



# The first national pressure ulcer prevalence survey in county council and municipality settings in Sweden

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hospital, nursing home, pressure ulcer, prevalence, prevention

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## Abstract

**Aim** To report data from the first national pressure ulcer prevalence survey in Sweden on prevalence, pressure ulcer categories, locations and preventive interventions for persons at risk for developing pressure ulcers.

**Methods** A cross-sectional research design was used in a total sample of 35 058 persons in hospitals and nursing homes. The methodology used was that recommended by the European Pressure Ulcer Advisory Panel.

**Results** The prevalence of pressure ulcers was 16.6% in hospitals and 14.5% in nursing homes. Many persons at risk for developing pressure ulcers did not receive a pressure-reducing mattress (23.3–27.9%) or planned repositioning in bed (50.2–57.5%).

**Conclusions** Despite great effort on the national level to encourage the prevention of pressure ulcers, the prevalence is high. Public reporting and benchmarking are now available, evidence-based guidelines have been disseminated and national goals have been set. Strategies for implementing practices outlined in the guidelines, meeting goals and changing attitudes must be further developed.

## Introduction

The prevalence of pressure ulcers (PUs) is an established quality indicator in health care. In 2001, the European Pressure Ulcer Advisory Panel (EPUAP) introduced a methodology to perform PU prevalence studies that would be valid and reliable and would allow comparison between institutions and countries [1].

So far, only a few European countries have used PU prevalence studies, which could provide a benchmark to evaluate care in various settings, on the national level. In Germany, nationwide annual prevalence studies have been conducted in hospitals and nursing homes since 2001 [2]. A summary of the first years shows that the prevalence of institution-acquired PUs dropped from 26.3% to 11.3% (hospitals) and from 13.7% to 6.4% (nursing homes) over 3 years. The use of guidelines and risk assessment scales increased to more than 90%. The Netherlands has also undertaken annual PU prevalence studies on a national level, using the same standardized methodology. A stable difference has been discovered between the two countries, with higher rates in the Netherlands, especially in nursing homes. This difference remains after adjusting for gender, age, risk scores and prevention [3,4]. In 2004, the PU prevalence in hospitals was

9.0% (Germany;  $n = 8515$ ) and 18.1% (the Netherlands;  $n = 10\,237$ ) [3]. Corresponding figures for nursing homes were 6.4% (Germany;  $n = 2531$ ) and 31.4% (the Netherlands;  $n = 10\,098$ ) [3]. A French study also conducted in 2004 in all French hospitals except university hospitals revealed a prevalence of 8.9% ( $n = 37\,307$ ) [5]. In 2008, the first national prevalence study in Belgium found a prevalence of 12.1% in hospitals ( $n = 19\,968$ ) [6].

In Sweden, the EPUAP methodology was introduced in 2002 [1,7]. This recommended and standardized approach has been used by many Swedish hospitals and shows prevalence rates that vary between 9.5% and 27% [8,9]. In a recent benchmarking study, two Swedish hospitals were compared with 207 American hospitals for PU prevalence, prevention strategies and nurse staffing [8]. The results revealed that risk and skin assessments, as well as prevention protocols for patients at risk for development of PUs were part of routine care in the United States, but not in the two Swedish hospitals. The prevalence was 6.3–6.5% in the US sample, while the Swedish prevalence was 9.5% in one hospital and 17.6% in the other. Furthermore, total nursing hours per patient day were higher in the American hospitals, which also had a higher proportion of registered nurses.

In 2007, a national patient safety initiative was launched by the Swedish Association of Local Authorities and Regions (SALAR). Prioritized areas were PUs, fall injuries, medication errors, urinary tract infections, central line infections, surgical site infections and nutrition. Experts were asked to develop evidence-based clinical guidelines for each area that would be easy to understand and use by the multidisciplinary team in hospitals and nursing homes. These guidelines are free of charge and have been distributed throughout the country. As a next step, to address the lack of national data, set national goals and assist hospitals and nursing homes in their quality improvement work, SALAR initiated the first nationwide PU prevalence study.

The overall aim of this study was to report data from the first national PU prevalence survey in Sweden on prevalence, PU categories, locations and preventive interventions for persons at risk for developing PUs.

## Methods

A cross-sectional research design was used. All county councils and municipalities in Sweden were invited to participate in the PU prevalence survey in 2011.

## Context

In Sweden, the counties are the first-level administrative and political subdivisions and a county council is an elected assembly of a county. The municipalities are the local government entities. The current 290 municipalities are organized into 21 counties whose councils are responsible for health care in the university hospitals ( $n = 6$ ), central county council hospitals ( $n =$  around 20) and county council hospitals ( $n =$  around 50). In 2009, there were about 25 650 beds, including both somatic and psychiatric ( $n = 4450$ ) care, according to the statistics of the National Board of Healthcare and Welfare (<http://www.socialstyrelsen.se>). The municipalities are responsible for care and social services for the elderly, that is, special housing for people with dementia, short-term care for the elderly and special permanent housing. In April 2011, about 89 000 persons aged 65 and older lived permanently in special forms of housing and 12 100 elderly had assistance for short-term care. Care and social services for the elderly in Sweden are similar to those offered by nursing homes referred to in international literature.

## Data collection

PU survey data in each participating unit were collected on one selected day during one specific week in March 2011. The methodology was developed by EPUAP and consists of a uniform, well-described and tested procedure [1]. The survey included patient data such as gender, age, risk assessment, skin observation (PU categories and location) and preventive interventions (pressure-reducing equipment and repositioning) at the time of the survey. Inclusion criteria were all adults ( $\geq 18$  years) who were admitted to the unit before 0700 h on the day of the survey.

The Modified Norton Scale was used to assess the risk to develop PU, although the Braden Scale is recommended by EPUAP [10]. The Modified Norton Scale is tested, recommended and well known in Sweden, and includes seven areas for assess-

**Table 1** The pressure ulcer classification system [13]

Category	Description
I	Non-blanchable erythema of intact skin
II	Partial thickness skin loss or blister
III	Full thickness skin loss
IV	Full thickness tissue loss. Necrotic ulcer was classified as Category IV

ment: mental condition, physical activity, mobility, food intake, fluid intake, incontinence and general physical condition [11,12]. A 4-point scale is used for each area (max score = 28); a total score of  $\leq 20$  indicates a risk to develop PU and preventive interventions are strongly recommended.

PUs were categorized according to the EPUAP-NPUAP classification system (see Table 1) [13]. Data on PU preventive interventions included pressure-reducing equipment and repositioning in bed and while sitting.

## Procedure

SALAR organized the national survey and encouraged all county councils and municipalities to participate. An expert group, including the authors, who were familiar with PU prevalence studies was put together to plan the procedure, define the survey data and organize the education sessions. Local supervisors for different parts of Sweden participated in education sessions that included general information about the survey and protocols, as well as theoretical training and use of the web-based educational programme pressure ulcer classification [14]. All information and the education session were accessible at the SALAR website (<http://www.skl.se>).

Local supervisors organized the survey and held education sessions for the nurses responsible for the data collection at both the county and municipality levels. To facilitate the assessment of the patient, all data collectors received a Pressure Ulcer Card with the Modified Norton Scale on one side and descriptions of the four PU categories illustrated with coloured photographs on the other. Data on skin inspection (PU categories and locations), risk assessment and preventive interventions were gathered by nursing teams visiting each patient. At least one of the two nurses in the team was a registered nurse and one was not employed at the unit under study.

## Data analysis

All data was entered into a national database at SALAR. Descriptive data are presented as frequencies and percentages.

## Ethics

All the county council and municipality directors approved the study. The principles set out in Declaration of Helsinki, as well as national and local ethical guidelines for research, were followed [15]. Persons received verbal and written information about the study and gave verbal consent to participate; if necessary, relatives were consulted. Participation was voluntary and all data were kept confidential.

	A		B		C		Total	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
	5271		6343		4852		16 466	
Persons with pressure ulcer	936	17.8	1048	16.5	753	15.5	2 737	16.6
Sacrum	325	6.2	353	5.6	267	5.5	945	5.7
Heel	282	5.4	311	4.9	219	4.5	812	4.9
Foot	102	1.9	110	1.7	78	1.6	290	1.8
Hip	20	0.4	36	0.6	15	0.3	71	0.4
Ishial tuberosity	38	0.7	29	0.5	19	0.4	86	0.5
Ear	49	0.9	69	1.1	45	0.9	163	1.0
Other location	120	2.3	140	2.2	110	2.3	370	2.2
Category 1	468	8.9	533	8.4	373	7.7	1 374	8.3
Category 2	252	4.8	270	4.3	190	3.9	712	4.3
Category 3	127	2.4	138	2.2	97	2.0	362	2.2
Category 4	89	1.7	107	1.7	93	1.9	289	1.8
Persons at risk* and preventive interventions	1047	19.9	1221	19.2	801	16.5	3 069	18.6
Pressure-reducing mattress	783	74.8	925	75.8	614	76.7	2 322	75.7
Heel protection/floating heels	341	32.6	390	31.9	246	30.7	977	31.8
Pressure-reducing chair cushion	112	10.7	76	6.2	101	12.6	289	9.4
Sliding sheets	232	22.2	293	24.0	187	23.3	712	23.2
Other equipment	85	8.1	91	7.5	65	8.1	241	7.9
Planned repositioning in bed	521	49.8	556	45.5	366	45.7	1 443	47.0
Background variables								
Female	2812	53.3	3315	52.3	2519	51.9	8 646	52.5
Male	2459	46.7	3028	47.7	2333	48.1	7 820	47.5
17–60 years	1071	20.3	1680	26.5	1611	33.2	4 362	26.5
61–69 years	803	15.2	1087	17.1	884	18.2	2 774	16.8
70–79 years	1244	23.6	1468	23.2	977	20.1	3 689	22.4
80 years and over	2153	40.8	2105	33.2	1378	28.4	5 636	34.2

\*Total score  $\leq 20$  Modified Norton Scale.

## Results

Over 35 000 persons participated in the study. The results for hospital and nursing home settings are reported separately.

### Hospitals

A total of 16 466 persons in county care participated and the overall prevalence of PU categories I–IV was 16.6% ( $n = 2737$ ; Table 2). There were 2737 persons with 3276 ulcers. Eleven per cent ( $n = 291$ ) had developed the PU before admission to the unit where the study was conducted. The prevalence of PU ranged from 15.5% (university hospitals) to 17.8% (county hospitals) and around 50% of the PUs were category I. In the 21 different counties, the prevalence ranged from 9% to 31%. The sacrum and heels were the most frequently affected locations. The proportion of persons at risk ranged from 16.5% (university hospital) to 19.9% (county hospitals). Around 75% of those at risk had a pressure-reducing mattress and between 46% and 50% had a planned repositioning in bed. The proportion of persons aged over 70 years ranged from 48.5% (university hospital) to 64.4% (county hospitals) and 53% were women.

### Nursing homes

A total of 18 592 persons from the municipalities participated and the overall prevalence of PU categories I–IV was 14.5% ( $n = 2693$ ;

**Table 2** Persons with pressure ulcers, preventive interventions and background variables at the county council hospitals (A), central county council hospitals (B) and university hospitals (C)

Table 3). The prevalence of PU ranged from 12.3% (special housing for people with dementia) to 21.9% (short-term care for the elderly) and category I PUs ranged from 47.7% (short-term care for elderly) to 61.5% (special housing for people with dementia). In the 85 participating municipalities (of 290), the prevalence of PU ranged from 5% to 40%. The sacrum, heels and feet were the most frequently affected locations. The proportion of persons at risk ranged from 26.1% (short-term care for the elderly) to 34.7% (special form of housing for people with dementia); around 73% of those at risk had a pressure-reducing mattress and 44% had a planned repositioning in bed. The proportion of persons aged over 70 years ranged from 90.0% (short-term care for elderly) to 96.6% (special forms of housing permanently) and most were women.

## Discussion

This nationwide study revealed a 16.6% prevalence of PUs in hospitals and 14.5% in nursing homes. Preventive strategies were quite similar in both settings. For example, many of those assessed as at risk for PUs did not receive a pressure-reducing mattress (23.3–27.9%) or planned repositioning in bed (50.2–57.5%). Evidence-based prevention involves taking effective preventive measures consisting of a reduction of the intensity and/or duration of pressure and shearing forces on the tissue of patients at risk for PU development [13].

**Table 3** Persons with pressure ulcer, preventive interventions and background variables at housing for persons with dementia (A), short-term care for the elderly (B) and special permanent housing (C)

	A		B		C		Total	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
	2902		812		14 878		18 592	
Persons with pressure ulcers	357	12.3	178	21.9	2 158	14.5	2 693	14.5
Sacrum	98	3.4	43	5.3	506	3.4	647	3.5
Heel	103	3.5	57	7.0	712	4.8	872	4.7
Foot	92	3.2	35	4.3	524	3.5	651	3.5
Hip	20	0.7	12	1.5	98	0.7	130	0.7
Ishial tuberosity	10	0.3	8	1.0	77	0.5	95	0.5
Ear	5	0.2	6	0.7	76	0.5	87	0.5
Other location	29	1.0	17	2.1	165	1.1	211	1.1
Category 1	219	7.5	81	10.0	1 208	8.1	1 508	8.1
Category 2	72	2.5	50	6.2	442	3.0	564	3.0
Category 3	45	1.6	24	3.0	308	2.1	377	2.0
Category 4	21	0.7	23	2.8	200	1.3	244	1.3
Persons at risk* and preventive interventions	1008	34.7	212	26.1	4 903	33.0	6 123	32.9
Pressure-reducing mattress	757	75.1	156	73.6	3 535	72.1	4 448	72.6
Heel protection/floating heels	128	12.7	36	17.0	778	15.9	942	15.4
Pressure-reducing chair cushion	496	49.2	68	32.1	2 558	52.2	3 122	51.0
Sliding sheets	419	41.6	77	36.3	1 982	40.4	2 478	40.5
Other equipment	34	3.4	13	6.1	257	5.2	304	5.0
Planned repositioning in bed	433	43.0	90	42.5	2 150	43.9	2 673	43.7
Background variables								
Female	2066	71.2	449	55.3	10 294	69.2	12 809	68.9
Male	836	28.8	363	44.7	4 584	30.8	5 783	31.1
17–60 years	24	0.8	21	2.6	84	0.6	129	0.7
61–69 years	132	4.5	61	7.5	420	2.8	613	3.3
70–79 years	475	16.4	162	20.0	2 086	14.0	2 723	14.6
80 years and over	2271	78.3	568	70.0	12 288	82.6	15 127	81.4

\*Total score  $\leq$  20 Modified Norton Scale.

The results show that the prevalence of PUs in Swedish hospitals was considerably higher than in German, French and Belgian hospitals, but lower than in Dutch hospitals [3,5,6]. The prevalence in Swedish nursing homes was lower than in German nursing homes, but higher than in Dutch nursing homes [3].

Tannen *et al.* point out that there is not a lack of evidence for preventing PUs, but rather a failure to put this knowledge into practice [3]. In a qualitative Swedish study, registered nurses were observed bedside with patients at risk for PUs. Afterwards, they were interviewed and the patient records were audited [16]. The results showed that compliance with evidence-based guidelines differed and seemed to depend on the care culture of the unit. Overall, registered nurses tended to pay little attention to PU prevention among patients at risk. The lack of attention was explained by registered nurses' trust in assistant nurses' knowledge, and prevention was seen as an assistant nurse task. The boundaries between who should perform the risk assessment also seemed to be unclear [17]. Another qualitative study describes contributing factors for the progression or regression of PUs in the care trajectory as they were understood by the nurses [18]. Factors identified were related to the individual patient, to the health care staff and to the health care structure. The care and prevention of PUs was regarded as low-status work. The registered nurses considered themselves to have an authoritative responsibility, based on their higher education, while

assistant nurses were expected to carry out the daily care. Nurses in general were considered to have adequate knowledge about the prevention of PUs, but did not act on this knowledge as a matter of routine [16,18]. Transfer in the care trajectory was considered to be a further risk factor for PU since no one seemed to take responsibility for patients' PUs in the new setting and the transfer of information about PU care was almost totally lacking [18].

Negative attitudes and lack of knowledge may act as barriers to using guidelines in clinical practice. In Belgium, the correlation between knowledge, attitudes and application of adequate prevention was studied in 14 hospitals and nine nursing homes [19,20]. Both studies showed that nurses had insufficient knowledge about PU prevention. Attitudes were significantly correlated with the application of prevention according to guidelines, while knowledge was not. A national longitudinal survey in Sweden investigated research use among registered nurses 2 years after graduation and found that the nurses were not aware of their own use of research in clinical practice [21]. This is remarkable, considering educational reforms have been implemented to equip nurses with the necessary skills to perform evidence-based practice and preventing PUs is not a new area in health care. Prevention of PUs has been on the agenda for many decades [22], and there is a large body of research regarding risk factors and preventive strategies [13].

During the last years, major initiatives from organizations and governments and considerable resources have been directed to improving patient safety. A statewide study of 10 North Carolina hospitals found that harm from medical care was common, and that the rate of harm did not decrease substantially over a 6-year period [23]. Recorded PUs in this study were assessed as preventable harms. However, several research groups have shown that repeated measurement and implementation of PU prevention guidelines could reduce the prevalence of PUs [2,24,25]. A research group in the Netherlands argues that several factors could influence compliance with guidelines, including the large number of guidelines competing for attention, which may be difficult to keep track of [26]. The SAFE or SORRY? Programme tested the effect of a multifaceted implementation strategy (education, patient involvement and feedback on process and outcome indicators) on the adverse events PUs, urinary tract infections and falls. Both hospitals and nursing homes were included. The results show that patients developed fewer adverse events in the intervention groups, but an increase in preventive care could not be demonstrated. These results show the difficulties of measuring compliance with guidelines.

Improved patient safety needs to be addressed at every level in the health care organization [27]. For example, on the macro-level, public reporting and benchmarking are important. On the meso-level, the key ingredients are strong leadership, strategic planning and goal setting for quality; data systems to monitor performance; and a culture of safety. On the micro-level, a multi-professional team-based approach is needed, along with small tests of change and effective communication strategies. In recent years, the Swedish government and SALAR have taken a lead in this work. A patient safety law came into effect January 2011 and there is a joint agreement in place until 2014 between the government and the SALAR to improve patient safety. The agreement has a performance-based remuneration model to the county councils with 100 million SEK (approximately 10 million €) allocated for participation in the prevalence study in 2011. National goals have now been set: all county councils and municipalities are to provide an action plan on PU prevention based on the results from the national survey (year 1), improved process indicators, such as pressure-reducing mattresses and repositioning (year 2) and improved outcome indicators, that is, reduced prevalence of PUs (year 3). The national PU prevalence survey will be conducted annually. Since 2008, evidence-based clinical guidelines have been disseminated throughout Sweden. The challenge now is to get the multidisciplinary teams in hospitals and nursing homes to adapt them to their own unit and use them.

### Methodological considerations

Prevalence data provide a snapshot of the problem of PUs at one point in time. The present study was one of the largest prevalence studies in Europe, including both hospitals ( $n = 16\,466$ ) and nursing homes ( $n = 18\,904$ ). Participation was voluntary.

All hospitals of different types and sizes and around 70% of possible persons participated, and therefore, the results should be generalizable to the counties. One university hospital, however, chose to analyze its own data without comparison with the national data. Participation from the municipalities, however, was only around 18%. Thus, a final statement about the magnitude of the PU

problem in nursing homes cannot be made. Our sample included 69% women in special forms of housing and 55% women short-term care. This corresponds well with national statistics from the National Board of Healthcare and Welfare reporting 70% and 51%, respectively. Special housing for people with dementia is not reported separately.

The EPUAP methodology is a robust and standardized approach. Data were based on physical examination of the patient by two nurses, which increases the reliability of the observations and strengthens the accuracy of the findings. Although the Braden Scale for risk assessment is recommended by EPUAP [1], we chose to use the Modified Norton Scale, which is well known and used by Swedish nurses. The goal was also to identify PUs that had developed in the hospital or in the nursing home, as institutionally acquired PUs are a more valid quality indicator than prevalence alone [28]. Unfortunately, in this, the first nationwide study, we were unable to attain valid information from the patient records to indicate whether or not PUs were present on admission.

### Conclusions

Despite great effort on the national level to encourage the prevention of PUs, the prevalence is high. Public reporting and benchmarking are now available; evidence-based guidelines have been disseminated, and national goals have been set. Strategies for implementing practices outlined in the guidelines, meeting goals and changing attitudes must be further developed. In this work, leadership on all levels is crucial.

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