was reported. Finally, indirect costs and benefits of fire-related injuries were studied.

Conclusions Conducting an incidence-based cost of illness study requires detailed person-level data. Due to multiple sources and raw data being administrative in nature makes the research burdensome. Annually on average direct and indirect costs exceed EUR 40 million (population 5.4 million). Majority of the costs are indirect.

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COOL RUNNINGS: A NOVEL APPROACH TO PREVENTING HOT BEVERAGE SCALDS IN YOUNG CHILDREN

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Background Burn injuries are common in young children, and one of the leading causes is hot beverage scalds. Innovative new technologies such as Smartphone applications (apps) present a novel way for delivering individual-level behaviour change messages. When combined with gamification (using game techniques in a non-game context), app-based interventions can engage and influence people's beliefs, attitudes and behaviours. Gamification has not been applied to injury prevention. The aim of this study was to develop a gamified app-based intervention to prevent hot beverage scalds in young children.

Methods Randomised control trial. Participants recruited online via targeted social media advertisements. Inclusion criteria: mothers aged 18+ with at least one child aged 5–12 months at time of recruitment, who own a Smartphone, and live in Queensland, Australia. Both groups complete a pre-test questionnaire to determine knowledge of hot beverage scald risks and burn first aid knowledge. Participants in the intervention group receive fortnightly messages (infographic or video) about hot drink scald risk factors and burn first aid treatment, and are incentivised with points and rewards/prizes. The control group receive three burn/first aid infographics without incentives. After intervention period participants from both groups complete a post-test questionnaire.

Results The six-month intervention period will finish in July 2016. The anticipated sample size is 480 (240 intervention/240 control). Intervention effectiveness will be assessed using regression models adjusting for baseline values. Preliminary results will be presented.

Conclusions Given the success of gamified app-based interventions for chronic disease management, smoking cessation, and physical activity, it is hoped this novel approach to injury prevention will be equally successful. The low cost, scalability and broad reach make this approach an ideal channel for future injury prevention efforts.

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REACH OUT (I'LL BE THERE). RECEIVE-FOCUSED BEST PRACTICES FOR EFFECTIVE FIRE SAFETY CAMPAIGNS

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Background General public need to have basic knowledge about risks by potentially reducing the likelihood of future incidents. In order to prevent accidents and even loss of life there is fire safety campaigns. The objective is that the messages will give

information so that the people can protect themselves and their nearest and dearest. In an effort to understand better how to make risk messages more accessible and effective the campaigns are regularly evaluated by using performance indicator.

Methods The purpose of this study is to investigate how to design an efficient fire safety campaign. Recent Finnish fire safety campaigns will be analysed by using an empirically tested model of efficient risk communication. By using the IDEA-model as an analytical tool we can find efficient risk messages. Furthermore, we will identify the weaknesses of the messages related to the behavioural intentions they will create.

Results The hypothesis of this research is that instructional risk messages will aim higher degrees of self-efficacy and behavioural intention to take appropriate action. Instructions for self-protection and focusing on receiver-oriented strategies will increase comprehension, garner desired response, and produce appropriate self-protective action.

Conclusions Official risk communicators engaged with publics, and there is ongoing interest on how such communication could be most effective, with initial questions focused on message creation but expanding to query how audiences process and act on messages. Message receiver-oriented approach is needed instead of organisation-oriented when planning the campaigns. Hence, effective fire security campaigns must be evaluated based on accurate receiver interpretations and behavioural intentions.

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FIRE-RELATED MORTALITY IN SWEDEN-TEMPORAL TRENDS 1952–2013

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Background The zero vision, declares that no one in Sweden should die or be seriously injured in fire-related incidents. In order to potentially reach this goal, historical trends are important to study to understand prevailing trends and emerging risk groups.

Methods This study examines temporal trends in deaths due to fire-related accidents in Sweden from 1952 to 2013 based on statistics in the Cause of Death register held by the Swedish National Board of Health and Welfare. Fatalities coded with underlying cause of death associated with fire-related accidents are included and absolute numbers and age-adjusted mortality rates are calculated and statistically analysed for trends using Poisson regression.

Results We observed a significant reduction in both absolute numbers and in the age-adjusted mortality rate with a decline in absolute number of deaths of 34% over the period. However, the elderly population (80+ years) showed a significant increase in absolute numbers. Regarding the age-adjusted mortality rate, a significant reduction of 63% was observed and children aged 0–4 years showed the largest decrease (91%). A reduction was seen both in terms of fatalities due to burns and carbon monoxide poisoning, although the reduction was more pronounced with regards to burns (69% compared to 46%).

Conclusions Although an overall decrease was observed in both absolute numbers and in the

age-adjusted mortality rate, with an ageing population, the absolute numbers of fire-related deaths for the elderly population will most likely increase in the future. Therefore, whilst previously a child-injury issue, fire-related deaths in Sweden is now

predominantly an issue of safety for the elderly. In combination with more deaths now being attributed to carbon monoxide poisoning, new preventative strategies might be required.

415 EVIDENCE-BASED FIRE SAFETY EDUCATION AND TRAINING MATERIAL FOR SOCIAL AND HEALTHCARE SERVICE PROVIDERS

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Background Fire safety in institutional care of vulnerable people in Finland is at a good level. However, in assisted living, residential and home care fatal fires still occur. Risk assessment, as well as knowledge of good procedures is therefore needed. Information of fire safety is included in vocational education of social and health care sector but for formal, non-formal and in-formal education material to improve care practices and identify the fire hazards at clients home is lacking.

Objective The aim of the project was to produce evidence-based educational material about fire safety for social and health care professionals. To produce this material, data gathered by National Institute for Health and Welfare, literature and good practices from social and health care and rescue services were utilised. The project took place 2012–2016 and was sponsored by Fire Protection Fund.

Results Fire safety education material for social and health care professionals, students and planners was first published in 2014. The web-based material includes information about background, legislation, fatal fire cases, principles of risk management and learning from accidents. In addition, there are statistic, special knowledge about fire sensitive fabrics, electrical equipment and chemicals and also good practices to improve fire safety. Additional compact educational package for craft teachers is available. The material can be used also in voluntary work and for example for people taking care of their relatives.

Conclusions Web-based material is freely available at <https://www.thl.fi/fi/tutkimus-ja-asiantuntijatyo/hankkeet-ja-ohjelmat/step-hanke/stepin-koulutusaineisto>. The material is available in Finnish and Swedish. English version is under consideration as there is urgent need of fire safety training also for increasing number of foreigners and immigrants in Finland.

416 THE CAUSE OF BURN ACCIDENTS BY THE USE OF BIO-ETHANOL

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Background Since 2010, commercially available bio-ethanol fuelled burners became increasingly popular in Europe. Unfortunately, the increase in bio-ethanol use resulted in an increase in the number of burn injury victims as a result of accidents with bio-ethanol. In 2010 there were 2 victims of accidents with bio-ethanol requiring admission in a Dutch burn centre, whereas this number rose to 29 victims in 2011. To assess what caused this sudden peak in accidents with bio-ethanol, a qualitative exploring research with a interpretative variant was performed.

Methods First, field research was conducted. Three experts on bio-ethanol (burners) were questioned in order to construct sensitising concepts as a background for framing the interviews. Second, non steering semi-structured interviews were conducted among 14 victims of a bio-ethanol burn accident. Complete transcripts of the recorded interviews were divided by thematic fragments and coded according to the sensitising concepts. All the identical coded fragments were combined.

Results Bio-ethanol was often misused, that is 8 of the 14 participants used the bio-ethanol as an accelerant for lighting up a fire or barbeque instead of using it for bio-ethanol fuelled burners.

All participants had poor knowledge of bio-ethanol use and most participants did not read the conditions of use. Vapour formation in half-full bio-ethanol bottles forms a major risk for an explosion, especially when there is a flame in close proximity when using bio-ethanol. Many of the bio-ethanol bottles were half-full when the accident happened and flames were still in place when using bio-ethanol.

Conclusions Bio-ethanol is cheap and easily obtainable, which creates an image of an innocent product. Instead, bio-ethanol is a product with a high risk of accidents when misused. Our outcomes showed that during accidents with bio-ethanol, there was a lack of knowledge, bio-ethanol was used for the wrong purpose and flames were still in place when using bio-ethanol.

417 INCIDENCE AND EPIDEMIOLOGY OF BURNS TREATED IN THE WELSH CENTRE FOR BURNS

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Background It is important to understand the epidemiology of burns in order to support the development and refinement of preventative measures. We used population based data from the Welsh Centre for Burns and Plastic Surgery (catchment area 2.3 million people) to study trends in the epidemiology of burns.

Methods Anonymised data from the Welsh Burns Centre have been included in the Secure Anonymised Information Linkage (SAIL) databank and linked to a population register. To describe the epidemiology of burns treated at the centre, data were restricted to acute injury assessments/admissions between 01/01/2003 and 31/12/2012 for patients who lived in Wales.

Results During the 10 years, there were 7160 acute injury admissions/assessments. There is an increasing trend in the rates over the decade, increasing from 26.6 per 100,000 population in 2003 to 31.9 in 2012. Rates of burns in the home have increased from 13.2 per 100 K in 2003 to 20.8 in 2012 and more specifically, rates of burns in the kitchen have increased. During 2012, rates of treated burns were highest in males aged 0–4. The 0–4 age group suffer mainly from scalds followed by contact burns; contact burn rates have doubled over the ten years for this group of patients. Over the decade, rates were highest in the most deprived quintiles; however the rates are increasing in the least deprived and a substantial narrowing of the inequality can be seen over time. The distance travelled to Morriston hospital does not appear to be increasing over time and the severity of the burns have not changed over the decade; therefore the increase in the rate of treated burns does not appear to be due to an increasing rate of transfers of more serious burns from other hospitals in Wales.