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Reducing avoidable ambulance conveyance in England: Interventions and associated evidence.

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Date: 2nd March 2020

Prepared for: **NHS** NHS England and NHS Improvement

Publishing Approval Reference: PAR0071

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1. Background

- 1.1 The Urgent and Emergency Care system in England continues to face demand-led pressures. The ambulance service has seen an average year-on-year increase of 6% in the number of calls received. In 2018-19, there were 11.7 million contacts via 999 with the ambulance service (1).
- 1.2 As a first response provider, ambulance services increasingly contribute to the reduction of unnecessary pressures on Emergency Departments (ED), through direct transportation to a more appropriate destination, by providing necessary care on-scene, or by providing advice over the telephone. Offering such alternatives has the potential to reduce pressures on the system but can also benefit patients by ensuring they receive 'the right treatment, at the right time, by the right person'. Ambulance service led interventions aimed at safely reducing avoidable conveyance to an ED are widespread and continue to develop within England. Often these interventions are locally led, developed to meet the needs of local populations, but may be limited by availability of resources both within the ambulance workforce and the wider health and social care system.
- 1.3 An evidence synthesis of models of urgent care delivery (2) found that much of the current evidence regarding avoidable conveyance relates to the use of paramedics with extended roles and is based on a small number of high quality studies. The review found that pre-hospital practitioners are effective in reducing the number of patients transported to the ED, providing appropriate care and referral in the community setting. Acceptability of avoidable conveyance interventions delivered by ambulance clinicians was positive amongst the general population, and satisfaction was higher than in groups receiving standard care, with patients feeling clearer about the advice given (2). Further evidence suggests that such interventions also have a positive effect on carers (3). A small number of studies examining the costs of managing patients out of hospital by ambulance clinicians report lower costs, and cost-effectiveness compared to usual care (2).
- 1.4 Supporting the reduction of avoidable conveyance to the ED is a key policy driver, with NHS England developing a long-term strategy to reduce ambulance conveyance to ED by 2023 (4). The Ambulance Improvement Programme (AIP) is currently developing a repository of local interventions used to reduce conveyance to an ED, which will offer an accessible resource to inform and support local transformation. Further work is also in progress by a team at NHSE/I to undertake analytic modelling to identify the potential impact of the interventions if they were to be rolled out at a larger scale.
- 1.5 The AIP has identified six pillars as the focus for reducing conveyance, safely: Falls, Mental Health Crisis, Care Homes, Access to GP/Health Care Professional



advice, Optimising the Response, Optimising the Clinical Skills of the Workforce. This report lists the interventions submitted to the repository to date, and focusses on the pillars of *Falls, Care Homes, and Mental Health Crisis*. For these pillars, a brief summary of each relevant intervention is given, together with evidence from peer-reviewed research regarding other interventions focussing on a similar population. The remaining pillars are not discussed in detail here, as they form part of an evolving programme of work within the AIP.

2. Objectives of this report

2.1 Using information provided as part of the AIP avoidable conveyance repository submission:

- To *categorise*, across the six pillars, local avoidable conveyance interventions reported to be operational in the ten larger ambulance services in England.
- To *summarise* the interventions (across the three pillars of Falls, Care Homes, and Mental Health Crisis) highlighting the *reported effectiveness* of local interventions.
- To *identify, and describe*, peer reviewed evidence in relation to avoidable conveyance with respect to Falls, Care Homes, and Mental Health Crisis.



3. Method

- 3.1 Data collected as part of the “Safely Reducing Avoidable Conveyance” repository were forwarded to the team at ScHARR. Submission data were forwarded to us between November 2019 and February 2020.
- 3.2 A draft data extraction template was created and populated with sample data from three interventions and discussed with NHSE/I to ensure all key information was captured. In many cases, the data necessary to undertake the planned analytic modelling (to be conducted post report), was of a greater depth and level of detail than the data provided by the ambulance trusts in response to the original submission template. For each intervention, the ScHARR team identified where further data was required, created a bespoke data request for each submission and contacted individual ambulance services to request this supplementary data. Information received – either by phone call or email – was then added to the data extraction spreadsheet. Alongside this, we drew together a library of supporting information regarding the submissions, both from documents supplied by Ambulance Service Trusts and information identified from internet searches.
- 3.3 To support the data received from the ambulance trusts, targeted searches were undertaken to identify peer-reviewed literature relating to similar interventions. A number of key publications were reviewed, specifically Turner et al (2), O’Cathain et al (5), and three Ambulance Safe Staffing Evidence Reviews recently produced by the research team. (6-8) Citations of these publications and relevant literature included within them were checked to identify any further recent evidence.



4. Findings

- 4.1 This is an evolving piece of work. The interventions presented here do not represent the full extent of avoidable conveyance work currently being undertaken by ambulance services across England.
- 4.2 Sixteen submissions were received at the time of writing this report (February 2020), from seven of the ten larger ambulance services in England. Five submissions were received from the Welsh Ambulance Service NHS Trust, but are not reported here. There was significant overlap between interventions targeting falls and those targeting care homes due to them often focusing on the same population i.e. frail elderly. Submissions were received relating to all six pillars, with some being relevant to more than one pillar. With respect to the pillars which are the focus of this report: six interventions focused on falls (frailty was also included within this pillar given the propensity to fall amongst those with frailty), three on care homes, and two on mental health. (Table 1). The focus of the remaining interventions was in relation to the remaining pillars: Accessing to GP/Healthcare Professional Advice, Optimising the Response to the Patient, and Optimising the Clinical Skills of the Workforce. Examples of these interventions include Single Point of Access, community response interventions, or advanced practitioner schemes. A description of the pillars, and examples of these interventions, is provided elsewhere (1).



Table 1: Interventions identified by ambulance services as safely reducing conveyance (arranged by ambulance service)

Intervention	Ambulance Service Provider	Pillar					
		Falls	Care Homes	Mental Health	GP/HCP advice	Optimising patient response	Optimising workforce skills
<i>Emergency Care Practitioner (ECP)/Specialist Practitioner (SP) – Care Home Scheme</i>	EEAST		X			X	X
<i>Falls Early Intervention Vehicle</i>		X				X	
<i>Mental Health Street Triage</i>					X	X	
<i>Advanced Paramedic Practitioner - Urgent Care</i>	LAS					X	X
<i>Falls Initial Response Skills Training</i>	NEAS	X	X				
<i>Enhanced Care Home Scheme</i>	NWS		X		X		
<i>Frailty Response Car</i>		X				X	
<i>Community Response Team</i>		X			X	X	
<i>First Aid Unit</i>	SCAS						X
<i>Community Enhanced Response</i>					X	X	X
<i>Primary Care Visiting Service</i>						X	X
<i>Falls and Frailty Project</i>		X				X	X
<i>Mental Health Professionals in Emergency Operations Centre</i>	SECAMB			X	X	X	
<i>Direct Access to Frailty Unit</i>	YAS	X				X	
<i>Single Point of Access & Rapid Response Team</i>					X	X	X
<i>Urgent Care Practitioner Team</i>						X	X

Optimising the patient response = Deployment of practitioners as effectively as possible – targeting a specific response to a specific patient group

Optimising workforce skills = Enhancement of paramedic clinical skill/utilisation of paramedics with extended skills.



Pillar 1: Falls

Box 1: Interventions targeting falls (and frailty)

Specialist response vehicles:

Frailty Response Car (NWS) A collaborative project (with Lancashire and South Cumbria NHS Foundation Trust), based in Southport, whereby 'frail' patients are attended by a Frailty Response Vehicle in response to a 999 call. Each vehicle operates with a paramedic, and a community therapist, on board, between the hours of 08:00 to 20:00, seven days a week. The intervention began operating in the Winter of 2019, in the Southport and Formby area. Whilst still in its early stages, NWS report that **73% of patients receiving this service were not conveyed to the ED.**

Falls and Frailty Project (SCAS) A collaborative project (with Royal Berkshire NHS Trust), whereby a specialist paramedic and advanced occupational therapist work from a specially adapted vehicle attending patients over the age of 65 who have fallen or are at risk of falling (frail). Introduced in 2015, the service is operational for 3 days a week, (Saturday to Monday) between 07:00 and 19:00. SCAS report a **non-conveyance rate which has progressively increased to at least 74% for patients receiving this service**, with 7-8% of these being See & Refer to a service other than the ED. **15% of patients re-contacted the ambulance service within 7 days**, a figure considered very low by geriatricians overseeing the project. The initial one-year pilot of a 1 day/week service was estimated to **save 297 potential hospital bed days** at a cost of £237,600. The service has been rated as an **area of outstanding practice by the CQC.**

Falls - Early Intervention Vehicle (EEAST) A targeted response to older (65+) patients who have fallen, consisting of a paramedic/EMT and an OT attending calls identified via 999 or crew referrals. Working with health and social care providers, the intervention aims to provide holistic assessment with a view to treating and discharging patient to care within the community. The scheme began as a pilot in 2016, now operating in various areas across the region. Operational hours vary, with some schemes operating for 12 hours a day, seven days a week. During the first year of operation, over **1000 patients** were assessed as part of the scheme. Whilst no data was available at the time of writing this report, EEAST report independent evaluation which found **significant reductions in ED attendance, hospital admission, 999 re-contact rates, and unplanned presentations to other healthcare services.**

Designated pathways and referral routes:

Direct Access to Frailty Unit (YAS) A collaborative project (with Mid Yorkshire Hospitals NHS Trust) whereby ambulance crews can access a clinical pathway enabling them to transport frail elderly patients directly to the hospital-based Frailty Unit, bypassing the ED. Introduced in 2018, the service operates seven days a week, between 08:00 and 20:00 on weekdays, with reduced hours at weekends. During the first nine months of operation, YAS report that 197 patients were conveyed to the Frailty Unit via the pathway, an average of five patients per week.



Patients/ carers report positive feedback of the pathway, with few patients re-admitted within 7 days (less than the overall rate for the unit) **and no recorded safety incidents.**

Community Response Team (NWAS) A pathway allowing ambulance crews to refer into a community response team, targeting 'frail elderly' patients. Operating in a single CCG, the co-located team consists of nurses, therapists, advanced practitioners and social care. Introduced in August 2018, the scheme operates seven days a week between the hours of 08:00 and 18:30. NWAS report an **8% decrease in ambulance conveyance** during the first year of operation. **999 re-contacts were 3.6%** for patients receiving the intervention, a similar re-contact rate to that of the wider ambulance Trust.

Preventative training for carers of vulnerable patients:

Falls Initial Response Skills Training (FIRST) (NEAS) A training course provided to residential and care home staff on prevention and management of falls. Operational since the winter of 2016/17, in the North East and North Cumbria, the intervention aims to improve the confidence and competence of care home staff in responding to falls, reducing the number of calls from care homes to 999. NEAS reported a **reduction, of up to 32% in 999 calls from care homes**, immediately after the period of training, but reduced in the longer term to between 7-10%. This was attributed to high attrition of care home staff. **66 fewer conveyances from care homes to the ED** were reported in 2017, many of which related to falls. More recent data show a **6% reduction in hospital admissions for care homes** trained during September 2018 – March 2019.



Existing academic evidence in relation to falls interventions and avoidable conveyance:

4.3 Of the three pillars considered in this report, the published peer-reviewed evidence relating to falls is the most advanced and robust. A number of studies have explored interventions to reduce falls-related conveyance, either through offering a different approach when attending or by referring attended patients to additional support to prevent future falls. These interventions can be grouped into three categories:

I. *Specialist paramedics (including ECPs and community paramedics) with a remit to reduce conveyance (9-12).* Whilst falls was not the sole focus of these practitioners' work, it was identified as one of the main reasons for attendance, and studies identified outcomes at least partly in relation to patients who had fallen. Three controlled studies reported lower rates of conveyance in the intervention group, and two also found significantly lower subsequent admissions at 28 days. Outcomes were reported in a variety of ways, but data from the largest study, a Randomised Control Trial (RCT), found patients in the intervention group were significantly less likely to attend an ED (relative risk 0.72) or require hospital admission within 28 days (relative risk 0.87), and also reported higher levels of satisfaction. The final study, of elderly high acuity patients with complex conditions, reported a conveyance rate of 17.9%, with low levels of subsequent admissions, and noted that most of these patients would normally have been transported.

II. *Additional support for standard paramedics in responding to falls through decision-support tools, protocols or pathways (13-15).* Two RCTs of paramedics trained to use tools to aid decision-making and increase community referral found some reduction in conveyance or ED attendance compared to controls, but this was not statistically significant in either case. There were however higher rates of referral to falls services in the intervention group and no differences in adverse events. The third study of residents in assisted living facilities explored the use of a protocol that paramedics used in consultation by telephone with a specialist primary care physician. Use of the protocol led to non-transport for 62.9% of falls. In a small number of instances where non-transport was recommended, patients had a time-sensitive condition which mostly led to transportation or physician attendance, and at least 99.3% of patients with a recommendation for non-transport received appropriate care.

III. *Identification of vulnerable elderly patients and referral for additional community-based assessment and/or support (16-20).* Three studies focused specifically on falls, and this was the main population in the other. Two RCTs of multidisciplinary interventions to provide support following a fall were identified. In one, all patients were provided with written fall



prevention advice, and the intervention group was given direct support to implement the advice. Overall findings showed no significant difference in subsequent falls and health service use between the two groups, but intervention participants who adhered to the recommendations had significantly lower rates of falls than non-adherers (OR 0.53). The second RCT compared a tailored support package from a community falls team to usual care and found significant reduction in the incidence of falls over one year (3.46 vs 7.68), and consequent reduction in calls for an emergency ambulance (total calls 245 vs 365). Mean difference in health and personal social care cost was -£1551 per patient over 1 year. The other two studies reported interventions where patients were referred directly by ambulance personnel to social services or a rapid response team for assessment and appropriate support, but no follow-up data was reported.

- 4.4 In summary, ambulance services submitted information on six interventions relating to falls. Interventions were grouped into three categories: interventions which utilised specialist paramedics; interventions which provided additional support to standard paramedics; and interventions which provided onward referral to community-based assessment. Peer reviewed evidence indicates that paramedics with extended roles can safely reduce conveyance after falls. Use of protocols for standard ambulance crews attending falls does not appear to have a significant impact on non-conveyance rates, although additional telephone support from a physician may increase this. There is mixed evidence regarding referral of fallers for additional community based-support, with some evidence that this can lead to reduction in subsequent falls and use of emergency services.



Pillar 2: Care Homes

Box 2: Interventions targeting Care Homes

Enhanced Care Home Scheme (ECHS) (NWAS) A collaborative project with West Lancashire CCG to reduce hospital conveyance for residential/nursing care home residents living with long-term conditions. Operational since January 2019, individual patient care plans have been created for care home residents to support decision-making for care home and NWAS staff. 19 care homes have participated in the ECHS, with 338 individual care plans in place. For those care homes participating in the scheme, NWAS report an overall **10.2% reduction in call volumes, 8.11% reduction in conveyance, and reduction in total hospital admissions.**

Emergency Care Practitioner/Specialist Paramedic Care Home Scheme (EEAST) Patients are attended by an ECP or SP (Urgent Care). If appropriate, the patient is left in the care home until the next day, with a temporary care package, until the patient can be assessed by a GP. With paramedic prescribing rights to some medications, the need for further intervention can be avoided. The scheme has been operational in the West Hertfordshire since 2016, operating seven days a week (06:00 to 00:00). Whilst no data was available at the time of writing this report, EEAST report independent evaluation which demonstrates **significant reductions in ED attendance, hospital admission, 999 re-contact rates, and unplanned presentations to other healthcare services.**

Falls Initial Response Skills Training (FIRST) (NEAS) A training course provided to residential and care home staff on prevention and management of falls (detail reported in Box 1).



Existing academic evidence relating to Care Homes interventions and avoidable conveyance

- 4.5 There is more limited evidence in relation to care homes (21-24), although much of the research regarding falls discussed above is also likely to be relevant in this context. One study reported the use of Extended Care Paramedics with additional specialist training to provide on-site assessment and treatment to residents of long-term care facilities. This 'before and after' study reported outcomes for patients attended by ECP or paramedic. Overall transportation rates to the ED fell from 94.9% before to 65.6% after implementation. This reduction was largely due to the introduction of ECPs, as following implementation, the transportation rate for calls attended by ECPs was 45.3% compared to 92.7% for paramedics. Following implementation, there were also fewer hospital admissions for patients seen by ECPs compared to paramedics (16.8% vs 39.8%) and a lower rate of relapse calls in the 48 hours after attendance (3% vs 14%). Some of these differences are attributable to lower acuity calls being differentially assigned to ECPs. Another study explored the introduction of an Urgent Response Team of Advanced Care Paramedics and Nurse Practitioners providing on-site care to residents of supportive living and long-term care facilities (mostly frail elderly with complex needs). Over a six-month period, 557 visits took place. The conveyance rate was 23%, with significantly less likelihood of conveyance for patients with lower acuity (CTAS) scores, and a trend towards lower conveyance for those with less aggressive Goal of Care Designations.
- 4.6 In summary, ambulance services submitted information on three interventions relating to care homes. There is insufficient peer reviewed evidence in relation to care homes, but the available evidence suggests that specialist paramedics, either operating alone or in collaboration with other specialist staff, may be able to safely reduce conveyance and hospital admissions for care home residents through provision of more comprehensive on-scene care.



Pillar 3: Mental Health Crisis

Box 3: Interventions targeting Mental Health Crisis

Introduction of Mental Health Professionals to Emergency Operations Centre (EOC) (SECAMB) Mental Health Clinical Supervisors, based in the EOC, providing immediate access to mental health advice. The intervention aims to reduce the need for ambulance attendance by offering advice to patients over the phone, and to reduce conveyance to the ED by offering advice to ambulance crews on scene. Covering the whole of the SECAMB region, the intervention has been operational since June 2019 employing eight WTE mental health professionals. Whilst no evaluation has been undertaken, SECAMB report that the scheme **manages mental health calls in a reduced time**, with a **reduction in the deployment of additional resources**, and achieves **better outcomes for patients**.

Mental Health Street Triage (MHST) (EEAST) A collaborative project between Paramedics, Mental Health Professionals, and Police Officers co-located on a dedicated response vehicle, responding directly to incidents or offering telephone advice. Operational since 2016 in the Bedfordshire, Luton, and Hertfordshire area, the team can access mental health services/patient records. In the past year, the MHST was involved in **207 incidents per month**, 68.4% of which were dealt with by telephone. EEAST estimate that during this time, there were an **average of 55 ED avoidances, 81 ambulance call-outs, 62 police call-outs, and 14 Section 136 diversions avoided each month. Conveyance to the ED was an average of 17.52%**.



Existing academic evidence relating to Mental Health Crisis interventions and avoidable conveyance

- 4.7 Limited evidence was found in relation to mental health interventions to reduce conveyance to the ED (25-27). In one study, an outreach team comprising an Extended Care Paramedic and a Mental Health clinical nurse enabled non-conveyance (21.9%) or direct transport to a mental health facility in 68.9% of patients, with only 31.9% being transported to the ED. Of those not transported, 96% of those who could be followed up in the next few days remained in the community with no ambulance re-contact. Two other studies evaluated diversion of appropriate patients experiencing mental health crisis to psychiatric facilities rather than the ED. In one study, specialist Advanced Practice Paramedics transported 85% of patients eligible for diversion to a range of alternative destinations, with only a low number subsequently transferred to the ED, although 27% of patients transported to one facility had a return visit to an ED or community facility. The other study found introduction of a protocol for all paramedics enabled 25% of psychiatric patients to be transported directly to a psychiatric emergency facility. Whilst there was a 29% rate of non-compliance with the protocol, these were mostly for minor variations and there were no critical or life-threatening problems and low rates of transfer to the ED.
- 4.8 In summary, ambulance services submitted information on two interventions relating to mental health crisis. There is insufficient peer reviewed evidence in relation to mental health crisis, but the available evidence suggests interventions may be able to safely reduce conveyance of patients experiencing mental health crisis to the ED, either by transporting to a more appropriate facility or providing on-scene treatment and care.



5. Conclusions and limitations

- 5.1 Interventions targeting avoidable conveyance are operational across England. This report provides a partial snapshot of interventions in England, in the latter part of 2019. Whilst at various stages of implementation, ambulance services report interventions which appear to have an impact on some, or all, of the following outcomes:
- Reduction in ED conveyance
 - Reduction in hospital admissions
 - No negative impact on 999 re-contacts
 - No evidence of adverse events
 - Reduction in 999 calls for interventions which have a preventative element
- 5.2 The predominant approach to the delivery of interventions relating to the three pillars was a collaboration with other healthcare partners, with specialist knowledge or skills related to the patient group. For example, Occupational therapists or mental health professionals. Other approaches included the use of paramedics with extended skills, referral pathways, and training for care home staff.
- 5.3 There is no expected requirement of NHS Trusts to commission external evaluation of service development and indeed in most cases, there was no evidence of external academic evaluation to determine the effectiveness of the avoidable conveyance interventions. In addition, no evidence was submitted of published peer reviewed evaluation in relation to any of the interventions. There were some instances where, following an initial positive internal evaluation of a pilot, interventions became 'business as usual' and no further evaluation was undertaken beyond regular data collection.
- 5.4 In relation to published research, the evidence base around targeted interventions for falls is quite large and includes some well-conducted studies (including randomised controlled trials). The evidence provides a consistent message that such interventions reduce avoidable conveyance to the ED. The evidence relating to interventions within other pillars, whilst promising, is more limited in extent and quality. The evidence base regarding paramedics with extended skills is strong – they are likely to be effective at reducing ED conveyance safely, and are an acceptable response to patients following a 999 call (7, 8). A number of the interventions highlighted in this report utilise the workforce in this way.



Limitations

- 5.5 The interventions highlighted here do not represent an exhaustive list of the avoidable conveyance work ongoing within ambulance services in England. In Wales, we are aware of other interventions such as patient pathways for condition-related presentations (eg epilepsy and hypoglycaemia), in addition to workforce related interventions such as the rotational paramedic model. Similar interventions are likely to be operational in England. Assessment of the evidence from the Welsh interventions could provide some opportunities for shared learning between the two countries.
- 5.6 The completeness of data submitted as part of the repository was variable. Processes to improve the completeness of data submitted as part of the repository have since been implemented, which seek to address the variation evident during the preparation of this report.
- 5.7 An exhaustive search of existing peer reviewed evidence was not undertaken due to the limited resources and timescales available. Therefore, it is possible that relevant evidence has not been presented here. However, the methods and sources, which were used to identify existing evidence led us to believe that key evidence has not been omitted from this report – particularly in relation to falls.

6. Recommendations

- 6.1. Ambulance Services, Lead Ambulance Commissioners and System Partners should consider the range of interventions for safely reducing avoidable conveyance that reflect local population needs, and are deliverable within their existing workforce resource, and the wider emergency and urgent care system.
- 6.2. Much of the available peer reviewed evidence points to the effectiveness of paramedics with extended skills in managing patients where conveyance could be avoided. Ambulance services should consider how they are utilising this workforce to maximise their potential in safely avoiding conveyance.
- 6.3. There was very little peer reviewed evidence regarding avoidable conveyance for patients in mental health crisis. However, the evidence does suggest that interventions targeting patients in mental health crisis may have the potential to safely reduce conveyance. As more resources become available to support patients in mental health crisis, there is likely to be an expansion of interventions that attempt to avoid ED conveyance for this patient group. In order to develop the academic evidence base, evaluation to measure the effectiveness, and acceptability, of such interventions should be undertaken.



- 6.4. Many of the interventions described have been operational for a period of 2 years or less. Undertaking academic evaluation of locally developed interventions is challenging. The pace of change regarding the development and implementation of interventions themselves is often at odds with processes involved in securing externally funded research grants. Nevertheless, evaluation of these interventions is needed to fully understand the effectiveness, and sustainability of these schemes moving forward.
- 6.5. There was variability in the information submitted to the repository by the ambulance services. On seeking additional data from ambulance services, we found that the data often existed but was had not been reported as part of the submission, or that ambulance services were under-resourced to access this data. To support any future evaluation, of these interventions or of future interventions yet to be initiated, ambulance services should consider how their routinely collected data may be made more easily available for this purpose. The development of the Ambulance Data Set is an important step towards this – collating data consistently across ambulance services. Potentially, this will reduce the variability found here and enable more robust evaluation.
- 6.6. There is inconsistency in the outcome data collected by ambulance services in relation to interventions. NHSE/I may want to recommend that services collect some standardised data in relation to avoidable conveyance interventions to enable ongoing monitoring, and service evaluation.



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