

# Could Fire and Rescue Services identify older people at risk of falls?

Anne H. Laybourne<sup>1</sup>, Finbarr C. Martin<sup>1,2</sup>, David G. Whiting<sup>3</sup> and Karen Lowton<sup>1</sup>

<sup>1</sup>King's College London, Institute of Gerontology, London, UK

<sup>2</sup>Guy's & St. Thomas' NHS Foundation Trust, London, UK

<sup>3</sup>London Fire Brigade, London, UK

Protecting or improving the efficiency and effectiveness of services while reducing costs in response to public sector funding reductions is a significant challenge for all public service organisations. Preventing falls in older people is a major public health objective. We propose here an innovative model of community partnership with Fire and Rescue Services assisting falls prevention services to enhance the safety and well-being of older people in local communities through early identification of those who are at risk of injury from a fall or accidental domestic fire.

**Key words:** falls prevention; Fire and Rescue Services; older adults; partnership working

*Received 19 November 2010; accepted 17 March 2011; first published online 24 May 2011*

## Introduction

The current agenda of austerity puts severe pressure on health-care and social-care budgets. We must seek novel approaches to achieve our public health objectives. One such objective is the prevention of falls and injuries in older people. The approach taken internationally varies from an emphasis on clinical services targeting individuals at risk to a population approach that addresses whole communities encompassing urban design, environmental safety and facilitating healthy life choices (McClure *et al.*, 2008).

In England, the Department of Health has recently developed a four-tier approach, identifying four objectives, each with a distinct target group to be addressed with interventions at the appropriate level (Department of Health, 2009; Martin, 2009). Presenting to primary and urgent care services with injurious falls including less-serious fractures, those in tier three are community-dwelling older individuals identifiable as at high risk of future falls

and injuries. They present a specific challenge: it is a large group, perhaps up to 25% of the older population. As these individuals have not necessarily 'declared themselves' as at risk of falls to their general practitioner, and indeed may not welcome attention (Yardley *et al.*, 2006), or be known to the relevant health-care and social-care providers, new approaches are needed to identify and to respond to their needs. Both a light touch and efficient approach are required. We develop here the concept and a putative model of joint service provision between health and Fire and Rescue Services (FRSs) to assist primary care practitioners and commissioned falls services to address this need. We will demonstrate that in FRSs we find a service with common goals and practices to health services, offering the potential to complement falls prevention services and to reach those in tier three.

## Falling and fires: common ground

### Epidemiology and consequences

One in three adults aged >65 years and half >80 years will fall annually (Rubenstein, 2006). Similarly, accidental domestic fires present a serious threat to the safety of older adults: the majority of

---

Correspondence to: Karen Lowton, Institute of Gerontology, King's College London, Strand, London WC2R 2LS, UK. Email: karen.lowton@kcl.ac.uk

**Table 1** The risk factors for injury from fires and falling in people aged  $\geq 65$  years

Risk factor	Accidental domestic fires	Falling	Risk factor for both fire and falls
Mobility problems	✓ <sup>a</sup>	✓ <sup>e</sup>	✓
Frailty	✓ <sup>a</sup>	✓ <sup>e</sup>	✓
Dementia	✓ <sup>a</sup>	✓ <sup>e</sup>	✓
Culprit medications	✓ <sup>a</sup>	✓ <sup>e</sup>	✓
Visual impairment		✓ <sup>e</sup>	
Single-occupancy living	✓ <sup>b</sup>		
Old housing stock	✓ <sup>c</sup>		
Low income	✓		✓
Lower limb strength		✓ <sup>e</sup>	
Advanced age	✓ <sup>a</sup>	✓ <sup>e</sup>	✓
History of falling		✓ <sup>e</sup>	
Poor balance		✓ <sup>e</sup>	
Alcohol	✓ <sup>d</sup>		
Absence of working smoke alarm	✓ <sup>d</sup>		

<sup>a</sup> London Fire Brigade (2007).

<sup>b</sup> Shai (2006).

<sup>c</sup> Office for National Statistics (2010).

<sup>d</sup> Todd *et al.* (2008).

<sup>e</sup> Rubenstein (2006).

fatalities from accidental domestic fires occur in >60-year age group (London Fire Brigade, 2007). Falling accounts for 40% of deaths from injury in >65s in England. Approximately 7% result in emergency department attendance and 14% of emergency hospital admissions of older people are from falls injuries (Scuffham *et al.*, 2003). A fall-related injury or fracture can result in first-time institutionalisation, hospitalisation, reduced activity and death. Costs are substantial, estimated at £2–3 billion annually to health-care and social-care providers in England (Davis *et al.*, 2010). There are also significant financial costs associated with fire for health-care, social-care and emergency services (London Fire Brigade, 2007).

## Risk

There is striking similarity in the risk factors for falling and injury or death from accidental domestic fires in the older population (Table 1). The risk of fire and associated injuries is determined by a combination of likelihood and consequence; factors such as housing or living arrangements combined with an inability to escape or pre-existing medical conditions influence an individual's risk. Reasons for the disproportionately high number of fire-related injuries and fatalities in older people include physical and cognitive disabilities, and use of certain

culprit medications. Living arrangements such as older housing and being in a single-person household are associated with increased risk (Shai, 2006). Three in five women aged  $\geq 75$  years live alone and are particularly vulnerable (Office for National Statistics, 2010). Furthermore, a social class gradient exists for fire injury in the older population, with people in lower-income brackets at an increased risk; they are less likely than others to live in homes with smoke alarms that has a significant association with accidental domestic fire mortality (Stevenson and Lee, 2003).

Similarly, factors increasing an older person's risk of falling include advanced age, reduced leg strength, balance deficits, history of falling, culprit medication use, visual and cognitive impairment (Rubenstein, 2006). There is also a socio-economic association (Todd *et al.*, 2008). The commonality of risk suggests that the same people may be potential beneficiaries and therefore 'shared' targets for prevention services aimed at reducing harm from fire and falls.

## Commonality of approach: current prevention practice

Strategies are in place in FRs and the NHS to reduce injuries from both fires and falls in older people. For example, as part of their Older People

**Table 2** Commonality of preventative practice of both Fire and Rescue and Falls Prevention Services

	Home fire safety visits	Assessment-based targeted multifactorial interventions
Increase Awareness	Increasing fire safety awareness of predisposing factors and proximate causes of fires	Falls safety awareness of risk factors such as medications, visual impairment and reduced strength/balance
Hazard reduction	Faulty or dangerous appliances	Floor clutter, loose rugs, optimum height of chairs, stools, beds, etc.
Behaviour modification	Behavioural change to avoid creation of material hazards or taking precipitant actions	Behavioural change to reduce personal risk factors (eg, weakness) and to optimise safe mobility function (eg, avoid excessive postural stability challenge during daily activities)
Early warning	Providing free smoke alarm systems to enable earlier response to a fire, including summoning help to limit its spread and mitigate its effects	Provide pendant alarms to improve chances of early rescue to mitigate the effects of 'long lie' and associated distress and physical complications
Minimise consequences	Foresee, plan and maintain a safe escape route, to reduce likelihood of serious injury from a fire	Hip protectors or other injury reduction devices Train in backward chain rising to reduce 'long lie' floor time <sup>a</sup>

<sup>a</sup> Backward chain: this is a technique used to train older people how to safely rise from the ground following a fall. It incorporates training adults to get on the floor and then how to rise safely. A full outline of this technique is described by Reece and Simpson (1996).

Strategy (London Fire Brigade, 2007), London Fire Brigade provides targeted home fire safety visits, based on priority 'places and faces', taking into account the risk profile (eg, specialist accommodation for older adults or individuals who live in accommodation without a functioning smoke alarm).

Similarly, in response to national policy, most local health services and local authority social-care departments in England and Wales now provide a collaborative falls prevention service either in the primary care setting or commissioned by primary care practitioners (Lamb *et al.*, 2007). Approaches vary but have some common components. Suitable individuals are identified, generally through contacts made with primary or community health services, social services or as part of a periodic broader assessment of need in high-risk groups. The identification of falls risk is based on various risk assessment tools or single clinical assessments of mobility and balance. The response is to offer a more in-depth multifactorial assessment that informs further intervention, including medication review, provision of walking aids, physiotherapy or exercise referral. Although the quality is variable, research synthesis suggests that potential effectiveness in reducing falls can be as much as 20% (Gillespie *et al.*, 2009). The parallels between community-based risk prevention

strategies provided by FRSs and health services are shown in Table 2.

### Policy and practice implications

Similarities in risk factors and service approaches have potential implications for practice. In England, this has particular relevance as the recent Local Government and Public Involvement in Health Act 2007 requires that all public sector partners engage and deliver a shared agenda for their communities. This is to be achieved for each locality through a local strategic partnership. Local authorities in England now have a duty to consult partner authorities, including Fire and Rescue authorities, when compiling their strategy for a sustainable community.

Therefore, is there scope for integrated local action on policies of fires and falls injury reduction? Both involve targeting high-risk individuals in the community. Both use interventions that embrace raising awareness, hazard reduction, behavioural modification and minimising harm through early warning. Are there mutual advantages? First, the intended outcome of improved strength, balance and mobility of exercise interventions for falls prevention may directly improve an individual's chances both of not accidentally

starting and also of escaping a fire. This individual capacity approach is not a feature of current community fire safety schemes, although examples of related community health partnerships do exist (Springboard, [www.cheshirefire.gov.uk/partnerships](http://www.cheshirefire.gov.uk/partnerships)). Second, primary care services do not have the resources to effectively case-find as large a group as those older adults in tier three, and therefore collaboration with organisations that do should be beneficial.

### Strengths and benefits of this collaboration

Policy discourse suggests multiple advantages of effective partnership: shared costs, increased participation by a range of people and organisations, cross-fertilisation of ideas and enhanced co-ordination and co-operation between agencies (D'Amour *et al.*, 2005). We propose that the similarities in risk and prevention strategies adopted by FRSs on fires and by health services on falls suggest possible gains in effectiveness and efficiency through inter-professional collaboration.

FRSs have an enviable public image and are trusted and valued. They can be very large; London Fire Brigade has approximately 6000 staff. Well-established communication allows swift and effective mobilisation. Perhaps, FRSs' greatest asset is the transcendence of cultural, socio-economic and ethnic barriers, with a fire station embedded within all communities. Therefore, FRSs' methods of access and identification could assist falls services in case-finding individuals in the community who may be harder to reach through more orthodox routes. These may include individuals who do not report falling due to factors such as poor memory, denial, lack of perceived risk of falling or mistrust of health-care or social-care professionals. Further, falls reduction itself is not a strong motivator for most older people to engage pro-actively with health-care interventions (Yardley *et al.*, 2006; 2007), and the prospect of enhanced mobility in the context of fire risk may be more motivating, resonating with increasing independence. Thus, through partnership, people who may be missed or do not engage via traditional referral routes could benefit from a falls prevention service.

Individuals who have fallen or are at a particular risk of falling and attend health-care settings for falls risk assessment may also be a suitable target group for fire prevention. At present, FRSs

target specialist elderly care housing but have no systematised method to identify older people living in their own homes.

### Caveats to this collaboration

There are caveats to our proposed partnership. First, there is a fundamental divergence in how practitioners promote client behaviour change in each organisation. Falls prevention practitioners actively discourage patients from becoming risk averse by encouraging the maintenance of activity levels to limit the future risk of falling. This is because individuals who fear falling and avoid what they perceive to be risky activity may paradoxically place themselves at a higher long-term risk of falling through disuse and deconditioning (Friedman *et al.*, 2002). Conversely, FRS practitioners actively promote risk aversion to fire, alerting people to the consequences of fire such as loss of property, morbidity or death. Practitioners hope to encourage behaviours and attitudes that prevent accidental fires.

Second, the different organisational structures may challenge this partnership; FRSs are traditionally an emergency response service, only in the last decade or so looking to emphasise a more pro-active preventive role. They are hierarchical in structure and deliver their core business through one profession. Conversely, health services have always taken a holistic approach and advocated preventative health practices. Health services largely involve many different professionals in a non-hierarchical structure.

In addition, although we argue that the same populations are at risk of falls and fires, differences between older people's attitudes towards these may limit this partnership. Older people generally accept a smoke alarm. The indiscriminate nature of the consequences is self-evident. However, alarm pendants for fallers are not universally acceptable and often are not worn. It is probable that fires and falling are not afforded the same status in terms of seriousness and personal applicability. Indeed, the concept of 'other' in contrast with 'self' is well established in falls research: it is others who are frail and might fall.

These differences in promoted behaviours, organisational structure and attitudes of service users may limit the ability to provide a coherent inter-professional prevention framework.

## Can it work? Current research into a co-ordinated fire and falls service

A two-way proof-of-concept study is underway in South East London to investigate the feasibility of our proposed partnership (Lowton *et al.*, 2010). In this, fire fighters in London Fire Brigade and NHS falls practitioners are identifying, assessing and referring to the partner service:

- 1) Older residents receiving a home fire safety visit are invited for a falls risk assessment. If appropriate according to the agreed criteria of our joint agency care pathway (SLIPs = Southwark and Lambeth Integrated Care Pathway for Falls Prevention; [www.slips-online.co.uk](http://www.slips-online.co.uk)), the resident is referred to their local falls clinic.
- 2) The nursing teams at falls clinics provide fire safety information to patients, together with a home fire safety visit self-referral postcard.

Feasibility, uptake by those referred to both partnership services and outcomes of interventions are recorded, with the acceptability of this shared model of working being explored through in-depth interviews with users and key stakeholders.

We believe that this is the first intervention that aims to jointly assess the risk of falling and accidental domestic fire with these two public sector services. We believe that it fits with the requirements to deliver a shared agenda for the communities served by FRSs and health services. Furthermore, the prevention of accidental domestic fires and falling within the older population has been outlined in national policy and thus the intervention reflects priority outcomes on a national level.

## References

D'Amour, D., Ferrada-Videla, M., Rodriguez, M. and Beaulieu, M.-D. 2005: The conceptual basis for interprofessional collaboration: core concepts and theoretical frameworks. *Journal of Interprofessional Care* 19 (Suppl. 1), 116–31.

Davis, J.C., Robertson, M.C., Ashe, M.C., Liu-Ambrose, T., Khan, K.M. and Marra, C.A. 2010: International comparison of cost of falls in older adults living in the community: a systematic review. *Osteoporosis International* 21, 1295–1306; doi:10.1007/s00198-009-1162-0.

Department of Health. 2009: Falls and Fragility Fracture Commissioning Toolkit. Retrieved December 2010 from [http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_103146](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_103146)

Friedman, S.M., Munoz, N., West, S.K., Rubin, G.S. and Fried, L.P. 2002: Falls and fear of falling: which comes first? A

longitudinal prediction model suggests strategies for primary and secondary prevention. *Journal of the American Geriatric Society* 50, 1329–35.

- Gillespie, L.D., Robertson, M.C., Gillespie, W.J., Lamb, S.E., Gates, S., Cumming, R.G. and Rowe, B.H. 2009: Interventions for preventing falls in older people living in the community. *Cochrane Database Systematic Review*, issue 2, Article no. CD007146, DOI: 10.1002/14651858.CD007146.pub2.
- Lamb, S., Gates, S., Fisher, J., Cooke, M., Carter, Y. and McCabe, C. 2007: *Scoping exercise on fallers' clinics: report to the National Co-ordinating Centre for NHS Delivery and Organisation R&D*. London: NCCSDO.
- London Fire Brigade. 2007: *London fire brigade older people strategy*. London: London Fire & Emergency Planning Authority.
- Lowton, K., Laybourne, A.H., Whiting, D.G. and Martin, F.C. 2010: Can Fire and Rescue Services and the National Health Service work together to improve the safety and wellbeing of vulnerable older people? Design of a proof of concept study. *BMC Health Services Research* 10, 327.
- Martin, F.C. 2009: Next steps for falls and fracture reduction. *Age and Ageing* 38, 640–43.
- McClure, R.J., Turner, C., Peel, N., Spinks, A., Eakin, E. and Hughes, K. 2008: Population-based interventions for the prevention of fall related injuries in older people. *Cochrane Database Systematic Review*, Article no. CD004441, DOI: 10.1002/14651858.CD004441.pub2.
- Office for National Statistics. 2010: Older people: living arrangements. Retrieved December 2010 from <http://www.statistics.gov.uk/cci/nugget.asp?id=1264>
- Reece, A.C. and Simpson, J.M. 1996: Preparing older people to cope after a fall. *Physiotherapy* 82, 227–35.
- Rubenstein, L.Z. 2006: Falls in older people: epidemiology, risk factors, and strategies for prevention. *Age and Ageing* 35, ii37–41.
- Scuffham, P., Chaplin, S. and Legood, R. 2003: The incidence and costs of unintentional falls in older people in the UK. *Journal of Epidemiology and Community Health* 57, 740–44.
- Shai, D. 2006: Income, housing and fire injuries: a census tract analysis. *Public Health Report* 121, 149–54.
- Stevenson, M.R. and Lee, A.H. 2003: Smoke alarms and residential fire mortality in the United States: an ecologic study. *Fire Safety Journal* 38, 43–52.
- Todd, C. *et al.* 2008: *Falls and falls prevention amongst older people: socioeconomic and ethnic factors*. Report to the English Department of Health. London: Department of Health.
- Yardley, L., Bishop, F.L., Beyer, N., Hauer, K., Kempen, G.I.J.M., Piot-Ziegler, C., Todd, C.J., Cuttelod, T., Horne, M., Lanta, K. and Holt, A.R. 2006: Older people's views of falls prevention interventions in six European countries. *Gerontologist* 46, 650–60.
- Yardley, L., Donovan-Hall, M., Francis, K. *et al.* 2007: Attitudes and beliefs that predict older people's intention to undertake strength and balance training. *Journals of Gerontology Series B Psychology Science and Social Science* 62B, P119–25.