERION F: FUNCTIONAL SIGNIFICANCE**

The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

Specify:

Acute: if duration of symptoms is less than three months.

Chronic: if duration of symptoms is three months or more.

Specify:

With delayed onset: if onset of symptoms is at least six months after the stressor.

## APPENDIX 2

# COST-OF-ILLNESS STUDY METHODS

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### OVERALL STUDY APPROACH

The current study adopts a similar methodology to a previous study by Thomas and Morris (2003), in their estimation of the economic cost of depression in England, which represents a standardised approach to cost-of-illness analysis widely used in similar research.

A 'prevalence-based' approach was used to estimate the total cost of PTSD among adults in Northern Ireland within a one year period. Specifically this cost-of-illness study estimates the economic burden of all prevalent cases of PTSD disorders in Northern Ireland in 2008 given the available data. The main body of this report considers two broad cost categories, namely 'direct' and 'indirect' economic costs.

Direct costs incorporate the cost of visits to service providers and the cost of medication among the sub-group of individuals who met the criteria for 12-month PTSD. Indirect costs capture the cost of reduced productivity associated with incapacity days among this subgroup and also the cost of 'presenteeism' or reduced productivity while at work. Aside from these two major cost categories, the human costs associated with PTSD are also considered in Appendix 3.

Human costs represent the burden of reduced health related quality of life among individuals with PTSD. While this additional category does not refer to resources used or lost or indeed money in real terms, an attempt has been made to capture the estimated economic value of reduced health related quality of life.

### OVERVIEW OF DATA SOURCES

Information and data from a variety of sources were utilised and merged to produce economic cost estimates. The current study is based largely on analysis of the Northern Ireland Study of Health and Stress (NISHS) which provided estimates of the prevalence/epidemiology of PTSD. This dataset also contained detailed information on units of service use, units of medication, work performance, rates of employment and reduced quality of life (measured in lost Quality Adjusted Life Years (QALYs)) among individuals with 12 month PTSD. A more detailed description of the NISHS is provided below.

The number of working days lost as a result of PTSD and other acute stress disorders was obtained from the Department for Social Development Northern Ireland (DSDNI, 2008). The relevant unit cost of service visits were derived from the Personal Social Services Research Unit (Curtis, 2008).

Medication costs were taken from Prescription Cost Analysis data provided by the Health & Social Care Board (HSC). Gender and age specific wage rates derived from the Annual Survey of Hours and Earnings (ASHE) conducted by the Department of Enterprise, Trade and Investment (DETNI, 2008). Finally, similar to previous studies, the cost of a QALY was derived from the cost-

effectiveness threshold for economic evaluations, as recommended by the National Institute of Clinical Excellence (Appleby et al., 2007).

### THE NORTHERN IRELAND STUDY OF HEALTH AND STRESS (NISHS)

The NISHS is one of over 30 national and international World Mental Health (WMH) Survey Initiative studies being undertaken under the auspices of the World Health Organisation (Kessler and Üstün, 2008a). All studies used the same survey instrument, the WMH Composite International Diagnostic Interview (CIDI) (Kessler and Üstün, 2008b) to investigate the prevalence of a wide range of mental and behavioural disorders based on validated diagnostic criteria. All WMH studies are being coordinated and supervised by Harvard University and besides providing valuable national data also open the opportunity for international comparisons.

The NISHS is a representative household survey of English speakers, 18 years and older in Northern Ireland. The participants in the NISHS were selected from a random sample of households. Face-to-face interviews were carried out between February 2004 and August 2008 with a response rate of 67%. The survey was administered in two parts.

Part 1 included a screening section and assessment of 'core disorders' such as depression and general anxiety (n=4340). Part 2 included questions about risk factors, and service use along with assessments of additional disorders such as PTSD. In total 1986 participants completed the total interview (Parts 1 and 2) while 4340 completed Part 1 only. All analyses presented in the current report are based on those who completed the full interview (N=1986).

Specifically related to the current report, the PTSD section of the NISHS included detailed questions about traumatic life events. This section was administered to all Part 1 respondents who met lifetime criteria for any 'core disorder' plus a probability subsample of other respondents. At the beginning of this section, participants were presented with 29 types of traumatic events and asked whether they had experienced them during their lifetime.

The survey instrument did not contain a specific question to link specific incidences of these 29 trauma types to the civil conflict in Northern Ireland. To obtain an estimate of the prevalence of traumatic events associated with the "Troubles", the research team identified events from the list that were likely to be 'conflict-related'. If an individual endorsed a specific traumatic event, they were subsequently asked more detailed questions about the event including the age at which they first experienced this event.

Individuals were also asked further questions about re-experiencing, avoidance and hyper-vigilance symptoms associated with a 'random event' and 'worst event' among those event types endorsed.

## **APPENDIX 2**

# **COST-OF-ILLNESS STUDY METHODS**

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Responses to questions within this PTSD section were then processed using statistical algorithms/ codes which identified those individuals that met the criteria for 12-month and lifetime DSM-IV PTSD.

### **INFORMATION ON UNITS OF RESOURCES USED OR LOST AMONG INDIVIDUALS WITH PTSD**

#### **1. The NISHS**

Information on the number of visits to a range of service providers for 'problems with emotions, nerves or mental health' was obtained from the 'service use' section of the NISHS. Specifically the NISHS data provides estimates of the number of hospital stays and visits to psychiatrist, psychologists, GPs, counsellors, social workers, healers, other mental health professionals and other medical professionals. The 'pharmacoepidemiology' section of the dataset provides comprehensive information on the types of medication taken by each individual for 'problems with emotions, nerves or mental health' in the previous 12 months.

The NISHS also contains detailed information on current employment and employment history. The rates of 'presenteeism' among males and females who met the criteria for PTSD was estimated based on responses to a question on work performance. Specifically individuals were asked: 'On a scale from 0-to-10 where 0 is the worst job performance anyone could have at your job and 10 is the performance of a top worker, what number describes your overall job performance on the days you worked during the past 30 days?'

Finally, the NISHS included the SF-12, a multi-dimensional generic survey used to assess health related quality of life (Ware et al., 1996). Econometric modelling, developed by Brazier and Roberts (2004) was then applied to individual SF-12 responses to determine an individual's Quality Adjusted Life Year (QALY). This is an index from 0-1 which basically weights a given year with an individual's health related quality of life. A QALY of 1 represents perfect health while 0 represents the worst imaginable health state.

#### **2. Prescription Cost Analysis data**

Estimates of average annual dosages of individual medications were obtained from the Health & Social Care Board (HSC), Business Services Organisation (BSO). This information is based on British National Formulary drug listings and was compiled using medication information based on a sample of GP practices across Northern Ireland.

#### **3. Department of Social Development**

Estimates of the total number of incapacity days due to PTSD were obtained from the Northern Ireland Department of Social Development (DSDNI), Analytical Services Unit. DSDNI statistics provided information on the total number of individuals on incapacity benefit as a result of PTSD and other acute stress reactions in 2008 as well as the

number of days of incapacity benefit for these individuals. These figures were available by gender and age group which facilitated more accurate cost estimation.

### **INFORMATION ON UNIT COSTS OF RESOURCES (2008 PRICES)**

#### **1. Personal Social Services Research Unit**

Estimates of the unit costs of the services were extracted from the Unit Costs of Health and Social Care 2008 (Curtis, 2008). This is an annual publication produced by the Personal Social Services Research Unit (PSSRU) which aims to provide the most up to date information on the costs of services in the health and social care sector in the UK.

#### **2. Prescription Cost Analysis data**

Estimates of the unit costs of individual medication types were obtained from the Health & Social Care Board (HSC).

#### **3. Department of Enterprise, Trade and Investment**

Information on the average annual salaries in Northern Ireland in 2008 was obtained from the Annual Survey of Hours and Earnings (ASHE) conducted by the Department of Enterprise, Trade and Investment (DETNI, 2008). These figures were categorised by age and gender. The overall average male salary for 2008 was just over £21,000 while the average female salary was almost £15,000.

#### **4. National Institute of Clinical Excellence (NICE)**

As previously outlined, this study attempts to estimate the monetary value of reductions in health related quality of life (QoL). A similar approach has been adopted by a number of studies led by the Sainsbury Centre for mental health in which a monetary value was attached to lost life quality, which is normally expressed in Quality Adjusted Life Years (QALYs) (SCMH, 2003; NIAMH, 2004). In this study, a QALY indicates the value of one year (2008 in this case) weighted by an individual's valuation of their health state. Similar to these previous studies, the cost of a QALY was derived from the cost-effectiveness threshold (£30,000) as recommended by the National Institute of Clinical Excellence (Appleby et al, 2007).

#### **5. Northern Ireland Statistics and Research Agency (NISRA)**

Mid-year adult population estimates for 2008 (age and gender specific where relevant) were obtained from NISRA (NISRA, 2010). These figures were combined with prevalence data from the NISHS to determine the total number of PTSD cases, which in turn were used to provide population cost estimates.

## APPENDIX 2

# COST-OF-ILLNESS STUDY METHODS

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### ANALYTIC PROCEDURES

This cost-of-illness study estimates the economic burden of all prevalent cases of PTSD in Northern Ireland in 2008. The units of resources in each cost category were combined with the relevant unit cost to obtain an estimate of the total economic cost among individuals with PTSD. Where appropriate, the average costs of each cost element (described above) were estimated among individuals with 12-month DSM-IV PTSD. Total costs within the Northern Ireland population were then estimated by combining costs from the individual level with estimates of the total number of 12-month cases of PTSD in Northern Ireland (described earlier). Methods of analysis used in the estimation of each cost category are described in more detail below.

All analyses were implemented using Stata statistical software v10.0 (StatCorp, 2007).

#### 1. Direct Costs

Direct costs of visits to service providers were estimated by combining the number of visits to each service provider for individuals with PTSD with the unit costs of these services. The average number of visits to each provider was combined with an estimate of the total number of cases of PTSD to determine the total number of visits among the adult population. This total was then multiplied by the relevant unit cost (Curtis, 2008) to obtain an estimate of the total cost of service visits.

The NISHS also provided information on the types of medication taken by individuals with PTSD in the year previous to the interview. By combining this information with the total number of cases of PTSD in Northern Ireland, the research team estimated the total number of individuals with PTSD taking each type of medication in the previous year. This information was combined with Prescription Cost Analysis data from the HSC BSO, which provides estimates of the average annual dosage of these medication types in Northern Ireland as well as associated costs.

The total cost of each medication type and total medication cost were therefore obtained by multiplying the total number of individuals taking each type of medication with the relevant costs of the average annual dosage in 2008.

#### 2. Indirect costs

The theoretical approach adopted for the calculation of indirect costs was the Human Capital Approach. This approach assumes that an individual's productive contribution to the economy is best estimated using their wage rate. In other words, wage rate is an indication of an individual's marginal productivity (Becker, 1964). This study therefore considers what individuals would have contributed to the economy in terms of productivity had they not had 12-month PTSD.

The cost of lost productivity associated with PTSD was obtained by combining age and gender specific incapacity benefit data (DSDNI, 2008) with age and gender specific wage rates for 2008 (DETNI, 2008).

This study also includes an estimate of 'presenteeism' among individuals with PTSD who were in employment at the time of the interview. This captures the lost productivity among individuals with PTSD while at work. Average rates of presenteeism (reduced work performance) among individuals who met the criteria for PTSD were combined gender specific wage rates to derive an estimate of the average economic cost of presenteeism. This figure was then multiplied by gender specific PTSD prevalence rates, employment rates and adult population figures to estimate the total economic cost of presenteeism among the adult population.

#### 3. Costs of reduced quality of life

An estimate of the reduced health related quality of life was obtained by calculating a 2008 Quality Adjusted Life Year (QALY, ranging from 0-1) for each participant in the NISHS. As previously described, this information was derived from the SF-12 (Brazier and Roberts, 2004). An average QALY for 2008 was then calculated for individuals (by gender) who met the criteria for 12-month PTSD and compared to the average QALY for those who did not meet the criteria, to obtain estimates of the average QALYs associated with PTSD. The total number of QALYs lost in 2008 was obtained by multiplying this average figure with PTSD prevalence rates and adult population figures.

In an attempt to place an economic value on these reductions in quality of life, the research team used the NICE cost-effectiveness threshold (£30,000) as an indication of the monetary value of a QALY (Appleby et al., 2007). These additional human costs are outlined in Appendix 3.

## APPENDIX 3

### THE HUMAN COSTS OF PTSD

Table 7 considers the human costs associated with PTSD by placing a monetary estimate on lost QALYs among individuals with PTSD. Although these less tangible are rarely included in cost-of-illness estimates as they do not reflect used or lost resources, this category of costs attempts to capture the reduced life quality (pain, suffering, impairment and such like) associated with mental health disorders that other cost categories fail to take into account.

Comparing estimates of the average QALYs among men and women, with and without PTSD, for 2008 provides an indication of the average lost QALYs among individuals with PTSD. Combining these estimates with gender specific PTSD prevalence and population figures suggests that over 12,000 QALYs were lost in 2008 among individuals with PTSD. Assuming that the monetary value of a QALY is £30,000 as per the upper cost-effectiveness threshold limit applied by NICE (Appelby et al., 2007) it is estimated that the monetary value of lost quality of life associated with PTSD was over £361 million in 2008.

**Table 7:**  
**Estimated costs associated with reduced health related quality of life among individuals with PTSD**

	Average loss in QALYs among individuals with PTSD	Total loss in QALYs among individuals with 12-month PTSD
Males	0.2657	6,880
Females	0.1229	5,173
		12,053
		<b>Total cost: £361,590,000</b>

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