

Extended Care Paramedic clinical guideline compliance, does it have potential for harm?

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Abstract

Background

Extended Care Paramedic (ECP) practice is aimed at managing more patients at home or in the community under a delegated scope of practice applying pre-determined clinical guidelines. These clinical guidelines have been carefully developed to mitigate the increased risk associated with treating more patients in the community. This study aimed to evaluate the compliance of the ECPs in applying the clinical guidelines for lower back pain and syncope and to analyse the risk associated with non-compliance.

Methods:

Cases of syncope or lower back pain attended by ECPs were reviewed for compliance in a two stage evaluation. Based upon the documented clinical record written by the ECP, the compliance with the clinical guideline was determined. In cases where the guideline was not followed, two independent experts assessed the potential risk of harm for a patient utilising the Ministry of Health clinical incident risk scoring system.

Results:

There were 23 lower back pain and 25 syncope cases collected between April 2011 and Feb 2012 that were assessed. In 16 (64%) of the syncope cases the patient was managed in the community, although in 7 (44%) of these the case documentation did not demonstrate guideline compliance. The most commonly

missed components of the guideline were headache, recent head injury and valvular heart disease.

In 17 (74%) of the lower back pain cases the patient was managed in the community, however in 13 (76%) of these cases the case documentation did not demonstrate guideline compliance. The most commonly missed components of the guideline were weight loss and the presence of osteoporosis.

The clinical risk associated with non-compliance was assessed differently by the two experts. One expert rated 3 (43%) of the syncope cases and 9 (69%) of the lower back pain cases as being a potential sentinel risk of harm to a patient, while the second rated 1 (14%) of the syncope cases and 2 (15%) of the lower back pain cases as a potential sentinel risk.

Conclusion

This study raises significant concerns regarding documentation of guideline compliance in cases where ECPs are choosing to manage patients in the community. It is not clear whether this reflects a failure in clinical care, or a failure in the documentation of the care provided. In either case, the risk to the patient, the ambulance service and the paramedic associated with the failure in documentation is considerable. In a significant proportion of these cases the risk associated with the missing documentation was classified as sentinel, although the variance in risk classification was considerable. The discrepancy associated with the risk assessment observed demonstrates the difficulty in evaluating risk purely on the basis of documentation of cases. The level of non-compliance appears to be different for the two clinical conditions studied. Quality improvement initiatives will be required to ensure that the ECP clinical evaluation of patients and the corresponding documentation are more compliant with the current operating guidelines.

Preface

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List of Abbreviations

(AMPDS)	Advanced Medical Priority Dispatch System
ALS	Advanced Life Support
BLS	Basic Life Support
CP	Community Paramedic
ECP	Emergency Care Paramedic
ED	Emergency Department
EMTs	Emergency Medical Technicians
GP	General Practitioner
ILS	Intermediate Life Support
PMH	Past Medical History
PP	Paramedic Practitioner
SMO	Senior Medical Officer
UCC	Urgent Community Care

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Introduction

Urgent Community Care (UCC) is a model of care where Extended Care Paramedics (ECPs) are trained with a more in-depth clinical assessment and knowledge compared to the standard training for paramedics. This is to enable them to treat patients safely in their homes, compared to the traditional model of care that leans more to transporting patients.^{1,4} The ECPs practice under the delegated scope of practice of a Medical Director with a defined set of clinical guidelines that are updated as new evidence is identified. ECPs do not have the same level of diagnostic ability or resources as are available in an emergency department (ED), therefore managing more patients in the community increases the potential risk of harm to a patient.¹ There is also risk to the reputation of the paramedic and the ambulance service if there are not sound systems in place to recognise and reduce this risk.

In May 2009, this different model of care was introduced on the Kapiti Coast in Wellington. It involved directing ambulance staff trained in additional clinical skills, to patients with conditions amenable to treatment in their own homes or local communities.⁴ The ECPs were dispatched from the Central Communication Centre that receives the 111 calls. They are dispatched to a broad range of clinical conditions where the patients can clinically be from low acuity through to critical. The area the ECPs practices in and in which this study was undertaken is Kapiti, which is an hour from the nearest tertiary hospital in Wellington.^{Fig1} Kapiti has a population of 48,900⁵ and has a higher median age group than the rest of the country, including nearly double in the over 65 age group.⁵ There is a growing demand internationally to manage more elderly patients at home and this group of population is growing rapidly

therefore increasing demand on ambulance services.^{4,6,7} Wellington is an area that has a higher than national average of > 24hr delay in being able to get a GP or Medical Centre appointment therefore patients can often be quite unwell and distressed by the time they call an ambulance.⁸ The ambulance service has two bases in this district covered with three ambulances and an ECP rapid response vehicle staffed with crews that have a mix of qualifications from Basic Life Support (BLS), Intermediate Life Support (ILS), Advanced Life Support (ALS) and ECP.

There are a variety of titles used internationally for the paramedics with extended scope; paramedic practitioner (PP), extended care paramedic (ECP) and community paramedic (CP).

Literature Review

Urgent Community Care (UCC) and Extended Care Paramedic (ECP) schemes

Mason and colleagues from Sheffield

"The evolution of the emergency care practitioner role in England: experiences and impact."

Mason and colleagues from Sheffield Group have published eight papers on their extended care paramedic models. The first compares different ECP programmes from seventeen sites by three methods: quantitative survey, qualitative interpretation based on telephone interviews from six sites and an economic study. The ECP programmes consisted of a variety of models comprising of 999 calls (emergency calls), minor injury units, walk in centres, primary care and ED. This is phase one of a much larger study examining issues including patient satisfaction, appropriateness and safety of care. Phase one examined the evolving development of the ECP schemes, evaluating factors that made them a success in the operational framework and the cost of the ECP schemes. Data from 8575 patient contacts over a year in 2004 were utilised for analysis for the quantitative survey. For the qualitative survey twelve participants from six sites were identified and were surveyed by phone. The economic analysis was from twelve sites, however not all the data was complete, but they were able to ascertain the cost of the ECP was on average 50% less than an ED visit. The results showed that 54% of patients managed by the ECP in any of the five different routes, did not require referral to an emergency department. Furthermore of the patients who were received through the emergency ambulance communications centre 999 system, the ECP's assessed and treated without further referral 43.5% of the patients they attended. The study came to the conclusion that the ECP schemes were

achieving their objectives and could have a significant impact on emergency service demand increases. The limitations of this study included tight timeframes, meaning that only 50% of the ambulance sites where the ECP models of care were being established were fully operational. Patient contact data was incomplete and limited in content, as the submission of data was voluntary and not primarily for research. This study did not explore the safety of the ECP clinical management of the patient.⁹

“Effectiveness of emergency care practitioners working within existing emergency service models of care.”

Mason et al did a further study that was a multi method approach which compared the care provided by the ECP (intervention) with the care provided in the same health care setting (control) for similar clinical presentations. The health care settings consisted of standard ambulance response, out-of-hours general practice and nurse led walk-in centres. The study had three components, the first was to evaluate the satisfaction, costs and appropriateness of the ECP care, secondly the impact of the ECP programmes and thirdly the cost effectiveness. The methods used to evaluate these components was a qualitative study utilising phone interviews with ECPs, Stakeholders and other health professionals to gauge impact and satisfaction of the ECP programmes and an economic analysis was undertaken to ascertain cost benefit. A questionnaire was sent to patients to ascertain the three and twenty-eight day outcomes to measure the appropriateness of the ECP care compared to the standard health providers. In total 524 patients were enrolled into the study from all ages, for a variety of clinical conditions with no difference in their primary complaint between the intervention and the control groups. The results demonstrated that 72.2% of patients attended by the ECP were managed without further referral. The ECP was more likely to refer the patient to their own home, access social and community services than the other usual providers

of care. There was no difference in the intervention or the control groups for the three to twenty-eight day outcomes albeit there was no clinical outcome data, the study relied on patients completing a questionnaire on whether they had accessed further health care. The conclusion was that the ECPs were just as effective, safe and cost efficient as other health providers for the same groups of patients. The limitations from this study included, time and resource limitations meaning that participants self-reported their use of the health service at twenty-eight days which could have led to a bias. Due to this the study did not demonstrate clinical safety of the ECP programme. The cost analysis was limited to only one out of the three operational settings therefore may not be able to be replicated across all settings.¹⁰

The next three papers from Mason et al were from one clustered randomised trial that evaluated the effectiveness of the ECP role compared to the standard paramedic, cost effectiveness, patient satisfaction and patient presentation between seven to twenty-eight days in ED after initial ECP attendance.

“Effectiveness of paramedic practitioners in attending 999 calls from elderly people in the community: cluster randomised trial.”

The first part of the study was a clustered randomised trial evaluating the effectiveness of a paramedic practitioner (PP) compared to the standard 999 (emergency ambulance) response to treat and transfer of patients aged >60 yrs with either minor injury or illness. The randomisation was done by a computer generated programme that selected which weeks were allocated to the intervention group (PP) or the inactive weeks when the PP were unavailable and the treatment was by the standard 999 response (control). 3018 patients were recruited into the study with n=1549 for the intervention group and n=1469 for the control group. The main outcome measure was twenty-eight day attendance at ED or hospital admission and a patient satisfaction survey. A secondary outcome was the investigations and treatment and subsequent use of

health service in 28 days and the mortality at 28 days. The results demonstrated that the patients attended by the PP were less likely to attend ED (62.6% compared to 87.5%) and had a higher rate of satisfaction (85.5% compared to 73.8%) than the control group. The patients seen by the PP had fewer other investigations but were more likely to receive more treatment. This group attended a secondary health service more frequently than the control group (21.3% compared to 17.6%). There was no significant difference in the two groups for mortality. The conclusion was that PP could effectively manage elderly patients with acute minor conditions.⁶ The limitations of this study was that the response to the questionnaire was lower than predicted due to the number of patients with cognitive inability to complete the form. The study was conducted in one centre only so may not necessarily be translatable across all settings.

“Safety of paramedics with extended skills.”

The second part of the study compared the PP managed patients to those attended by standard ambulance service, evaluating unplanned seven day attendance at ED. This was a clustered randomised trial with an intervention week (PP) and a control week (standard paramedic). The study enrolled 3,018 patients, of which 993 were admitted to hospital, therefore excluding them from the analysis leaving 2,025 patients that had an intervention by a PP. The clinical safety was evaluated by two ED clinicians reviewing ED records for seven day ED attendance identifying related or avoidable episodes and suboptimal care. Of the 2025 patients 219 (10.8%) had an unplanned ED attendance within seven days of which 162 were for the same clinical condition they were originally attended for. There was no significant difference between either the intervention or the control group for seven day presentation at ED. There was sub optimal care identified by the two ED clinicians in 0.80% of the cases. There was no difference between the intervention or the control group

for sub optimal care (26.5% compared to 27.1%). The conclusion established was that the PP practice was as safe as the standard paramedic practice of transfer and treatment in the ED. The study limitations were that the PPs chosen for this study were handpicked and given extra training, therefore were well motivated to perform.¹¹

“Is it cost effective to introduce paramedic practitioners for older people to the ambulance service? Results of a cluster randomised controlled trial.”

The third part evaluated clinical decision making, patient satisfaction, treatment patterns and seven –twenty-eight day patient outcome for unplanned ED or hospital admission. As this was part of the previous two studies the cluster randomisation was the same with intervention weeks (PP) and control weeks (standard paramedic). The results demonstrated that there were significantly less ED admission for the PP patients attended (53.3% compared to 84.0%). For the patients attended by the PP they had reduced hospital attendance time 126.6 minutes compared to 211.3 minutes. Both the reduced attendances and reduced length in ED led to the PP model proving there was a reduction in overall cost of a patient episode of £140, although this was not shown to be statistically significant. The limitation of this study was that it was conducted in one location and therefore different PP models with other health trusts may not see the same results.¹²

“Quality and safety of care provided by emergency care practitioners.”

The next study by the Sheffield group evaluated the quality of care of the extended care paramedic (ECP) compared to the non-ECP (Paramedic, nurse practitioner) in a range of three emergency care settings. The study was a retrospective case review conducted by a panel of seven emergency medical registrars. There were forty patient episodes selected from the twelve ambulance services which provided a total of 480 cases that were evenly divided into the two groups ECP and non-ECP. The cases were graded on a

scale from one to six. A grade of one was considered being very poor overall care and six being excellent. The results demonstrated that the ECP cases were scored significantly higher with a mean difference of 0.30 in their assessment, overall care and quality of records albeit the differences did not show statistical significance. The limitations from this study were that patient outcome was not measured and that a review of the patient records was undertaken to gauge the quality and safety of the ECP. The quality of the clinical records also made this process more difficult as there were significant issues noted in the quality of the clinical records which may not necessarily reflect the care given, just that it was not documented correctly.²

“A community intervention trial to evaluate emergency care practitioners in the management of children.”

The 2011 study by Mason et al evaluated the ECP impact on the delivery of care to children in the unscheduled care setting. It was a quasi-experimental multi-site community intervention trial comparing the ECP with other health care providers. The usual health care providers comprised of Nurse led 24h casualty in a small hospital, Nurse Practitioners working in a Minor Injury Unit and a GP led Out-of-Hours. The two outcome measures used were the percentage discharged after care and the percentage referred to hospital or another primary care setting. The results showed that ECPs discharged significantly fewer patients than the usual health care providers (7.3% compared to 13.6%). The conclusion noted that it would be more advantageous to target ECPs to particular patient groups to be more effective and in particular adults compared to children. This study has demonstrated that ECPs are less effective in managing children and this is possibly due to less emphasis in their training and clinical placements on this subject. The limitations for this study were again the incomplete clinical records which made data analysis difficult.¹³

“A pragmatic quasi-experimental multi-site community intervention trial evaluating the impact of emergency care practitioners in different UK health settings on patient pathways (neecap trial).”

Masons’ et al latest (2012) study compared the ECP discharge of patients in various emergency clinical settings to the usual care providers. The study enrolled 5525 patients that were divided into an intervention group (ECP) n=2363 compared to the control group (usual care providers) n=3162. The results demonstrated that the ECP significantly discharged more patients in the mobile setting such as ambulance (36.7% compared to 42.7%) or home services (36.8% compared to 46.8%) however the reverse was noted for the static settings of GP after hours and urgent care centres. The conclusion was that the ECP has a greater impact on patient discharge if they operate in a mobile setting compared to the static Out-of-Hours or GP Centres. The limitations of this study was that the review was of the initial episode only and therefore it is unknown if the patients were re-attended.¹⁴

University of Plymouth group

“The emerging role of the emergency care practitioner.”

Cooper et al who are a group from the University of Plymouth, Devon, studied whether the ECP role was comparable to the standard paramedic by using a mixed method approach of qualitative and quantitative study of patient treatment. There was a difference in how the two groups were deployed with the standard paramedics being dispatched via the emergency communication centre whereas for the ECP this was the case in 34% of their calls with the rest coming via self-activation and referrals. The results showed that the ECP were more likely to treat the patient at scene 28% of the time compared to 18% for the standard paramedic. The limitations in this study were that it was done by the paramedics completing reflective case studies not by following clinical

outcomes for the patients therefore did not evaluate clinical safety of the ECP role.¹⁵

“Collaborative practices in unscheduled emergency care: Role and impact of the emergency care practitioner--quantitative findings.”

Cooper et al from the University of Plymouth group¹⁶, undertook a two part study that identified areas where the ECP programme worked in a collaborative practice and what areas created hindrance. It was a qualitative and quantitative mixed method case study approach that measured communication, team work and leadership. The results demonstrated that the more experienced the ECP the higher they rated on the leadership and communication score. The more experienced ECPs conveyed 35% of patients compared to the training ECPs who conveyed 58%. Again this study did not evaluate the clinical outcome of the patients and therefore the clinical safety of the ECP schemes.¹⁶

Yorkshire Group

“Avoiding admissions from the ambulance service: A review of elderly patients with falls and patients with breathing difficulties seen by emergency care practitioners in South Yorkshire.”

Gray and Walker from the Yorkshire Ambulance Trust¹ have undertaken three studies, the first aimed to measure the impact of ECPs on admission rates in ED. This study evaluated two groups of patients: those with breathing difficulties and those >65 who had had a fall. They compared those seen by an ECP and admitted to hospital and those seen by the standard emergency ambulance. The clinical records in ED were evaluated to analyse whether the patients were admitted or discharged. The results showed that for patients with breathing difficulties the ECP had 64% of patients avoid an ED attendance. This rate was then correlated to the 2005 figures for breathing difficulty cases which calculated the ECP would avoid admission for 46.7% of patients. Albeit there

was a twenty-eight day admission rate of 17% for the ECP group leaving an overall reduced admission rate of 30%. The results for falls showed that of 233 patients 73% were managed at home. Again this was then related to the numbers in 2005 which correlated to an avoidance rate of 56%. Their conclusion was that ECPs can reduce admission rates in these two groups. The limitation is that the study relies on no changes from 2005 to 2006 in the health system to ensure an accurate comparison which is unlikely. The study did not evaluate clinical safety.¹

“Introduction of non-transport guidelines into an ambulance service: A retrospective review.”

The second study by Gray and Wardrope¹⁷ was a retrospective review of application of non-transport guidelines by Emergency Medical Technicians (EMTs) and Paramedics. The four guidelines were developed for the non-transport of patients with minor limb injury, no injury, resolved hypoglycaemia and known epilepsy. They compared the documentation completed by the paramedics for accuracy of the application of the guidelines. The results demonstrated that the guidelines were applied incorrectly 39.8% of the time. The study theorised that the paramedics that have more development for the extended paramedic roles would help reduce this risk. The limitation is that this study was not done on the ECPs who had more in depth training in assessment and clinical decision making.¹⁷

“Ampds categories: Are they an appropriate method to select cases for extended role ambulance practitioners?”

The third study by Gray and Walker¹⁸ evaluated whether Advanced Medical Priority Dispatch System (AMPDS) could be used to accurately predict in which cases the ECP would have greater benefit. The AMPDS is the system used in the emergency communication centre for identifying types of cases. A review of all AMPDS codes dispatched to the ECPs could be evaluated to decide which

calls the ECPs had a greater impact of avoiding ED. The ECP was traditionally targeted to the category C calls however this study demonstrated that in category A calls there was a 36% avoidance of ED and in category B there was a 52% avoidance of ED attendance. The conclusion was that AMPDS is not a triage system and therefore is not an accurate predictor of ED avoidance and would not be a suitable tool for deciding which calls the ECPs should be targeted to. The limitations in this study was that it did not review clinical outcome of the patient and therefore clinical safety of the ECP.¹⁸

London Study

“Patients’ experiences of care provided by emergency care practitioners and traditional ambulance practitioners: A survey from the London ambulance service.”

A patient satisfaction survey undertaken in London by Halter et al concluded that the two groups of patients, those seen by an ECP and those seen by a standard paramedic, both had a high level of satisfaction. The ECP rated higher in two areas that were; ‘thoroughness of assessment’ and ‘explaining what would happen next’ which is expected given the ECP conveys less patients to ED and spends longer on their assessments due to the more in-depth nature thus improving the patient experience. The referral to ED rate for the standard paramedic was 80.2% compared to the ECP rate of 58%.¹⁹

“The role of the paramedic practitioner in the UK.”

Woollard⁷ describes the differing models of ECP programmes in the UK and concludes that there is an urgent need for outcome based research of these various schemes. Most of these models are still in pilot phase and Woollard concludes that if they are to remain they will need a structured education programme with defined standards of practice registered with the British

Paramedic Association (BPA) as there is for the other levels of paramedic practice.⁷

Canadian studies

“Community paramedics expand health-care access.”

“Community paramedicine in Canada.”

Canada has developed a community paramedic role that works closely with the physicians to manage more patients at home and in particular the elderly.

There have been two descriptive papers that outline the schemes and reduction in calls due to better integrated community management of patients, however there has been no published research on the extended role of the paramedic and clinical safety.

A systemic review was undertaken of five groups of medical staff with extended scopes: paramedics, physiotherapists, occupational therapists, radiographers and speech and language therapists. This review looked at 355 studies with the aim of identifying randomised controlled trials and those studies that had sound methodology. Of the 355 only 21 progressed to a full review due to the rest being flawed in design. The conclusion from this systemic review was that there has been little true research undertaken on these extended roles and the health outcome for the patient.^{20,21}

Australian Studies

“Expanding the role of paramedics in northern Queensland: An evaluation of population health training.”

“Would a pre-hospital practitioner model improve patient care in rural Australia?”

There have been two descriptive papers^{22,23} on the extended role of the paramedic in Australia which describe the community paramedic role in a predominately rural setting. These papers concluded that the extended role of

the paramedic into public and primary health care have helped in an area that has been difficult to staff due to the rural nature and therefore having a person with broader skills creates better job satisfaction and a better patient experience. These papers have not researched clinical outcome of the patient.^{22,23}

Evaluation of the Kapiti UCC Scheme

“The changing face of prehospital care in New Zealand: The role of extended care paramedics.”

In New Zealand there have been three papers produced on the role of the extended care paramedic. The first was a descriptive paper on the urgent community care programme in Kapiti outlining the model that was introduced and summarising initial results that demonstrated only 38% of patients attended by the ECPs were referred to ED compared to 63% in the months preceding the introduction of this initiative.⁴

“Patient satisfaction and outcome using emergency care practitioners in New Zealand.”

The second was a patient satisfaction survey that was undertaken on 100 patients comparing those attended by an emergency ambulance service (EAS) paramedic to those attended by the ECP. The patient satisfaction study showed there was equal satisfaction with both groups however the patients preferred to be managed at home rather than transferred to ED. There was a seven day follow up with the GP records for the patients managed at home. The ECPs managed thirty-eight (76%) of patients at home and of these eight attended their GP, and one a midwife within seven days of the initial ECP attendance. There was one who attended ED within seven days for the same condition however this was considered to be appropriate by the Medical Specialist. The EAS paramedics managed eight (19%) of patients at home and of these six (75%) saw their GP within seven days. This study concluded that patients are

more satisfied being managed at home and can be safely managed within the wider health community rather than being transferred to hospital.²⁴

“The introduction of the extended care paramedic model in New Zealand.”

A third paper evaluated the first 1000 presentations attended by the ECPs in Kapiti. The 1000 presentations equated to 797 patients of whom 59% were managed at home by the ECPs compared to 26% for standard paramedics. Of the 59% there were thirty-one cases (5%) that presented to ED within seven days. The conclusion of this study was that ECPs could significantly reduce transport rates to hospital, more so if they were targeted to particular clinical conditions and that the seven day follow up had better results than previously international studies had demonstrated. The limitation of this study was that it was not a randomised controlled trial and therefore there was a possibility of bias in the dispatch of the ECPs to lower acuity work.^{11,25}

Summary of Literature Review of ECP Papers

There have been numerous studies of ECP programmes internationally analysing the cost effectiveness, appropriateness, seven to twenty-eight day presentation rates, patient satisfaction and effectiveness in not transferring patients to ED.^{1-4,6,7,9-11,13-16,18,19,21-32}

The studies researched different ECP models and did ascertain that the ECP role is cost effective with low ED transfer rates and high patient satisfaction. What they have yet to demonstrate is the clinical safety of the guidelines applied. The studies by the Sheffield group noted that the clinical safety analysis was limited in their studies as they were taken by either clinicians reviewing records in ED or patients completing their own questionnaire which gave a limited perspective on the actual application of the clinical guidelines and the subsequent clinical decision making.^{2,6,9-11}

The other studies by the Plymouth, Yorkshire and London groups did not study the clinical safety or clinical decision making of the ECP.^{7,15,17-19} Likewise the studies from Canada and Australia did not study the clinical safety or clinical decision making of the ECP.²⁰⁻²³ The one study that has studied the seven day clinical outcome is the Kapiti programme. This study did prove the programme was clinically safe however this study did not evaluate the clinical decision making that led to the decision to refer the patient to ED or to manage them at home.^{24,25} Paramedics are trained to default to transport to an ED or Medical Centre as a safety net if unsure about a patient and therefore some will automatically get transferred not necessarily due to an active clinical decision being applied from an alert in the guidelines. There has only been one other study that explored the appropriateness of care from the clinical record, albeit this study did not match the care against the guidelines applied to understand the clinical decision making of the ECP when deciding to transfer a patient to ED or to manage the patient at home, which is what the study undertaken for this thesis does. An assumption is made that the ECP makes the decision to transport or to manage the patient at home based on the red flags in their guidelines however if these aren't applied to the full extent then the decision can be adhoc sometimes being correct due to other factors.

Literature Review on Paramedic Decision Making

Key to this ECP model of care is accurate decision making, knowing which guideline to apply and the accuracy with which they document their decisions. Studies in the UK have analysed components of ECP models but none have evaluated the clinical decision making of the ECP's but have evaluated clusters of patients for transport versus non-transport.^{33-35,36-38}

There have been differing views on the safety of the paramedic making the clinical decision to not transport patients and to manage more patients at home. The research to date has analysed paramedic practice with varying levels of qualifications and has had no standard method of evaluating the potential risk of harm.^{3,11,39} Most of this research uses the clinical records to gather the data for analysis about the clinical decision making of the paramedic. One study by Gray et al. makes the statement "Studies reviewing 'treat and release' protocols by paramedics have shown increased risk of inappropriate decision making. It is likely that the extended role and training received by the ECPs will decrease the risk."^{1(p170)}

Another similar study in the U.S. found that the paramedics with the extended skills tended to under triage the patients which led to more being transported unnecessarily to ED.⁴⁰

There are different models of decision tools that can be applied to clinical guidelines that are being developed and researched internationally to aid clinical decision making that could assist the paramedic, however these do not address the issue of accurate documentation and in particular evidence of guideline application and the decision point to transfer to ED or manage the patients at home.^{38,40-43}

“Paramedic clinical decision making during high acuity emergency calls: Design and methodology of a delphi study.”

A Delphi study is currently underway in Canada using multi rounding techniques of reviewing clinical decisions made by paramedics. The first round reviews what clinical decisions are important; the next round ranks these and so on for the next rounds. When there is 80% consensus then this is considered the important clinical decision and is plotted on a process map.⁴⁴ This method has yet to be validated as demonstrating accurate clinical decision making of the paramedic.

“Support and assessment for fall emergency referrals (safer 1) trial protocol. Computerised on-scene decision support for emergency ambulance staff to assess and plan care for older people who have fallen: Evaluation of costs and benefits using a pragmatic cluster randomised trial.”

There are various models internationally where some ambulance services use delegated advice to deliver care. One such system is being trialled in the UK where support is provided to the paramedics through a computerised clinical decision making programme that can be delivered on a hand held unit, however since the trial to test this was registered in 2006, a national ambulance service restructure took place delaying the start and therefore is yet to produce results.³²

“A decision support system for lower back pain diagnosis: Uncertainty management and clinical evaluations.”

Lin et al reviewed as part of their research multiple clinical decision tools for lower back pain and came to the conclusion that although there are numerous tools designed there are still challenges remaining due to the clinician trying to make a decision in a process that is not linear with patients who often have co-morbidities. There are influences such as environment, social, patient compliance, co morbidities and other conflicting organisational demands.⁴⁵

“The out-of-hospital validation of the Canadian c-spine rule by paramedics.”

Vaillancourt et al conducted a prospective study enrolling 1949 patients evaluating the paramedics' ability to apply the Canadian C Spine Rule that was developed to clear cervical spine injuries without the need for diagnostic imagery. The rule was applied to 1594 (81.7%) of the patients successfully, with 731 (37.7%) of patients could have avoided immobilisation with the correct application of the rule.³⁵ They concluded that paramedics can successfully apply this clinical decision rule to safely avoid unnecessary immobilisation of patients.³⁵

Summary of Literature Review on Paramedic Decision Tools

The papers to date on paramedic clinical decision making have looked at tools to aid decision making but have not tested the current application of clinical guidelines by paramedics. It has been theorised that the ECP would have higher developed clinical decision making ability due to their extra training however this is supposition and as yet not proven.¹ The study by Lin et al did review decision making tools for lower back pain which is the condition this thesis evaluated however it differs in that their study evaluated the tools not the application to practice.⁴⁵ Another method utilised for clinical decision making for some conditions such as adult cardiac arrest have been to use an algorithmic model, however for the vast variety of cases that the paramedic with extended skills would attend, it would be impossible to have an algorithm to cover the spectrum. Most of the patients the ECP attends have co-morbidities and are on poly pharmacy and therefore do not fit neatly into any one particular algorithm. Lin et al reached the same conclusion about the clinical decision tools they evaluated.⁴⁵ That is not to say that a decision tree that alerts when there are red flags that indicate the patient should be in ED or conversely is safe to be treated in the community would not aid the ECPs.

Study Aim

The study for this thesis evaluates the ECP guideline compliance for patients who presented with either syncope or lower back pain. Further the potential risk of harm for a patient should the ECP not follow the guideline correctly was analysed.

This was a retrospective analysis of 48 patient report forms written by the ECPs applying clinical guidelines for lower back pain (appendix B, D) and syncope (appendix C, E). There was a pilot phase testing the method that was going to be applied, making any changes identified as necessary and then the subsequent main test group were gathered. The aim was to identify how accurately the ECPs documented their management of the patient and in particular, whether they documented the important components of the clinical guideline which led to the decision to transport to ED or manage the patient in the community. These two guidelines were chosen as they were used frequently by the ECPs and are conditions that can be complex with underlying pathophysiology that creates greater risk to the patient when they are managed at home.

Methods

The study protocol was reviewed and approved by the Ministry of Health Central Region Ethics Committee.

The syncope and lower back pain guidelines each have specific criterion that are followed that lead to various patient dispositions of being transported to hospital (red flags), referred to GP(amber flag) or managed at home (green flag). These guidelines are included in appendices B-E.

A retrospective analysis of the documentation with compliance to these guidelines was undertaken in a two-stage process. In the first stage 10 cases of each condition was reviewed to ensure that documentation of guideline compliance could be evaluated. To select the 10 cases a search was undertaken of the provisional diagnosis noting lower back pain and syncope cases attended. Then each patient report form read to ascertain whether each case met the requirements for that guideline.

For the syncope cases, there were eight selected that had the provisional diagnosis written in various forms such as faint, collapse and syncope. The eight syncope cases occurred over a period of four weeks.

For the lower back pain guideline there were 10 cases that had provisional diagnosis of back pain, lower back pain and lumbar pain. The lower back pain guideline should be applied for an isolated injury generally caused by lifting or twisting therefore if the patient had other injuries then these cases were excluded.

Following completion of this stage the ECPs received educational feedback in order to emphasise the importance of accurate documentation. After this education the second stage of the study was to evaluate guideline compliance of up to twenty-five cases of each condition, and to evaluate risk associated with any non-compliant documentation.

Part One: Pilot (the first 10 cases)

One of the other reasons for collecting these 10 pilot cases was to test our ability to assess the two clinical guidelines. The sensitivity test looked at how often a criterion of the guideline led to the correct results for the destination of the patient. An example being that in the lower back pain guideline, if the patient's pain was severe or worsening, especially at night the patient would be transported to an ED or a medical centre.

The specificity was determined by identifying how many of the 10 cases ended up being transported to hospital or a medical centre when in a follow up review of the patients by an ED Consultant, they could have been managed at home.

Case selection

Syncope cases

Inclusion criteria

Transient loss of consciousness documented

Any demographic

Exclusion criteria

No transient loss of consciousness documented.

Lower Back Pain cases

Inclusion criteria

Isolated acute lower back injury caused by a mechanical force such as lifting or twisting.

Any demographic

Exclusion criteria

If the lower back pain was not an isolated injury.

Documented Compliance with Guideline

The ECP's documents their cases on an electronic patient report form that has a mixture of selection boxes and free text components. The ECP assessment and management of the patient is typed free hand, whereas the demographics are mainly a selection box process. Documented compliance from the ECP electronic patient report against the clinical guideline was assessed for each guideline component (see Table 1 for lower back pain and Table 2 for syncope). Incomplete documentation was not excluded as this formed part of the analysis of the study.

Guideline Revision and ECP Education

Following assessment of the original cases, the Wellington Free Ambulance Medical Director made minor modifications to the guidelines to address areas of apparent ambiguity. In addition the ECPs received a focused educational session on the importance of complete documentation.

Table 1: Lower Back Pain Compliance Check Sheet

PART ONE						
Back Pain (Term used)	Date	Case No.	Clinical guideline check list	Criterion checked	Criterion missed	Correct decision Y/N
			Signs of systemic upset			
			Severe or worsening pain especially at night or lying down			
			Significant trauma			
			Weight loss, history of cancer			
			Use of intravenous drugs or on steroids			
			Patient over 50yrs			
			Chest pain			
			Unable to walk			
			Any neurological symptoms			
			Any bowel/bladder problems			
			PMH of back surgery or spinal problems			
			Osteoporosis			
			Systemic illness or pyrexia			
			Persistent back pain			
			Patient likely to require prescription only analgesia			
			Patient able to comply with ECP advice			

Key for sensitivity test for back pain guideline

Back pain term used: Is the provisional diagnosis written on the patient report form by the ECP?;

Date: Self-explanatory;

Case: Case number;

Clinical guideline checklist: The decision component of the guideline that needs to be followed;

Criterion checked: Components of the guideline assessed;

Criterion missed: Components of the guideline not followed;

Correct decision: Y or N on the aspects of the guideline not followed and final disposition to transport, refer or treat at home. A criterion maybe checked yet the decision is made not to transport. If this is in the red flag component of the guideline then 'N' is entered;

Table 2: Syncope Compliance Check Sheet

PART ONE						
Syncope (Term used)	Date	Case No.	Clinical guideline check list	Criterion checked	Criterion missed	Correct decision Y/N
			Systemic compromise			
			Severe Pain			
			Possibility of pregnancy			
			Chest pain			
			Headache			
			Suspected first seizure			
			Continuing symptoms			
			Abnormal examination findings e.g. neurological			
			Hypoglycaemia post treatment			
			Recent head injury			
			Valvular heart disease			
			Exertional syncope			
			Serious co-morbidities e.g. diabetes			
			Risk factors: Congestive heart failure Anaemia ECG abnormality Dyspnoea BP<90mmHg FH of sudden death			
			Complete recovery			

Key for sensitivity test for syncope guideline

Syncope term used: Is the provisional diagnosis written on the patient report form by the ECP?;

Date: Self-explanatory;

Case: Case number;

Clinical guideline checklist: The decision component of the guideline that needs to be followed;

Criterion checked: Components of the guideline assessed;

Criterion missed: Components of the guideline not followed;

Correct decision: Y or N on the aspects of the guideline not followed and final disposition to transport, refer or treat at home. A criterion maybe checked yet the decision is made not to transport. If this is in the red flag component of the guideline then 'N' is entered;

Part Two: The main test group

Case selection for lower back pain and syncope

The main test cases were gathered using the same selection criteria for the two conditions of lower back pain and syncope. The cases were gathered sequentially until 25 had been attained however for the lower back pain cases these were proving timely to collect due to patients not always having an isolated injury and therefore they were stopped after 23 had been collected. The same inclusion and exclusion criteria as listed above for part one of the study was applied.

Compliance with Guidelines

Each case was evaluated against the individual guideline criteria to determine whether or not that component had been assessed. The overall decision that was made regarding patient disposition was also reviewed and classified as consistent or inconsistent with the guideline.

The definition of criteria 'considered as being assessed' for each guideline component are given in appendices F and G.

All cases that followed the guideline and noted at least one red flag that resulted in the patient being transported were considered to be a correct application not requiring further analysis by the two ED Consultants. Cases that had components of the assessment not documented, yet the outcome were to either transport or refer the patient to the GP or to manage the patient at home, were analysed and risk scored to evaluate the potential of harm to a patient. Albeit some of these cases were transferred to another medical professional for care the clinical guideline may have directed the disposition to ED if the guideline had been applied fully.

If the decision to transport or refer to GP was undertaken after consultation with another medical person such as a Senior ED clinician or GP, then the cases were removed from the group for further analysis due to this being considered equivalent to taking the patient to the doctor therefore the patient is effectively under medical care from that point.

Risk Assessment

A tool for risk assessing any deviations from the clinical guideline was developed for the two ED Consultants to use. After reviewing the literature for risk assessment tools it was decided to use the system recommended by the Ministry of Health for clinical incident reporting that has a tool for assessing potential for risk of harm to a patient from an event.

Table 3: Risk Assessment Tool and Definitions

Category	Definition
Minor	no or very low risk of harm to a patient
Moderate	potential of a longer recovery time with no disability
Serious	possibility of transient disability and a prolonged recovery time
Sentinel	possibility of leading to permanent disability or death

As there was a range of risk scores for each criterion in each case, the highest risk score is the one that was accepted as the overall grade for that case. Both ED Consultants work for a District Health Board and are therefore familiar with this system for clinical incident reporting.

The ED Consultants were given four syncope cases and three back pain cases as a trial sample to test the risk assessment tool and ensure it would be suitable. The sample cases had details of the ECP and the patient removed to reduce the risk of bias should the clinician recognise the ECP or patient. Both consultants found the risk assessment tool straightforward and appropriate and recommended continuing with the test group of cases. On this basis they then proceeded to score all cases.

Results

Results for Phase One

Table 4: Summary of phase one test cases ED Consultants risk graded for syncope

Date	Case	ED Consultant 1	ED Consultant 2
17/11/2011	744	Sentinel	Sentinel
8/01/2012	249	Sentinel	Moderate
22/09/2011	333		Serious
6/04/2011	183	Moderate	Minor

Table 5: Summary of phase one test cases ED Consultants risk graded for lower back pain

Date	Case	ED Consultant 1	ED Consultant 2
14/08/2011	0	Sentinel	Serious
2/08/2011	103	Sentinel	Sentinel
1/05/2011	163	Sentinel	Minor

By placing the cases for each guideline through the evaluation tool clear trends became obvious.

In the sample group the two ED Consultants had divergent scoring for the overall risk assessment of 66% for both lower back pain and syncope. This was their first pilot cases and a small sample and therefore this trend could change with practice with the main test group, therefore it was decided to not intervene and continue the evaluation of the main test group.

It was found that pertinent negatives were not necessarily documented such as 'use of intravenous drugs or on steroids' for the back pain patients. The ECP would note the medications the patient was taking but not specifically the ones listed that would raise a red flag for that condition requiring the patient to be transported. Likewise the ECP would ask about the past medical history but not document whether the patient had a medical history of osteoporosis.

Another common area not well documented was the lower limb neurological

assessment. The ECP would note neurological assessment however not specifically lower limb assessments.

For the syncope guideline compliance the main things identified as not being documented on the patient report form was history of recent head injury or first seizure. Likewise chest pain or headaches were not regularly documented.

Results of Phase Two

Over a period of ten months there were twenty-three lower back pain cases and twenty-five syncope cases gathered. The demographics of the two patient groups are demonstrated in table 4.

Table 6: Demographics of both patient groups

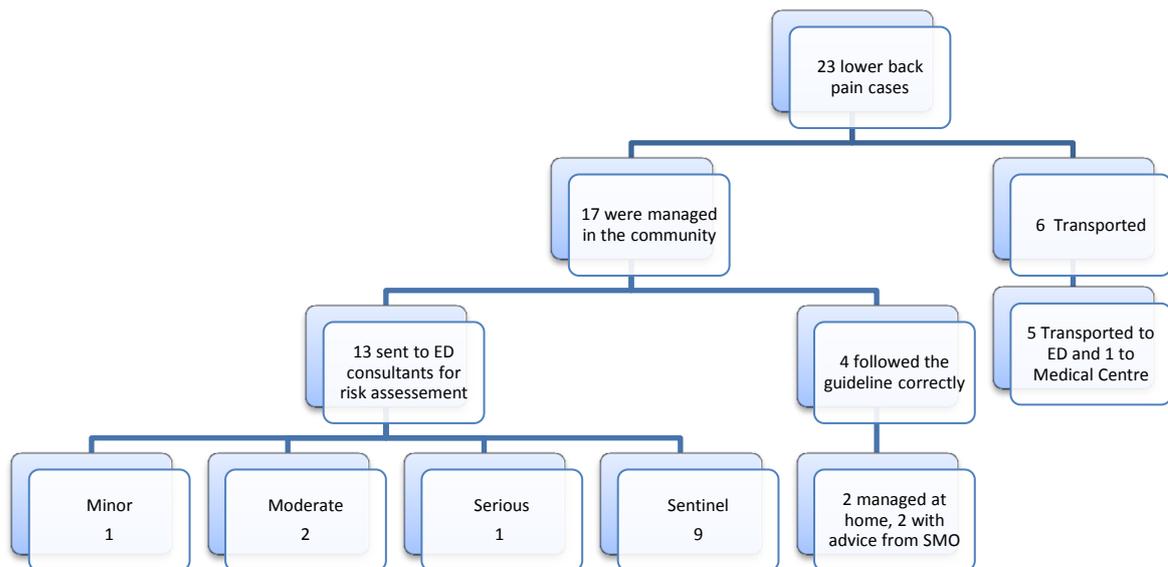
	Back Pain n=23	Syncope n=25
Mean Age (range)	55 (10-93)	72 (15-99)
Gender	11 M (48%)	11 M (44%)
Ethnicity	20 NZ European 2 Maori 1 European	23 NZ European 2 Maori

Assessment of documented evidence of following guideline

Lower Back Pain Cases

All twenty-three lower back pain cases were assessed against the individual criterion in the guideline for compliance.

Figure 1: Lower Back Pain Summary of Cases



For the lower back pain cases, six were transported of which five were transported to the emergency department and one transported to a medical centre. There were seventeen cases managed at home where two followed the guideline correctly, two cases the ECP sort advice from a senior medical officer (SMO) leaving thirteen cases that did not comply with the guideline fully.

Table 7: Criterion assessment and risk grading by each ED Consultant for lower back pain cases

					Criterion considered as not assessed risk grading			
	ED Consultant 1 Assessed	ED Consultant 1 Not assessed	ED Consultant 2 Assessed	ED Consultant 2 Not assessed	Minor	Moderate	Serious	Sentinel
Sign of systemic upset	10	3	8	5	2	3	1	2
Severe or worsening pain at night	10	3	6	7	4	2	2	2
Significant trauma	12	1	12	1		1		1
Weight loss	1	12	3	10	14	2	5	1
History of cancer	10	3	3	10	4	3	4	2
Use of intravenous drugs or steroids	1	12	2	11	12	5	3	3
Patient over 50yrs	6	7	12	1	2	1		5
Chest pain	13	0	4	9	9			
Unable to walk	13	0	12	1			1	
Any neurological symptoms	8	5	10	3	1		3	4
Any bowel/bladder problems	8	5	10	3	2	1	1	4
PMH back surgery or spinal problems	12	1	9	4	5			
Osteoporosis	11	2	3	10	7	5		
Systemic illness or pyrexia	9	4	9	4	2	1	2	3

Table 8: Summary of ED Consultants Risk Grading Lower Back Pain

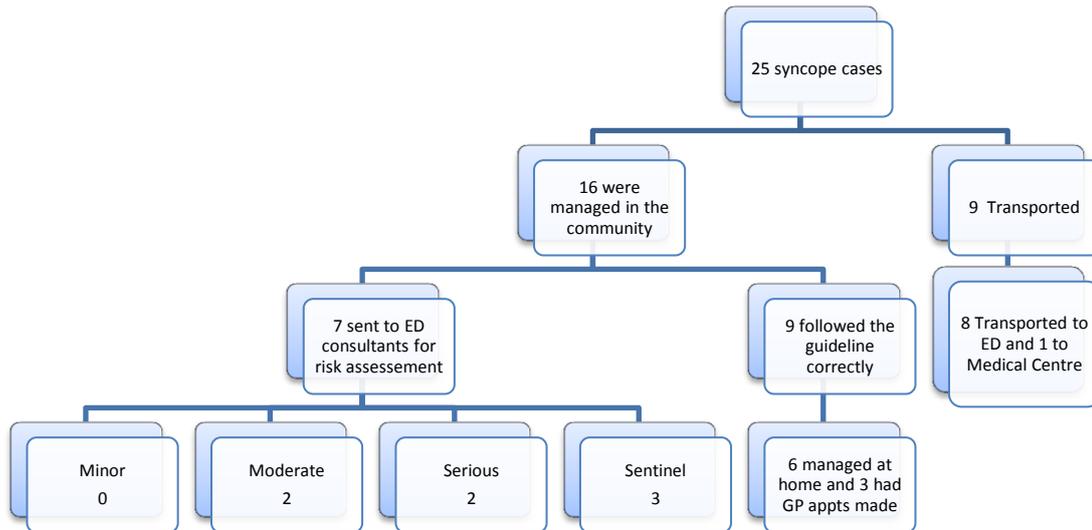
Date	Case	ED Consultant 1	ED Consultant 2
19/02/2012	380	Moderate	Minor
21/12/2011	673	Minor	Serious
2/01/2012	437	Minor	Minor
6/08/2011	288	Sentinel	Moderate
16/09/2011	811	Sentinel	Sentinel
19/07/2011	38	Sentinel	Serious
28/08/2011	446	Sentinel	Serious
23/05/2011	159	Sentinel	Serious
21/05/2011	116	Sentinel	Serious
10/08/2011	760	minor	Moderate
14/08/2011	0	Sentinel	Serious
2/08/2011	103	Sentinel	Sentinel
1/05/2011	163	Sentinel	Minor

When the cases are compared by ED Consultant for risk grading, there was consensus in three cases with two being rated as sentinel risk and one a minor risk. In the other ten cases there was no consensus on the risk grade, albeit for seven of the ten they were just one grade apart.

Syncope Cases

All twenty-five syncope cases were assessed against the individual criterion in the guideline for compliance.

Figure 2: Syncope Summary of Cases



For the syncope cases nine were transported of which eight went to the emergency department and one was transported to a medical centre. A further sixteen were managed in the community where nine were managed at home following the guideline correctly, with a further three having GP appointments made, leaving seven cases that did not comply with the guideline fully.

Table 9: Criterion assessment and subsequent risk grading by each ED Consultant for syncope cases

	ED Consultant 1 Assessed	ED Consultant 1 Not assessed	ED Consultant 2 Assessed	ED Consultant 2 Not assessed	Criterion considered as not assessed risk grading			
					Minor	Moderate	Serious	Sentinel
Systemic compromise	4*	2*	4	3	1		2	2
Severe pain	6	1	6	1		1	1	
Possibility of pregnancy	6	0	6	0				
Chest pain	3	3	3	4	4		1	2
Headache	2	4	1	6	4	4	1	1
Suspected first seizure	3	3	2	5	4	2		1
Continuing symptoms	6	0	7	0				
Abnormal examination findings eg neurological	6	0	7	0				
Abnormal BSL	6	0	6	1		1		
Recent Head Injury	1	5	1	6	9	1		1
Valvular heart disease	5	1	3	4	4	1		
Exertional syncope	5	1	1	6	5	2		
Serious co-morbidities	6	0	6	1	1			
Risk Factors	2	4	2	5	4	2	1	2

*One of the ED consultants considered one of the cases to be a faint and not syncope so gave no risk grading to each criterion, hence only 6 cases graded.

Table 10: Summary of ED Consultants Risk Grading Syncope

Date	Case	ED Consultant 1	ED Consultant 2
23/08/2011	0	Minor	Moderate
19/05/2011	128	Sentinel	Serious
22/01/2012	390	Minor	Serious
17/11/2011	744	Sentinel	Sentinel
8/01/2012	249	Sentinel	Moderate
22/09/2011	333		Serious
6/04/2011	183	Moderate	Minor

For case 333 one of the ED Consultants considered the case to be a faint and therefore no loss of consciousness and not a syncope, therefore did not risk assess the case.

When the cases are compared by ED Consultant there was consensus in one case that there was a sentinel risk and for the other six cases there was a difference of opinion in the risk grading. In three of the six they were just one grade apart. In three of seven cases the ED Consultants considered there to be sentinel risk of harm to a patient.

Discussion

The aim of this study was to evaluate guideline compliance by ECPs and to discover to what extent they are documenting appropriately their application of the appropriate guideline. Furthermore the cases of non-compliance risk assessed for risk of harm to a patient.

In more than 50% of cases where the patient was treated at home, there were issues with non-compliance with the guideline, however what is difficult to ascertain is whether this relates to the application of the guideline, or that the documentation has not been completed fully. The failure to document correctly the pertinent components from the clinical guideline creates risk for the patient, the paramedic and the ambulance service. It is not unique to this group of paramedics as it appears to be a common thread in some of the published research on ECP's.^{2,3,11,13}

The two ED Consultants had divergence in their results in sixteen (80%) of the cases they risk assessed. The divergence was just one grade apart in ten of the sixteen cases (63%) which is not unexpected given that clinicians view patients bringing their individual expertise, experiences and knowledge which is variable. The Two ED Consultants found the non-compliance in twelve (60%) of the cases to be of a sentinel risk of harm to the patient. This would be difficult to defend for the paramedic should a clinical incident eventuate as their documentation could not be evidence of correct guideline application. It is also then difficult to know if the patient received optimal care required before being left at home.

Internationally there is a growing trend to developing these extended paramedic roles due to the increasing demand on health and finding more appropriate ways of managing patients in the community. There has been some research on the effectiveness and efficiency of these new models of care

but limited research on how the ECP applies these new clinical guidelines and what is the risk to the patients, the ECPs and the ambulance services if the assessment and management of the patient is not documented appropriately.

ECPs, like standard paramedics, practice under a delegated scope of practice with a set of clinical guidelines that direct them to a patient outcome of being transported to ED, refer to GP, or manage them at home. Failure to follow these guidelines correctly can lead to the patient not receiving the right destination which can increase the risk of potential harm. This study researched how these guidelines are being applied through a review of the ECP patient report form matching it against the criteria in the clinical guideline to ascertain whether they were applied appropriately. A more thorough observational study would need to be undertaken to ascertain fully how the clinical guidelines are being applied in practice.

Previously developed theories and audit tools

Research has been undertaken on the efficiency and effectiveness of the ECP role, for example the cost effectiveness and the effectiveness in certain patient groups such as falls and patient satisfaction.^{2,6,7,10,18,24} A review of the literature revealed a small amount of research on the audit of the clinical guideline application and to what extent this had been documented appropriately.^{2,3,17}

There were no audit or evaluation tools developed that could be applied to this study therefore one was developed suitable for this research. The evaluation tool was tested by the two ED Consultants for suitability prior to the main groups of cases being tested. The evaluation tool was found to be suitable to demonstrate the components of the ECP's assessment that was not evident and to be able to risk score the noncompliance.

Implication of Results

Originally when a review of how many syncope cases were being undertaken by the ECPs it was a condition that was thought to be attended far more frequently due to the provisional diagnosis figures however in actuality these numbers were much lower.

The lower back pain cases continued with a provisional diagnosis of lumbar pain, spinal pain, back pain etc. and likewise each case had to be gone through in detail to discover that a proportion of them also were not lower back pain caused by an acute event of lifting or twisting.

Disconcerting was the fact that in 60% of the cases the two ED Consultants graded the potential risk of harm to the patient to be sentinel. This poses a real concern for the patient, the paramedic and the ambulance service that needs to be addressed before such an incident eventuates. To date this ECP scheme in Kapiti has had no sentinel or significant incidents.^{4,25}

What is difficult to ascertain from written documentation is whether the assessments were undertaken and not documented as pertinent negatives under general health, for example 'chest pain'. If the patient denied chest pain then the ECP may not write this down instead opting to only document symptoms found. The other factor that makes it difficult to ascertain whether an assessment was undertaken is components that would be elicited through general history taking such as exertional syncope. This would be ascertained when the history of how the syncope occurred. Valvular heart disease would also be ascertained as part of the past medical history not necessarily asking the question directly, however as it is one of the red flag components should be documented as either being present or as a pertinent negative as not being present. Similarly for the lower back pain cases, weight loss, osteoporosis and drug use would need to be ascertained from direct questioning, however 'steroid use' could be ascertained from the medication history. To ascertain the

completeness of the assessments an observational study would need to be undertaken to validate exactly how the guidelines are being applied and subsequently documented.

What needs to be developed further is the importance of documentation as the aids for clinical decision making are only as good as the evidence of appropriate application, particularly should there be any investigation. There would be medico-legal implications for the paramedic and ambulance service if there was a clinical incident as investigations are reliant on documentation to evidence the facts as to what happened.

Effectiveness and Safety of the ECP Model

Ultimately, the effectiveness and safety of the ECP model is dependent upon the ECP training, the quality of the guidelines and the extent to which these are followed accurately, documented appropriately, and the clinical referral pathways being available. Despite the centrality of these concepts to most models of paramedic care being used in developed nations, there is very little literature evaluating the application of clinical guidelines by paramedics or the accuracy of their documentation. The literature demonstrates that as a service delivery model it is effective from a cost and performance perspective. The ECP models of care have also demonstrated greater patient satisfaction.^{2,26,33-35}

Action to reduce or mitigate risks

Some of the ways to reduce the risks identified is to have a sound clinical governance framework. Clinical Governance as defined by Scally & Donaldson⁴⁶ is 'the framework through which health care organisations are accountable for continuously improving the quality of their services and safeguarding high standards of care by creating an environment in which excellence in clinical care will flourish.' A clinical governance framework is an

essential component of any health organisation to enable the effective and risk adverse management of service delivery to patients.

Table 11: Clinical governance framework for Wellington Free Ambulance⁴⁷

<p>Clinical Effectiveness</p>	<p>Clinical effectiveness is the degree to which the organisation is ensuring that evidence based 'best practice' exists. It should also use its own research to inform 'best practice' where possible. Its clinical procedures and policies should reflect this.</p> <p>Clinical audit is the continual evaluation, measurement and improvement by health professionals of their work and the standards they are achieving. Auditing the organisations performance against key clinical indicator also allows for continual improvement through evidence based practice. Audit should also be developed at local, regional and national levels to truly demonstrate the effectiveness of clinical standards, plus help develop national clinical standards.</p>
<p>Risk Management Effectiveness</p>	<p>Risk management is about having systems that allow organisations to understand, monitor and minimise the risks to patients and staff, plus to learn from mistakes at both an individual and organisational level. This should be achieved through incident reporting and root cause analysis, plus regular reviews of the incident database to highlight trends. Systematic risk analysis should also be undertaken for areas of clinical development, ensuring that the organisation is aware of any potential risks. Risks that could impact on strategy should be presented to Board with assurances on any corrective or mitigating actions. It will be key for WFA to stay informed on the national risk reporting strategy that is being developed. The other key areas that are part of the national health strategy developed by Ministry of Health are safe medicines management and infection prevention and control.</p>
<p>Patient Experience</p>	<p>Patient experience is the primary focus of health care delivery. This can be achieved by engaging with patients about their journey via modes such as forums, surveys and complaints and compliments.</p> <p>If possible any significant changes to service delivery or service developments should have some level of public input.</p> <p>The MOH initiative of optimising the patient journey brings a focus on the patient's perception of the journey at a national health forum.</p>
<p>Communication Effectiveness</p>	<p>Using information covers the systems the organisation has in place to collect and interpret information and to use it to monitor, plan and improve the quality of patient care.</p>
<p>Resource Effectiveness</p>	<p>Staffing and management covers the recruitment, management and development of staff. It also includes the promotion of good working conditions and effective methods of working, including clinical supervision/support. Poor clinical</p>

Strategic Effectiveness	performance should be identified early and managed appropriately with consistency. This will need to be achieved through collaborative working between HR, Operations, Clinical and Training departments.
	Strategic effectiveness is about having a clear defined organisational strategic plan which includes a systematic and system wide approach to continually improve the quality of care delivered to the patient. Ensuring there are synergies between local and national health care strategies.
Learning Effectiveness	Education and training covers the support available to enable staff to be competent in doing their jobs, whilst developing their skills. Education and training should also ensure that staff are kept up to date with developments in their field both nationally and internationally.

It is incumbent on the ambulance service to ensure the ECPs have appropriate clinical guidelines, appropriate training and sound audit systems to ensure the safe practice and reduce the potential of risk. From these results further training needs to be undertaken on the importance of accurate clinical documentation albeit the Medical Director did undertake this action after the first test cases. Unfortunately this did not demonstrate any improvement in the documentation. The results of this thesis will be made available for further education to reinforce the level of risk anticipated if the ECPs continue to not complete the documentation appropriately.

Study Limitations

Given that gathering the evidence of assessment was taken from a patient report form and not by observation, then it is difficult to gauge in these cases exactly where the decision to transport was made, which may account for the assessment not being complete.

The study was a limited sample of two guidelines representative of the complete range of clinical guidelines that are used by the ECPs, however they are two of the more complex and commonly used so therefore an ideal sample to determine risk.

The assessment for potential risk of harm was performed by two ED Consultants who are experts in their field, however due to the nature of medicine there will often be difference in opinion which was demonstrated in this study with the variance in the assessment of potential risk. This was phenomenon was also noted in two of the Sheffield's groups' studies.^{2,11} The audit tool used to test the guideline compliance and assess the risk required the clinician to evaluate using a subjective judgement rather than following objective criteria.

Conclusion

The results of this study demonstrated there is evidence of potential risk of harm to patients as evidenced by the results of the risk assessment undertaken by the two ED Consultants. What is difficult to ascertain is whether this is a failure to document appropriately the full assessment or clinical care failure as this was not an observational study. The fact that the ED clinicians graded such a high number of the failures as sentinel means it is imperative that quality improvement initiatives are undertaken to ensure the ECPs follow the clinical guidelines correctly and document fully their assessment and management of the patient. There have been multiple international studies in this new field of paramedicine that will continue to inform and develop the role, however there is limited studies on the clinical decision making that informs the outcome of whether to convey the patient to hospital or manage them at home. Once quality improvement initiatives have been introduced and had time to bed into practice it would be worthwhile to ascertain whether the sentinel risk has been mitigated.

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APPENDICES

Appendix A

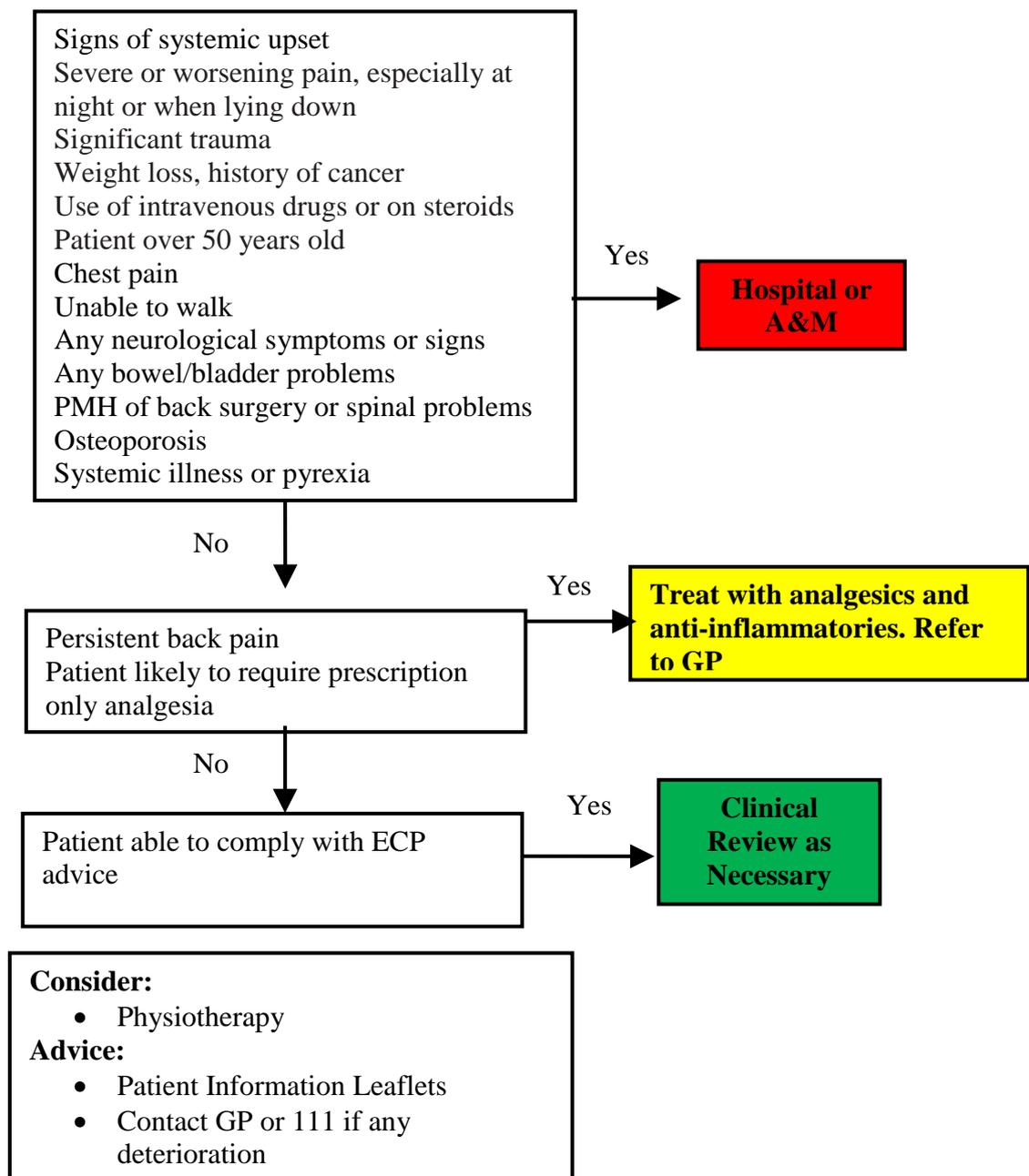


Figure 3: Map of Wellington Free Ambulance Coverage and Ambulance Station Location

The patient describes a pain isolated to the lower back, which is aggravated by movement which is usually precipitated by lifting or twisting. While the assessment and management of mechanical back pain is within the scope of the Emergency Care Practitioner, patients suffering back pain from another cause must be assessed by a Doctor.

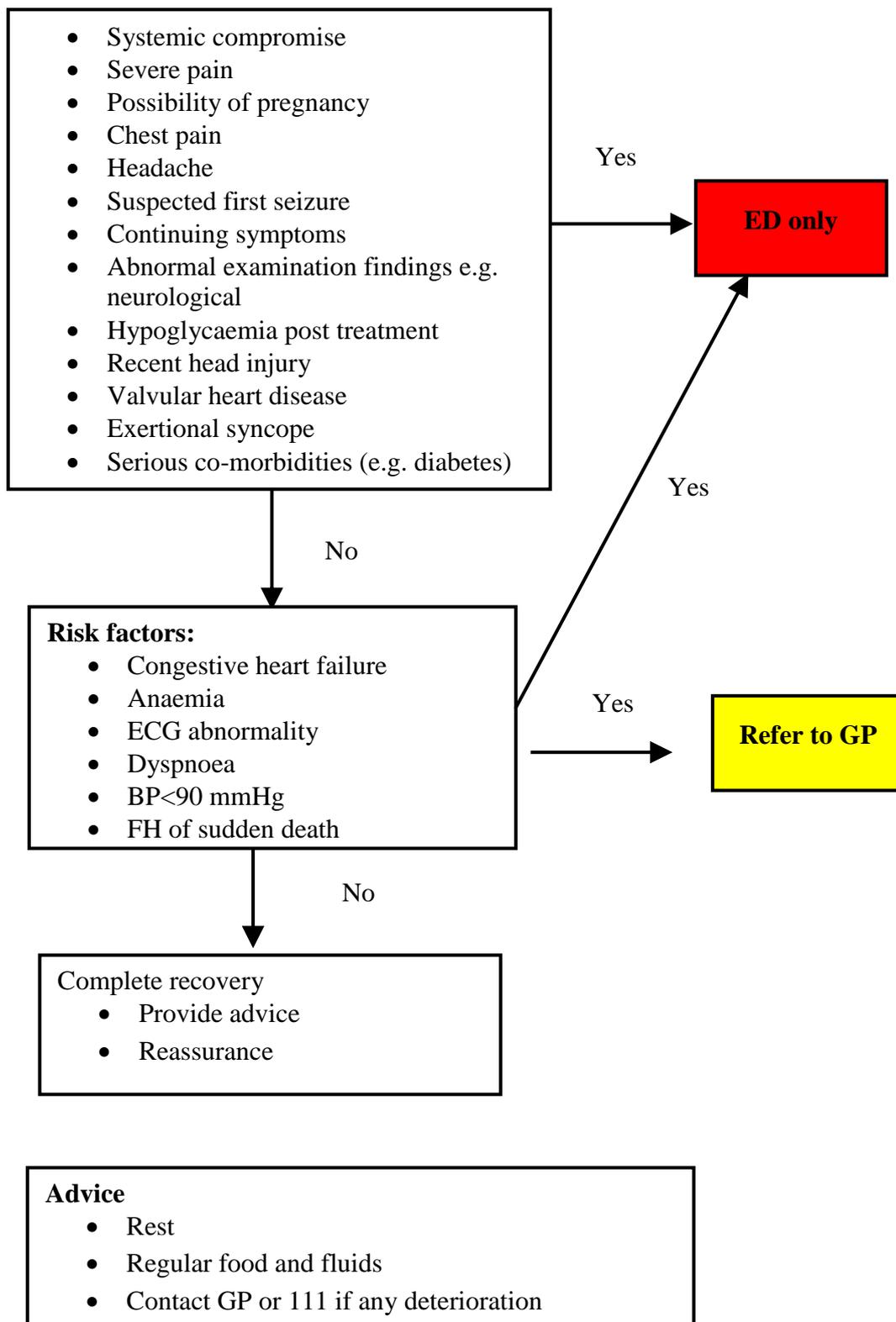
IF IN DOUBT: REFER

Clinical Care Pathway



Appendix C

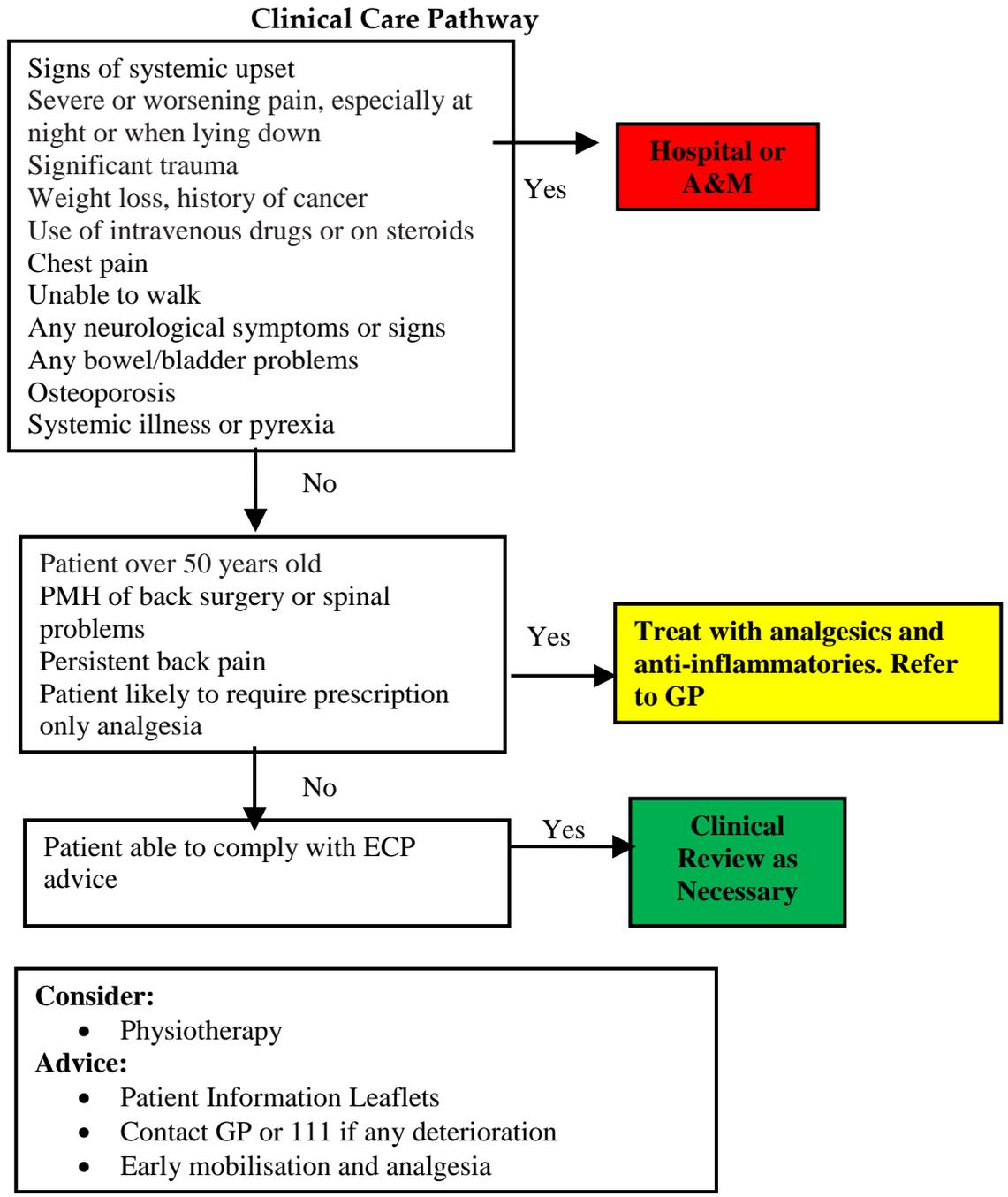
SYNCOPE



Appendix D LOWER BACK PAIN

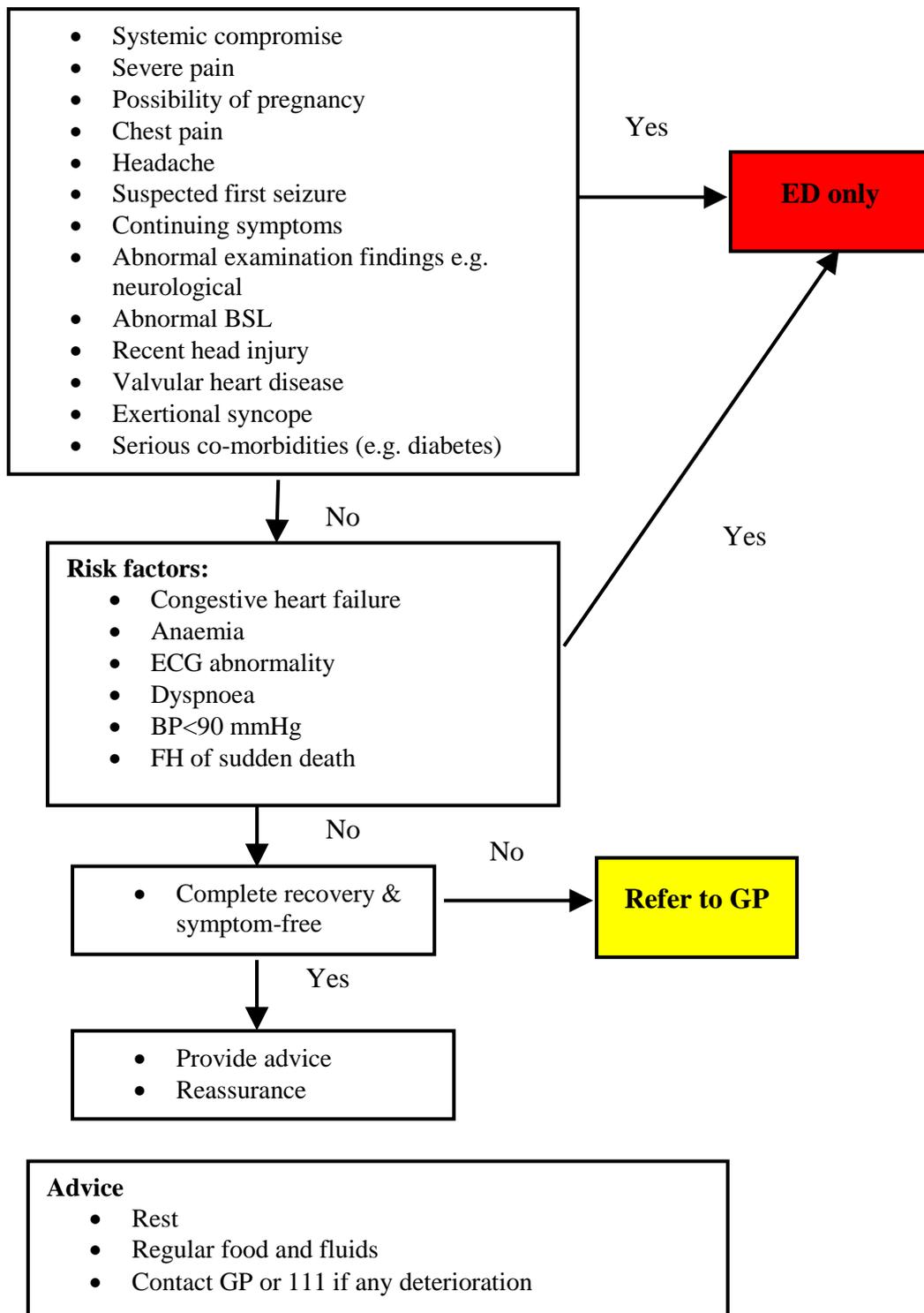
The patient describes a pain isolated to the lower back, which is aggravated by movement which is usually precipitated by lifting or twisting. While the assessment and management of mechanical back pain is within the scope of the Emergency Care Practitioner, patients suffering back pain from another cause must be assessed by a Doctor.

IF IN DOUBT: REFER



Appendix E

SYNCOPE
Spontaneous transient loss of consciousness
Clinical Care Pathway



Andrew Swain

Appendix F

Table for risk assessment of back pain guideline compliance.

Guideline criterion	Considered as being assessed	Considered not have been assessed	Decision correct with guideline recommendation	Minor - No or very low risk to the patient of harm	Moderate - Potential of longer recovery time no disability	Serious - Possibility of transient disability and prolonged recovery time	Sentinel - Possibility of leading to permanent disability or death
Sign of systemic upset	Vital signs assessed and within normal range	Vital signs absent or incomplete					
Severe or worsening pain at night	Adequate description of timing or occurrence of pain	No or incomplete documentation of timing or occurrence of pain					
Significant trauma	Mechanism of injury or spontaneous onset noted	No documentation of mechanism or of spontaneous onset					
Weight loss	Weight trend documented	No documentation of weight trend					
History of cancer	Past or present cancer included or excluded by the history	No documentation of past or current health expected to elicit a history of cancer					
Use of intravenous drugs or steroids	Documentation of drug history	No documentation of drug history					
Patient over 50yrs	Age recorded	No age recorded					
Chest pain	Location of pain specified	Location of pain not specified					
Unable to walk	Mobility documented	No mention of mobility					
Any neurological symptoms	Neurological assessment documented	No neurological assessment,, especially for cauda equina symptoms					
Any bowel/bladder problems	Documentation of bowel and bladder function	No documentation of bladder function.					
PMH back surgery or spinal problems	History includes or excludes previous spinal problems	Previous spinal problems not included or excluded					
Osteoporosis	History of osteoporosis included or excluded	No record of general health to include or exclude osteoporosis					
Systemic illness or pyrexia	Febrile illness included or excluded	No record of temperature					

Appendix G

Table for risk assessment of syncope guideline compliance.

Guideline criterion	Considered as being assessed	Considered not have been assessed	Decision correct with guideline recommendation	Minor - No or very low risk to the patient of harm	Moderate - Potential of longer recovery time no disability	Serious - Possibility of transient disability and prolonged recovery time	Sentinel - Possibility of leading to permanent disability or death
Systemic compromise	Deviation of vital signs or GCS from normal range	No vital signs or GCS documented					
Severe pain	Pain included or excluded	No documentation of pain					
Possibility of pregnancy	Noted either as a positive or pertinent negative in relevant age group	No mention of pregnancy in relevant age group					
Chest pain	Pain included or excluded with location	No mention of pain or location					
Headache	Pain is included or excluded with location	No mention of pain or location					
Suspected first seizure	Seizure occurred or excluded	Seizure not excluded.					
Continuing symptoms	Conscious level assessed	Conscious level not established					
Abnormal examination findings e.g. neurological	Adequate examination including neurological	Inadequate examination including neurological					
Abnormal BSL	BSL documented	BSL not documented					
Recent head injury	Recent injury included or excluded	Injury not included or excluded					
Valvular heart disease	Heart disease included or excluded	Heart disease not included or excluded					
Exertional syncope	Included or excluded by history	Not included or excluded by history					
Serious co-morbidities (eg diabetes)	Past & current medical history documented covering diabetes, cardiac & anaemia.	Co-morbidities not included or excluded.					
RISK FACTORS: Congestive heart failure Anaemia ECG abnormality Dyspnoea BP<90mmHg FH of sudden death	Risk factors are checked and included or excluded	Risk factors not included or excluded.					

Papers Authored

Swain AH, **Hoyle SR**, Long AW. The changing face of prehospital care in new zealand: The role of extended care paramedics. *N. Z. Med. Journal.* 2010;123:11-14

Swain AH, Manar A, **Hoyle SR**, Larsen PD. Patient satisfaction and outcome using emergency care practitioners in new zealand. *Emergency Medicine Australasia.* 2012; 24:175-180

Hoyle SR, Swain AH, Fake P, Larsen PD. The introduction of the extended care paramedic model in new zealand. *Emergency Medicine Australasia.* 2012; 24: 652-656