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Ice cleat distribution programmes and ice cleat use among older adults: repeated cross-sectional evidence from 63 municipal interventions in Sweden

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► Additional supplemental material is published online only. To view, please visit the journal online (http://dx.doi.org/10.1136/ip-2022-044681).

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Received 13 June 2022
Accepted 24 July 2022
Published Online First 3 August 2022

Check for updates

To cite: Holmberg R, Gustavsson J, Svensson M, *et al. Inj Prev* 2022;**28**:539–544.

ABSTRACT

Introduction Ice cleats may help prevent ice-related falls in places with icy roads, but there is limited evidence about the association between ice cleat distribution and ice cleat use. Our study examined the association between Swedish municipal distribution programmes and ice cleat use among older adults (65+ years).
Methods We combined data on municipal ice cleat distribution programmes (n=63) with repeated cross-sectional self-reports of ice cleat use in Sweden from 2007, 2010, 2014 and 2018. Respondents (n=63 234) were classified as exposed if they lived in a municipality with a programme, belonged to an eligible age group and responded after distribution (n=2507). Dose-response was assessed using distributed ice cleat pairs per capita (mean: 0.38). Linear probability models were used to estimate probability differences in ice cleat use between exposed and unexposed respondents, adjusting for age, sex, country of birth, education, survey wave and municipality. Ineligible age groups living in programme municipalities, who should be unaffected by ice cleat distribution, were used for bias assessment.
Results Exposure to ice cleat distribution programmes was associated with 7.5 percentage points (95% CI 4.2 to 10.9) higher self-reported ice cleat use after confounding adjustment. The association was larger in municipalities that distributed one pair of ice cleats per capita (17.3 percentage points (95% CI 11.2 to 23.4)). No association was found among the ineligible age groups (−2.3 (95% CI −5.5 to 1.0)).
Conclusion Distributing ice cleats to older adults may help increase their use of ice cleats in settings with icy road conditions.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Previous research reports that the distribution of a pair of free anti-slip devices (ice cleats) to older adults (65+ years) may decrease ice-related fall injuries. Such distribution programmes are also low cost and likely to require minimal behaviour change to be cost-effective. However, there is currently no direct evidence that distribution influences ice cleat use, which means that the mechanisms through which ice cleat distribution affects ice-related injuries can be questioned.

WHAT THIS STUDY ADDS

⇒ We find an association between ice cleat distribution in Swedish municipalities and increased ice cleat use among older adults targeted by the programmes. The findings also show that greater reach (distributed ice cleats per capita) is associated with greater increases in ice cleat use.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ Our study suggests that targeted ice cleat distribution by local governments may increase ice cleat use among older adults in settings with icy road conditions. While confirmatory trials are required before drawing strong causal conclusions, our study provides evidence for decision making that may help improve pedestrian safety for older adults.

INTRODUCTION

Falls are the most frequent cause of injury among older adults.[1] Environmental factors can affect the risk of falling. One such risk factor is recurrent exposure to ice and snow, which in the northern parts of the world increases the risk of fall-related injuries during winter.[2–4] Ice cleats—anti-slip devices applied to shoes to improve grip on icy or snow-covered surfaces—can reduce the risk of fall injuries during winter conditions.[5–7] Increasing the use of ice cleats in older populations could thus help combat the seasonal rise in ice-related fall injuries.

Many Swedish municipalities have begun distributing ice cleats to older adults to alleviate the increased risks of pedestrian falls associated with icy road conditions.[8] However, these programmes vary in design in ways that are likely to influence their reach[9] and impact on behaviours. For instance, some municipalities mailed coupons to senior citizens that could be exchanged for a free pair of ice cleats at designated stores, some offered a free pair of devices when eating lunch at any municipal-owned restaurant, and in others, municipal officials handed out ice cleats during fall prevention events.[8]

It is well established that ice cleats can reduce ice-related injury risks at the individual level,[5–7 10] but data on the effects of ice cleat distribution is relatively scarce. One study from Gothenburg, Sweden, found a reduction in emergency department visits due to ice-related fall injuries during the first year after ice cleats were distributed by the municipality.[11] From an economic perspective, simulations based on input data from Swedish ice cleat programmes also indicate that a very small increase in ice cleat use (0.15% of the population if one ice cleat pair is purchased for each citizen) could be sufficient for the programmes to pass a cost–benefit test at the societal level, due to low programme costs.[12] While ice cleat distribution programmes seem reasonable from an injury and economic perspective, whether these programmes influence usage rates have yet to be established empirically.[8] It is also unclear whether greater reach (ie, more ice cleat distributed per citizen) leads to greater increases in ice cleat use. Therefore, this study aimed to investigate the association between municipal ice cleat distribution programmes and ice cleat use and assess the dose–response relationship between ice cleat use and the number of ice cleats distributed per capita.

MATERIALS AND METHODS

In this repeated cross-sectional study of the association between ice cleat distribution and ice cleat use, we collected data on municipal ice cleat distribution programmes and combined them with data on self-reported ice cleat use in the Swedish population aged 18–79 years.

Data collection

Programme data

As part of a previous process evaluation study of ice cleat distribution in Sweden,[8] we conducted an electronic survey sent to all Swedish municipalities (n=290) in 2019 to collect data about ice cleat programmes. In total, 228 municipalities participated and were asked if they had ever distributed ice cleats. If they said yes, we asked for further information on programme characteristics. Detailed characteristics of the programmes, including communication strategies, distribution points, programme duration, costs, types of ice cleats distributed and programme theory, have been described previously.[8] For this study, we used municipality-level data on the year of implementation and age of eligibility to classify individuals as exposed or unexposed to ice cleat programmes. The number of distributed ice cleat pairs was also used to quantify programme reach. Specifically, we defined reach as the number of distributed pairs per age-eligible citizen using age-and-municipality-specific data from Statistics Sweden's population register.[13]

National surveys

We also used data from existing repeated cross-sectional surveys conducted by Statistics Sweden in 2007, 2010, 2014 and 2018 on behalf of the Swedish Civil Contingencies Agency. In each wave, stratified random samples of the Swedish population aged 18–79 years were invited to answer questionnaires about perceptions and behaviours related to safety and security (*n* respondents=88 676; average response rate across all waves: 52.2%; see online supplemental table S1 for wave-specific data). Register data on municipality of residence, age, sex, place of birth (native, non-native), educational attainment (postsecondary education (>12 years of schooling), secondary education or less (≤12 years of schooling)), was also linked to the respondents via personal identification numbers.[14] The data were deidentified before being provided to us. Data from the 2018 wave have previously been used to study predictors of ice cleat use in Sweden.[15] Further details about the survey design are provided in online supplemental appendix.

Outcome measure

The outcome variable in this study was self-reported ice cleat use. Each wave of the national surveys contained variations on a question about whether the respondent uses 'anti-slip protection (eg, ice cleats) on their shoes' during icy road conditions. The available response categories were on ordinal scales in 2007 and 2010 (from never to always) and on a binary scale (yes or no) in the 2014 and 2018 waves. To homogenise the data, we classified those who reported using ice cleats sometimes, often, or always as ice cleat users in the earlier waves (never or seldom were classified as non-users). The exact phrasing of each question and our coding is presented in online supplemental table S2.

Exposures

For our primary exposure variable, respondents were classified as exposed if they lived in a municipality with a programme, belonged to an eligible age group and participated in a survey wave after ice cleat distribution. This definition implies an intention-to-treat perspective: All individuals are considered exposed even if they did not participate in the programme, in line with recommendations for estimating real-world effectiveness.[16] If the municipality had stopped distributing ice cleats, we still classified individuals who fit the above criteria as exposed, because the behaviour change may last longer than the programme.

As a secondary exposure, we defined a continuous exposure variable where we assigned each exposed individual a value corresponding to the number of ice cleat pairs distributed per age-eligible citizen in their municipality (unexposed individuals were assigned a value of zero). This exposure was used to establish a dose–response relationship between programme reach and ice cleat use and to estimate programme efficacy[16] under ideal conditions, defined here as one pair of ice cleats distributed per age-eligible citizen.

Below, we refer to results for the primary exposure as the association at average reach and the secondary exposure as the association at perfect reach to highlight the difference in interpretation.

Eligibility and handling of missing data

Respondents living in municipalities that did not respond to our programme survey were excluded due to unknown exposure status (n=25 442). Individuals with missing responses or who responded 'don't know' to the ice cleat questions were treated as non-users (n=3070). Register data on age, sex, place of birth and municipality of residence were complete in all waves. Individuals with missing data on education (n=719) were assigned to the most common category (no postsecondary education).

Analysis

We first conducted descriptive analyses of the sample characteristics and self-reported ice cleat use by programme exposure status. We used χ^2 tests and t-tests to assess group differences in categorical and continuous variables, respectively. Associations between the exposure variables and self-reported ice cleat use were then estimated using linear probability models.[17] The main benefit of this modelling strategy, compared with logistic regression, is that coefficients from linear probability models can directly be interpreted as probability differences. The method also yields unbiased coefficients and consistent SEs in large samples and has been shown to be a more robust choice than logistic regression in models that include many fixed effect terms.[17] In our fully adjusted specification, we included sex, place of birth (native, non-native), educational attainment (postsecondary education, secondary education or less) and survey wave and municipality fixed effects. In addition to observed individual-level confounding, this model captures unobserved wave-specific effects that are common to all respondents (eg, time trends and the variation in the ice cleat questions) and unobserved effects that are common to individuals living in the same municipality (eg, climate and local injury risks).[18]

All SEs were clustered by municipality, in line with recommendations to cluster at the level at which the intervention is provided.[19] The analyses were conducted in Stata (V. 17; StataCorp).

Subgroup analyses

We conducted subgroup analyses by age group, sex, place of birth and educational attainment to assess potential effect measure modification[20] by these factors.

Sensitivity analyses

We conducted a sensitivity analysis including respondents who reported seldom using ice cleats in the definition of an ice cleat user (see online supplemental table S2). We also considered logistic regression as an alternative to the linear probability models to ensure that the results were not driven by our choice of modelling strategy.

Negative control test

We used a negative control group, that is, explored associations among a group that should not be affected by the intervention, to assess the risk of bias.[21] The negative controls were defined as postintervention respondents between 1 and 15 years younger than the age of eligibility in each programme municipality (65+ years was the most common age of eligibility, so the negative controls mainly consisted of individuals aged 50–64 years). We excluded those above the age of eligibility in programme municipalities to ensure that the negative controls were compared with unexposed respondents from other municipalities (or other ineligible ages within the same municipality). Finally, we repeated the primary statistical analyses as if the negative controls were exposed to programmes, expecting to find null associations.

Patient and public involvement

No patients or members of the public were involved in the design of the study.

RESULTS

Participants

Seventy-three out of the 228 municipalities that responded to our survey responded that they had distributed ice cleats to older adults. We could link programme data from 63 of these programmes to the survey respondents (no one from the remaining ten participated in the surveys after implementation). Of these, 1 had implemented a programme by the 2007 wave, 4 had implemented a programme by 2010, 11 had implemented a programme by 2014 and 63 had implemented a programme by 2018. Regarding eligibility to participate in the programmes, 56 programmes had set the minimum age at 65+ years, 6 had set the minimum age at at 70+ years and 1 had set the minimum age at at 75+years.

After excluding the 25 442 respondents from non-responding municipalities, our final analysis sample contained 63 234 survey participants, of whom 2507 (3.9%) were classified as exposed to ice cleat distribution programmes. The average number of ice cleat pairs distributed per age-eligible citizen was 0.38 (min: 0.01, max: 1.09). In addition, 2192 participants were classified as negative controls (mean age: 57 (min: 50, max: 74)). The participating municipalities and included programme municipalities are listed in online supplemental tables S3 and S4.

Descriptive data

We present the characteristics of all respondents and those aged 65 years and older in table 1, the latter also stratified by programme exposure status. While most characteristics differed significantly ($p<0.001$) between exposure groups due to the large sample size, we note that the exposure groups were reasonably similar in most characteristics except for survey year (most programmes were implemented late in the study period). Usage rates generally increase with age, but the increase seems

Table 1 Characteristics of the sample in total, among older adults, and by exposure to ice cleat distribution programme

	All ages	65+ years			
Characteristic	**Entire sample**	**Entire sample**	**Unexposed to programme**	**Exposed to programme**	**P value***
Sample size—n	63 234	17 906	15 399	2507	
Age—mean (SD)	52.0 (16.7)	71.1 (4.2)	71.1 (4.2)	71.5 (4.1)	<0.001
Women—%	53.1	51.5	51.8	50.3	0.17
No postsecondary education—%	64.9	75.9	76.6	71.4	<0.001
Born in Sweden—%	86.3	88.1	87.7	90.3	<0.001
Survey wave—%					<0.001
2007	18.0	14.0	16.2	0.3	
2010	29.3	24.4	27.7	4.1	
2014	28.3	30.8	34.5	8.0	
2018	24.3	30.8	21.6	87.6	
Ice cleat users, main†—%	29.5	53.5	51.9	62.9	<0.001
Ice cleat users, alternative‡—%	34.0	58.4	57.6	63.7	<0.001
Ice cleat pairs distributed per age-eligible citizen—mean (SD)				0.38 (0.22)	

*P value for group differences in characteristics between exposed and unexposed respondents in the 65+ age group. Based on χ^2 tests for categorical variables and t-tests for continuous variables.
†Respondents who reported 'sometimes', 'often' or 'always' using ice cleats during icy road conditions were classified as ice cleat users in the waves that used ordinal response scales (2007 and 2010; never or seldom were classified as non-users). Response options to later waves were binary (yes or no).
‡Those who reported seldom using ice cleats were also classified as ice cleat users in this definition.

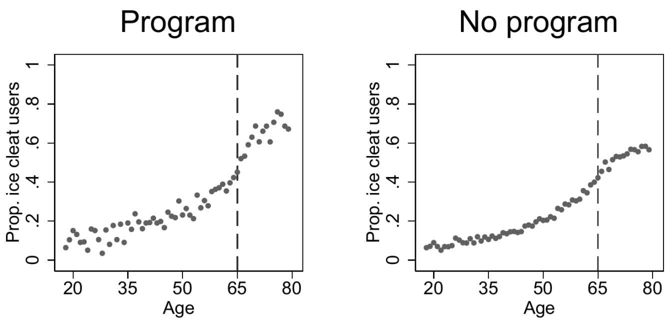

Figure 1 Proportions of self-reported ice cleat users by 1 year age group between 18 and 79 years (n=63 056). Respondents were defined as being from a programme municipality if they lived in a municipality with an ice cleat distribution programme ('programme') and responded in a postintervention period; otherwise they were defined as living in a non-programme municipality ('no programme'). Individuals living in municipalities with minimum eligible age for ice cleat distribution programmes above 65 years of age were excluded from the figures (n=178) to ensure a homogenous age cut-off.

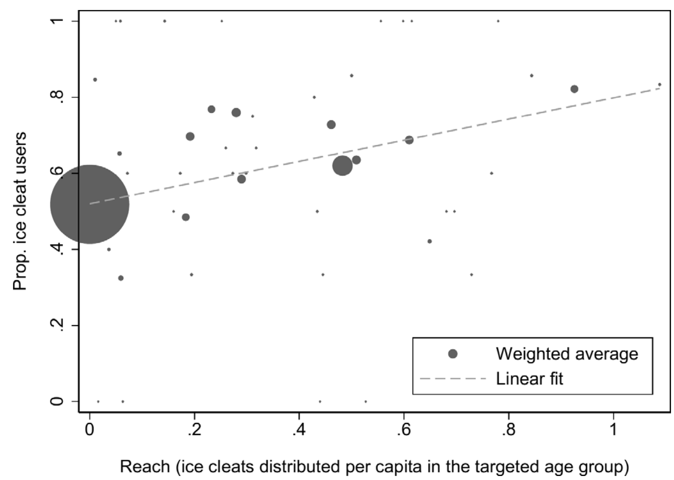

Figure 2 Scatter plot of the average ice cleat usage probability and programme reach for respondents aged 65 years and older. Non-programme municipalities are coded as having zero reach. The size of each circle is proportional to the number of respondents to the national surveys. The average reach in the exposed group was 38%.

to accelerate faster after 65 years in the programme municipalities (figure 1). Overall, older individuals (65+ years) exposed to programmes had a higher ice cleat usage rate (62.9%) than those not exposed to programmes (51.9%) ($p<0.001$; table 1).

Estimates of programme effectiveness at average reach

The age-adjusted ice cleat use was 10.6 (95% CI 5.4 to 15.8) percentage points higher among respondents exposed to the average ice cleat distribution programme than those who were not exposed (table 2, column I). In the fully adjusted model, the probability was 7.5 (95% CI 4.2 to 10.9) percentage higher among exposed respondents than those who were not exposed (table 2, column II).

Dose-response and estimates of efficacy at perfect reach

The age-adjusted dose-response relationship between ice cleat use and programme reach among older adults (65+ years) showed that greater programme reach was associated with higher ice cleat use (figure 2). Specifically, the estimate implied a 26.9 (95% CI 18.4 to 35.3) percentage point increase at perfect reach (ie, one ice cleat pair distributed per age-eligible citizen) (table 2, column I). The fully adjusted estimate suggested a 17.3 percentage point (95% CI 11.2 to 23.4) increase at perfect reach (table 2, column II).

Subgroup analyses

The subgroup-specific associations were too imprecise to establish significant effect measure modifiers, as all 95% CIs overlap (table 3). However, the point estimates suggested the following patterns: (1) the associations grew stronger with older age, (2) the association was stronger for men than women, (3) the association was similar in the two education groups and (4) the association was stronger for non-natives than natives.

Sensitivity analyses

Sensitivity analyses using the alternative definition of ice cleat users and logistic regression showed slightly smaller associations, but the conclusions remain the same (table 2, columns III and IV).

Table 2 Adjusted associations between ice cleat distribution programmes and self-reported ice cleat use, main specifications (columns I–II), sensitivity (columns III–IV) and negative control tests (column V)

	I: Linear probability models, age adjusted	II: Linear probability models, fully adjusted	III: alternative outcome*	IV: Logistic regression models	V: Negative control analysis†
Sample size	63 234	63 234	63 234	63 234	60 727
Primary exposure					
Exposed to programme	0.106 (0.054 to 0.158)	0.075 (0.042 to 0.109)	0.066 (0.034 to 0.099)	0.044 (0.016 to 0.072)	−0.023 (−0.055 to 0.010)
Secondary exposure					
Programme reach‡	0.269 (0.184 to 0.353)	0.173 (0.112 to 0.234)	0.149 (0.090 to 0.208)	0.103 (0.050 to 0.156)	−0.004 (−0.087 to 0.080)

Notes: All models except for column I were fully adjusted for place of birth (native, non-native), educational attainment (postsecondary education, no postsecondary education), sex, age (in 5-year age groups, except 18–24 years), survey and municipality fixed effects. Estimates in cells reflect probability differences in the proportion of ice cleat users between respondents exposed and eligible to a municipal ice cleat distribution programme versus those who were not; 95% CI (clustered by municipality) are presented in parentheses. Coefficients from the logistic regression reflect marginal effects (ie, probability differences) estimated via the margins command in Stata. The primary and secondary exposures were modelled separately.
*Respondents who replied seldom using ice cleats are also considered ice cleat users in this definition.
†Analyses coding respondents between 15 years and 1 year under the age threshold for programmes as the 'treated' age group. Sample size is smaller because those who were actually exposed are excluded from the analysis.
‡Distributed ice cleat pairs per age-eligible citizen, coded as zero for unexposed respondents.

Table 3 Subgroup analyses of the proportion of ice cleat users among unexposed and exposed respondents and the adjusted association between ice cleat distribution programmes and self-reported ice cleat use based on linear probability models

Subgroup	Proportion of ice cleat users among the unexposed (65+ years)	Proportion of ice cleat users among the exposed (65+ years)	Adjusted probability difference (exposed vs unexposed)	Sample size
Age group				
65–69 years	0.471	0.546	0.034 (–0.024 to 0.093)	7255
70–74 years	0.541	0.650	0.053 (–0.006 to 0.112)	6197
75–79 years	0.570	0.716	0.091 (0.025 to 0.157)	4454
Sex				
Men	0.402	0.526	0.101 (0.057 to 0.145)	29 634
Women	0.628	0.732	0.053 (0.018 to 0.089)	33 600
Educational attainment				
Postsecondary education	0.553	0.644	0.065 (0.007 to 0.124)	22 190
Secondary education or lower	0.509	0.624	0.076 (0.042 to 0.109)	41 044
Place of birth				
Sweden	0.534	0.633	0.069 (0.034 to 0.104)	54 582
Other	0.417	0.597	0.109 (0.035 to 0.184)	8652

Notes: Analyses were adjusted for place of birth (native, non-native), educational attainment (postsecondary education, no postsecondary education), sex, age (in 5-year age groups, except 18–24 years), survey and municipality fixed effects. Cluster-robust 95% CI (clustered by municipality) are presented in parentheses. The subgroups were modeled separately.

Negative control test

The negative control analyses showed no associations between ice cleat distribution and ice cleat use among younger, ineligible individuals living in programme municipalities (table 2, column V).

DISCUSSION

This is the first study to assess the association between ice cleat distribution programmes and ice cleat use. Our results are consistent with the hypothesis that ice cleat distribution increases use: We found an association between programme exposure and usage rates, which was stronger in municipalities that distributed more ice cleats per age-eligible citizen, implying a dose–response relationship. We also found suggestive evidence association may be stronger in groups with lower baseline use (especially men and non-native Swedes; table 3), indicating that municipal ice cleat distribution may serve as a tool to decrease inequality in personal safety. However, the subgroup estimates were too imprecise to draw strong conclusions about effect measure modification.

As noted in the introduction, it is relatively well established that using ice cleats can reduce the risk of ice-related injuries at the individual level.[5–7 10] Only a few studies have investigated ice cleat distribution programmes.[8 11 12] Of these, a process evaluation study found that Swedish ice cleat programmes reached about 40% of their target population regarding the number of distributed ice cleats, with limited evidence of severe implementation issues.[8] An impact evaluation also found that pedestrian fall injuries related to snow and ice decreased among older adults in Gothenburg following the introduction of their ice cleat programme.[11] However, none have previously been able to establish an association with increased ice cleat use.

Together with this study, our interpretation is that the current research supports the idea that ice cleat distribution may be an effective injury prevention programme in places affected by icy road conditions, especially when considering the cost-effectiveness of these devices. A model-based economic evaluation that combined effect estimates from a randomised trial[7] and cost data from Swedish municipalities also showed that a 0.15 percentage point increase in ice cleat use would be sufficient for the programmes to be cost–beneficial from a Swedish societal perspective if one pair of ice cleats is purchased per age-eligible citizen[12]; an estimate that is far below the association we observed (7.5 percentage points at average reach; 17.3 at perfect reach).

Strengths and limitations

A weakness of our study is that we could only make ecological connections between individuals and ice cleat distribution programmes.[22] Consequently, we cannot confirm that the observed associations are driven by individuals who took part in the ice cleat distribution.

Additionally, our observational approach is prone to confounding bias. To assess the risk of bias, we used younger, ineligible individuals within the same municipality as negative controls.[21] We found no association between programme exposure and ice cleat use among the negative controls, implying that the results are not driven by age-independent confounders that set programme municipalities apart from the other municipalities in the data. However, this test cannot identify if age-eligible individuals in programme municipalities systematically differ from unexposed individuals of the same age in control municipalities.

Our exposures may also be susceptible to misclassification[23] if the municipalities that answered our survey reported erroneous programme data. We believe that our secondary exposure (distributed ice cleats per capita) is more susceptible to this issue than the primary (yes or no) exposure, as documentation of the number of distributed ice cleats may be inadequate. Further, our outcome variable is self-reported and may be prone to bias if exposed individuals feel the need to falsely report using ice cleats because of the programmes.[24] However, we note that there is no direct connection between the questions asked in the national surveys and the distribution programmes, so this concern should be limited.

We used repeated cross-sectional data from national samples, enhancing generalisability to the Swedish population. However, selective participation is always a concern despite using a random sampling design.[25] Moreover, the surveys only sampled individuals below 80 years, so we could not assess associations for individuals over that age. It is also unclear if our results are transferable to other settings. At the very least, we hope that they can provide suggestive data for decisions about interventions in other countries with icy winter conditions with similar populations and local government structures as Sweden.

CONCLUSIONS

Distributing ice cleats to older adults in settings affected by icy road conditions may help increase ice cleat use. Confirmatory research with randomised distribution would help further establish a causal relationship between ice cleat distribution and changes in ice cleat use, and empirical research on reductions in ice-related fall injury rates is required to confirm the cost-effectiveness of the existing ice cleat programmes in Sweden.

Acknowledgements We would like to thank the Swedish municipalities for providing valuable data on their ice cleat programmes and the Swedish Civil Contingencies Agency for allowing us to use their survey data for the purposes of this study.

Contributors RH, CB and JG conceptualised the study and carried out the data collection. RH performed data management and statistical analyses with assistance from CB. RH drafted the manuscript with critical revisions from CB, JG and MS. CB is the guarantor, and accepts full responsibility for the conduct of the study, had access to the data, and controlled the decision to publish. All authors contributed to the interpretation of the results.

Funding This work was supported by research grants from the Kamprad Family Foundation (Familjen Kamprads Stiftelse; grant number 20180067) and the Swedish Transport Administration (Skyltfonden; TRV 2021/111693).

Disclaimer The funding sources had no role in the design of the study, the analysis and interpretation of the data or the writing of, nor the decision to publish, the manuscript.

Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval This study was approved by the Regional Ethics Board in Uppsala (diary number 2018/480; with addendum (diary number 2021-10338) approved by the Swedish Ethical Review Authority).

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available on reasonable request. Data may be obtained from a third party and are not publicly available. This study used data from two sources. Our programme survey data are non-sensitive and will be shared with anyone upon reasonable request. The national survey data are protected by a confidentiality agreement with the Swedish Civil Contingencies Agency and therefore cannot be shared publicly. Researchers interested in obtaining these data can contact the Swedish Civil Contingencies Agency.

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Online Supplementary Appendix

This Appendix contains supplementary information about data collection methods and supplementary tables.

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Data collection, additional details

Electronic municipal survey to collect data on ice cleat distribution programs

We designed an electronic survey sent to all municipalities in Sweden (*n* = 290) on June 10th, 2019 (with up to four reminders sent on July 1st, 2019; August 16th, 2019; September 10th, 2019; and October 16th, 2019). The survey collected information about the ice cleat programs, e.g. if the municipalities ever had or have an ongoing ice cleat distribution program, the time span of the programs (when they were introduced and/or ended), the amount of distributed ice cleats, the costs of the programs, the targeted age group, etc. The municipal respondents were also given the opportunity to reply with supplementary information via e-mail. In total, 228 municipalities participated in the survey. During the data retrieval process, the region of Jönköping informed us that they acted as the main distributor of ice cleats in their region (the Swedish municipalities are divided into 21 regions). This affected a total of 13 municipalities. Nine of them had already responded to the survey, which made us add additional four municipalities as exposed to a program. Our study focuses on municipalities that have introduced distribution programs targeting older adults. Therefore, five municipalities were excluded as they distributed ice cleats to all ages, making them ineligible for analysis. In summary, a total of 227 municipalities were included in the program data that we matched to respondents from Statistics Sweden’s surveys (see next section). Respondents from 223 of these municipalities were available in the survey data. The number of survey respondents per municipality is presented in Table S3. A corresponding list, containing only the 63 matched municipalities with programs, is available in Table S4.

Statistics Sweden surveys to collect data on ice cleat use

In recent decades, the Swedish Civil Contingencies Agency has repeatedly commissioned Statistics Sweden to investigate how the Swedish population perceives how safe their everyday lives are. To do this, Statistics Sweden designed nationwide surveys using a stratified random sampling design, targeting adults living in Sweden aged 18-79 (about 7 million people). The surveys were designed to investigate individuals’ self-reported perceptions of everyday threats and risks and their perceptions of safety and security. Also, Swedish municipalities were allowed to purchase a municipality-specific survey in addition to the national data collected by Statistics Sweden (600 survey samples per municipality, per year). Four nationwide survey waves were conducted in 2007, 2010, 2014, and 2018, with new random samples in each wave (i.e., the data does not contain repeated observations on the same individuals). Random samples stratified by age group, sex, place of birth (in the

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2007, 2010 waves) and age group and sex (in the 2014, 2018 waves) were drawn from a national sampling frame. Respondents within a stratum had the same probability of being included in the sample. Measures were applied to not double-count survey participation (the same participants who responded to the national survey could not participate in the municipal survey). Statistics Sweden also linked data on educational attainment (from the Swedish Education Register) to the respondents using personal identification numbers. In summary, 169,721 respondents were asked to participate in the surveys (see Table S1 for details), and a total of 88,676 respondents participated (i.e., a 52.2% response rate).

Measurement of ice cleat use per survey wave

In every survey conducted by Statistics Sweden, there were variations on questions relating to the use of personal safety equipment, and each survey included subquestions related to ice cleats (see Table S2 for details). However, there were differences in outcome responses in the four waves that needed to be handled to make them more homogeneous for analysis (the last two waves only included a yes or no question). In the first two waves (2007, 2010), the respondents were asked: “How often do you do the following for your own safety?”, with subquestions “Use anti-slip protection when the roads are icy (e.g., ice cleats)” (in 2007) and “Use anti-slip protection on your shoes (e.g., ice cleats) when it is slippery or icy” (in 2010).

In the first survey (year 2007), the respondents were given six response options, using an ordinal scale with alternatives ranging from; (1) *never*, (2) *seldom*, (3) *sometimes*, (4) *often*, (5) *always*, and (6) *don’t know* (total participants n = 11,186*)*. For our primary analysis, we dichotomized the self-reported outcomes defining alternatives 3-5 as ice cleat users (n = 2,595), while using 1, 2 and 6, the *never* (n = 7,112), *seldom* (n = 971) and *don’t know*-users

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(*n* = 508) as non-ice cleat users. To assess the implications of this interpretation, we also conducted a sensitivity analysis by recoding the *seldom*-users as ice cleat users.

The second survey (year 2010) reduced the number of self-rated alternatives to using ice cleats from six to five; (1) *never or very rarely*, (2) *sometimes*, (3) *often*, (4) *always or almost always*, (5) *don't know* (total participants *n* = 18,546). Once again, we recoded and dichotomized the reported outcomes defining options 3 and 4 as ice cleat users (*n* = 3,082), using the remaining alternatives *never or very rarely*-users (*n* = 12,112), and *don't know*-users (*n* = 1,173) as non-users. We also coded the *sometimes*-users (*n* = 1,872) as ice cleat users in a sensitivity analysis.

The other two survey samples, the years 2014 (*n* = 17,916) & 2018 (*n* = 15,362), Statistics Sweden asked this question differently; "*Do you use any of the following safety equipment?*" with five sub-questions and we addressed the ice cleat-question specifically; "*Do you use anti-slip protection on your shoes (e.g., ice cleats) when it is slippery or icy outside?*". The answer options were binary coded: (1) yes, (2) no, and (3) don't know. The respondents who stated that they use ice cleats (1) are used for the primary analyses (year 2014 *n* = 6,425 & year 2018 *n* = 6,536), and non-users (2) and don't know users (3) were coded as non-users (year 2014 *n* = 11,491 & year 2018 *n* = 8,826).

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Supplementary tables

Table S1. Sample size and response rate of surveys conducted by Statistics Sweden on behalf of the Swedish Civil Contingencies Agency.

		Survey year			
		2007	**2010**	**2014**	**2018**
Sample size					
	National sample	12 000	10 000	10 000	10 000
	Municipality samples	21 600	37 800	34 800	33 521
	Total	33 600	47 800	44 800	43 521
Response rate (%)					
		20 881 (62.1%)	26 161 (54.7%)	23 168 (51.7%)	18 466 (42.4%)
	Municipality[a]	55-70%	44-62%	44.5-62.2%	38-46%

a Shows the interval for the response rate for the municipality-specific survey. The number of municipalities that purchased survey participation varies each survey year.

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Table S2. Questions and response categories relating to ice cleat use in each wave (in Swedish and with our translation to English), and coding rules for the main outcome measure and sensitivity outcome measure.

	Original question (in Swedish)		English translation		Coding	
Wave	Question	Response categories	Question	Response categories	Main analysis	Sensitivity analysis
2007	”Hur ofta gör du nedanstående saker för din egen säkerhets skull?” *(Main question)* + ” Använder halkskydd vid halt väglag (t.ex. broddar)”	Aldrig (1); Sällan (2); Ibland (3); Ofta (4); Alltid (5); Ej aktuellt (6).	”How often do you do the following for your own safety?” (Main question) + “Use anti-slip protection when the roads are icy (e.g., ice cleats)”	Never (1); Seldom (2); Sometimes (3); Often (4); Always (5); Not relevant (6).	ICE CLEAT USER = YES IF 4 OR 5, ELSE NO (MISSING AS NO).	ICE CLEAT USER = YES IF 3 OR 4 OR 5, ELSE NO (MISSING AS NO).
2010	”Hur ofta gör du följande för din egen säkerhets skull?” *(Main question)* + ”Använder halkskydd på skorna (t.ex. broddar) när det är halt eller isigt” *(Subquestion)*	Aldrig eller mycket sällan (1); Ibland (2); Ofta (3); Alltid eller nästan alltid (4); Vet inte/ej aktuellt (5).	”How often do you do the following for your own safety?” (Main question) + “Use anti-slip protection on your shoes (e.g., ice cleats) when it is slippery or icy” (Subquestion)	Never or very rarely (1); Sometimes (2); Often (3), Always or almost always (4); Don’t know/not relevant (5)	ICE CLEAT USER = YES IF 3 OR 4, ELSE NO (MISSING AS NO).	ICE CLEAT USER = YES IF 2 OR 3 OR 4, ELSE NO (MISSING AS NO).
2014	”Använder du någon av följande säkerhetsutrustning?” *(Main question)* + ”Använder du halkskydd på skorna (t.ex. broddar) när det är halt eller isigt ute?” *(Subquestion)*	Ja (1); Nej (2); Vet ej (3).	”Do you use any of the following safety equipment?” (Main question) + “Do you use anti-slip protection on your shoes (e.g., ice cleats) when it is slippery or icy outside?”	Yes (1); No (2); Don’t know (3).	ICE CLEAT USER = YES IF 1, ELSE NO (MISSING AS NO).	SAME AS MAIN.
2018	”Använder du någon av följande säkerhetsutrustning?” *(Main question)* + ”Använder du halkskydd på skorna (t.ex. broddar) när det är halt eller isigt ute?” *(Subquestion)*	Ja (1); Nej (2); Vet ej (3).	”Do you use any of the following safety equipment?” (Main question) + “Do you use anti-slip protection on your shoes (e.g., ice cleats) when it is slippery or icy outside?”	Yes (1); No (2); Don’t know (3).	ICE CLEAT USER = YES IF 1, ELSE NO (MISSING AS NO).	SAME AS MAIN.

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Table S3. Municipalities that participated in the electronic survey that could be matched to the national surveys on ice cleat use (n=223), and the number of survey participants per municipality, age 18-79 (n=63,234)

Municipality	***Survey responses***	***Municipality***	***Survey responses***	***Municipality***	***Survey responses***
Alvesta	386	Karlstad	867	Stenungsund	394
Aneby	19	Kil	344	Storfors	8
Arjeplog	4	Klippan	34	Storuman	17
Arvidsjaur	14	Kristinehamn	343	Strängnäs	79
Arvika	711	Krokom	32	Strömstad	43
Askersund	319	Kumla	15	Strömsund	23
Avesta	25	Kungsör	21	Sundbyberg	79
Bengtsfors	324	Kungälv	762	Sunne	31
Berg	16	Kävlinge	404	Surahammar	29
Bjurholm	308	Köping	56	Svedala	38
Bjuv	39	Laholm	393	Svenljunga	18
Bollebygd	21	Laxå	651	Säffle	605
Bollnäs	47	Lekeberg	8	Säter	12
Borgholm	370	Leksand	391	Sävsjö	26
Borlänge	56	Lessebo	173	Södertälje	67
Borås	643	Lidingö	385	Tanum	32
Botkyrka	483	Lidköping	54	Tidaholm	9
Bräcke	20	Lilla Edet	338	Tierp	342
Burlöv	47	Linköping	1,218	Timrå	91
Båstad	38	Ljungby	66	Tjörn	375
Dals-Ed	7	Ljusdal	21	Tomelilla	39
Danderyd	378	Ljusnarsberg	5	Torsby	26
Dorotea	1	Lomma	422	Torsås	383
Eda	574	Ludvika	28	Tranås	697
Ekerö	352	Luleå	1,181	Trelleborg	395

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Eksjö	406	Lund	251	Trollhättan	461
Emmaboda	19	Lycksele	337	Trosa	16
Enköping	44	Lysekil	209	Tyresö	69
Eskilstuna	550	Malmö	1,388	Töreboda	15
Eslöv	63	Malå	8	Uddevalla	811
Fagersta	564	Mariestad	35	Ulricehamn	56
Falkenberg	1,069	Mark	450	Umeå	1,308
Falköping	384	Mellerud	22	Upplands-Bro	38
Filipstad	21	Mjölby	36	Uppsala	466
Finspång	719	Mora	386	Vadstena	10
Flen	434	Mullsjö	740	Vaggeryd	659
Forshaga	332	Munkfors	278	Valdemarsvik	13
Färgelanda	14	Mölndal	803	Vansbro	6
Gislaved	27	Mönsterås	29	Vara	22
Gnosjö	12	Mörbylånga	38	Varberg	1,572
Gotland	486	Nordanstig	75	Vaxholm	24
Grums	312	Nordmaling	14	Vetlanda	946
Grästorp	9	Norrköping	1,122	Vimmerby	29
Gullspång	8	Norsjö	4	Vingåker	455
Gällivare	314	Nybro	420	Vänersborg	92
Gävle	340	Nykvarn	9	Vännäs	394
Göteborg	4,374	Nässjö	913	Värmdö	18
Habo	1,515	Ockelbo	17	Värnamo	664
Hagfors	23	Olofström	40	Västervik	489
Hallsberg	11	Orsa	5	Västerås	330
Halmstad	1,25	Orust	19	Växjö	575
Hammarö	375	Osby	31	Vårgårda	13
Haninge	123	Oskarshamn	55	Ydre	774

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Haparanda	29	Ovanåker	13	Ystad	64
Hedemora	16	Oxelösund	25	Älmhult	413
Helsingborg	686	Pajala	3	Älvkarleby	38
Herrljunga	17	Piteå	774	Älvsbyn	18
Hjo	18	Ronneby	165	Ängelholm	78
Hofors	35	Sala	1,087	Åmål	356
Hultsfred	33	Salem	28	Ånge	22
Hylte	18	Sandviken	115	Åre	27
Hällefors	6	Sigtuna	601	Årjäng	18
Härjedalen	33	Simrishamn	51	Åstorp	31
Härryda	455	Sjöbo	46	Åtvidaberg	11
Hässleholm	100	Skara	23	Öckerö	719
Håbo	17	Skellefteå	1,045	Örebro	640
Högsby	12	Skinnskatteberg	10	Örkelljunga	22
Hörby	27	Skurup	43	Örnsköldsvik	1,559
Jokkmokk	17	Skövde	95	Östersund	560
Järfälla	100	Smedjebacken	15	Österåker	77
Jönköping	1,739	Sollefteå	41	Östhammar	2
Kalmar	548	Sollentuna	428	Östra Göinge	30
Karlsborg	4	Solna	164	Övertorneå	15
Karlskoga	21	Sorsele	4		
Karlskrona	673	Sotenäs	25		

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Table S4. The municipalities that implemented ice cleat distribution programs for older adults (n=63) and the number of survey participants per municipality, ages 65-79 and exposed to ice cleat distribution (n=2.507).

Municipality	***Survey responses***	***Municipality***	***Survey responses***	***Municipality***	***Survey responses***
Aneby	2	Jönköping	133	Sundbyberg	5
Askersund	2	Kalmar	10	Svenljunga	1
Bengtsfors	1	Karlskrona	130	Säffle	132
Borgholm	4	Krokom	1	Säter	4
Borås	7	Kungsör	2	Sävsjö	6
Dorotea	1	Laholm	6	Tranås	118
Eksjö	3	Laxå	154	Trollhättan	16
Emmaboda	1	Lidingö	5	Töreboda	3
Fagersta	101	Lidköping	13	Uddevalla	95
Gislaved	2	Ljusdal	4	Uppsala	130
Gnosjö	1	Lund	37	Vaggeryd	122
Grästorp	1	Mark	137	Valdemarsvik	3
Gällivare	3	Mellerud	1	Vetlanda	153
Göteborg	128	Mullsjö	1	Värnamo	131
Habo	130	Mönsterås	3	Västervik	6
Halmstad	19	Norrköping	136	Älmhult	1
Haninge	23	Nässjö	106	Åmål	136
Haparanda	4	Oskarshamn	5	Öckerö	2
Härryda	97	Skövde	5	Örkelljunga	1
Hörby	3	Smedjebacken	1	Österåker	7
Järfälla	5	Strängnäs	5	Övertorneå	2

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Online Supplementary Appendix

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Data collection, additional details

Electronic municipal survey to collect data on ice cleat distribution programs

We designed an electronic survey sent to all municipalities in Sweden (*n* = 290) on June 10th, 2019 (with up to four reminders sent on July 1st, 2019; August 16th, 2019; September 10th, 2019; and October 16th, 2019). The survey collected information about the ice cleat programs, e.g. if the municipalities ever had or have an ongoing ice cleat distribution program, the time span of the programs (when they were introduced and/or ended), the amount of distributed ice cleats, the costs of the programs, the targeted age group, etc. The municipal respondents were also given the opportunity to reply with supplementary information via e-mail. In total, 228

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In recent decades, the Swedish Civil Contingencies Agency has repeatedly commissioned Statistics Sweden to investigate how the Swedish population perceives how safe their everyday lives are. To do this, Statistics Sweden designed nationwide surveys using a stratified random sampling design, targeting adults living in Sweden aged 18-79 (about 7 million people). The surveys were designed to investigate individuals' self-reported perceptions of everyday threats and risks and their perceptions of safety and security. Also, Swedish municipalities were allowed to purchase a municipality-specific survey in addition to the national data collected by Statistics Sweden (600 survey samples per municipality, per year). Four nationwide survey waves were conducted in 2007, 2010, 2014, and 2018, with new random samples in each wave (i.e., the data does not contain repeated observations on the same individuals). Random samples stratified by age group, sex, place of birth (in the

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In every survey conducted by Statistics Sweden, there were variations on questions relating to the use of personal safety equipment, and each survey included subquestions related to ice cleats (see Table S2 for details). However, there were differences in outcome responses in the four waves that needed to be handled to make them more homogeneous for analysis (the last two waves only included a yes or no question). In the first two waves (2007, 2010), the respondents were asked: “How often do you do the following for your own safety?”, with subquestions “Use anti-slip protection when the roads are icy (e.g., ice cleats)” (in 2007) and “Use anti-slip protection on your shoes (e.g., ice cleats) when it is slippery or icy” (in 2010).

In the first survey (year 2007), the respondents were given six response options, using an ordinal scale with alternatives ranging from; (1) *never*, (2) *seldom*, (3) *sometimes*, (4) *often*, (5) *always*, and (6) *don’t know* (total participants *n* = 11,186*)*. For our primary analysis, we dichotomized the self-reported outcomes defining alternatives 3-5 as ice cleat users (*n* = 2,595), while using 1, 2 and 6, the *never* (*n* = 7,112), *seldom* (*n* = 971) and *don’t know*-users

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	Municipality samples	21 600	37 800	34 800	33 521
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Response rate (%)					
		20 881 (62.1%)	26 161 (54.7%)	23 168 (51.7%)	18 466 (42.4%)
	Municipality[a]	55-70%	44-62%	44.5-62.2%	38-46%

a Shows the interval for the response rate for the municipality-specific survey. The number of municipalities that purchased survey participation varies each survey year.

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Table S2. Questions and response categories relating to ice cleat use in each wave (in Swedish and with our translation to English), and coding rules for the main outcome measure and sensitivity outcome measure.

	Original question (in Swedish)		English translation		Coding	
Wave	Question	Response categories	Question	Response categories	Main analysis	Sensitivity analysis
2007	”Hur ofta gör du nedanstående saker för din egen säkerhets skull?” *(Main question)* + ” Använder halkskydd vid halt väglag (t.ex. broddar)”	Aldrig (1); Sällan (2); Ibland (3); Ofta (4); Alltid (5); Ej aktuellt (6).	”How often do you do the following for your own safety?” (Main question) + “Use anti-slip protection when the roads are icy (e.g., ice cleats)”	Never (1); Seldom (2); Sometimes (3); Often (4); Always (5); Not relevant (6).	ICE CLEAT USER = YES IF 4 OR 5, ELSE NO (MISSING AS NO).	ICE CLEAT USER = YES IF 3 OR 4 OR 5, ELSE NO (MISSING AS NO).
2010	”Hur ofta gör du följande för din egen säkerhets skull?” *(Main question)* + ”Använder halkskydd på skorna (t.ex. broddar) när det är halt eller isigt” *(Subquestion)*	Aldrig eller mycket sällan (1); Ibland (2); Ofta (3); Alltid eller nästan alltid (4); Vet inte/ej aktuellt (5).	”How often do you do the following for your own safety?” (Main question) + “Use anti-slip protection on your shoes (e.g., ice cleats) when it is slippery or icy” (Subquestion)	Never or very rarely (1); Sometimes (2); Often (3), Always or almost always (4); Don’t know/not relevant (5)	ICE CLEAT USER = YES IF 3 OR 4, ELSE NO (MISSING AS NO).	ICE CLEAT USER = YES IF 2 OR 3 OR 4, ELSE NO (MISSING AS NO).
2014	”Använder du någon av följande säkerhetsutrustning?” *(Main question)* + ”Använder du halkskydd på skorna (t.ex. broddar) när det är halt eller isigt ute?” *(Subquestion)*	Ja (1); Nej (2); Vet ej (3).	”Do you use any of the following safety equipment?” (Main question) + “Do you use anti-slip protection on your shoes (e.g., ice cleats) when it is slippery or icy outside?”	Yes (1); No (2); Don’t know (3).	ICE CLEAT USER = YES IF 1, ELSE NO (MISSING AS NO).	SAME AS MAIN.
2018	”Använder du någon av följande säkerhetsutrustning?” *(Main question)* + ”Använder du halkskydd på skorna (t.ex. broddar) när det är halt eller isigt ute?” *(Subquestion)*	Ja (1); Nej (2); Vet ej (3).	”Do you use any of the following safety equipment?” (Main question) + “Do you use anti-slip protection on your shoes (e.g., ice cleats) when it is slippery or icy outside?”	Yes (1); No (2); Don’t know (3).	ICE CLEAT USER = YES IF 1, ELSE NO (MISSING AS NO).	SAME AS MAIN.

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Table S3. Municipalities that participated in the electronic survey that could be matched to the national surveys on ice cleat use (n=223), and the number of survey participants per municipality, age 18-79 (n=63,234)

Municipality	***Survey responses***	***Municipality***	***Survey responses***	***Municipality***	***Survey responses***
Alvesta	386	Karlstad	867	Stenungsund	394
Aneby	19	Kil	344	Storfors	8
Arjeplog	4	Klippan	34	Storuman	17
Arvidsjaur	14	Kristinehamn	343	Strängnäs	79
Arvika	711	Krokom	32	Strömstad	43
Askersund	319	Kumla	15	Strömsund	23
Avesta	25	Kungsör	21	Sundbyberg	79
Bengtsfors	324	Kungälv	762	Sunne	31
Berg	16	Kävlinge	404	Surahammar	29
Bjurholm	308	Köping	56	Svedala	38
Bjuv	39	Laholm	393	Svenljunga	18
Bollebygd	21	Laxå	651	Säffle	605
Bollnäs	47	Lekeberg	8	Säter	12
Borgholm	370	Leksand	391	Sävsjö	26
Borlänge	56	Lessebo	173	Södertälje	67
Borås	643	Lidingö	385	Tanum	32
Botkyrka	483	Lidköping	54	Tidaholm	9
Bräcke	20	Lilla Edet	338	Tierp	342
Burlöv	47	Linköping	1,218	Timrå	91
Båstad	38	Ljungby	66	Tjörn	375
Dals-Ed	7	Ljusdal	21	Tomelilla	39
Danderyd	378	Ljusnarsberg	5	Torsby	26
Dorotea	1	Lomma	422	Torsås	383
Eda	574	Ludvika	28	Tranås	697
Ekerö	352	Luleå	1,181	Trelleborg	395

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Eksjö	406	Lund	251	Trollhättan	461
Emmaboda	19	Lycksele	337	Trosa	16
Enköping	44	Lysekil	209	Tyresö	69
Eskilstuna	550	Malmö	1,388	Töreboda	15
Eslöv	63	Malå	8	Uddevalla	811
Fagersta	564	Mariestad	35	Ulricehamn	56
Falkenberg	1,069	Mark	450	Umeå	1,308
Falköping	384	Mellerud	22	Upplands-Bro	38
Filipstad	21	Mjölby	36	Uppsala	466
Finspång	719	Mora	386	Vadstena	10
Flen	434	Mullsjö	740	Vaggeryd	659
Forshaga	332	Munkfors	278	Valdemarsvik	13
Färgelanda	14	Mölndal	803	Vansbro	6
Gislaved	27	Mönsterås	29	Vara	22
Gnosjö	12	Mörbylånga	38	Varberg	1,572
Gotland	486	Nordanstig	75	Vaxholm	24
Grums	312	Nordmaling	14	Vetlanda	946
Grästorp	9	Norrköping	1,122	Vimmerby	29
Gullspång	8	Norsjö	4	Vingåker	455
Gällivare	314	Nybro	420	Vänersborg	92
Gävle	340	Nykvarn	9	Vännäs	394
Göteborg	4,374	Nässjö	913	Värmdö	18
Habo	1,515	Ockelbo	17	Värnamo	664
Hagfors	23	Olofström	40	Västervik	489
Hallsberg	11	Orsa	5	Västerås	330
Halmstad	1,25	Orust	19	Växjö	575
Hammarö	375	Osby	31	Vårgårda	13
Haninge	123	Oskarshamn	55	Ydre	774

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Haparanda	29	Ovanåker	13	Ystad	64
Hedemora	16	Oxelösund	25	Älmhult	413
Helsingborg	686	Pajala	3	Älvkarleby	38
Herrljunga	17	Piteå	774	Älvsbyn	18
Hjo	18	Ronneby	165	Ängelholm	78
Hofors	35	Sala	1,087	Åmål	356
Hultsfred	33	Salem	28	Ånge	22
Hylte	18	Sandviken	115	Åre	27
Hällefors	6	Sigtuna	601	Årjäng	18
Härjedalen	33	Simrishamn	51	Åstorp	31
Härryda	455	Sjöbo	46	Åtvidaberg	11
Hässleholm	100	Skara	23	Öckerö	719
Håbo	17	Skellefteå	1,045	Örebro	640
Högsby	12	Skinnskatteberg	10	Örkelljunga	22
Hörby	27	Skurup	43	Örnsköldsvik	1,559
Jokkmokk	17	Skövde	95	Östersund	560
Järfälla	100	Smedjebacken	15	Österåker	77
Jönköping	1,739	Sollefteå	41	Östhammar	2
Kalmar	548	Sollentuna	428	Östra Göinge	30
Karlsborg	4	Solna	164	Övertorneå	15
Karlskoga	21	Sorsele	4		
Karlskrona	673	Sotenäs	25		

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Table S4. The municipalities that implemented ice cleat distribution programs for older adults (n=63) and the number of survey participants per municipality, ages 65-79 and exposed to ice cleat distribution (n=2.507).

Municipality	***Survey responses***	***Municipality***	***Survey responses***	***Municipality***	***Survey responses***
Aneby	2	Jönköping	133	Sundbyberg	5
Askersund	2	Kalmar	10	Svenljunga	1
Bengtsfors	1	Karlskrona	130	Säffle	132
Borgholm	4	Krokom	1	Säter	4
Borås	7	Kungsör	2	Sävsjö	6
Dorotea	1	Laholm	6	Tranås	118
Eksjö	3	Laxå	154	Trollhättan	16
Emmaboda	1	Lidingö	5	Töreboda	3
Fagersta	101	Lidköping	13	Uddevalla	95
Gislaved	2	Ljusdal	4	Uppsala	130
Gnosjö	1	Lund	37	Vaggeryd	122
Grästorp	1	Mark	137	Valdemarsvik	3
Gällivare	3	Mellerud	1	Vetlanda	153
Göteborg	128	Mullsjö	1	Värnamo	131
Habo	130	Mönsterås	3	Västervik	6
Halmstad	19	Norrköping	136	Älmhult	1
Haninge	23	Nässjö	106	Åmål	136
Haparanda	4	Oskarshamn	5	Öckerö	2
Härryda	97	Skövde	5	Örkelljunga	1
Hörby	3	Smedjebacken	1	Österåker	7
Järfälla	5	Strängnäs	5	Övertorneå	2