



Universiteit
Leiden
The Netherlands

Proactive care programs in the emergency department: effectiveness and feasibility

Loon, M. van

Citation

Loon, M. van. (2023, April 13). *Proactive care programs in the emergency department: effectiveness and feasibility*. Retrieved from <https://hdl.handle.net/1887/3593961>

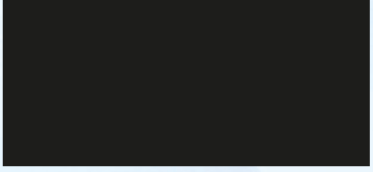
Version: Publisher's Version

License: [Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden](#)

Downloaded from: <https://hdl.handle.net/1887/3593961>

Note: To cite this publication please use the final published version (if applicable).





CHAPTER 5

Telephone follow-up to reduce unplanned hospital returns for older ED patients: a randomized trial

Merel van Loon-van Gaalen
M. Christien van der Linden
Jacobijn Gussekloo
Roos C. van der Mast

J Am Geriatr Soc. 2021;69(11):3157-3166 ■

This is the peer reviewed version of the following article: Telephone follow-up to reduce unplanned hospital returns for older ED patients: a randomized trial, which has been published in final form at DOI: 10.1111/jgs.17336. This article may be used for non-commercial purposes in accordance with Wiley Terms and Conditions for Use of Self-Archived Versions. This article may not be enhanced, enriched or otherwise transformed into a derivative work, without express permission from Wiley or by statutory rights under applicable legislation. Copyright notices must not be removed, obscured or modified. The article must be linked to Wiley's version of record on Wiley Online Library and any embedding, framing or otherwise making available the article or pages thereof by third parties from platforms, services and websites other than Wiley Online Library must be prohibited.

ABSTRACT

Background/objectives

Telephone follow-up calls could optimize transition from the Emergency Department (ED) to home for older patients. However, effects on hospital return rates are not clear. We investigated whether telephone follow-up reduces unplanned hospitalizations and/or unplanned ED return visits within 30 days of ED discharge.

Design

Pragmatic randomized controlled trial with allocation by month; odd months intervention group, even months control group.

Setting

Two ED locations of a non-academic teaching hospital in The Netherlands.

Participants

Community-dwelling adults aged ≥ 70 years, discharged home from the ED were randomized to the intervention group ($N=4732$) or control group ($N=5104$).

Intervention

Intervention group patients: semi-scripted telephone call from an ED nurse within 24 hours after discharge to identify post-discharge problems and review discharge instructions. Control group patients: scripted satisfaction survey telephone call.

Measurements

Primary outcome: total number of unplanned hospitalizations and/or ED return visits within 30 days of ED discharge. Secondary outcomes: separate numbers of unplanned hospitalizations and ED return visits. Subgroup analysis by age, sex, living condition and degree of crowding in the ED at discharge.

Results

Overall, 42% were males, and median age was 78 years. In the intervention group, 1516 of 4732 patients (32%) consented, and in the control group 1659 of 5104 (33%) patients. Unplanned 30-day hospitalization and/or ED return visit was found in 16% of intervention group patients and 14% of control group patients (odds ratio 1.16; 95% confidence interval: 0.96-1.42). Also, no statistically significant differences were found in secondary outcome measures. Within the subgroups, the intervention did not have beneficial effects for the intervention group.

Conclusion

Telephone follow-up after ED discharge in older patients did not result in reduction of unplanned hospital admissions and/or ED return visits within 30 days. These results raise the question of whether other outcomes could be improved by post-discharge ED telephone follow-up.

INTRODUCTION

The number of older patients visiting emergency departments (EDs) is increasing.^{1,2} Studies following older patients after discharge from the ED have reported that 10-22% have an unplanned ED return visit within one month.¹⁻⁴ In addition, these patients appeared to be at increased risk of hospitalization, loss of functional independence and death.^{1-3,5-7}

In general, ED return visits and hospital admissions are viewed as unfavorable and have been identified as a quality indicator of care.^{3,8-10} Although unplanned ED return visits could be solely considered as an indicator of functional decline,^{3,11} they may also be a result of inadequate care transitions from the ED to home.^{1,2,12,13} The transition to home after ED discharge involves communication of complex information concerning the diagnosis, discharge instructions, medication use and follow-up care at a time when patients are easily distracted by anxiety, stress or discomfort, causing difficulties in perceiving and processing this information.^{12,14,15} This may be even more complicated when the ED is crowded and ED personnel experiences time pressure while delivering discharge information.^{12,15} Older adults may have a higher risk of poor understanding of discharge instructions, because of cognitive and sensory impairments.^{12,16,17}

Telephone follow-up has been identified as a practical and inexpensive method to offer transitional care in the post-ED discharge period.^{14,18-21} By repeating discharge information and providing additional care during a telephone follow-up call, it is likely that this intervention could prevent ED return visits that are due to misunderstanding of information, anxiety or lack of support.^{12,22-24} Currently an increasing number of hospitals have started to implement this service.²⁵ However, up to now only few studies examined the feasibility and effectiveness of telephone follow-up for older patients after discharge from the ED.^{4,18,20,21,26-28} A recent systematic review on this topic could not demonstrate a benefit of the intervention, but only two high-quality studies met eligibility criteria for this review.^{4,21,27} Only one large randomized controlled trial (RCT) assessed the effect of telephone follow-up for older patients on hospitalization and ED return visits within 30 days after ED discharge, reporting no benefit of the intervention.⁴ However, the study investigated the effect on both planned and unplanned admissions and ED return visits. These could be considered opposite outcomes, as return to the hospital for a planned admission or ED visit implies discharge plan adherence, while unplanned hospital returns may result from failure to comply with discharge instructions or insufficient (transitional) care. Combining these opposite outcomes could obscure a beneficial effect of telephone follow-up on unplanned hospital returns.

Therefore, the objective of this study was to examine the effects of a telephone follow-up call for community-dwelling patients aged 70 years and older after discharge from the ED on unplanned hospital admissions and/or ED return visits within 30 days.

We also explored whether the effects of telephone follow-up were different for subgroups of patients at high risk for hospital return, including older age,^{3,6,29} male sex^{3,6,30} and living alone,^{1,2,31,32} and for patients who were discharged when the ED was busy.

METHODS

Study design

In this pragmatic RCT, patients aged 70 years and older were randomized according to the month of their ED visit; patients included in odd months received an intervention telephone call and patients included in even months received a satisfaction survey telephone call.

The Medical Ethics Review Committee of Haaglanden Medical Center (HMC) approved the study, which closely followed routine care (METC Zuidwest Holland, nr. 17-028). The trial was conducted in adherence to the Consolidated Standards of Reporting Trials³³ and registered in the Netherlands Trial Register (Trial NL6598).

Participants

Patients were eligible if they were discharged from one of the EDs of HMC to an unassisted living environment during the trial period from February 1, 2018 to July 1, 2019.

The exclusion criteria were: hospital admission, discharge to nursing home or another care facility or assisted living environment and planned follow-up appointment at an outpatient clinic or ED within 24 hours. A planned follow-up appointment was an appointment following the index ED visit that could be foreseen at the time of ED discharge.³⁴

Of patients with more than one ED visit during the study period, only the first telephone call was included. If a patient had more than one ED return visit or hospital admission during the 30-day follow-up period, only the first unplanned ED return visit or hospital admission was counted.

Hospital admissions and ED return visits were defined as unplanned if they could not be foreseen at the time of discharge from the index ED visit.³⁴

Setting

The trial was performed in the two EDs of HMC, a non-academic, inner-city teaching hospital in The Hague, The Netherlands. In 2018, location Westeinde received 53,000 patients of which 18% were 70 years or older and location Bronovo received 28,000 patients, of which 25% were ≥ 70 years.

Procedures

Telephone follow-up was integrated in the daily practice of the EDs. Every morning ED nurses received a list with hospital numbers and destinations of all patients aged 70 years and older who had been discharged from the ED during the previous 24 hours.

Per patient, trained ED nurses made a maximum of three call attempts at different times of the day during quiet moments of their shift. The nurse explained the nature of the telephone call and asked for consent to participate. If the patient was not available or able to answer the phone, a spouse, family member or caregiver received the explanation and the request to participate. Informed consent was noted in the case report form (CRF), integrated in the patient's electronic medical file. After indicating in the CRF whether it was an even or odd month, the questionnaire of the matching month opened (see Supplementary File 1 and 2).

The calling nurses were not blinded to the intervention.

Telephone follow-up was not possible in case of a non-existing telephone number, lack of a working telephone, missing notes in the electronic medical records (EMR), electronic hospital system (EHS) malfunctioning, advanced impaired cognition, severe language barrier, and deafness in patients without an available spouse or caregiver. A patient was defined as having advanced impaired cognition if the diagnosis dementia or impaired cognition was recorded in the patient's EMR and the patient was not able to understand information or to have a structured conversation during the ED visit. If patients were not reached or not approached, the reason was indicated in the CRF.

In order to investigate healthcare use of participants during the 30 days after ED discharge, we performed a second telephone call after 30 days between October 1, 2018 and March 15, 2019.

Intervention

Participants in the intervention group received a semi-scripted telephone call from a trained ED nurse to identify post-discharge problems and to offer additional information. ED nurses were taught how to adapt the conversation to the patient's health problem (Supplementary File 1). Participants were asked to repeat the discharge instructions to explore whether more explanation was needed. Advice was given if the patient was not feeling well. When indicated, additional assistance was

offered, for example, the pharmacy was called to deliver medication to the patient's home or home care services were arranged. Participants who reported serious symptoms were advised to visit their GP or to revisit the ED.

Participants in the control group received a scripted survey that assessed satisfaction with their ED visit (Supplementary File 2). The five questions were derived from a validated patient satisfaction questionnaire (Picker Patient Experience Questionnaire (PPE-15)).³⁵ Participants were not asked about their wellbeing or about post-discharge problems. Trained ED nurses performed the satisfaction survey calls, assisted by trained final year medical and nursing students between October 1, 2018 and March 15, 2019. The purpose of these calls was to control for any effect that a telephone call from the hospital might have. Only patients who turned out to be unwell during the satisfaction survey call or who had urgent medical questions received targeted medical advice.

Training and monitoring of telephone calls

The 57 ED nurses and nine medical and nursing students, who made the telephone calls, received a study training. The script questions were explained and interviewers were taught how to interpret and score the patients' answers. In the presence of one researcher, the ED nurses and students performed a number of trial conversations (ranging from 3 to 15, depending on their performance) to familiarize them with the scripts, before they started to include patients. To ensure script adherence, one researcher regularly attended the telephone conversations, reviewed the CRFs, and provided feedback to the interviewers as needed.

Data collection

Demographic data, data related to the patients' ED visits, and data concerning ED return visits and hospitalizations within 30 days after ED discharge were abstracted from the EHS by an information technology specialist, who was not involved in the study, and organized by a researcher who was blinded to the study groups. For data abstraction, we adhered to the methods as described by Worster.³⁶

Outcomes

The primary outcome was the total number of unplanned hospital admissions and unplanned ED return visits within 30 days after ED discharge. If a patient was hospitalized via the ED, following an ED return visit, only the hospital admission was counted for the primary outcome.

Secondary outcomes were the separate numbers of unplanned hospitalizations and unplanned ED return visits within 30 days. If a patient was hospitalized following an ED return visit, both the ED return visit and the hospital admission were counted for the secondary outcomes.

One researcher, who was blinded to the patients' study group, checked in the patients' EMR whether or not the hospital admissions and ED return visits were unplanned.

To investigate whether patients returned to other hospitals than HMC, the number of self-reported ED return visits and hospital admissions to other hospitals was asked during the 30-day follow-up calls. To determine the validity of self-reports, an agreement rate was calculated. The agreement rate was the proportion of subjects whose reported ED visit or hospitalization status was similar to that reported in the EHS.

While conducting the study, but prior to analysis, we further specified the primary outcome measure from both planned and unplanned hospital admissions to the combined outcome of unplanned hospital admissions and/or unplanned ED return visits. We believed that reducing only unplanned hospital returns would be beneficial, as these could be a result of nonadherence with discharge instructions, in contrast to planned returns. We have added unplanned ED return visits to the primary outcome, as we expected the intervention to mainly reduce ED return visits for patient-related reasons, such as misunderstanding of discharge information, uncertainty or lack of support, which did not always require hospitalization.

Subgroups of interest

Additionally, we examined the effects of the intervention in subgroups of patients at high risk for hospital return including age^{3,6,29} (³ or < median age of 78 years), sex,^{3,6,30} and living condition (whether or not living alone).^{1,2,31,32} Although degree of ED crowding was not associated with increased unplanned hospital return in the literature, our experience is that it can negatively influence communication. In a busy ED, personnel experiences time pressure while delivering discharge information and older patients could be more easily distracted.^{12,15} Degree of crowding in the ED at discharge was measured with the National Emergency Department OverCrowding Scale (NEDOCS). The NEDOCS converts a data set into a score that correlates accurately with the degree of crowding as perceived by the staff working at that time.³⁷ If the NEDOCS is 60 or higher, the department is considered to be busy.³⁸

Sample size

The sample size was based on a pilot study of 544 patients, conducted in HMC, reporting a difference of 3% in all hospital admissions after 30 days between the intervention and the control group. We considered a 3% difference in unplanned hospital admissions and/or ED return visits between the groups of clinical relevance. With a power of 80% and a significance level of 0.05, we needed a sample size of 2049 patients per group to find a significant difference in unplanned hospital admissions and/or ED return visits within 30 days.

Analyses plan and statistical methods

Per-protocol analysis of the data was performed. If patients in the control group received additional advice during the satisfaction survey call, it was noted in the CRF. These patients were not excluded from analysis, as they did receive the control intervention.

Statistical significance was tested using the Chi-square tests, with a p -value ≤ 0.05 . Results were tabulated with odds ratios (OR) calculated, including 95% confidence intervals (CI).

Data were analyzed using SPSS, version 26.

RESULTS

The trial ran from February 1, 2018 to July 1, 2019, when the study was stopped prematurely due to unforeseen closure of one of the ED locations.

During the study period, 9836 community-dwelling patients aged 70 years and older were discharged home from the ED, 4732 in odd months and 5104 in even months (Figure 1). Due to shortage of staff, trained ED nurses were not able to call 40% of eligible patients in the intervention group and 36% of patients in the control group ($p < 0.001$). In the intervention group, 32% could not be reached, compared with 31% in the control group ($p = 0.42$). In total, 3175 patients (1827 from location Westeinde and 1348 from location Bronovo) were included and allocated to the intervention ($n = 1516$) or the control ($n = 1659$) group as presented in the flowchart in Figure 1.

In both groups, the median age of the participants was 78 years and 42% were males. Other baseline characteristics were also well balanced between the study groups (Table 1). Baseline characteristics of the participants did not differ from those of patients who were not called (data not shown).

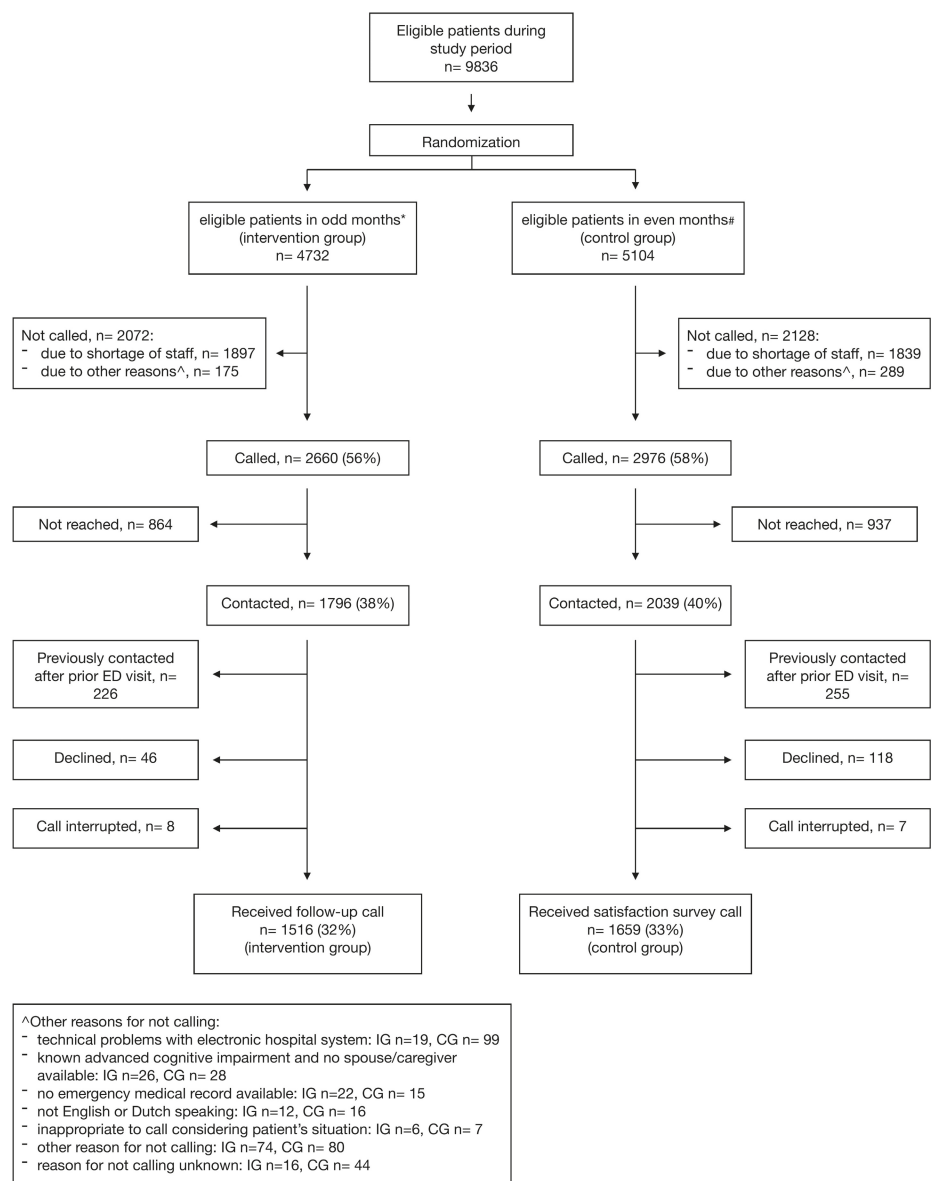


Figure 1. Flow diagram of enrollment and study groups.

*Eight odd months during the study period; #9 even months during the study period
CG, control group; IG, intervention group; n, number.

■ **Table 1.** Baseline patient and ED visit characteristics of patients in the intervention and control groups

	Intervention group (N=1516)	Control group (N=1659)
Age in years, median (IQR)	78 (73-83)	78 (73-83)
Male sex, % (n)	42 (635)	42 (694)
Living alone, % (n)*	31 (475)	30 (496)
Mode of referral, % (n)		
- Ambulance	25 (382)	26 (434)
- General practitioner	35 (527)	33 (550)
Transport by ambulance, % (n)	33 (500)	33 (555)
Triage category urgent, % (n)**	72 (1091)	70 (1167)
ED visit at daytime, % (n)	73 (1113)	70 (1162)
Length of ED stay in minutes, median (IQR)	151 (113-210)	154 (108-209)
NEDOCS at discharge $\geq 60^{\wedge}$, % (n)	36 (540)	30 (491)

* Living condition unknown in 327 intervention group patients and 367 control group patients

** Triage category urgent: red, orange and yellow according to Manchester Triage System

$\wedge$ NEDOCS at discharge was missing in 5 intervention group patients and 175 control group patients due to technical malfunction of electronic hospital system on days that patients were discharged from the ED.

ED, Emergency Department; NEDOCS, National Emergency Department OverCrowding Scale; IQR, Interquartile Range

Of all 3175 patients, 239/1516 (16%) in the intervention group and 230/1659 (14%) in the control group had an unplanned hospital admission and/or unplanned ED return visit within 30 days after ED discharge (OR 1.16, 95% CI: 0.96-1.42)(Figure 2). Separate rates of unplanned hospital admissions and unplanned ED return visits were also not significantly different between the groups (Supplementary Figure 1 and 2).

In both groups, more than half of the hospital admissions and almost all ED return visits were unplanned (Supplementary Table 1 and 2).

In subgroups according to sex and living condition, there was no effect of the telephone intervention on unplanned hospitalization and/or ED return visits (Figure 2). However, in the subgroup of patients aged <78 years, intervention group patients had more unplanned hospital admissions and/or ED return visits than control group patients (18% vs 14%; OR 1.33, 95% CI: 1.01-1.75). A similar effect was seen in the subgroup with NEDOCS<60 at discharge (17% vs 13%; OR 1.32, 95% CI: 1.03-1.70).

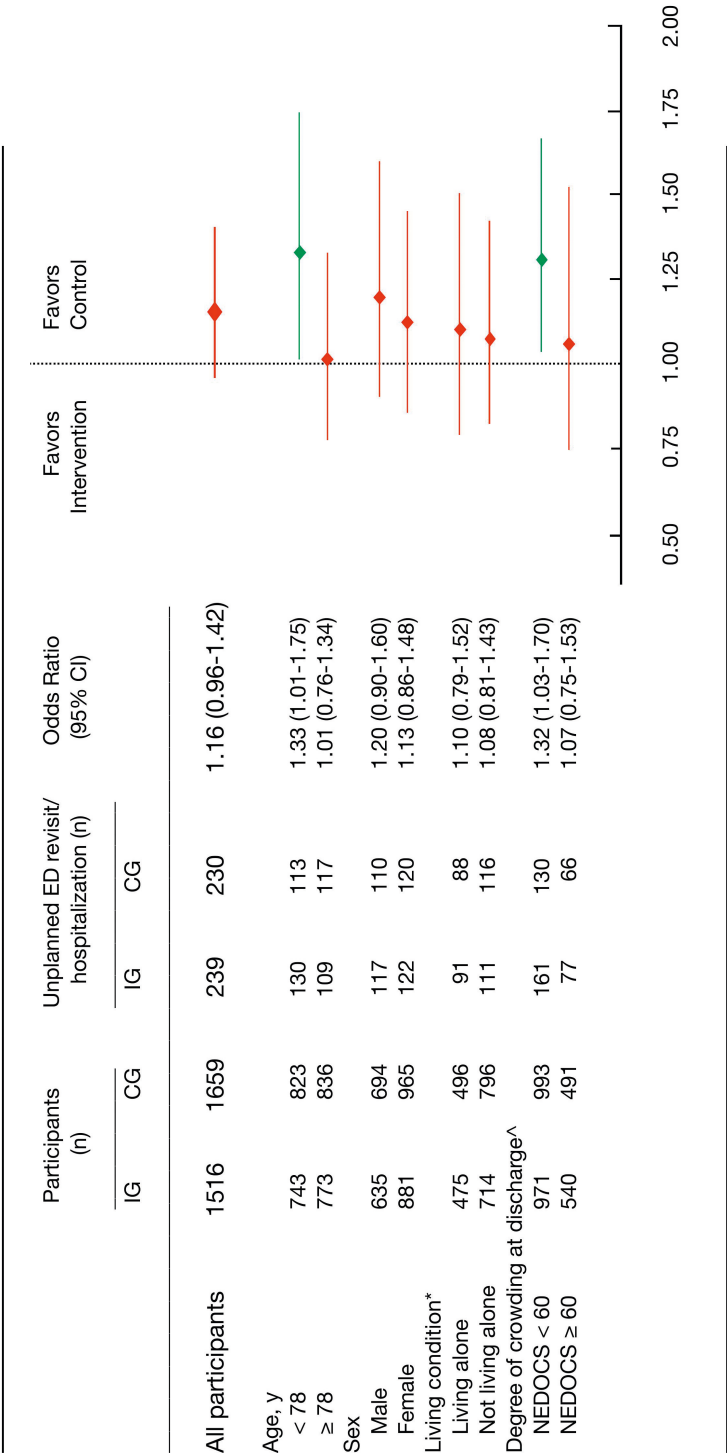


Figure 2. Risk of unplanned hospitalization and/or ED return visit within 30 days, depending on study group. *Living condition unknown in 327 intervention group patients and 367 control group patients
^ NEDOCS at discharge unknown in 5 intervention group patients and 175 control group patients
CG, Control Group; CI, Confidence Interval; ED, Emergency Department; IG, Intervention Group; NEDOCS, National Emergency Department Overcrowding Scale.

In the control group, 77 of the 1659 patients (4.6%) received some form of advice or information in addition to the satisfaction survey. After excluding these patients from analysis, the results of the primary and secondary outcomes remained unchanged (data not shown).

None of the 304 patients who were called again after 30 days reported an unplanned hospital admission or ED return visit in another hospital than HMC. The agreement rate between self-reported ED return visits and hospital admissions and EHS data was 96%.

DISCUSSION

This pragmatic RCT examined whether a telephone follow-up call to older community-dwelling adults within 24 hours after discharge home from the ED reduced the number of unplanned hospital admissions and/or ED return visits within 30 days compared to a satisfaction survey telephone call. No difference was found between groups.

In addition, no reduction of unplanned hospital admissions and/or ED return visits was found in any of the subgroups.

These results are in line with the findings of our recent systematic review, examining the effects of telephone follow-up on health-related outcomes in older ED patients, which found no demonstrable effects on health services utilization, and understanding of and compliance with discharge instructions.²⁷ The results are also in line with the RCT of Biese et al., reporting no effect of a telephone follow-up call for older patients on hospitalization or ED return visits after discharge.

In Biese's trial, patients with cognitive impairment or psychiatric diagnoses were excluded, despite that these patients are at high risk of hospital return. Moreover, the effect of telephone follow-up on unplanned hospital admissions and ED return visits was not investigated.⁴ Although these limitations were overcome in our current trial, the results were similar.

The limited telephone accessibility of patients was a limitation of Biese's trial that we could not overcome. Our success rates of reaching eligible patients were in line with other studies.^{4,14,39}

In our study, trained ED nurses were not able to call 36% of the eligible patients in the intervention group due to shortage of staff. In the control group more patients were called, as trained students were available during three even months of the study period to conduct satisfaction survey calls. Although some studies reported no time

restrictions, others, especially studies that had not appointed a dedicated nurse to make the telephone calls, mentioned comparable problems.⁴⁰

Although we found no effect of telephone follow-up in the total group of patients, subgroup analysis revealed that in patients aged <78 years and those who left the ED when the NEDOCs was below 60, intervention group patients returned more often to the ED within 30 days than control group patients. Although this effect is reported in previous studies,⁴¹ these results ask for further investigation, as our subgroup analysis was not powered to detect differences between subgroups.

Although a beneficial effect on hospital returns was not found, there is data suggesting that telephone follow-up improves patient satisfaction,²⁰ and feelings of loneliness and depressive symptoms in older patients at risk, who were discharged from the ED.⁴² This could be examined in future research.

In a short review, Nasser et al. reported that telephone follow-up could identify non-compliance with discharge instructions in older ED patients,²⁸ which may provide insight into which patients may need extra support.

Strengths and weaknesses

To our knowledge, this is the largest study investigating the effects of telephone follow-up in older adults after discharge from the ED. Moreover, this is the first study that focused on the effect of telephone follow-up on unplanned hospital admissions and unplanned ED return visits and explored the effects in subgroups of patients at high risk for hospital return. Patients were included all year round and the telephone calls were integrated in the daily routine of the ED nurses.

In this pragmatic RCT, participants were randomized according to the month of their ED visit. Since telephone follow-up was integrated into the daily practice of our EDs and multiple nurses were conducting the telephone calls at the same time, it was not feasible to allocate participants randomly to the study groups. However, baseline characteristics of the study groups were found to be similar. More importantly, outcome measures were abstracted from the EHS by researchers who were blinded to the study groups.

We had no data on hospital admissions and ED visits in other hospitals. However, based on the interviews after 30 days with 304 study patients, we found that none of them had an unplanned hospital admission or ED visit in any hospital other than HMC. Moreover, the agreement rate between self-reported hospital returns and EHS data was high.

It could be seen as a methodological limitation that we changed the primary outcome measure during the study from all hospital admissions to unplanned hospital admissions and/or ED return visits. However, we think that focusing on unplanned hospital admissions and/or ED return visits is a strength, as we believed that reducing only unplanned hospital returns would be beneficial.

Due to the closure of one of the study sites, we were able to reach only 77% of the calculated sample size. With the current sample size, we would have been able to find a statistically significant difference of 4% in unplanned hospital admissions and/or ED return visits between the study groups. However, based on the results that tend to show an adverse effect of the intervention, it is unlikely that we would have shown a 3% benefit of the intervention with the full sample size.

During the patients' index ED visits, we were not able to collect more health determinants that could have identified individuals at high risk of hospital return and potentially poor-quality transitions.^{43,44} These include comorbid health conditions, medication burden, cognitive and physical functioning, health literacy, and living circumstances. Patients at risk and their caregivers may have high needs for social support and additional explanations and care, which could be addressed with telephone follow-up. Evaluating the effects of a telephone intervention in these subgroups in future research is important.

Telephone follow-up and communication of discharge information in the ED can be regarded as socially complex interventions that could be influenced by patient and contextual factors, but also by confounders at the level of the healthcare providers.^{41,45,46} Training ED physicians and nurses in geriatric competences, including communication skills and shared decision making, could enhance a potential beneficial effect of telephone follow-up.

Conclusion

This study did not find a beneficial effect of a telephone follow-up call on reducing unplanned hospital admissions and/or ED return visits. Based on the results of this large study, a previous RCT and a systematic review, we advise not to introduce telephone follow-up to reduce unplanned hospital admissions and ED return visits in older patients.^{4,21,27} Future studies could evaluate the effects of this intervention on other health-related outcomes.

REFERENCES

1. Aminzadeh F, Dalziel WB. Older adults in the emergency department: a systematic review of patterns of use, adverse outcomes, and effectiveness of interventions. *Ann Emerg Med* 2002;39:238-247.
2. Arendts G, Fitzhardinge S, Pronk K, Hutton M, Nagree Y, Donaldson M. Derivation of a nomogram to estimate probability of revisit in at-risk older adults discharged from the emergency department. *Intern Emerg Med* 2013;8:249-254.
3. de Gelder J, Lucke JA, de Groot B, et al. Predictors and Outcomes of Revisits in Older Adults Discharged from the Emergency Department. *J Am Geriatr Soc* 2018;66:735-741.
4. Biese KJ, Busby-Whitehead J, Cai J, et al. Telephone Follow-Up for Older Adults Discharged to Home from the Emergency Department: A Pragmatic Randomized Controlled Trial. *J Am Geriatr Soc* 2018;66:452-458.
5. Caplan GA, Brown A, Croker WD, Doolan J. Risk of admission within 4 weeks of discharge of elderly patients from the emergency department--the DEED study. Discharge of elderly from emergency department. *Age Ageing* 1998;27:697-702.
6. Lowthian J, Straney LD, Brand CA, et al. Unplanned early return to the emergency department by older patients: the Safe Elderly Emergency Department Discharge (SEED) project. *Age Ageing* 2016;45:255-261.
7. McCusker J, Roberge D, Vadeboncoeur A, Verdon J. Safety of discharge of seniors from the emergency department to the community. *Healthc Q* 2009;12:24-32.
8. Hughes G. A&E quality indicators. *Emerg Med J* 2012;29:90.
9. Jencks SF, Williams MV, Coleman EA. Rehospitalizations among patients in the Medicare fee-for-service program. *N Engl J Med* 2009;360:1418-1428.
10. Trivedy CR, Cooke MW. Unscheduled return visits (URV) in adults to the emergency department (ED): a rapid evidence assessment policy review. *Emerg Med J* 2015;32:324-329.
11. Driesen B, Merten H, Wagner C, Bonjer HJ, Nanayakkara PWB. Unplanned return presentations of older patients to the emergency department: a root cause analysis. *BMC Geriatr* 2020;20:365. Doi: 10.1186/s12877-020-01770-x [Epub ahead of print]
12. Hastings SN, Barrett A, Weinberger M, et al. Older patients' understanding of emergency department discharge information and its relationship with adverse outcomes. *J Patient Saf* 2011;7:19-25.
13. Engel KG, Buckley BA, Forth VE, et al. Patient understanding of emergency department discharge instructions: where are knowledge deficits greatest? *Acad Emerg Med* 2012;19:e1035-1044.
14. Zavala S, Shaffer C. Do Patients Understand Discharge Instructions? *J Emerg Nurs* 2011;37:138-140.
15. Engel KG, Heisler M, Smith DM, Robinson CH, Forman JH, Ubel PA. Patient comprehension of emergency department care and instructions: are patients aware of when they do not understand? *Ann Emerg Med* 2009;53:454-461.
16. Bartlett G, Blais R, Tamblyn R, Clermont RJ, MacGibbon B. Impact of patient communication problems on the risk of preventable adverse events in acute care settings. *Cmaj* 2008;178:1555-1562.

17. Han JH, Bryce SN, Ely EW, et al. The effect of cognitive impairment on the accuracy of the presenting complaint and discharge instruction comprehension in older emergency department patients. *Ann Emerg Med* 2011;57:662-671.

18. Jones JS, Young MS, LaFleur RA, Brown MD. Effectiveness of an organized follow-up system for elder patients released from the emergency department. *Acad Emerg Med* 1997;4:1147-1152.

19. Racine AD, Alderman EM, Avner JR. Effect of telephone calls from primary care practices on follow-up visits after pediatric emergency department visits: evidence from the Pediatric Emergency Department Links to Primary Care (PEDLPC) randomized controlled trial. *Arch Pediatr Adolesc Med* 2009;163:505-511.

20. Poncia HDM, Ryan J, Carver M. Next day telephone follow up of the elderly: A needs assessment and critical incident monitoring tool for the accident and emergency department. *J Accid Emerg Med* 2000;17:337-340.

21. Biese K, Lamantia M, Shofer F, et al. A randomized trial exploring the effect of a telephone call follow-up on care plan compliance among older adults discharged home from the emergency department. *Acad Emerg Med* 2014;21:188-195.

22. Wu CL, Wang FT, Chiang YC, et al. Unplanned emergency department revisits within 72 hours to a secondary teaching referral hospital in Taiwan. *J Emerg Med* 2010;38:512-517.

23. Šteinmiller J, Routasalo P, Suominen T. Older people in the emergency department: a literature review. *Int J Older People Nurs* 2015;10:284-305.

24. Sheikh S. Risk Factors Associated with Emergency Department Recidivism in the Older Adult. *West J Emerg Med* 2019;20:931-938.

25. American College of Emergency Physicians; American Geriatrics Society; Emergency Nurses Association; Society for Academic Emergency Medicine; Geriatric Emergency Department Guidelines Task Force. Geriatric emergency department guidelines. *Ann Emerg Med* 2014;63:e7-25.

26. Morse L, Xiong L, Ramirez-Zohfeld V, Dresden S, Lindquist LA. Tele-Follow-Up of Older Adult Patients from the Geriatric Emergency Department Innovation (GEDI) Program. *Geriatrics* 2019;4. Doi: 10.3390/geriatrics4010018

27. van Loon-van Gaalen M, van Winsen B, van der Linden MC, Gussekloo J, van der Mast RC. The effect of a telephone follow-up call for older patients, discharged home from the emergency department on health-related outcomes: a systematic review of controlled studies. *Int J Emerg Med* 2021;14:13. Doi: 10.1186/s12245-021-00336-x [Epub ahead of print]

28. Nasser L, Stratton T. BET 1: Follow-up phone calls and compliance with discharge instructions in elderly patients discharged from the emergency department. *Emerg Med J* 2019;36:126-127.

29. LaMantia MA, Platts-Mills TF, Biese K, et al. Predicting hospital admission and returns to the emergency department for elderly patients. *Acad Emerg Med* 2010;17:252-259.

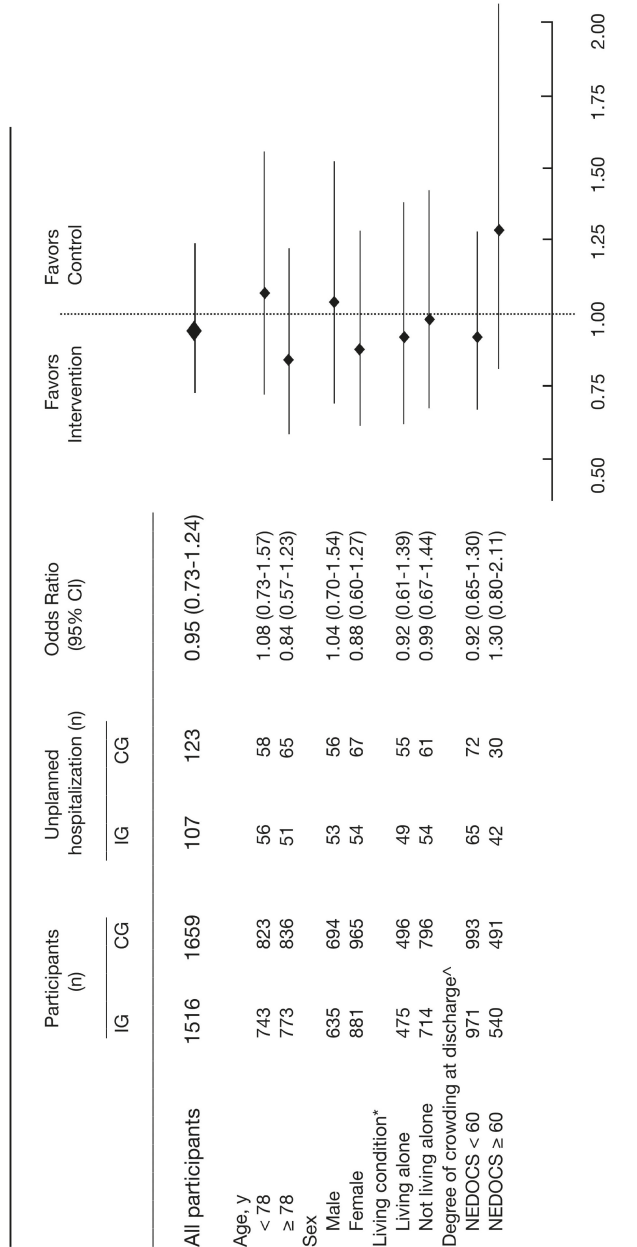
30. Graf CE, Giannelli SV, Herrmann FR, et al. Identification of older patients at risk of unplanned readmission after discharge from the emergency department - comparison of two screening tools. *Swiss Med Wkly* 2012;141. Available at: www.smw.ch/content/smw-2012-13327. Accessed May 3, 2021.

31. McCusker J, Cardin S, Bellavance F, Belzile E. Return to the emergency department among elders: patterns and predictors. *Acad Emerg Med* 2000;7:249-259.

32. McCusker J, Healey E, Bellavance F, Connolly B. Predictors of repeat emergency department visits by elders. *Acad Emerg Med* 1997;4:581-588.
33. Schulz KF, Altman DG, Moher D, Group C. CONSORT 2010 statement: updated guidelines for reporting parallel group randomised trials. *PLoS Med* 2010;7. Doi: 10.1371/journal.pmed.1000251
34. Landrum L, Weinrich S. Readmission data for outcomes measurement: identifying and strengthening the empirical base. *Qual Manag Health Care* 2006;15:83-95.
35. de Vos MS, Hamming JF, Boosman H, Marang-van de Mheen PJ. The Association Between Complications, Incidents, and Patient Experience: Retrospective Linkage of Routine Patient Experience Surveys and Safety Data. *J Patient Saf* 2021;17:e91-e97.
36. Worster A, Haines T. Advanced statistics: understanding medical record review (MRR) studies. *Acad Emerg Med* 2004;11:187-192.
37. Van Der Linden MC, Van Loon M, Gaakeer MI, Richards JR, Derlet RW, Van Der Linden N. A different crowd, a different crowding level? The predefined thresholds of crowding scales may not be optimal for all emergency departments. *Int Emerg Nurs* 2018;41:25-30.
38. Weiss SJ, Derlet R, Arndahl J, et al. Estimating the degree of emergency department overcrowding in academic medical centers: results of the National ED Overcrowding Study (NEDOCS). *Acad Emerg Med* 2004;11:38-50.
39. Cochran VY, Blair B, Wissinger L, Nuss TD. Lessons learned from implementation of postdischarge telephone calls at Baylor Health Care System. *J Nurs Adm* 2012;42:40-46.
40. Bahr SJ, Solverson S, Schlidt A, Hack D, Smith JL, Ryan P. Integrated literature review of postdischarge telephone calls. *West J Nurs Res* 2014;36:84-104.
41. Crede SH, O'Keeffe C, Mason S, et al. What is the evidence for the management of patients along the pathway from the emergency department to acute admission to reduce unplanned attendance and admission? An evidence synthesis. *BMC Health Serv Res* 2017;17:355.
42. Lowthian JA, Lennox A, Curtis A, et al. HOspitals and patients WoRking in Unity (HOW R U?): telephone peer support to improve older patients' quality of life after emergency department discharge in Melbourne, Australia-a multicentre prospective feasibility study. *BMJ Open* 2018;8. Doi:10.1136/bmjopen-2017-020321
43. Hwang U, Hastings SN, Ramos K. Improving Emergency Department Discharge Care with Telephone Follow-Up. Does It Connect? *J Am Geriatr Soc* 2018;66:436-438.
44. Carpenter CR, Shelton E, Fowler S, et al. Risk factors and screening instruments to predict adverse outcomes for undifferentiated older emergency department patients: a systematic review and meta-analysis. *Acad Emerg Med* 2015;22:1-21.
45. Nielsen LM, Gregersen Østergaard L, Maribo T, Kirkegaard H, Petersen KS. Returning to everyday life after discharge from a short-stay unit at the Emergency Department-a qualitative study of elderly patients' experiences. *Int J Qual Stud Health Well-being* 2019;14. Doi: 10.1080/17482631.2018.1563428
46. Carpenter CR, Malone ML. Avoiding Therapeutic Nihilism from Complex Geriatric Intervention "Negative" Trials: STRIDE Lessons. *J Am Geriatr Soc* 2020;68:2752-2756.

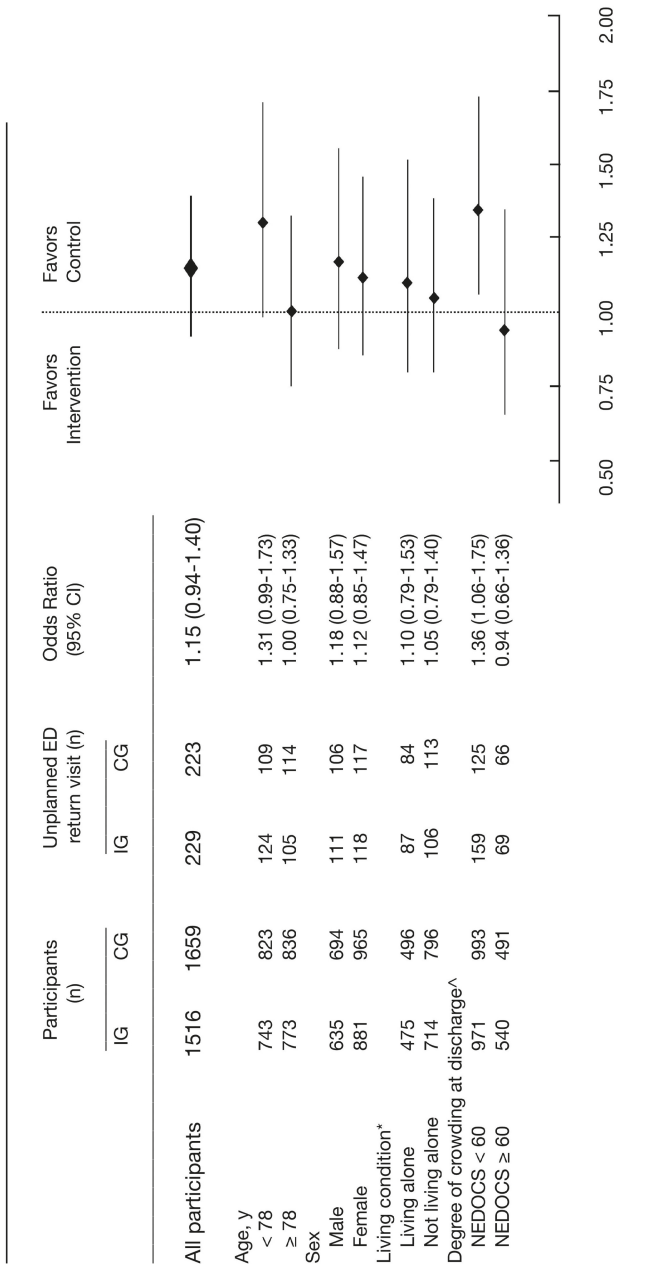
SUPPLEMENTARY INFORMATION

Supplementary figure 1. Risk of unplanned hospitalization within 30 days, depending on the study group



* Living condition unknown in 327 intervention group patients and 367 control group patients
^ NEDOCS at discharge unknown in 5 intervention group patients and 175 control group patients
CG, Control Group; CI, Confidence Interval; ED, Emergency Department; IG, Intervention Group; NEDOCS, National Emergency Department OverCrowding Scale

Supplementary figure 2. Risk of unplanned ED return visit within 30 days, depending on the study group



* Living condition unknown in 327 intervention group patients and 367 control group patients
^ NEDOCS at discharge unknown in 5 intervention group patients and 175 control group patients
CG, Control Group; CI, Confidence Interval; ED, Emergency Department; IG, Intervention Group; NEDOCS, National Emergency Department OverCrowding Scale

■ **Supplementary table 1.** Number of unplanned and planned hospital admissions per study group

Hospital admissions per study group	Unplanned hospital admissions, n=230	Planned hospital admissions, n=198	<i>p</i> -value	OR (95% CI)
Intervention group, n= 203/1516 n (%)	107 (53)	96 (47)	0.69	0.92 (0.63-1.35)
Control group, n=225/1659 n (%)	123 (55)	102 (45)		

CI, confidence interval; *n*, number; *OR*, odds ratio

■ **Supplementary table 2.** Number of unplanned and planned ED return visits per study group

ED return visits per study group	Unplanned ED return visits, n=452	Planned ED return visits, n=27	<i>p</i> -value	OR (95% CI)
Intervention group, n= 242/1516 n (%)	229 (95)	13 (5)	0.80	1.11 (0.51-2.41)
Control group, n=237/1659 n (%)	223 (94)	14 (6)		

CI, confidence interval; *ED*, emergency department; *n*, number; *OR*, odds ratio

Follow-up call (intervention group)

"You were/Mr./Mrs./Ms. was at the Emergency Department yesterday. I would like to ask how you are/he/she is doing. Is this okay with you?"

- Permission to participate with telephone follow-up call: ☐ Yes ☐ No

[Here the nurse indicates whether or not the patient gives permission to participate. If the nurse clicks "Yes", the subsequent questions of the questionnaire will appear.]

[If the nurse clicks "No", the following text will appear:]

- No consent for participation. Wish the patient a good day and end the conversation.

[If the patient has consented to participate, the nurse continues with the following question. In case the nurse does not talk to the patient, but to someone else, "you" is replaced by the patient's name. After the nurse has listened to the interviewee's answer, he/she asks which of the following 5 answers fits best with the interviewee's experience.]

- "You were at the Emergency Department yesterday. How are you doing today?"

- ☐ Very well ☐ Reasonable ☐ Very bad
☐ Well ☐ Bad

[Now the nurse has to indicate whether or not he/she notices a language barrier, hearing impairment or other communication problem while talking to the interviewee.]

Is there a language barrier, hearing impairment or other problem with communication?

- ☐ Language barrier ☐ Other communication problem
☐ Hearing impairment ☐ No problems noticed

- "Did you experience any problems?" ☐ No ☐ Some ☐ Yes

- Explanation: *[space for free text]*

["Explanation" and space for free text appears if the nurse clicks "Some" or "Yes". Here the nurse can fill in which problems the patient has experienced.]

- "To what extent did you understand the advice that you received?"

[The nurse asks which of the following 5 answers fits best with the interviewee's experience.]

- ☐ Very well ☐ Reasonable ☐ Very bad
☐ Well ☐ Bad

•"Can you tell me what the doctor has advised you?"

- ☐ Very well ☐ Reasonable ☐ Not at all
☐ Well ☐ Not quite

[Here the nurse scores to what extent the interviewee is able to repeat the information and advice that has been given in the emergency department by comparing the interviewee's answer with the discharge information and instructions reported in the patient's medical records. If it becomes clear that the interviewee has not properly understood or remembered certain instructions or information, the nurse provides further explanations and repeats or clarifies instructions.]

[If something has been changed in the patient's medication (e.g. new medication was started, change of dose) the nurse asks the next question. Nurses were taught to ask whether the interviewee has understood the new dosing schedule, indication for the medication change, what the medication is for and whether the

patient will be able to acquire the medication. If the patient is not able to acquire the medication, the nurse explores why this is not possible and helps to find a solution. E.g. he/she can offer to phone the pharmacy to ask them to deliver the medication at the patient's home.]

- "I see something has been changed in your medication. Do you have any questions about that?"

[space to fill in the interviewee's answer and to register any problems]

[Besides the next question, the nurse checks whether the interviewee has understood whether, when and where the patient has a follow-up appointment. The nurse checks in the EHS whether follow-up appointments are scheduled and if not, he/she can arrange to schedule one. The nurse also checks whether the interviewee has understood what to do if he/she notices alarm symptoms or signs. If the patient reports alarm symptoms, the nurse advises to contact the general practitioner, to return to the ED or, when in doubt, asks the emergency physician on call to contact the patient.]

- "Do you have any questions about follow-up appointments?"

[space to fill in the interviewee's answer and to register any problems]

- "Do you know when you have to contact your general practitioner or the emergency department?"

[space to fill in the interviewee's answer and to register any problems]

- "Do you have any other questions?"

[space to fill in the interviewee's answer and to register any problems]

[The nurse will fill in the following items]:

Indicate on which topic additional information or care was required:

- | | | |
|---|--|---|
| ☐ Medication change or use | ☐ Self-care advice | ☐ Follow-up appointments |
| ☐ Alarm symptoms | ☐ Referral (to e.g. general practitioner, dentist, physiotherapist, | |
| ☐ Other | home care) | |

Explain what additional information or care was given: *[space for free text]*

- "Do you feel insecure now that you are back home?"

[The nurse asks which of the following 3 answers fits best with the interviewee's experience.]

- | | | |
|--------------------------|--------------------------------|---------------------------|
| ☐ No | ☐ A little | ☐ Yes |
|--------------------------|--------------------------------|---------------------------|

- Explanation: *[space for free text]*

["Explanation" and space for free text appears if the nurse clicks "A little" or "Yes". Here the nurse can fill in why the patient feels insecure and which actions were undertaken to support the patient. The nurse discusses with the patient whether he/she can help to offer more support. E.g. by contacting the patient's caregiver or general practitioner or by arranging home care.]

- "Do you feel supported?"
- | | | |
|--------------------------|--------------------------------|---------------------------|
| ☐ No | ☐ A little | ☐ Yes |
|--------------------------|--------------------------------|---------------------------|

- "If you feel supported, by whom do you feel supported?"

- | | | |
|--|---|---------------------------------------|
| ☐ People around me/caregiver(s) | ☐ The hospital | ☐ Pets/animals |
| ☐ People from home care | ☐ Mental supporter | ☐ Nobody |
-

"Now I would like to ask you some questions about how you experienced the Emergency Department visit."

- "Did you receive the care that you expected at the Emergency Department?"

[The nurse asks which of the following 4 answers fits best with the interviewee's experience.]

- | | | | |
|---------------------------------------|------------------------------|--------------------------------|----------------------------------|
| ☐ Yes, completely | ☐ Mostly | ☐ A little | ☐ Not at all |
|---------------------------------------|------------------------------|--------------------------------|----------------------------------|

o "What score do you give your stay in this Emergency Department of Haaglanden Medical Center (HMC)?"

- | | | | |
|---------------|-----|-----|-----------------|
| o 1, very bad | o 4 | o 7 | o 10, excellent |
| o 2 | o 5 | o 8 | |
| o 3 | o 6 | o 9 | |

o "To what extent would you recommend this Emergency Department to relatives and friends if they would need emergency care?"

- | | | | |
|--------------------|-----|-----|-----------------|
| o 1, certainly not | o 4 | o 7 | o 10, certainly |
| o 2 | o 5 | o 8 | |
| o 3 | o 6 | o 9 | |

- Remarks [*space for free text*]

[Here the nurse can explain the interviewee's score, for instance if he/she had any complaints or problems and whether these need further action.]

[From September 2018 to March 2019, we asked patients the following question before ending the conversation:]

"Currently we are conducting a scientific study on healthcare use by patients who have visited our Emergency Departments. May we call you again to ask questions about this in one month? The data will be processed anonymously."

- Permission to call again in one month

o Yes	o No
-------	------

Thank the patient for his/her time, wish the patient a good day and end the conversation.

Satisfaction survey call (control group)

"You were/Mr./Mrs./Ms. was at the Emergency Department yesterday. I would like to ask how you have experienced the emergency department visit, so that we can improve our care with that information. Are you okay with that?"

- Permission to participate with satisfaction survey call: ☐ Yes ☐ No

[Here the nurse indicates whether or not the patient gives permission to participate. If the nurse clicks "Yes", the subsequent questions of the questionnaire will appear.]

[If the nurse clicks "No", the following text will appear:]

- No consent for participation. Wish the patient a good day and end the conversation.

[Now the nurse has to indicate whether or not he/she notices a language barrier, hearing impairment or other communication problem while talking to the interviewee.]

Is there a language barrier, hearing impairment or other problem with communication?

- ☐ Language barrier ☐ Other communication problem
☐ Hearing impairment ☐ No problems noticed

"I would like to ask you five questions. For each question, please choose from the answers that I mention the one that fits best with your experience."

- "Did you receive the care that you expected at the Emergency Department?"

☐ Yes, completely ☐ Mostly ☐ A little ☐ No, not at all
- "Did the healthcare provider give you clear information about your treatment during your stay at the Emergency Department?"

☐ Yes, completely ☐ A little ☐ Not applicable
☐ Mostly ☐ No, not at all
- "Did the healthcare provider tell you what signs or symptoms you had to be aware of after leaving the Emergency Department?"

☐ Yes, completely
☐ Mostly
☐ A little
☐ No, not at all
☐ Not applicable (my health problem was solved)
- "What score do you give your stay in this Emergency Department of Haaglanden Medical Center (HMC)?"

☐ 1, very bad ☐ 4 ☐ 7 ☐ 10, excellent
☐ 2 ☐ 5 ☐ 8
☐ 3 ☐ 6 ☐ 9
- "To what extent would you recommend this Emergency Department to relatives and friends if they would need emergency care?"

- | | | | |
|--|-------------------------|-------------------------|-------------------------------------|
| ☐ 1, certainly not | ☐ 4 | ☐ 7 | ☐ 10, certainly |
| ☐ 2 | ☐ 5 | ☐ 8 | |
| ☐ 3 | ☐ 6 | ☐ 9 | |

- Remarks [space for free text]

[Here the nurse can explain the interviewee's score, for instance if he/she has any complaints or problems and whether these need further action.]

[From September 2018 to March 2019, we asked patients the following question before ending the conversation:]

"Currently we are conducting a scientific study on healthcare use by patients who have visited our Emergency Departments. May we call you again about this in one month? The data will be processed anonymously."

- Permission to call again in one month ☐ Yes ☐ No

Thank the patient for his/her time, wish the patient a good day and end the conversation.