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Team training program's impact on medication administration, teamwork and patient safety culture in an ambulance service (TEAM-AMB): a longitudinal multimethod study protocol

Anne Vifladt [1,2] Randi Ballangrud [1] Kjetil Myhr,[1,3] Eystein Grusd,[1,4] Jan Porthun,[1] Pål Anders Mæhlum,[1,4] Karina Aase,[1,5] Stephen J M Sollid,[4,5] Kristian Ringsby Odberg [1]

Correspondence to
Dr Anne Vifladt;
anne.vifladt@ntnu.no

ABSTRACT

Introduction Medication administration errors (MAEs) have the potential for significant patient harm, and the frequency of MAEs in the ambulance services is not well known. Effective teamwork is paramount for providing safe and effective patient care, especially in a time-sensitive, high-risk environment such as the ambulance services. Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS) is an evidence-based team training programme that, to our knowledge, has not been studied in the ambulance services previously. TeamSTEPPS is based on the five principles: team structure, communication, leadership, situation monitoring and mutual support. This study aims to advance the knowledge of the medication administration process in the ambulance services and study the impact of a team training programme on the frequency of MAEs, and the perception of teamwork, and patient safety culture.

Methods and analysis This study uses a longitudinal multimethod design to evaluate medication administration and the implementation of the team training programme TeamSTEPPS in an ambulance service. A review of electronic patient journals 6 months prior to the intervention, and 12 months after the intervention will provide data on the frequency of MAEs. Focus group interviews and questionnaires will be carried out before and after the intervention to describe the perception of teamwork and patient safety culture among ambulance professionals. Observations, individual interviews and a review of guidelines will be conducted in the first and second quarters of 2022 to study the medication administration process in ambulance services.

Ethics and dissemination The study protocol was reviewed by the Regional Committees for Medical and Health Research Ethics Central Norway and approved by the Hospital Trust data protection officer, and the head of the Prehospital Division at the Hospital Trust. The data material will be managed confidentially and stored according to regulations. The results will be disseminated through scientific papers, reports, conference presentations, popular press, and social media.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ This study will explore aspects of prehospital healthcare mostly undescribed in the existing literature.
⇒ This study uses a multimethod assessment of the impact of team training in an ambulance service through journal review, focus group interviews and questionnaires.
⇒ Other factors than the TeamSTEPPS intervention may influence the results.

INTRODUCTION

Medication administration is a significant source of harm to patients and can occur at all stages of the medication administration process.[1–3] The WHO defines all medication administration in emergencies and the administration of narcotics and sedatives as high-risk activities.[4] In the WHO Global Patient Safety Action Plan (2021–2030),[5] *medication without harm* is part of a strategy directed towards the safety of clinical processes. Central in the process to ensure safe medication practice are the 'five rights' of medication administration: the right patient, the right drug, the right time, the right dose and the right route. The 'five rights' are focused on the individual performance, however, safe medication administration lies within a broader systems approach.[6]

Part of the emergency medical service is the ambulance service that cares for the entire spectrum of patient presentations,

from elective transfers between facilities to accidents involving multiple causalities requiring complex interventions with an increased risk of medication administration errors (MAEs). The term 'medication error' is by the National Coordinating Council for Medication Error Reporting and Prevention (NCC-MERP, USA) defined as *any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the healthcare professional, patient or consumer.*[7] MAEs in the ambulance services are not well described. A systematic review of patient safety in emergency medical services published in 2012 by Bigham *et al*,[8] described the limited research concerning MAEs. The review included studies referencing drug dose calculations and medication prescriptions in ambulances. A Swedish trigger tool review of medical records, estimated that adverse events occur in 4.3% of ambulance missions where several triggers originate from medication administration.[9] A retrospective analysis of medication dosing errors in paediatric patients found medication dosing deviations in 34.7% of administered medications by the ambulance services.[10] Longer transport time and a higher number of different drugs have been associated with an increased risk of MAEs.[11]

Team training in healthcare appears to improve patient results.[12] Teamwork is defined as *the interaction or relationship between two or more health professionals who work interdependently to provide care for patients* (Oandasan, p3).[13] A recently published systematic review concluded that teamwork and communication training positively affect the patient safety culture and patient outcomes in the emergency department.[14] A German study found that, communication failures were associated with MAEs in the prehospital setting.[15]

Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS) is a team training programme developed by the United States Agency for Healthcare Research and Quality (AHRQ) and the United States Department of Defense.[16 17] Team training implies the endorsement of a team structure and teamwork competencies, and has been used in various healthcare settings and countries.[18] The programme provides an evidence-based strategy to promote teamwork and patient safety within healthcare.[16 17 19] TeamSTEPPS is based on the five key principles: team structure, communication, leadership, situation monitoring and mutual support. And the programme presents tools and strategies that can be used to improve competency within these principles.[16] Team training is essential to improve teamwork skills and thereby strengthen patient safety culture.[16] Further, communication and teamwork skills are highlighted as essential for safe patient care.[16] In a systematic review by Buljac-Samardzic *et al*,[20] TeamSTEPPS was described as one of several team training programmes that improve team performance. In this study, the intervention is the implementation of the TeamSTEPPS programme.

To improve the patient safety, creating an environment with a positive patient safety culture has been recommended.[21] Patient safety culture has been defined as *an integrated pattern of individual and organisational behaviour, based on shared beliefs and values that continuously seek to minimise patient harm, which may result from the process of care delivery* (European Union Network for Patient Safety (EUNetPaS), p4).[22] In a recently published systematic review by Churruca *et al*,[23] the most frequent themes of the patient safety culture in hospitals identified were leadership, perception of safety, teamwork and collaboration. Studies on patient safety culture have been carried out in many healthcare settings, while less is known about the patient safety culture in the ambulance services.[24] The patient safety culture has been studied in Norwegian prehospital context, where one of the dimensions scored highly were *teamwork within unit.*[25]

Theoretical framework
System engineering initiative for patient safety model
The human factors discipline is about understanding the *interaction among humans and other elements of a system.*[26] The System Engineering Initiative for Patient Safety (SEIPS)[27] model is a dynamic system-based approach to patient safety. It will be used as a theoretical framework to improve understanding of the complexity of medication administration in ambulance services. The SEIPS model visualises how the work system elements (persons, internal environment, tasks, tools, technology and organisation) interact, including medication administration and teamwork, resulting in specific outcomes.[27]

Kotter's model for leading change
The Kotter's model for leading change will guide the TeamSTEPPS implementation.[16 28] The model describes the process of change in eight successive steps. The implementation process is facilitated by a change team and requires (1) *establishing a sense of urgency*, (2) *creating a guiding coalition*, (3) *developing a vision and strategy*, (4) *communicating the change vision*, (5) *empowering broad-based action*, (6) *generating short-term wins*, (7) *consolidating gains and producing more change* and (8) *anchoring new approaches in the culture.*[28]

Rationale for the research study
Given the limitations of the current evidence base,[8–11] the rationale behind this longitudinal multimethod study is to fill parts of the knowledge gaps regarding the medication administration process in the ambulance service, and how the intervention based on the team training programme TeamSTEPPS affects MAEs. While TeamSTEPPS has proven beneficial in various hospital settings around the world,[20] to our knowledge, no studies have been published documenting its impact on the ambulance services.

Aims and objectives
This study aims to (1) advance the knowledge of the medication administration process in an ambulance service and (2) study the impact of a team training programme on MAEs, teamwork and patient safety culture as illustrated
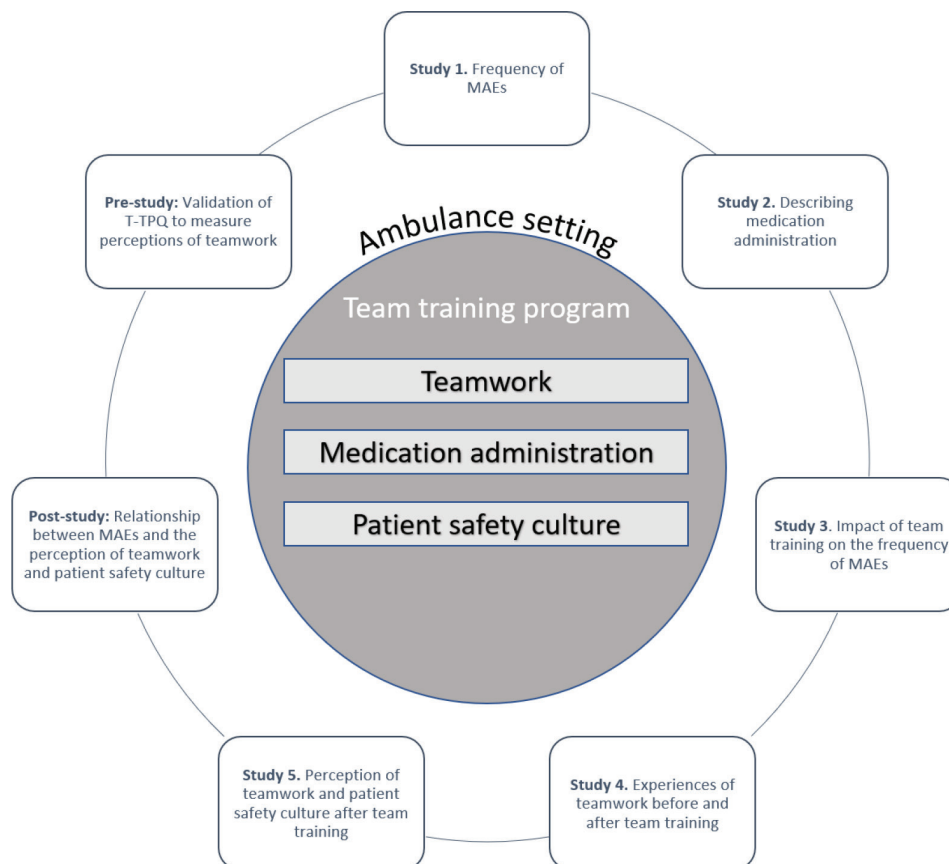
Figure 1 Team training and medication administration in an ambulance service (TEAM-AMB). MAEs, medication administration errors; T-TPQ, TeamSTEPPS Teamwork Perception Questionnaire.

in figure 1. To address the overall aims, the following objectives will guide the study:

Pre-study objective

To analyse and validate the psychometric properties of the Norwegian version of the TeamSTEPPS Teamwork Perception Questionnaire (T-TPQ) for use within ambulance services.

Study objectives

1. To determine the frequency of MAEs in an ambulance service.
2. To describe the medication administration process in an ambulance service according to the SEIPS model.
3. To identify the impact of a team training programme on the frequency of MAEs in an ambulance service.
4. To explore ambulance professionals' teamwork experiences before and after the implementation of a team training programme, as well as their experiences with the programme.
5. To compare ambulance professionals' perceptions of teamwork and patient safety culture before and after the implementation of a team training programme.

Post-study objective

To study the association between MAEs, team training and patient safety culture in an ambulance service.

METHODS AND ANALYSIS
Design

This study uses a longitudinal multimethod design, including qualitative and quantitative approaches and is composed of a prestudy, five main studies and a poststudy. An overview of the study is presented in table 1. Relevant items from the Standard Protocol Items: Recommendations for Interventional Trials checklist were used when drafting the manuscript (online supplemental file 1).

A stepped-wedge cluster randomised trial (SW-CRT) provides the framework for the intervention based on the team training programme TeamSTEPPS. Two clusters will be formed from seven ambulance stations, with both clusters containing a combination of urban and rural units. The order in which the two clusters undergo the intervention will be randomised.

The prestudy includes a cross-sectional survey to test the psychometric properties of the Norwegian version of the TeamSTEPPS Teamwork Perception Questionnaire (T-TPQ). Study 1 and 3 involves a retrospective review of electronic patient journals (EPJs) to provide data on the frequency of MAEs before and after the intervention of the team training programme. Study 2, individual interviews and observations of ambulance professionals, in conjunction with a review of relevant local and national guidelines, will be used to analyse the medication

Table 1 Overview of the TEAM-AMB study

A team training programme's impact on medication administration, teamwork, and patient safety culture in an ambulance service (TEAM-AMB).

Prestudy	Research questions: Are the psychometric properties of the Norwegian version of the T-TPQ appropriate for use within ambulance services? Design: quantitative Sample: ambulance professionals Data collection: a cross-sectional survey with T-TPQ				
Aims	The overall aims of the study are: (1) to advance the knowledge of the medication administration process in an ambulance service and (2) to study the impact of a team training programme on MAEs, teamwork and patient safety culture				
	Study 1	**Study 2**	**Study 3**	**Study 4**	**Study 5**
Research questions	What is the frequency of MAEs in an ambulance service?	How can the medication administration process in an ambulance be described according to the SEIPS model?	What is the impact of a team training programme on the frequency of MAEs in an ambulance service?	How do ambulance professionals experience teamwork before and after implementing a team training programme? Relatedly, how can their experience with the programme be described?	Have ambulance professionals' perceptions of teamwork and patient safety culture changed after the implementation of a team training programme?
Design	Quantitative	Qualitative	Quantitative	Qualitative	Quantitative
Sample data source	EPJs	Ambulance professionals	EPJs	Ambulance professionals	Ambulance professionals
Data collection	Retrospective review of EPJs	Individual interviews, observations and review of guidelines	Retrospective review of EPJs	Focus group interviews before and after the intervention	A cross-sectional survey with the questionnaires T-TPQ and PreHSOPSC before and after the intervention
Poststudy	Research questions: What is the relationship between MAEs and ambulance professionals' perceptions of team training and patient safety culture in an ambulance service? Design: quantitative Sample: ambulance professionals and EPJs Data collection: data from the review of EPJs (Study 1 and 3) and the cross-sectional survey of the ambulance professionals' perceptions of teamwork and patient safety culture (Study 5)				

EPJs, electronic patient journals; MAEs, medication administration errors; PreHSOPSC, Prehospital Survey on Patient Safety Culture; SEIPS, System Engineering Initiative for Patient Safety; T-TPQ, TeamSTEPPS Teamwork Perception Questionnaire.

administration process. In study 4, focus group interviews will provide data on the ambulance professionals' experience with teamwork and the team training programme. For study 5, a cross-sectional survey will provide data on ambulance professionals' perceptions of teamwork and patient safety culture, before and after the intervention. The poststudy uses a quantitative approach and includes data from study 1, 3 and 5 to study the relationship between MAEs, team training, and patient safety culture.

Research setting

The study will be conducted at ambulance service within a Norwegian hospital trust that serves a population of 150 000 inhabitants and performs approximately 20 000 missions yearly. The distance from the most rural local ambulance station to the nearest hospital is 250 km, equivalent to approximately 3 hours of driving.

Sample
Ambulance professionals

In the prestudy, studies 2, 4 and 5 and the poststudy the sample will consist of frontline ambulance professionals, including ambulance service technicians, paramedics and registered nurses. An ambulance service technician is a licensed emergency medical technician with 4 years of vocational high-school education, including 2 years of

on-the-job training. Paramedics are licensed ambulance service technicians with an additional 1 year full-time equivalent university education, or a 3-year university education at the bachelor's level. Registered nurses have a 3-year university education at the bachelor's level and a license. Physicians can also work in ambulance services.

Data from patient medical records

In study 1 and 3, a retrospective review of EPJs will be conducted to describe the frequency of MAEs before and after the intervention. The frequency of MAEs in the ambulance services has varied substantially in the literature.[10 11] Therefore, the plan for study 1 is to review an initial 500 EPJs, perform an interim analysis and according to the frequency of MAEs, possibly expand the number of EPJs examined to ensure an adequate sample size. The number of journals to review in study 3 will be decided with a power analysis utilising the findings from study 1.

Team training intervention

The TeamSTEPPS intervention will adopt a similar strategy, previously used at a Norwegian surgical hospital ward.[29] The plan is based on the original TeamSTEPPS implementation plan,[16] and change model by Kotter.[28] Furthermore, the research study is based on principles

from the Medical Research Council's guide for 'Developing and evaluating complex interventions'.[30]

Assessment, planning and establishing a change team

A site assessment, according to the TeamStepps implementation guide, will be carried out ahead of the team training programme to assess organisational readiness to undertake the intervention. Dedicated change teams will be assembled in each cluster (Kotter, step 2) with the necessary authority, motivation and expertise to provide the leadership and guidance essential for the intervention to be successful. The unit leader, chief medical officer and hand-picked ambulance professionals with different levels of experience will be invited to join the change team, who will be supported by members of the research group throughout the process. Members of the change team will undergo training to become TeamSTEPPS instructors and they will be responsible for planning and executing the team training programme within their respective clusters. Throughout the intervention period, development of the four core competencies central to TeamSTEPPS (communication, leadership, situation monitoring and mutual support) will form the basis of the intervention.

Training and implementation

All ambulance professionals from the two clusters will be mandated to participate in an introduction day, carefully designed to establish a sense of urgency (Kotter, step 1), communicate the organisation's vision for change (Kotter, step 4) and empower broad-based action (Kotter, step 5). Short lectures, simulations, group exercises and discussions will be used to introduce TeamSTEPPS and its key concepts and tools. Each cluster will have two separate introduction days to allow for ongoing clinical duties. Supporting material in the form of pocket guides and leaflets will be distributed to ambulance professionals on their respective introduction days. Following the introduction day, the TeamSTEPPS tools selected by the research group and change teams will be introduced gradually during the intervention period. Unit meetings and individual appraisals, newsletters and posters will be used strategically, to remind ambulance professionals of the organisation's teamwork and patient safety vision, as well as highlight the TeamSTEPPS tools scheduled for implementation in an ongoing manner. Unit-specific goals will be chosen at the onset of team training, and the change teams will celebrate short-term achievements (Kotter, Step 6).[16 28]

Sustainment

Refresher courses that are similar to the introduction day will be held approximately 3 and 9 months into implementation, to increase consistent implementation of the team training programme.

Data-collection

For study 1, a review of EPJs from the 6-month period prior to the intervention will be conducted. For study 3, EPJs from the 12-month period after the intervention will

be reviewed. The data collection for the prestudy, and studies 2, 4 and 5 will take place from the first quarter of 2022 to the third quarter of 2023. For study 2, the observations, individual interviews and review of guidelines will start in the first quarter of 2022. The poststudy uses quantitative approach and includes data from studies 1, 3 and 5. Table 2 illustrates the timeline for the TeamSTEPPS intervention and the data collection.

Retrospective patient journal review (studies 1 and 3)

A retrospective review of EPJs will be conducted to document the frequency of MAEs before and after implementing the team training programme. The extracted data will be systematically reviewed by members of the research group who have extensive knowledge and experience with ambulance services and emergency medicine. Two reviewers will analyse all EPJs separately, and then classify and compare them. A third member of the research group with extensive clinical and research experience will be consulted if an agreement whether a MAE or not cannot be reached.

Qualitative mixed-methods study (study 2)

Data will be collected via individual interviews, and secondarily via participant observations of ambulance professionals, supplemented by local and national medication guidelines.
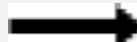
Individual interviews

Semistructured individual interviews with 8–12 ambulance professionals will be conducted to gain insight into their experiences with the medication administration process. The interviews will occur at the same ambulance stations where the observations will be conducted within the two study clusters. A semistructured interview guide will include themes from the work system elements, such as tools and technology, organisation, physical environment, task, and persons (online supplemental file 2). The focus will be on critical aspects of the medication administration process and include keywords such as training, teamwork and competence, working environment, technology, and double control. Guidelines will supplement the interviews and notes from direct observations.[31 32]

Participant observation

Observations will occur at selected ambulance stations located within the two clusters, for a period of 5 months, approximately. Randomly selected ambulance professionals from the station will be observed while working. The observation guide will be based on the SEIPS framework[27] to analyse and describe the medication administration process (online supplemental file 3). Current guidelines related to medication administration will be reviewed for each ambulance station. The observers will be trained paramedics and an intensive care nurse with a PhD. in patient safety, who adhere to ethical guidelines and are bound by patient confidentiality. Only one observer will be assigned to each case because that is what working conditions onboard an ambulance allow for.

Table 2 Timeline for the TeamSTEPPS intervention and the data collection for the two clusters and the validation group

Timepoint	2021		2022				2023			
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Intervention, cluster 1: TeamSTEPPS			➡							
Assessments, cluster 1:										
Study 1 and 3 (review of EPJs) Medication administration events	t_0	t_0			t_1	t_1	t_1	t_1		
Study 2 (individual interviews, observations) Process of medication administration			x	x						
Study 4 (focus-group interviews) Teamwork			t_0	t_1						
Prestudy and study 5 (cross-sectional) Safety culture, teamwork			t_0	t_1			t_2			
Intervention, cluster 2: TeamSTEPPS				➡						
Assessments, cluster 2:										
Study 1 and 3 (review of EPJ) Medication administration events			t_0	t_0			t_1	t_1	t_1	t_1
Study 2 (individual interviews, observations) Process of medication administration			x	x						
Study 4 (focus-group interviews) Teamwork					t_0		t_1			
Prestudy and study 5 (cross-sectional) Safety culture, teamwork					t_0		t_1		t_2	
Assessment, validation group:										
Prestudy (cross-sectional) Safety culture, teamwork			t0						t1	

t_0 =Baseline, t_1=follow-up, time 1, t_2=follow-up, time 2, x=times of individual interviews and observation.
EPJs, electronic patient journals; TeamSTEPPS, Team Strategies and Tools to Enhance Performance and Patient Safety.

Semi-structured focus group interviews (study 4)

Semistructured focus-group interviews will be conducted before and after the intervention period. Two convenience samples, with five to seven ambulance professionals in each sample, will be invited to participate. In total, at least four interviews will be conducted. A pilot interview with a focus group of similar size and composition outside the two clusters, but within the same hospital trust, will be conducted to validate the interview guide (online supplemental files 4 and 5). A moderator, and an observer who will take field notes, will be responsible for conducting the interviews. To validate the interviews, notes will be reviewed by the participants on completion of the interviews.

Cross-sectional survey (prestudy and study 5)

Three cross-sectional surveys will be electronically distributed in each cluster. One will be distributed before starting the team training intervention, one on completion and one 8 months after completion. Each survey will consist of the T-TPQ and the Prehospital Survey on Patient Safety Culture (PreHSOPSC). Each respondent will be asked to provide baseline demographic data: age group, sex, professional education, current position, workplace and work experience.

Teamwork perceptions questionnaire

The T-TPQ will be used to measure the perception of teamwork among ambulance professionals. The questionnaire was developed by the American Institute for Research[33] and validated.[34] It has been translated into Norwegian and tested for its psychometric properties and found to be acceptable for measuring individual healthcare professionals' perceptions of group-level teamwork within their unit.[35] The T-TPQ consists of 35 items using five dimensions, with seven items within each dimension. These dimensions relate to teamwork and include team structure, communication, leadership, situation monitoring and mutual support. The items will then be scored on a five-point scale (1=strongly agree, 5=strongly disagree). For each dimension, the mean score will then be calculated.[33]

Data from the cross-sectional survey with T-TPQ will be used in the prestudy. The T-TPQ will then undergo adaptation to fit the ambulance setting and will be tested for reliability and construct validity.

Prehospital survey on patient safety culture

The PreHSOPSC will be used to measure ambulance professionals' perception of patient safety culture.[36] The PreHSOPSC was adapted to the prehospital environment from the original questionnaire Hospital Survey on Patient Safety Culture developed by Sorra and Nieva in 2003,[37 38] funded by the AHRQ in the USA. The questionnaire was previously translated into Norwegian, tested for psychometric properties and found satisfactory for use in hospital[39] and prehospital settings.[36] The PreH-SOPSC consists of 46 items composed of 12 dimensions of safety culture; 7 of these are at the unit level, 3 at the hospital level and 2 are outcome measures. The items will be scored on a five-point scale (1=strongly disagree, 5=strongly agree/1=never, 5=always). In addition, the questionnaire consists of two single items related to *the frequency of error reporting* and *overall perception of safety.*[36]

Data analysis plan

Quantitative analysis

For studies 1, 3 and 5 and the prestudies and poststudies, descriptive statistics such as frequencies, percentages, means, medians, SD and 95% CIs will be reported, where appropriate. Relevant parametric and non-parametric statistical tests will be conducted based on the normality of the variables. The use of relevant statistical analyses allows the study to evaluate the relationship between the variables and understand changes over time.

For the pre-study, the T-TPQ will be tested for reliability and construct validity using a confirmatory factor analysis.

IBM SPSS Statistics V.25 and SPSS AMOS V.25 will be used for data analysis.

Qualitative analysis

For study 2, the work system elements from the SEIPS model will provide a theoretical framework to analyse and describe the medication administration process.[27] Individual interviews with ambulance professionals will be the primary data, supplemented by data collected from written guidelines and notes from observations. A content analysis based on Elo and Kyngäs[40] will be used to analyse the data.

For study 4, an inductive approach, based on reflexive thematic analysis[41 42] will be used to analyse qualitative data from the focus group interviews.

Limitations

There are potential limitations in study design. By design, the SW-CRT trial may be confounded in that the control period occurs before the intervention period.[43] One cluster will be randomised to undergo the intervention before the other cluster being exposed for the intervention, all under evaluation. One benefit of this design is that the intervention will be rolled out to all participants included in the study.

The study uses a longitudinal approach and include data collection from two clusters over time. This is a limitation because the risk of attrition increases when the interval

between data collection points is too long.[44] Changes in the participants within the two clusters during the study period, due to job changes, retirement and leave, might affect study results.

Regarding observations, there is uncertainty regarding the extent of access to situations where medication administration takes place. Furthermore, there is a risk of bias-influenced situations with an observer, as ambulances are inherently small working environments. The latter will be strengthened through the use of two observers and the inclusion of more than one ambulance stations.

Patient and public involvement

A stakeholder from the ambulance services is a member of the TEAM-AMB study group who has contributed ideas surrounding the design and feasibility of this study and the development of the research protocol. Members of the change team hold active positions in the ambulance service. Involvement of the leadership and change team in ambulance services may prove positive for generating a feeling of ownership in the study and may serve to reinforce potential effects associated with teamwork and patient safety culture. Patient and public involvement is not part of this study. Involvement of patients due to medication administration in ambulance setting could have been interesting considering their experience with both communication and involvement when administration medication in ambulance setting, and with MAEs.

ETHICS AND DISSEMINATION

The studies have been planned and will be conducted according to the Helsinki Declaration and personal data regulation.[45] The study protocol, trial documents, including participants' information and consent forms, and data management were approved by the Data Protection Officer at the Hospital Trust (reference no: 16797830), and the head of the Prehospital Division at the Hospital Trust. The study was reviewed by the Regional Committees for Medical and Health Research Ethics Central Norway (reference no: 250950). Information about the study and an invitation to participate will be provided to participants in written form and will include information about the principle of voluntariness and confidentiality as well as the right to withdraw from the study at any time. Written consent will be obtained from participants in studies 2 and 4. Online supplemental file 6 gives an example of the consent form for interviews in study 2. The prestudy and study 5 will remain anonymous, and participation will be confirmed by answering and submitting questionnaires.

Data from the interviews will be collected in the form of encrypted audio recordings using a smartphone application before being transcribed. Field notes will be written on paper and finalised electronically directly after the observations are taken. The transcribed interviews and observation notes will be anonymised prior to the analysis. Deidentified data from the medical record review

will be transferred from the medical record to a secure server by a third person. The reviewers will not have access to anything directly identifiable about the patients or contact information. In the case of discovering an undetected event with the potential to cause harm during the journal review, the project leader will notify the Hospital Trust division management which can reidentify the EPJ forms and take appropriate action. The data from the electronic survey will be collected by 'Nettskjema'. All data will be stored at a secured server. The Hospital Trust is the data owner in this study.

The findings of this study will be disseminated through publication in peer-reviewed scientific journals, presentations at national and international conferences, the popular press and social media. This study will contribute new knowledge about medication administration and team training in an ambulance setting. This knowledge is highly relevant for those pursuing their bachelor's degrees as paramedics, people working in ambulance settings, and other stakeholders.

Author affiliations
¹Department of Health Sciences Gjøvik, Norwegian University of Science and Technology, Gjøvik, Norway
²Department of Research, Innlandet Hospital Trust, Brumunddal, Norway
³Department of Acute Care Medicine, Innlandet Hospital Trust, Brumunddal, Norway
⁴Department of Prehospital Care, Innlandet Hospital Trust, Brumunddal, Norway
⁵Center for Resilience in Healthcare, Faculty of Health Sciences, University of Stavanger, Stavanger, Norway

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ORCID iDs
Anne Vifladt http://orcid.org/0000-0001-6594-9725
Randi Ballangrud http://orcid.org/0000-0003-0403-0509
Kristian Ringsby Odberg http://orcid.org/0000-0003-3456-9740

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