The economic impact of prevention activities delivered by Merseyside Fire and Rescue Service

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BACKGROUND

Both the number of fires attended, and fire-related fatalities continues to decrease (Bryant & Preston, 2017). In the past decade alone, attendance has fallen by 5% and fatalities by 13% (UK Home Office, 2022). In 2013, a *'Facing the Future'* review of fire service efficiency and operations in England concluded that with fire-related incidents at an all-time low and expenditure remaining relatively stable, there was room to increase service efficiency and effectiveness (Knight, 2013). In the decade since this report, government funding for fire services across England has decreased, including cuts of £139.7 million between 2016-2021 (Fire Brigades Union, 2021a). However, this same decade has also seen a 46% increase in non-fire related incidents in England, including flooding (UK Home Office, 2022). Whilst fire related incidents are decreasing, the UK is starting to experience the effects of climate change, with frequency, intensity, and impact of flooding, wildfires, heatwaves, and droughts expected to worsen (Met Press Office, 2022; Wentworth, 2021). In effect, fire services are being required to do more with less and these pressures are expected to grow. Accordingly, the need for robust economic analysis is becoming increasingly important for demonstrating the efficiency and effectiveness of service delivery and informing decisions regarding use of finite resources (Knight, 2013; Waring et al., 2022).

One area of fire service activity in need of economic analysis is prevention. With prevention work being linked to reductions in fires and fire-related fatalities, there have been recent calls to increase this activity (Bryant & Preston, 2017; Webb, 2021). However, evidence is needed to inform decisions regarding what prevention activities to undertake and how much resource to invest. Economic analysis is important for establishing whether the benefits of increasing provision outweigh the costs (Tannous et al., 2019). In recognition of this, Merseyside Fire and Rescue Service (MFRS) requested the University of Liverpool (UoL) to economically evaluate activities delivered across their four main prevention pillars: i) Home safety (Home Safety Fire Checks); ii) Safeguarding and High Risk (Safe and Well Visits); iii) Community Engagement (road, water, and arson reduction activities); and iv) Youth Engagement. Below, we provide an overview of existing research to highlight what is currently known about the economic value of these activities, before moving on to detail our methodological approach and findings.

'Home Safety' and 'Safeguarding and High Risk'

The purpose of Home Fire Safety Checks (HFSCs) is to identify potential fire risks within homes and provide tailored advice to prevent and reduce these risks, including ensuring the home has working smoke alarms and creating an escape plan (Lehna et al., 2017; Taylor et al., 2022). The HFSC is one of the main approaches adopted by UK fire services to prevent accidental dwelling fires (ADFs) (Arch & Thurston, 2013; Lancashire Fire & Rescue Service, 2021; Taylor et al., 2022). However, the number of HFSCs completed annually by UK fire services has declined by 43% since 2010 due to budget restrictions (UK Home Office, 2021). Instead, fire services are using their finite resources to adopt a targeted approach, focusing on those at higher risk of ADFs, including people over the age of 65 or with disabilities (Cassidy et al., 2020; Taylor et al., 2019). However, with life expectancy increasing, the number of individuals aged 65 and over is growing, posing further resource implications (Bryant & Preston, 2017).

In addition to HFSCs, some fire services also conduct Safe and Well (SW) visits. The content and delivery of SW visits is similar to HFSCs, with fire safety advice and equipment being provided to reduce ADFs. SW visits are also targeted toward people at higher risk from ADFs, but these include smoking or alcohol and other substance misuse problems (Higgins et al., 2013; Johnson et al., 2016). SW visits also place a stronger emphasis on partnership working, with health and other partner agencies making referrals to fire services (Craig et al., 2015; Taylor et al., 2019). In some regions, such as Merseyside, fire services also make referrals to partners where additional risks are identified during SW visits (e.g., NHS smoking and alcohol reduction services) (Taylor et al., 2019). Indeed, there is an expectation that fire services and partners will collaborate in supporting risk reduction for vulnerable populations, with intelligence and risk information being shared where necessary (UK Home Office, 2018).

Whilst SW visits have the potential to improve referral pathways for vulnerable people, little research has examined the economic benefits of this. The research that has been conducted focuses on pilot schemes, using small samples to calculate figures. This includes estimating cost savings for partner agencies making referrals to MFRS (Local Government Association, 2012), and Scottish Fire and Rescue Service, with evidence indicating a saving of £5.20 for every £1 spent due to reductions in fires (Craig et al., 2015). In contrast, HFSCs have received greater research focus, with evidence also indicating an association between targeted home visits and a reduction in ADFs and fatalities (Hewitt et al., 2022; Johnson et al., 2016; Reinhart & Chatsiou, 2019; Williams et al., 2009). However, figures vary across studies, with savings ranging from £1.35 (Sund et al., 2019; Sweden) and £3 (Hewitt et al., 2022), through to £14-£30 (Williams et al., 2009) for every £1 spent on HFSCs. Part of the reason for the variation in figures is the lack of consistency in how economic models are being calculated, with some studies focusing on direct costs incurred by the service (e.g., equipment, staff wages) whilst others include wider indirect costs (e.g., costs to the economy, health, or other services). Economic evaluations also often lack transparency regarding the nature of the activity being evaluated, measures included in costs, and how these costs were derived, all of which limits ability to make direct comparisons to assess the accuracy of figures (Waring et al., 2022).

'Community engagement'

MFRS provides a range of community-based interventions that aim to reduce road, water and arson related incidents, and associated fatalities.

Road traffic collisions (RTCs) refer to incidents that involve at least one vehicle and result in at least one person being seriously injured or killed (Metropolitan Police, 2022). Globally, 1.3 million individuals die from RTCs each year and between 20 and 50 million suffer non-fatal injuries (World Health Organization [WHO], 2022). Although COVID-19 related public health restrictions led to a 30% reduction in RTCs in England between 2020 and 2021, there has been an overall increase of 2% in this type of incident over the past five years (from 29,919 to 30,624) (UK Home Office, 2022). Figures suggest that the economic and social cost of RTCs in 2019 was in the region of £33 billion (TRL Academy, 2021). Both the increase in incident numbers and financial cost highlights a need for greater investment in interventions to reduce RTCs. For MFRS, interventions take the form of school visits to highlight the dangers of reckless driving and provide a simulated experience of RTCs using virtual reality headsets. There is some evidence from Spain and Brazil that school-based programmes can improve knowledge of road safety, and reduce both risky behaviours (Alonso et al., 2018; 2020) and

severity of RTC-related trauma and injuries in young people (Salvarani et al., 2019). However, the lack of transparency regarding how these school-based interventions are delivered makes it difficult to extend conclusions to other countries. In addition, little research focus has been directed toward evaluating the economic benefit of this type of initiative.

Water incidents are also associated with substantial loss of life and injury, with more than 236,000 deaths from drowning occurring worldwide in 2019 (WHO, 2021). In London alone, the annual economic cost of drownings is estimated to be between £800,000 and £1.1 million (Public Health England, 2018). In Liverpool, five accidental drownings occurred in 2021, which represents an increase of two fatalities compared to the previous three years (National Fire Chiefs Council [NFCC], 2021a). The large stretch of coastline, rivers, reservoirs, and canals in Merseyside attract a range of visitors each year, creating an increased need for interventions that focus on improving water safety. With young people at increased risk from drowning (WHO, 2021), MFRS focus on delivering water safety education in schools, along with a 'pop up' advice service at tourist hotspots such as the Albert Dock during summer months. However, as with RTCs, little research focus has been directed toward evaluating the efficacy or economic value of these types of initiative.

Arson is a form of anti-social behaviour that involves deliberately setting fire to property. In 2021, 23,894 arson offences were recorded in the UK, 4,000 of which endangered life (Office of National Statistics, 2021). The economic impact of arson is estimated to be between £5.7 and £11.46 billion annually (NFCC, 2021b). Young people are particularly implicated, with over a third worldwide engaging in risky behaviours associated with deliberate fire setting (Tyler et al., 2019). In England, more than 40% of arson offences were committed by young people between the ages of 10 and 17 in 2000 (Johnston & Tyler, 2022). In addition, the majority of firework-related injuries are linked to teenagers, especially boys (Vassilia et al., 2004). Accordingly, arson interventions delivered by MFRS typically take the form of school visits to educate young people on how to safely handle fire (matches, bonfires), and the dangers of fireworks. Whilst evidence suggests that fire safety is improved when messages are delivered by firefighters rather than parents (Porth et al., 2018), there has been a lack of research focus directed toward evaluating the economic value of this type of intervention.

'Youth engagement'

Evidence highlights that young people are at increased risk from drowning (WHO, 2021), RTCs (Klaitman et al., 2018), and arson (Willis, 2015). Young people are also at increased risk of unemployment, with 280,000 18–24-year-olds unemployed and 1.68 million economically inactive between May-July 2022 (Powell & Francis-Devine, 2022). In 2017, the economic impact of 923,000 young people being unemployed or economically inactive was calculated to be £77 billion due to potential loss in taxes, public service costs, and associated crime and poor health (Mawn et al., 2017). One key factor implicated in both youth unemployment, poor health, and engagement in criminal activity and other risky behaviours such as alcohol and drug use, is poor school attendance (Allison et al., 2019; Kim & Streeter, 2008). Concerns have also been raised about a skills gap in young people, further affecting their employability and life chances (House of Lords, 2021). Taken together, this evidence highlights the need for interventions that support young people to actively engage in school and develop life skills that will be beneficial for gaining employment.

MFRS are involved in delivering four intervention programmes that seek to support young people with improving their school attendance and employability: the Beacon Project, Healing Together, Fire Cadets, and Prince's Trust. All four schemes have received little previous research focus, other than a qualitative study that highlights the value of the Prince's Trust for helping young people to develop their confidence (Robertson., 2018). Further research focus is needed to evaluate the efficacy and economic value of these programmes.

Current study

To date, little research has been conducted into the economic and social value of fire service prevention work. Of the research that has been conducted, most focus has been directed toward establishing the economic value of HFSCs. However, results vary substantially across these studies and there is often a lack of transparency regarding what measures were included in economic models, preventing direct comparison and assessment of the accuracy of figures. However, in recognition of the importance of economic evaluation for demonstrating the efficiency and effectiveness of service delivery and providing evidence to inform decisions regarding use of finite resources, MFRS asked UoL to undertake an economic evaluation of their four main pillars of prevention: i) Home safety; ii) Safeguarding and high risk; iii) Community engagement; and iv) Youth engagement. This report details the findings of this economic evaluation.

METHOD

Data for economically evaluating the four main pillars of MFRS prevention work was collected in two stages: i) a scoping exercise to develop an economic evaluation framework, followed by ii) gathering of available figures to conduct cost-benefit analysis.

Stage 1: Scoping exercise

Between April and May 2022, six one-hour interviews were conducted with the Area Manager for Prevention in MFRS, the four Group Managers responsible for overseeing each of the four prevention pillars, and the Data Team Manager. The purpose of these interviews was to understand what resources MFRS invests into delivering each of the four prevention pillars, what activities are undertaken, the intended purpose, outcomes / benefits of conducting these activities, and what data is available to demonstrate these intended outcomes. After these initial interviews, a decision was made to collapse the 'Home Safety' and 'Safeguarding and High Risk' pillars into a single evaluation framework. This is because although referral mechanisms differ, the purpose and delivery of HFSCs and SW visits are predominantly the same, to offer fire safety advice and equipment to people at increased risk of ADFs.

The information provided during initial interviews was used to develop economic evaluation frameworks that set out the plan for how to measure outcomes for the four pillars. These evaluation frameworks were shared and discussed with the Area Manager, Group Managers, and Data Team Manager during a second round of one-hour interviews. The purpose of these second interviews was to verify the accuracy of the information and clarify whether data was available that could be used to both calculate resource costs and outcomes. Details of these evaluation frameworks can be found in Tables 1, 2, and 3 in Appendix 1.

Stage 2: Economic analysis

The intention was to conduct cost-benefit analysis (CBA) for each activity delivered across all four prevention pillars. CBA is a data-driven decision-making tool that monetises benefits of an intervention and compares them to costs (Celini & Kee, 2010). CBA also allows comparisons pre- and post- intervention to determine whether total benefits exceed costs (Manning et al., 2016). To allow direct comparisons across time periods, the Bank of England Inflation Calculator[1] was used to bring financial figures up to the most recent year of inflation (2021).

For some prevention activities, the data needed to calculate the full range of costs incurred by MFRS was unavailable. The data needed to measure outcomes / benefits was also unavailable for some activities, preventing CBA from being conducted in relation to 'road and water safety', 'street intervention', and 'incident investigation' aspects of the 'Community Engagement' pillar. Accordingly, for these activities, we have presented the costs incurred by MFRS and society for these incidents. Outcome data was also unavailable for activities across the 'Youth Engagement' pillar, which prevented any analysis being conducted in relation to the Healing Together programme. However, Beacon, Prince's Trust, and Fire Cadets all focus on developing employability skills and previous work has established the economic benefits of similar programmes that seek to improve life and employability skills (National TOMs, 2021). Further evaluation is needed to establish the efficacy of Beacon, Prince's Trust, and Fire Cadets in improving life and employability skills. However, this project has used economic figures from National TOMs (2021) to indicate what the potential economic benefit of delivering Beacon, Prince's Trust, and Fire Cadets could be.

Across most activities, including HFSCs and SW visits, data needed to causally link outcomes to prevention activities was unavailable, which limits ability to claim that benefits were solely the result of investment in prevention activities (see Tables 1-3 in Appendix 1 for details). MFRS introduced HFSCs more than 20 years ago and the data relating to ADFs, and ADF-related fatalities and casualties does not go back this far, preventing pre- and post-intervention comparisons. However, although MFRS have also been conducting SW visits for several years, the number of visits more than doubled between 2016-2021, thereby allowing comparisons to be made before and after this increase in resource investment (average of 4197 SW visits a year between 2012-2015, compared to 9,130 between 2016-2021). Accordingly, CBA has been conducted for these activities. Table 4 in Appendix 1 details the data used in this project and how this data was used.

FINDINGS

Due to issues with data availability, we were unable to conduct robust economic analysis of activities across all four pillars of MFRS prevention work. However, key findings are detailed below. For a full breakdown of this economic analysis, please see Appendix 2.

'Home Safety' and 'Safeguarding and High-Risk'

- ADFs were contained to the room of origin in 80% of homes that received a HFSC or SW visit, compared with 33% in homes that did not receive a HFSC or SW visit.

[1] https://www.bankofengland.co.uk/monetary-policy/inflation/inflation-calculator

- The average number of ADFs occurring annually has decreased by 16.6% since MFRS increased the level of resources invested into SW visits in 2016.
- There has been a 50% reduction in the number of ADF-related fatalities since MFRS increased the level of resources invested into SW visits.
- There has been a 27.1% decrease in the average number of ADF-related casualties occurring each year since MFRS increased the level of resources invested into SW visits.
- The total annual cost of delivering both HFSCs and SW visits is £5,501,042.69. The total financial benefit of reductions in ADFs, and ADF related deaths and injuries is £30,864,496.56. Figures indicate a saving of £5.61 for every £1 invested in HFSCs and SW visits as a result of reductions in ADFs and related fatalities and injuries.

Whilst available data indicates a link between HFSCs and SW visits and reductions in ADFs, and related fatalities and injuries, causality cannot be linked to these prevention activities alone. Other factors are also likely to have influenced this, including a reduction in smoking trends and use of chip pans (e.g., Bryant & Preston, 2017). However, figures show a further reduction in ADFs and related fatalities and injuries when SW visits substantially increase, which indicates that this prevention work has substantially contributed to reductions in ADFs and related fatalities and injuries. Data also indicates that even when ADFs do occur in vulnerable populations, they are more likely to be confined to the room of origin if the household has received a HFSC or SW visit. This suggests that the education and equipment provided to vulnerable people during these visits provides them with the knowledge needed to better contain fires, thereby reducing fire damage. Accordingly, delivery of HFSCs and SW visits is likely to generate substantial cost savings, both for MFRS in reducing attendance at ADFs, and for Merseyside residents, health services, and insurance companies.

However, there are some limitations with the way service data is currently captured, which poses implications for conducting economic analysis. Firstly, whilst MFRS keeps records of the referrals they make to partner agencies based on additional risks identified during SW visits and HFSCs, partner agencies do not provide updates on actions taken as a result of referrals and data indicating the impact of this. It is likely that MFRS making these referrals is leading to a range of health benefits for vulnerable populations, including supporting them to reduce alcohol intake, smoking, and preventing slips, trips, and falls. However, partner agencies need to share this data with one another for more robust economic analysis to be conducted that demonstrates the range of benefits achieved through partnership working. Similarly, fire services should also be sharing data with partners regarding actions taken as a result of referrals made to them and the wider impact of this on fire incident figures.

Furthermore, there are issues with the completeness of data being captured for costs of delivering HFSCs and SW visits. Whilst staff salary costs were calculated for delivering HFSCs and SW visits, this is not a complete reflection of costs incurred by the service as it does not include pension and national insurance contributions, or other associated costs that employers incur alongside salaries. Data relating to travel costs for Advocates was also unavailable. In addition, there was a lack of transparency in how the service calculates appliance costs. For example, it was not clear whether these included vehicle maintenance, insurance, and fuel costs.

The way that data is stored also made it too resource intensive for MFRS to provide access to information needed to calculate the full range of benefits associated with 'Home Safety' and 'Safeguarding and High-Risk' pillars. For example, figures were not available to compare the number of instances of fires being contained to room of origin in homes where a HFSC or SW visit had and had not been received. Accordingly, these figures relating to (reductions in) property damage could not be included in the economic model. Data relating to the level of resources invested in attending ADFs was also not available so specific costs incurred by MFRS could not be calculated. Instead, we have drawn on existing cost figures for domestic fire in England (Greater Manchester Combined Authority, 2021). Unfortunately, individual costs are not broken down in this figure, instead an overall sum is provided for the consequence of responding to a fire (fiscal, economic, and social costs), which includes costs incurred for fire services to attend. Consequently, we have been unable to calculate the specific saving to MFRS for investing in HFSCs and SW visits.

Overall, these issues mean that neither the full range of costs or benefits could be calculated, and the value provided above should be viewed as an indicator rather than a definitive figure.

'Community Engagement'

- In 2021/2022, MFRS attended 112 more RTCs than in 2019/2020, with an increase in fatalities (17 compared to 7) but a decrease in both serious (60 compared to 69) and minor injuries (224 compared to 274). Overall, this combination of increased fatalities and reduced injuries reflects a rise in social costs of £25,607,389. The rise in RTC incidents attended in 2021/2022 reflects an increase of £105,638.40 for fire service response compared to 2019/2020.
- In 2021/2022, MFRS attended 26 more water related incidents than in 2019/2020, which reflects a cost increase of £24,523.20 for fire service response.
- In 2021/2022, MFRS attended 521 more arson related incidents than in 2019/20, which reflects an increased cost of £491,407.20 for fire service response.
- The average annual number of bonfire related incidents attended by MFRS has decreased by 224 since introducing bonfire prevention activities in 2015.
- The total annual staffing cost of the Arson Team is £156,749.60. The total saving for MFRS in reducing the number of bonfire related incidents attended is £211,285.86. This indicates a saving of £1.31 in reduced bonfire incidents for every £1 invested into the Arson Team.

It was not possible with the data provided to conduct a cost-benefit analysis of the types of prevention activities used by MFRS to reduce RTCs, and water and arson related incidents. However, figures indicate that the occurrence of these incidents is increasing, which has cost implications for MFRS in needing to attend them (along with health and other partners). MFRS provided incident figures for the past five years, which indicate a decrease in RTC, and water and arson incidents during 2020/2021 when COVID-19 public health restrictions were in place. However, figures post-pandemic demonstrate an increase compared to pre-pandemic, potentially highlighting the need for greater investment in prevention measures across partner agencies.

In contrast, MFRS were able to provide bonfire incident figures from 2008 through to 2021. MFRS introduced a range of bonfire prevention measures in 2015, which are delivered by

their Arson Team, including removal of combustible waste, and providing school-based fire safety interventions. Figures suggest that these activities are contributing toward a reduction in bonfire incidents, with associated cost benefits for MFRS. However, data was not available to determine causality or establish whether one form of bonfire prevention activity is more beneficial than another. In addition, the arson team have a wider range of responsibilities than bonfire prevention, which means that the figures provided above do not capture the full range of costs or benefits.

'Youth Engagement'

- The total annual cost to MFRS for delivering the Beacon Project is £63,429.66. The total annual financial benefit in terms of helping young people to develop important life skills is £131,901 (based on 175 young people completing the programme). Figures indicate that every £1 spent on the Beacon Project results in a saving of £2.08 for society.
- The total annual cost for MFRS to deliver the Prince's Trust is £164,041. The total annual financial benefit in terms of helping young people to gain skills and qualifications recognised by employers such as BTECs is £334,951.20. Figures indicate that every £1 spent on delivering the Prince's Trust results in a saving of £2.04 for society.
- The total annual cost of delivering the Fire Cadets is £22,057.95 (MFRS receives funding of £8,506.75 toward this cost). The total annual financial benefit in terms of helping young people to gain skills and qualifications recognised by employees such as BTECs is £604,773 (based on 60 young people undertaking Fire Cadets). Figures indicate that every £1 spent on delivering the Fire Cadets results in a saving of £27.42 for society.

Figures indicate that the financial benefits associated with young people completing all three youth engagement programmes outweighs the costs that MFRS invest. Whilst MFRS receives funding support for delivering some of these interventions, this is not the case for all interventions. With development of employability and life skills in young people being of wider benefit to society, this raises questions regarding funding to avoid the cost burden falling solely on the fire service.

It is important to note that the lack of prior evaluation into programmes such as Beacon, Fire Cadets, and Prince's Trust means their efficacy in improving life and employability skills has not been established. The economic value of benefits for each of these programmes was based on proxy values, rather than values directly established in relation to these programmes. Some of these proxy values are based on young people completing formal qualifications such as BTECs but MFRS did not have data to indicate how many of the young people undertaking these programmes completed these formal qualifications. Accordingly, figures provided above should be viewed as indicators only. Further work is needed to establish both the efficacy and economic value of Youth Engagement activities.

RECOMMENDATIONS

Due to issues in the quality of data available, all findings in this report should be viewed with caution. The following recommendations are provided to improve data collection to increase the trustworthiness and transparency of economic models for demonstrating the value of prevention work.

- **Establish data sharing agreements with partner agencies for monitoring referral outcomes.** Whilst partnership working between fire, health and other agencies is likely to be improving referrals and outcomes for vulnerable people, agencies need to be sharing information with one another regarding the outcomes of referrals to their services. This is beneficial for both allowing agencies to understand whether they are making appropriate referrals to relevant agencies, how their referrals are being acted on, and to demonstrate both the effectiveness and economic benefits of partnership working. Consultation across partner agencies and the collective development of a data sharing agreement would be beneficial for working through concerns regarding use and storage of data in line with General Data Protection Regulations.
- **Keep transparent records that provide a full breakdown of costs and how they were determined.** Whilst large direct costs such as staff salary tend to be regularly captured, less evident direct and indirect costs should also be recorded, including those relating to pension contributions, uniform, travel, maintenance and use of workspaces, and intervention development (if available). Providing a breakdown of these costs would also help to improve transparency (for example, whether vehicle costs include fuel, road tax, and maintenance costs). This is important for both providing a more accurate account of delivery costs and allowing direct comparisons to be made across services and interventions.
- **Conduct follow-up economic evaluation of prevention pillars using more robust data.** This project provides figures that indicate the economic value of various prevention activities being delivered by MFRS. However, in a number of instances the data needed to causally link outcomes with the activities being delivered by MFRS was not available. This limits the robustness of the analysis and strength of claims that can be made about the value of these activities. The economic frameworks developed through this project provide an important tool for helping fire services to identify the types of data that should be collected to demonstrate the economic and social value of their work more fully.
- **Engage in sector-wide consultation regarding the development of standardised prevention evaluation frameworks.** The economic frameworks developed through this project provide a useful template for improving data collection and evaluation. However, they were developed through consultation with one fire service. Sector-wide discussion is needed to agree the development of standardised frameworks that can be applied across fire services to examine the efficacy and economic value of activities. This would be beneficial for allowing comparisons to be made across activities, improving the sharing of evidence-based best practice, and understanding where it would make sense for initiatives being delivered in one fire service to be implemented in others.
- **Ensure that the findings of economic work across the fire sector are being shared:** There are pockets of economic work taking place across the fire sector. However, this work needs to be coordinated and shared across fire services to improve and strengthen the development of evidence bases that can inform practice.

CONCLUSION

At the request of MFRS, the UoL undertook a project to economically evaluate activities being delivered across the four prevention pillars. Such work is important for demonstrating the efficiency and effectiveness of services and for providing evidence to inform decisions. Due to issues with availability of data, we were unable to conduct cost-benefit analysis for all

activities delivered under the four prevention pillars. We were also unable to causally link benefits directly to prevention activities. However, the evidence available does indicate that the variety of prevention activities being delivered across the service are having a range of social value and economic benefits for partner agencies and society. Recommendations have been provided to help strengthen the collection of data so that future economic analysis is more robust and transparent. Both the findings of this economic evaluation and the economic evaluation frameworks developed can be used to inform fire sector discussions regarding data collection and the development of national standardised evaluation frameworks to improve the strength of evidence bases for informing decisions regarding use of finite resources.

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APPENDIX 1: Evaluation frameworks and data sources

Table 1.
Economic framework for mapping the resources, intended outcomes, measures needed to demonstrate intended outcomes, and whether this data was available for 'home safety' and 'safeguarding and high risk' pillars.

Resources	Tasks	Outcomes	Outcome measures needed	Data available to measure outcome?
<u>Home Safety staff (grey book, except group manager)</u> ● 1 Group manager (Green book) ● 2 Station manager Bs (70% time spent on prevention activities and 30% on operational work) ● 1 Watch manager B ● Firefighters: 5 x firefighters per appliance (fire-engine) conduct Prevention duties for approximately 2 hours each day. Each visit takes an average of 15 minutes. 24 fire stations complete HFSCs, 22 of which have one appliance and 2 have two appliances. This equates to 130 firefighters conducting HFSCs every day. **<u>Safeguarding and High-Risk staff (green book)</u>** ● Grade 9 group manager ● 4 x grade 8 (prevention team managers) ● 16 x grade 6 (Advocates) ● 5 x grade 3 (Apprentices) **Advocate travel costs have never been calculated.	● Oversee prevention and safeguarding teams and report to the management board ● Receive and triage calls to identify those in need of safeguarding checks ● Conduct 'SW' checks and 'HFSC' to risk assess those over the age of 65 years or deemed vulnerable (unsafe heating methods, alcohol reduction, smoking cessation, alcohol). ● A light-touch health check of individuals in the home. ● Provide resources where necessary to reduce fire-related risks (fire retardant bedding and throws,	● Reduction in ADF	● Number of ADFs that occurred per annum prior to and since the introduction of HFSCs and SW visits. ● Number of ADFs occurring in homes where HFSCs or SW visits were conducted compared to where no HFSC or SW visits were conducted.	MFRS has a 15-year data set containing: ● The number of ADFs that occur ● Whether a 'SW' or an 'HFSC' had been conducted The dataset has limited information relating to vulnerabilities. The data reported are the circumstances at the time of the fire. The data collected includes whether there were disability or mobility issues and whether the victim needed a carer. It would only be possible to look at the data from a limited time frame (likely to be less than 6 months) between the visit and the fire.
		● Reduction in ADF-related fatalities.	● Figures for the number of ADF-related fatalities that occurred per annum prior to and since the introduction of HFSCs or SW visits. ● Number of ADF-related fatalities occurring in homes where HFSCs or SW visits were conducted compared to where no HFSCs or SW visits were conducted.	There is a 10 Year Business Intelligence Report executive summary that has annual statistics for the number of ADF-related fatalities over 10 years. Fatality reports contain details of: ● Whether a HFSC or SW visit had been conducted for this individual in the past ● HFSC and SW data (vulnerabilities and age) Figures are available for 2021/22. This data also goes back to before HFSCs, and SW visits were introduced. This is important for making comparisons. However, this data would take too long for MFRS staff to access and present in a format that could be used for this project.

Staff that support both Home Safety and Safeguarding and High-Risk pillars (green book) ● 5 x full-time Fire Service Direct staff (one Grade 8 manager, four grade 3 staff) **Other resources** ● Breakdown of equipment given (number of different fire safety items given and cost, such as smoke alarms and fire-retardant blankets) ● Cost of vehicle used to conduct visits. This data was available for ''HFSC'' but not 'SW' visits.	hard-of-hearing fire alarms, air fryers) ● Identification of risks in the home, and remedial action where possible. ● Make referrals to partner agencies if safeguarding issues are identified. Including fuel poverty, health, unsafe homes (hoarders), fall risk assessments, child safety, smoking, drugs, and alcohol reduction. ● Attend slips, trips, and falls in the over 65s and risk assess.	● Reduction in ADF-related injuries.	● Number and type of ADF-related injuries that occurred per annum prior to and since the introduction of these SW visits and HFSCs. ● Number and type of ADF-related injuries occurring in homes where SW visits and HFSCs were conducted compared to where no SW visit and HFSC was conducted.	Data is available for the number and type of ADF-related injuries per year prior to and since the introduction of HFSCs and SW visits. Data regarding the number and type of ADF-related injuries occurring where HFSCs and SW visits have and have not been conducted may exist. However, this data sits across multiple systems and MFRS have not attempted to retrieve and match up this type of information from their systems before. The time and resource that would be taken to manually check and match up the unique property reference number prevented this information form being included in this project. It is only possible to look at the data for a limited time frame (less than 6 months) between the visit and the fire.
		● Improvements in fire containment to the room of origin	● Number of ADFs contained to the room of origin where HFSCs or SW visits were conducted compared to where no HFSCs or SW visits were conducted. This is important for being able to demonstrate that conducting HFSCs or SW visits in the target population improves the fire containment to the room of origin.	Theoretically, data could be available that links this specifically to SW visits. However, this is something MFRS has not done. The only data that included vulnerability and 'HFSC' information that was in a format that was accessible to use in this project was fatality data from 2017 with details regarding ADF-related fatalities in relation to visits. There is no guarantee that the person who had a home visit was living at the property when the fire took place or is the person who died.

		● Improvements in identifying and raising awareness of people with safeguarding issues to appropriate partner agencies as a result of conducting SW visits.	● Details of the numbers and types of referrals made to partner agencies, which agencies, and the actions taken after referral. ● Details of whether partner agencies were already aware of these safeguarding issues. It would be useful to have figures from prior to and post the introduction of SW visits to make a direct comparison.	The database 'Goldmine' does not currently include details of whether partner agencies are already aware of safeguarding issues and what steps have been taken by partners as a result of referrals. Data is not available pre- and post-introduction of SW visits. MFRS conducts SW visits and will only give feedback to partners if requested or non-contactable. As standard MFRS does not follow up on referrals. This type of data is needed to better understand the economic and social impact of this partnership working.
		● Improvements in data sharing between partners so that MFRS can identify where SW visits are needed.	● Figures highlighting the number of referrals for SW visits made to MFRS by partner agencies.	MFRS only measures referrals from MFRS internal, partners, and the public. This data was only collected from April 2021 until now. This data could not be provided for this research project given the time frame.

*Across all four pillars, staff have been calculated as working full-time on these prevention activities unless otherwise stated.

Table 2.
Economic framework for mapping the resources, intended outcomes, measures needed to demonstrate intended outcomes, and whether this data was available for the 'community engagement' pillar

Resources	Tasks	Outcomes	Outcome measures needed	Data available to measure outcome?
Road and Water Safety staff ● Watch Manager B (grey book) ● Grade 6 (green book)	● School-based educational intervention sessions focusing on water and road safety.	● Duty to reduce road and water incidents by young people aged 16 -24.	● Number of road / water incidents involving children from schools where interventions have been delivered compared to where interventions have not been	● No data is available for the number of road / water incidents involving children from schools where interventions have been delivered compared to where interventions have not been delivered, or pre- and post-interventions with schools.

	● 'Pop up' water safety advice service provided for individuals visiting the Albert Docks.		delivered, or pre- and post-interventions with schools.	Data is available for the number of road- and water-related incidents MFRS attends and the number of road- and water-related injuries and fatalities. However, such data cannot be used to economically model the economic value of MFRS road and water safety interventions.
Arson staff ● 6 x grade 7 arson officers (green book) ● Group Manager ● Station Manager (20% arson prevention, other 80% station manager responsibilities) **Other resources** ● Breakdown of equipment given following an arson incident (number and cost of equipment, such as letter box plates and smoke alarms)	● Attend schools for bonfire safety ● Reduce material available to burn (litter picking) ● Provide fire prevention equipment to people who have experienced an arson attack.	● Reduction in the number of bonfires / deliberate fires ● Reduction in the number of bonfire-related casualties / fatalities	● Number of bonfires / deliberate fires lit by young people from schools where bonfire safety interventions have and have not been delivered, or pre- and post-interventions in schools ● Number of bonfires / deliberate fires attended by MFRS prior to and since the introduction of the bonfire safety initiative (litter picking) is available. ● Number of bonfire related injuries / fatalities	● Data is not available regarding number of bonfires / deliberate fires lit by young people from schools where bonfire safety interventions have and have not been delivered, or pre- and post-interventions in schools. ● Data for the number of bonfires / deliberate fires attended by MFRS prior to and since the introduction of the bonfire safety initiative (litter picking) is available. ● Data relating to the number of bonfire related injuries / fatalities is available.

Street Intervention Team ● Grade 7 (4 hours a week) **Other costs** ● Uniform ● Vehicle ● IT equipment (Data to calculate these other costs is not available)	● Engage with youths on the street ● Kicks – an intervention delivered with Liverpool FC to keep kids off the street through football	● Reduction in anti-social behaviour	● Police data for number of incidents of antisocial behaviour the young person was involved in three / six months prior to and post engagement in Kicks.	● Police data for number of incidents of antisocial behaviour the young person was involved in three / six months prior to and post engagement in Kicks is not available.
Incident Investigation Team staff: ● 4 Station Manager A's **Resilience Team staff (Shadow IIT)** ● 4 Watch manager B's (5% increase in salary for attending 12-18-month part-time course to train to be part of the incident investigation team) **Other costs** ● 4 cars ● Fire investigation equipment (Data to calculate these other costs is not available)	● Investigate deliberate / accidental fires ● Attend court to present findings of fire investigation	● Ensure all deliberate and accidental fires are investigated	● Police data regarding outcomes of criminal investigations involving deliberate fire where MFRS have provided investigative support compared to where support has not been provided.	This data is not available.

*Across all four pillars, staff have been calculated as working full-time on these prevention activities unless otherwise stated.

Table 3.
Economic framework for mapping the resources, intended outcomes, measures needed to demonstrate intended outcomes, and whether this data was available for the 'youth engagement' pillar

Resources	Tasks	Outcomes	Outcome measures needed	Data available to measure outcome?
Beacon staff ● 2 grade 6 Youth Advocates **Other costs** ● MFRS minibus and fuel to pick up / return students to schools	● Delivery of 6-week courses that focus on educating youths on arson, community safety, development of relationships, and resilience (12 young people per course, 4 courses per week during school term time)	● Improved school attendance ● Improved engagement and behaviour in school ● Improved behaviour at home ● Reduction in antisocial behaviour	● School attendance figures for six months prior to and six months post Beacon programme ● Behavioural assessment ratings from teachers / assessment grades for six months prior to and six months post Beacon programme ● Behavioural assessment ratings from parents for six months prior to and six months post Beacon programme ● Police records of anti-social behaviour six months prior to and six months post Beacon programme	This data is not available.
Healing Together staff ● 1 grade 6 post	● Delivery of 1-5 courses a week during term-time (depending on finding). Programmes that focus on developing techniques to adaptively manage emotions (1-5 young people per course – delivered to 36 young people so far)	● Improved school attendance ● Improved engagement and behaviour in school ● Improved behaviour at home ● Reduction in antisocial behaviour ● Increased disclosure of difficulties in young person's life, which is shared with the school to help provide support	● School attendance figures for six months prior to and six months post Beacon programme ● Behavioural assessment ratings from teachers / assessment grades for six months prior to and six months post Beacon programme ● Behavioural assessment ratings from parents for six months prior to and six months post Beacon programme ● Police records of anti-social behaviour six months prior to and six months post Beacon programme ● Feedback from schools to rate the benefits of additional information	This data is not available.

			MFRS has provided for young people, how this information has been acted on, and impact on young people.	
Fire Cadets ● 5 grade 6 unit leaders (each paid 3 hours per week)	● Delivery of programmes that focus on improving resilience and development of transferable skills that are beneficial to employability (60% of programme focuses on developing life and employability skills such as first aid and formal BTEC qualifications)	● Improved development of employment skills (including formally recognised qualifications such as BTECs)	● Number of young people successfully completing formal qualifications such as BTECs through the Fire Cadets programme ● Assessment of skills six months prior to and six months post involvement in Fire Cadets.	This data is not available. MFRS keep a spreadsheet that shows how many cadets have become volunteers, firefighters, and other forms of success but this done through word of mouth rather than standardised follow-ups with young people.
Prince's Trust ● 1 grade 9 youth coordinator ● 1 grade 7 team leader ● 1 grade 5 programme support worker **Other costs** ● There are a range of additional costs, including minibus and fuel, and residential costs. However, a breakdown of these costs was not available.	● Delivery of 12-week programmes that focus on improving resilience and development of employability skills.	● Improved development of life and employability skills (including formally recognised qualifications such as BTECs). ● Community benefits from projects led by young people as part of the Prince's Trust programme.	● Employment status six months prior to and six months post engagement in Prince's Trust ● Assessment of skills prior to and post involvement in Prince's Trust ● Implementation of pre- and post-measures for each community engagement project delivered by young people to demonstrate community benefits.	This data is not available.

*Across all four pillars, staff have been calculated as working full-time on these prevention activities unless otherwise stated.

Table 4.
Data sources used in the economic evaluation of prevention activities

Data used	What data was used for	Data Source
Number of HFSCs and SW visits	The average number of HFSCs was used to calculate the annual cost of an appliance and firefighters for conducting visits.	MFRS
The cost of an appliance and the 5 firefighters on board when completing a 15-minute HFSC	This was used to calculate the average annual cost of HFSCs based on the average number conducted in a year. Each visit takes an average of 15 minutes (chargeable cost is £471.60 inc. VAT per hour, therefore 15 minutes is approximately £118).	MFRS
Green book and grey book staff costs for all interventions	Salary of prevention staff was used to calculate the staffing resources invested into each pillar annually. For each grade / role, the mid spine point on the salary scale was used to calculate costs.	Green book salaries: MFRS Grey book salaries: Fire Brigades Union (2021b)
Number and cost of fire safety equipment given during HFSCs, SW visits	The cost was calculated for all of the fire safety items given to people during safety visits between 2018-2022 and divided to produce an average annual equipment cost.	MFRS
Fatality data from 2017-2022 linking fire confinement to the room or floor of origin and whether the house received a HFSC or SW visit	This was used to determine the number of fire incidents contained to the room or floor of origin for people who had received a fire safety visit compared to people who had not received a visit.	MFRS
The cost of rooms in a North West house based on average regional cost and square metres	This was used to calculate the cost of containing a fire to the room of origin instead of the floor of origin, to calculate the total average saving of containing a fire.	Number of Rooms: https://www.nomisweb.co.uk/census/2011/QS407EW/view/2013265922?rows=rural_urban&cols=cell Average house price: Hewitt et al. (2022)
Number of ADFs and the cost of a domestic fire	These statistics were used to calculate the average annual cost saving from reduction in ADFs.	Number of ADFs: MFRS Cost of domestic fire: https://www.greatermanchester-ca.gov.uk/what-we-do/research/research-cost-benefit-analysis/
Number of ADF, RTC, water, and arson related fatalities and the cost of loss of life based on the average life	This was used to calculate the average annual cost of fatalities (or cost saving where fatalities were reduced). As details regarding the age of fatalities was unavailable, costs have been calculated by using the average age of people in the UK and average life expectancy to work out	Number of ADF-related fatalities: https://www.gov.uk/government/statistical-data-sets/fire-statistics-data-tables Number of RTC-related fatalities: MFRS Number of water-related fatalities: MFRS

expectancy	the quality adjusted life years.	Number of arson-related fatalities: MFRS Average age in the UK: https://www.worldometers.info/world-population/uk-population/ Average life expectancy: https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/lifeexpectancies/bulletins/nationallifetablesunitedkingdom/2018to2020 Cost of a fatality: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1063330/Green_Book_2022.pdf
Number of ADF-related casualties and the cost of minor and major fire injuries	This was used to calculate the average annual cost saving of reduction in fire-related casualties.	Number of ADF related casualties: https://www.gov.uk/government/statistical-data-sets/fire-statistics-data-tables Cost of casualties: https://webarchive.nationalarchives.gov.uk/ukgwa/20121105004822mp_/http://www.communities.gov.uk/documents/fire/pdf/144524.pdf
Number of RTC-related casualties and the cost of minor and major RTC injuries	This was used to calculate the average annual cost of RTC injuries.	Number of RTCs and casualties: MFRS Cost of minor injuries: https://www.gov.uk/government/statistical-data-sets/reported-road-accidents-vehicles-and-casualties-tables-for-great-britain#historic-trends-ras01 Cost of major injuries: https://www.gov.uk/government/statistical-data-sets/reported-road-accidents-vehicles-and-casualties-tables-for-great-britain#historic-trends-ras01
Number and cost of fire safety equipment given during post-arson safety visits	This was used to calculate the cost of equipment given to victims of arson by the Arson Team to improve future safety between 2017 and 2022.	Number and cost of equipment: MFRS
Number of young people successfully completing the Beacon programme.	This was used to calculate the cost benefit for developing crucial life skills (which is calculated to be £125.62 per person).	Number of young people completing the programme in 2021 (N = 174): MFRS Economic benefit of developing life skills: National TOMs (2021)
Number of young people successfully completing Fire Cadets / Princes Trust	This was used to calculate the cost benefit for completing formally recognised qualifications, such as BTEC (which is calculated to be £258.45 per person per week).	Number of young people completing these programmes in 2021 (N = 60 for Fire Cadets; N = 108 Princes Trust): MFRS Economic benefit of gaining qualification: National TOMs (2021)

APPENDIX 2: Breakdown of economic analysis

'Home Safety' and 'Safe and Well' costs

Table 5.
Number of 'HFSC' and 'SW' visits conducted by MFRS each year

Year	'HFSC' completed	'SW' visits completed
2012/13	56,222	3,637
2013/14	41,540	4,097
2014/15	34,820	3,803
2015/16	35,031	5,249
2016/17	49,606	7,670
2017/18	41,454	9,571
2018/19	40,107	8,184
2019/20	44,047	10,177
2020/21	3,576	9,760
2021/22	30,527	9,416
Average	**37,693**	**7,156**

Table 6.
Total number of equipment given out during 'HFSC' and 'SW' visits each year and average annual spend

Equipment	2018/19	2019/20	2020/21	2021/22	Average	Total annual cost (item cost)
Optical smoke alarm	8,142	9,488	9,997	8,414	9,010	£49,555.00 (£5.50)
CO2 alarm	80	9	254	1,374	430	£3,913.00 (£9.10)
Wi-Fi smoke alarm	859	964	649	817	822	£17,755.20 (£21.60)
Strobe unit & pad	524	541	369	450	471	£20,347.20 (£43.20)
Fire retardant throw	305	358	245	369	319	£5,946.16 (£18.64)
Fire retardant apron	1	0	0	0	0	£0 (£15.84)
Single bedding pack	107	92	86	145	108	£5,085.72 (£47.09)
Double bedding pack	82	99	75	123	95	£1,201.80 (£80.12)
King size bedding pack	18	13	5	12	12	£1,176.96 (£98.08)
Deep fat fryer	67	62	24	54	52	£3,728.40 (£71.70)
Metal bin	413	415	309	519	414	£1,598.04 (£3.86)
Strip adaptor	122	123	79	156	120	£734.40 (£6.12)
Oil filled radiator	57	54	92	71	69	£3,576.96 (£51.84)
RCD adaptor	48	48	98	58	63	£812.07 (£12.89)
Winter warm pack	-	-	152	392	272	£4,896.00 (£18.00)
Smoke alarm adaptor Plates	-	-	-	558	558	£111.60 (£0.20)
Draft excluders	-	-	-	249	249	£2,527.37 (£8.50)
Total	**10,825**	**12,266**	**12,434**	**13,761**	**12,322**	**£122,965.88**

Note: Missing data indicates that equipment was not yet introduced to be given on visits. The data provided did not specify the quantity of each specific radiator given out. Therefore, the cost of an oil-filled radiator was derived from the average cost of a 1.5kw and 2.0kw oil-filled radiator.

Table 7.
Annual staffing costs for 'Home Safety' and 'Safeguarding and High-Risk' pillars

Staff	Total annual salary for all staff in each role (individual staff cost)
1 Group Manager	£41,088.50
1 Sub Manager	£31, 892.33
4 Prevention team Managers	£127,568.00 (£29,165.00)
4 Fire Service Direct staff	£76,302.00 (£19,075.50)

1 Fire Service Direct Manager	£31,892.33
5 Apprentices	£95,377.50 (£19,075.50)
16 Advocates	£379,688.00 (£23,730.50)
1 Grey Book Group Manager (90% of time spent on 'Home Safety', 10% on operational activities)	£46,084.05
2 Grey Book Station Manager Bs (70% of time spent on 'Home Safety', 30% on operations)	£64,205.40 (£32,102.70)
1 Grey Book Watch Manager B	£39,974.00
Total staffing cost	**£934,072.11**

Note: MFRS provided firefighter and appliance costs in a single figure, so this is calculated separately below. Annual salary reflects the percentage of time spent on prevention activities. Each grade has pay levels (based on experience) but the specific band for each member of staff could not be provided. Therefore, the average was taken for each grade. As it is unknown whether the Grey Book group manager for 'Home Safety' is A or B, the average of a Competent Group Manager A and B pay scales have been used.

The cost of one 15-minute 'HFSC' is £117.90. This is based on the cost of the appliance used to attend the visit (including VAT) and the cost of the operational staff on board (5 Firefighters). The annual cost of conducting 'HFSC' is £4,444,004.70.

Total annual costs for 'Home Safety' and 'Safe and Well' pillars: £5,501,042.69.

'Home Safety' and 'Safe and Well' benefits

Table 8.
The price of different spaces in a North West house based on average regional cost and square metres

Description	Value
Average price of a North West house (Hewitt et al., n.d.)	£203,611
Average number of rooms per house in the North West (ONS, 2011.)	5
Average cost of a room in a North West house	£40,722.20
Average cost per floor of a North West house (based on a 2-storey house)	£101,805.50
Total cost saving for confining the fire to the room of origin compared to fire spreading across the floor	**£61,083.30**
Total cost saving for confining the fire to the room of origin compared to fire spreading across the house	**£162,888.80**

Annually, £162,888.80 per property is saved on average by the public and insurance companies when a fire is contained to the room of origin rather than spreading throughout the property. However, this figure does not include the value of items destroyed or damaged, or fire severity. Unfortunately, as data was not available to compare the number of ADFs occurring in homes where vulnerable people had and had not received a SW visit or HFSC, this cost measure could not be included in the economic model. The data that was available indicates that between 2017 and 2021, 24 ADF-related fatalities occurred in homes with vulnerable residents. In total, people in 15 of these 24 incidents had received a SW visit or HFSC and 9 had not. In 80% of these 15 homes that received a SW visit or HFSC, the fire was contained to the room of origin compared to only 33% in the 9 homes that did not receive a SW visit or HFSC.

Table 9.
Number of ADFs prior to and post increased investment in SW visits

Year	Number of ADF
2012/13	1,133
2013/14	1,153

2014/15	1,053
2015/16	1,090
Average prior to increased investment in SW visits	**1107**
2016/17	998
2017/18	927
2018/19	900
2019/20	869
Average post increased investment in SW visits	**923**

Note: The number of ADFs has been rounded to the nearest whole number for the average total.

Since increasing SW visits, the average annual number of ADFs has decreased by 184. The benefit of the reduction in ADFs can be considered as the savings incurred when preventing a fire. The economic cost of a domestic fire in England is estimated to be £55,349.51 (Greater Manchester Combined Authority, 2021). The costs associated with the consequence of fire include fiscal, economic, and social costs. How this cost was derived is not clear, but it encompasses costs as a consequence of a fire occurring and the costs incurred for fire services to attend a fire. However, this figure encompasses the average cost of arson, rather than ADF. Prevention costs are excluded from this statistic (e.g., the cost of fitting a smoke alarm).

Total annual saving from reductions in ADFs since SW visits were increased: £10,184,309.84.

Table 10.
Number of ADF-related fatalities prior to and post increased investment in 'SW' visits

Year	Number of dwelling fire fatalities
2012/13	6
2013/14	9
2014/15	10
2015/16	14
Average prior to increased investment in SW visits	**10**
2016/17	7
2017/18	4
2018/19	4
2019/20	5
Average post increased investment in SW visits	**5**

Note: The number of Fatalities has been rounded to the nearest whole number for the average total.

Figures indicate a 50% decrease in the average number of ADF fatalities since the increase in resource investment for 'SW' visits. The age of fatalities was not recorded. Therefore, the average age of an individual in the UK was used, which is 41 years (Worldometer, 2022) as visits are conducted with vulnerable individuals who are under the age of 65 as well as over the age of 65. The average life expectancy is approximately 86 years (ONS, 2021). The average cost of loss of life is £60,000 per year (HM Treasury, 2022), which equates to a cost of £2,700,000 per person in this instance.

Total annual saving from reduced ADF-related fatalities since SW visits were increased: £13,500,000.

Table 11.
Number of ADF-related casualties prior to and post increased investment in 'SW' visits

Year	Total number of casualties
2012/13	243

2013/14	248
2014/15	180
2015/16	200
Average prior to increased investment in SW visits	**218**
2016/17	175
2017/18	153
2018/19	159
2019/20	149
Average post increased investment in SW visits	**159**

Note: Number of casualties have been rounded to the nearest whole number. Data provided does not clarity what injuries casualties had, which means it is not possible to determine whether these were slight or serious.

Figures highlight a 27.1% decrease in the average number of ADF-related casualties since the increase in 'SW' visits.

Table 12.
The cost of fire injuries based on severity (Department for Transport, 2004, as cited in Office of the Deputy Prime Minister, 2006)

Severity of injury per person	Cost
Slight fire injuries (casualties have injuries that do not need hospital attention. Or hospital treatment is received but the impact of the injury will not last long; Department for Transport, 2020, as cited in Lakoma & Murphy, 2021)	£17,489.54
Serious fire injuries (casualties who need hospital attention and have impactful, longer-lasting injuries but do not die within the fatality recording window; Department for Transport, 2020, as cited in Lakoma & Murphy, 2021)	£225,906.61
Average cost	**£121,698.08**

Note: Only fire-related injuries that arose from incidents that fire services attended are included in figures. Smoke inhalation, burns, and various physical injuries are incorporated in figures. Healthcare costs, losses in economic output, and emotional, and physical suffering are included. Economic losses for firefighters injured in training is incorporated in this statistic.

As the data available did not clarify the nature of injuries, we were unable to identify how many casualties were slightly or seriously injured. Accordingly, we have calculated an average injury cost by combining the slight and serious fire costs and dividing.

Total annual saving from reducing the number of ADF-related casualties: £7,180,186.72.

Total annual costs for 'Home Safety' and 'Safe and Well' pillars: £5,501,042.69.
Total annual benefit from 'Home Safety' and 'Safe and Well' pillars: £30,864,496.56
Overall Cost-Benefit: Every £1 invested in 'Home Safety' and 'Safe and Well' pillars results in a saving of £5.61

'Community Engagement' costs

The cost used for MFRS attending an RTC, water or arson incident is £943.20 (figure supplied by MFRS, calculated on two-hour appliance use and firefighters to attend an incident).

Table 13:
Salary of prevention staff for road and water safety

Member of staff	Salary (£)
Watch Manager B	£39,793
Grade 6	£20,444
Total salary costs	**£60,237**

Table 14:
Number of RTCs attended and costs

RTCs attended	Numbers attended	Cost per attendance (£)	Total cost (£)
2017/18	556	£943.20	£524,419.20
2018/19	617	£943.20	£581,954.40
2019/20	718	£943.20	£677,217.60
2020/21	555	£943.20	£523,476.00
2021/22	830	£943.20	£782,856.00

There has been an increase of 112 RTCs attended from 2019/20 to 2021/22. Therefore, there has been a cost increase of £105,638.30 between the two periods.

Table 15:
The economic cost of the different RTC accident types attended by MFRS

	Incident outcome	2019/20			2021/22		
		Number attended	Cost per accident	Total annual cost	Number attended	Cost per accident	Total annual cost
All age groups	Fatal	7	£2,916,000	£20,412,000	17	£2,916,000	£49,572,000
	Serious	69	£252,479	£17,421,051	60	£252,479	£15,148,740
	Minor	274	£25,606	£ 7,016,044	224	£25,606	£5,735,744
	Total			**£44,849,095**			**£70,456,484**
16–24-year-olds	Fatal	6	£2,916,000	£17,496,000	4	£2,916,000	£11,664,000
	Serious	65	£252,479	£16,411,135	81	£252,479	£20,450,799
	Minor	-	-	-	-	-	-
	Total			**£33,907,135**			**£32,114,799**

The increase in number of RTC-related fatalities between 2019/20 and 2021/2022 equates to an additional economic loss of £29,160,000. The decrease in number of serious and minor injuries equates to an economic saving of £3,552,611. Overall, this equates to an economic loss of £25,607,389. For young people between the ages of 16-24, figures highlight a decrease in RTC-related fatalities between 2019/20 and 2021/22, equating to an economic saving of £5,832,000. However, there has been an increase in the number of serious injuries for this age group, equating to an increase in cost of £4,039,664 for society. Nevertheless, within this particular age group, figures suggest an economic saving of £1,792,336.

Total cost incurred by MFRS for responding to RTCs in 2021/22: £782,856.00.

Table 16
The cost incurred by MFRS for attending water incidents

Water incidents	Numbers attended	Cost per incident	Total annual cost

2017/18	43	£943.20	£40,557.60
2018/19	35	£943.20	£33,012.00
2019/20	26	£943.20	£24,523.20
2020/21	32	£943.20	£30,182.40
2021/22	52	£943.20	£49,046.40

In 2021/22, MFRS attended 26 more water related incidents than in 2019/20, which equates to a cost increase of £24,523.20 for the service.

Total cost incurred by MFRS for attending water related incidents: £49,046.40.

Table 17
Salary costs for the arson team

Role	Total salary (cost per staff member)	Percentage of time in arson	Annual salary cost for time spent on arson prevention
6 Arson Officers	£138,000 (£23,000)	100%	£23,000
Station Manager B	£45,861	20%	£ 9,172.20
Group Manager Development	£47,887	20%	£ 9,577.40
Total			**£156,749.60**

Table18.
Data on the number of deliberate fires attended by MFRS

Year	Total deliberate fires attended	Cost per attendance (£)	Total Cost (£)
2017/18	5302	£943.20	£5,000,846.40
2018/19	5121	£943.20	£4,830,127.20
2019/20	3544	£943.20	£3,342,700.80
2020/21	3552	£943.20	£3,350,246.40
2021/22	**4065**	**£943.20**	**£3,834,108.00**

MFRS have attended 521 more arson related incidents in 2021/22 compared to 2019/20, which equates to a cost increase for the service of £491,407.20.

Table 19.
Costs of the fire prevention equipment installed by MFRS after an arson attack

Equipment	Cost per item	Total number issued annually	Total cost
Optical Smoke Alarm	£ 6.06	370	£2,242.20
Lockable Letterbox Plate	£18.00	124	£2,232.00
Letterbox Lock	£ 1.50	317	£ 475.50
Total			**£4,949.70**

Table 20.
Number of bonfire incidents attended by MFRS prior to and post introduction of bonfire prevention activities

Before / after Prevention	Year of incident	Number of incidents	Cost per attendance (£)	Average cost (£)
Before prevention activities were introduced	2008	1011	£943.20	£953,575.20
	2009	753	£943.20	£710,229.60
	2010	720	£943.20	£679,104.00
	2011	613	£943.20	£578,181.60
	2012	427	£943.20	£402,746.40
	2013	213	£943.20	£200,901.60
	2014	308	£943.20	£290,505.60
Average before		**578**		**£545,043.86**
	2015	411	£943.20	£387,655.20

After prevention activities were introduced	2016	579	£943.20	£546,112.80
	2017	392	£943.20	£369,734.40
	2018	366	£943.20	£345,211.20
	2019	243	£943.20	£229,197.60
	2020	268	£943.20	£252,777.60
	2021	218	£943.20	£205,617.60
Average after		**354**		**£333,758.00**

The number of bonfire incidents attended by MFRS after the introduction of bonfire prevention activities has decreased by 224 compared to prior to before, resulting in a cost decrease of £211,285.86.

Average annual cost for arson team salary and fire prevention equipment: £161,699.30
Average annual saving from reduced bonfire incident attendance: £211,285.86
Overall cost-benefit: Every £1 spent on arson prevention results in a saving of £1.31 for MFRS in reduced incident attendance.

'Youth Engagement' costs

Table 21.
Expenditure for the Beacon Project

	Type of costs	Annual cost
Funded costs	Equipment	£7359.88
	Staff (2 grade 6 youth advocates)	£42,266.78
	Other	£9653
MFRS contribution	Annual Minibus Costs	£2000
	Fuel + Maintenance	£1500
	Insurance	£650
Total cost		**£63,429.66**

Note: Equipment includes training foam, teambuilding props and replacement PPE. Other includes student t-shirts, lunch/ refreshments, stationery, and certificate frames.

Table 22.
Expenditure for the Fire Cadets

Type of cost	Annual cost
Staff costs (5 grade 6 unit leaders, 3 hours per week each)	£11,527.98
Transport costs	£752.75
Supplies and services	£9,516.12
Central/ department expenditure	£261.10
Total	**£22,057.95**

Note: MFRS receives £8,506.75 funding contribution toward these costs.

Table 23.
Expenditure for the Prince's Trust

	Type of cost	Annual cost
Staffing costs	Grade 5 Programme Support Worker	£28,074
	Grade 7 Team Leader	£35,238
	Grade 9 Youth Co-ordinator	£42,269
Additional costs	Residential costs	£27,900
	Final Presentation buffet	£2,500
	Clothes hire for presentation	£5,500
	PT course fee	£12,600

	Qualifications	£4,860
	Stationery	£300
	Travel passes	£1,800
	Consumables	£700
	Food costs for residentials	£2,300
Total		**£164,041**

'Youth Engagement' benefits

Benefits of Beacon Project: The annual cost of delivering the Beacon Project in 2021/2022 was £63,429.66. In 2021/2022, 175 young people (out of 182) completed the Beacon Project. The proxy value for a young person developing life skills is £125.62 per week (National TOMs, 2021) and the programme is 6 weeks long (£735.72 per young person). Therefore, the economic benefits of individuals taking part is £131,901. Figures indicate that each £1 invested in delivering the Beacon Project resulted in a saving of £2.08 for society.

Benefits of Fire Cadets: The annual cost of delivering the Fire Cadets in 2021/2022 was £22,057.95. In 2021/2022, 60 young people joined the Fire Cadets (which runs for 39 weeks of the year). Young people can undertake BTEC qualifications through the Fire Cadets, which has a proxy value of £258.45 per week (National TOMs, 2021). The economic benefit of one young person undertaking a BTEC or equivalent through Fire Cadets would be £10,079.55. If all 60 young people undertook a BTEC or equivalent through Fire Cadets, this would equate to an economic benefit of £604,773. If all Fire Cadets undertook a BTEC or equivalent through this programme, figures would indicate a cost saving of £27.42 for society for every £1 invested in delivering Fire Cadets.

Benefits of Prince's Trust: The annual cost of delivering Prince's Trust in 2021/2022 was £164,041. In 2021/2022, 108 students took part in the Prince's Trust and undertook BTEC qualifications. Completing a BTEC has a proxy value of £258.45 per week (National TOMs, 2021) and Prince's Trust is 12 weeks long. The total value of one young person taking part is £3,101.40 and the total value of 108 young people taking part is £334,951.20. Figures indicate that every £1 spent on delivering Prince's Trust equates to a saving of £2.04 for society.