**Research project protocol**

Exploring the impact on Emergency Department (ED) vertical stream patient flow metrics of the Advanced Scope Physiotherapy (ASP) service at St John of God Midland Public and Private Hospital (SJGMPPH) ED. To determine whether an additional ASP and expansion of hours in SJGMPPH ED influences these metrics.

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**PROJECT PROTOCOL**

1. **Aims**

To explore the impact on Emergency Department (ED) vertical stream patient flow metrics of the Advanced Scope Physiotherapy (ASP) service at St John of God Midland Public and Private Hospital (SJGMPPH) ED. To determine whether an additional ASP and expansion of hours in SJGMPPH ED influences these metrics.

1. **Background**

Emergency Departments (ED) worldwide are concerned with overcrowding5. The number of people presenting to Australian ED’s is at a higher rate than ever before6, 7. Patients with MSK pain or injury are one of the most common ED presentations in Australia accounting for 12.4% to 17.2% of total ED presentations and contributes to ED overcrowding8, 1. Of those patients presenting with MSK pain or injury, 80% to 83% are triaged semi-urgent and 89% are discharged home; 31% of all ED presentations triaged at categories 4-5 are MSK in origin9, 10,11.As ED’s become busier, have more frequent higher acuity patients and an increasingly older patient population group, patients with MSK pain or injury with an Australasian Triage Scale of 4 to 5 wait longer to be seen in ED, and less patients are discharged within four hours7.

Advanced scope physiotherapists have been part of the SJGMPPH ED team for eight years. ASP’s are postgraduate trained physiotherapists who work in a primary contact role, accepting responsibility for the assessment, diagnostic workup and management of patients with musculoskeletal pain and/or injury, with medical oversight and nursing support when needed.

When working in ED teams, ASPs have a proven record of high level and effective care for patients with MSK pain/injury and patients report high levels of satisfaction with the care they receive14. Patients in ED who are seen by an ASP have a reduction in time to be seen from triage and reduced total length of stay8,12,13.It is hypothesized by efficiently seeing and discharging patients with MSK pain/ injury, it improves the flow of other patients through the ED. This may be due to freeing up of medical and nursing staff to focus on medically unwell patients, as well as reducing the overall resource utilisation of an ED. Whether ASP’s in an ED impact patient flow through this mechanism is not known. Also, the magnitude of impact an ASP has on patient flow metrics whilst working within ED is not known.

Patients with less urgent medical problems, including most patients with MSK pain and/or injury are seen within the fast-track area of ED. The fast-track area of SJGMPPH ED is named the vertical stream. Patients are triaged into vertical stream by the triage nurse using a set clinical criterion (see Appendix A). Patients suitable for vertical stream are lower acuity, medically stable patients who do not require an ED bed to lie down in for most of their assessment or management. Vertical stream operates a “hot bed” system, in which these patients are assessed and treated on a bed and then moved back to a seated waiting area whilst waiting for test results.

The current percentage of patients who did not wait to be seen in SJGMPPH ED is 8%. An audit from February to April 2024 showed the average time a patient waits in ED before deciding to leave and be classified as ‘Did Not Wait’ (DNW) is 156 minutes. Length of time to be seen is also consistently the main reason for negative feedback SJGMPPH ED receives on the Net Promoter Score. From February to April 2024, 60% of patients who DNW were from the vertical stream of ED. MSK pain or injury is in the top three presenting complaints for patients who DNW, and 95% of DNW patients were ATS 3 and 4. Most patients who DNW did so between 12noon and midnight. There is a significant percentage of patients within this DNW group who could have been seen and discharged by an ASP had an ASP be working in ED at the time. Whether ASP’s and the addition of more ASP’s can impact DNW numbers is not known. The size of any impact is also not known.

The number of patients that present to ED fluctuates, but Mondays at SJGMPPH ED is frequently the busiest day of the week. Patients present increasingly to ED from 8am to noon with a peak between noon and 4pm. The proposed research aims to pilot an additional ASP shift on for five consecutive Mondays to examine the impact of patient flow for the patients with MSK injury and other patients in the vertical stream during and after the hours of ASP service. ED presentations downward trend from 8pm to 8am therefore we propose to pilot the additional ASP to service the peak between either 12 noon to 8pm or 2pm to 10pm.

1. **Research Questions**

Our research aims to answer our primary research question:

* Does the addition of a second Advanced Scope Physiotherapist on Mondays, impact vertical stream patient flow metrics at St John of God Midland Emergency Department?

And secondary question:

* Does the addition of a second Advanced Scope Physiotherapist on Mondays, impact the number of patients who leave the Emergency Department prior to being assessed (Did Not Wait)?
1. **Rationale / Significance**

Patients with musculoskeletal (MSK) pain and/or injury are one of the most common presentations to St John of God Midland Public and Private Hospital (SJGMPPH) Emergency Department (ED)part1,2. Whilst many of these patients are triaged to categories of lower acuity and are medically stable, this patient group contributes to overcrowding of the ED. More patients presenting to ED and limited number of beds results in decreased patient flow (movement of patients through the ED from their time of arrival until discharge/admission/transfer). This results in patients waiting longer to be seen, increased length or stay in ED or time to be admitted into the hospital, patients leaving ED without assessment (Did Not Wait [DNW]) and is associated with an increased risk and rate of adverse events3.

Advanced Scope Physiotherapists (ASPs) are part of the vertical stream team at SJGMPPH ED. ASP’s provide expert and efficient care for patients with MSK pain or injury. Currently one ASP is rostered for 7.6 hours per day in SJGMPPH ED, yet patients with MSK pain/injury present to ED throughout the day, and especially from noon to 8pm4. We aim to explore the role ASP’s play in the MSK patient group seen by the ASPs and the impact this may have on vertical stream patient flow. Furthermore, we propose to pilot additional ASP staff and hours of service to determine if an additional ASP can assist with meeting ED patient flow metrics of vertical stream at SJGMPPH ED.

A second ASP working in the ED could have a positive impact on patient flow metrics for a significant number of patients including, a reduced waiting time, increase in the percentage of patients seen within the recommended time as per the Australasian Triage Scale (ATS), increase in the percentage of patients discharged within four hours of presentation to ED and decrease the total number of patients who DNW. These metrics have significant financial applications for SJGMPPH ED.

This study needs to be performed to demonstrate the impact and value-add of the ASP service on vertical stream patient flow and its potential in improving the patient’s journey through SJOGMPPH ED. This study is a pilot trial to determine if a larger study with more funding and longer period of intervention (additional ASP service provision in ED) is feasible and worthwhile. Expected outcomes of the ASP service at in SJGMPPH ED on vertical stream patient flow metrics and for patients within scope of the ASP include a reduced time from triage to clinician assessment, reduced total length of stay, reduced number of patients who DNW and increased percentage of patients seen within recommended time as per ATS and percentage of patients discharged from ED within four hours. The impact of an additional ASP and expansion of service hours in ED could improve vertical stream patient flow metrics.

1. **Methods**
	1. **Study design**

This study is quasi-experimental prospective interventional study over a ten-week period from February to April 2025.

* 1. **Study location**

This study will be conducted at SJGMPPH ED, an urban public hospital in Perth, Western Australia with 75,000 annual presentations.

* 1. **Participants**

All patients who present to SJGMPPH ED and triaged to vertical stream over the study period will be included for the project. Data will be collected from electronic WebPAS BiLaunch database.

* 1. **Intervention**

The intervention involves rostering an additional ASP to work from either 12 noon to 8pm or 2pm to 10pm in the vertical stream of SJGMPPH ED for five consecutive Monday’s. This ASP will be additional to the ASP who is normally rostered in vertical stream from 8am to 4pm on Mondays. The ASP’s will function as per usual, in a primary contact role focusing on assessing and managing patients within their defined scope of practice.

* 1. **Data collected**

It is a preference of the researchers to collect and analyse aggregate non-identifiable data if available. If unavailable, identifiable data will be viewed for inclusion/exclusion and sub-grouped for analysis. Once identifiable data has been organised for research project purposes, it will be converted to non-identifiable aggregated data which will be used for analysis and reporting. All reports with identifiable data will be deleted, and no records saved.

* + 1. Demographic characteristics
		2. Patient demographic data collected will includes age in yearsand genderHospital episode data

Hospital episode data for each patient collected will include Australian Triage Scale priority, ED arrival mode, Presenting complaint by broad term, Discharge diagnosis by broad term, discharge destination and mean (SD) access block for ASP patients in minutes.

* + 1. Primary outcome measures

To assess vertical stream ED patient flow metrics, we will collect:

* Wait time from triage to be seen by clinician in minutes (mean and SD)
* Total time length of stay in minutes (mean and SD)
* The proportion of patients seen within the maximum time as indicated by the Australasian Triage Scale (ATS) i.e. Cat 3 patients seen within 30 minutes
* The proportion of patients that met West Australian Access Target (WEAT) – the percentage of patients to be seen, transferred, admitted or discharged within four hours from ED
	+ 1. Secondary outcome measure
* The percentage of patients who ‘Did Not Wait’ – that is the percentage of patients who left the ED who had been triaged, but did not wait to be seen by a health professional
* variation in vertical stream clinical workforce as potential confounder
	1. **Procedure**

Baseline data will be collected. Baseline period will include five consecutive Mondays prior to the intervention period. Metrics will be collected for a 24-hour period: Vertical stream all patients, MSK injury patients seen by ASP, MSK injury patients seen by non-ASP, Non-MSK vertical stream patients

Intervention data will be collected. Intervention period will include five consecutive Mondays. Metrics will be collected for a 24-hour period: Vertical stream all patients, MSK injury patients seen by ASP, MSK injury patients seen by non-ASP, Non-MSK vertical stream patients

*Confounders*: Patient flow can be affected by many factors including the total number of patients in ED, their time of arrival, the number and experience of staff working in Vertical stream. We propose to collect this data during our baseline data and intervention data, although given the short time for the intervention period we will not have large enough sample to make an adjustment for these factors.

Bed access block will also be recorded in minutes by the ASP's on shift for all patients they assess during the baseline and intervention periods. Bed access block is the time an ASP is ready to see patient, but a bed in vertical stream is unavailable. Bed access block may impact the ability of the ASP and other vertical stream clinicians to see and discharge patients promptly which may impact on key vertical stream patient flow metrics.

To determine whether any observed changes as result of the project’s intervention, were not just co-incidence or due to daily/weekly changes in ED patient case-mix/ volume, we aim to collect additional ED data. We aim to collect patient flow data for the main area of ED (horizontal stream) on the same ten Mondays of the study period. We also aim to collect vertical stream patient flow data for Tuesdays over the same ten weeks. The additional data will be compared with vertical stream patient flow data.

Vertical stream patient flow metrics will be collected from Webpas systems and converted to RedCAP for analysis. Metrics will be collated and compared between the five Monday intervention period, and the five Mondays prior to intervention.

*Statistics*: Descriptive statistics will be reported for vertical stream patient flow metrics. The data will be assessed for normality. Absolute and relative frequencies will be reported for categorical variables. Estimate of changes due to intervention will be presented with 95% confidence intervals to express degree of uncertainty.

We appreciate the study has low power due to the financial constraints of the grant allowing only for five intervention days, however we aim to account for this by collecting additional data on horizontal stream patient flow metrics for the same period as well as Tuesday ED vertical patient flow metric data.

If an effect on patient flow metrics is observed, we will consider using interrupted time series analysis to determine if any observed effect is a result of the intervention.

*Timeline*: 2024 August/September Ethics approvals, 2025 February-April baseline data and five shift interventions to take place, 2025 May Data collation and analysis. June Report drafting, review and submission

*Dissemination plan*: Disseminate report to physiotherapy and allied health managers, ED head of department and nursing manager, ASP and nurse practitioner colleagues. Consider disseminating results in poster format at Annual Midland Research Symposium and if feasible for publication in Australian Physiotherapy or Medical Journal.

*Future planning*: This study may result in larger studies with more financial funding to determine the feasibility of permanently expanding ASP services and staffing at SJGMPPH ED, as well as continue to build on the evidence for an ASP workforce in other hospitals and urgent care centres. The study may also develop ideas for novel strategies to meet the challenges of ED over-crowding, by utilising the expert and high-quality care that ASP’s can deliver practising at the top of their scope.

1. **Ethical Considerations**

**6.1 Consent**

An opt out approach for consent for the research project will be sought. Consent for inclusion for this research project is impractical and overly burdensome for the researchers involved. An estimated 1000 patients will be triaged to vertical stream of Emergency Department (ED) over the baseline and intervention period of ten weeks. Data used for this research project is already automatically collected as part of standard ED data collection practices at St John of God Midland Public and Private Hospital (SJGMPPH). Collation and analysis of the data will be performed at a point in time after all patients are discharged from ED. Furthermore, Advanced Scope Physiotherapists (ASP) are not staffed 24 hours within SJGMPPH ED and therefore there will be large periods of a 24-hour day where an ASP is not available to gain consent from patients for inclusion in the study.

A poster in plain language explaining the aims of the study, what information will be collected and the procedure to opt-out for inclusion of the research project will be placed in an easily accessible, visible location within SJGMPPH ED where all vertical stream patients wait. Patients will be able to opt-out for inclusion of the research project throughout their ED journey and any time after they are discharged from ED, up to the time of data analysis. The poster will include the coordinating investigators email and work phone number to contact for more information on the project, as well as to opt-out. The poster will be made available electronically in other common languages other than English for non-English speaking patients.

If a patient requests additional information on the research project, and/or decides to opt-out of the study, they will be provided with an information pack and opt-out consent form. Information packs and opt-out consent form will be available and stored in the vertical waiting room for all ED clinicians to provide to a patient on request. Patients will be given the opportunity to voice questions and/or concerns and have their questions answered concerning the research project during their time in ED. Should a patient seek further information or want to opt-out of the project, they may contact the coordinating investigators via email or phone number that is provided on the poster and information package. Patients will be able to opt out of the project by contacting the co-ordinating investigator up until the time of data analysis. The information packs and opt-out consent forms will also be available electronically in non-English forms for non-English speakers. The patient will need to liaise with their health professional to provide their email address to be sent an electronic version of the Participation Information Sheet and/or opt out consent form.

**6.2 Risk**

There is minimal to no risk of harm or discomfort to patients associated with the intervention of this research project. Patients presenting to St John of God Midland Public and Private Hospital (SJGMPPH) Emergency Department (ED) and triaged to vertical stream are seen by a team of clinicians including a medical doctor, nurse practitioner or advanced scope physiotherapist (ASP). The intervention of this project is an additional ASP working additional hours on five Mondays in SJGMPPH ED. The additional ASP shift and hours will be shared between the existing ASP team who are all credentialed to work as an ASP, are existing employees of SJGMPPH and have already worked as an ASP in SJGMPPH ED. Both the existing ASP and additional ASP as part of the intervention will work as per standard practice and scope of ASP's at SJGMPPH ED.

There is a low risk of potential social harm to the patient with regards to data protection of sensitive health information. This will be mitigated with robust data collection and data storage processes and adherence to these processes.

Patients will not be overly burdened or inconvenienced due to the research project. The only potential inconvenience for the patient is the inconvenience of having to consider to opt-out of the project should they choose to. Should a patient want to opt-out of the research project, they will need to let a clinician know, be provided the information package physically or electronically and sign and date the opt out consent form. Should the patient prefer electronic versions of the documents, the patient will need to liaise with their health professional to provide their email address to be sent the electronic documents.

Due to the research project, during the intervention period, patients triaged to vertical stream of SJGMPPH ED may potentially be seen more efficiently through the ED due to the addition of an extra ASP. This potentially reduces inconvenience for patients who are seeking healthcare via the ED.

There is no risk of harm or discomfort, inconvenience or burden to participants and third parties due to the project.

The low risk of social harm through unauthorised disclosure of personal information is mitigated by the preference to only use aggregated non-identifiable patient flow metric data. Should this not be available or possible, any identifiable health information will only be viewed retrospectively to include or exclude participants into the project, and to sub-group participant data for secondary analysis. Once this is performed, all identifiable information will be deleted and converted to no-identifiable aggregate data which will be used for analysis and reporting.

No identifiable information will be stored or reported on.

The potential inconvenience of filling out an opt-out consent form should the patient choose to opt-out of the project is minimized by having a simple opt-out consent form that only requires the patient to write their name, sign and date the form.

**6.3 Benefits**

Potential benefits for patients triaged to vertical stream for patients seen by the ASP as well as patients not seen by the ASP include a reduced time from triage to clinician assessment, reduces total length of stay in ED, reduced total number of patients who did not wait to be seen in ED, increased number of patents to be seen within the maximal recommended time as per the Australasian Triage Scale and increased number of patients discharged from ED within four hours.

The low risk of social harm by unauthorised publication of personal information is mitigated by having a robust data collection and storage processes. The potential inconvenience of patients filling out an opt-out consent form is significantly outweighed by the potential benefits of improved patient flow within SJGMPPH ED vertical stream.

Written information in the form of a poster and on request, additional information package will be provided to patients about the research project. These will outline the aims and methods of the research project which will aim to temper any expectation of benefit for patients as result of the research project.

There will no perceived benefit from the patients point of view during the baseline period and intervention period of the study, as they will perceive their care as normal care and process in St John of God Midland Public and Private Hospital ED.

**6.4 Data protection and privacy**

It is a preference of the researchers of this study to use non-identifiable patient flow metric aggregate data from the outset for analysis and reporting. However, if this data is not readily available with existing SJGMPPH data collection systems, processes and with human resources available, then identifiable data will be viewed and collated retrospectively. The identifiable data will be aggregated to non-identifiable data which will be used for analysis and reporting. Identifiable data will not be stored and immediately discarded once turned into non-identifiable aggregate data. No identifiable data will be stored or reported on.

There will be instances where identifiable health records and associated data will need to be reviewed for inclusion or exclusion into sub-groups for secondary analysis. Any identifiable data, once sub-grouped will have all identifiable data deleted. This data set will be converted to aggregated non-identifiable data which will be used for analysis and reporting. Identifiable data will not be stored and immediately discarded/closed once turned into non-identifiable aggregate data. No identifiable data will be stored or reported on.

Only non-identifiable aggregated data will be stored on local REDCap servers. Only researchers involved in data analysis (KR, AS, KK) will have access to aggregated data on REDCap which is password protected.

Data collection will only begin after SJGHC final approval has been granted and stop by ethics end date.

Data collection practices follow ALCOA-CCEA principles; Attributable, legible, contemporaneous, original, accurate, complete, consistent, enduring and available

Only delegated research team personnel and regulatory agencies will be given access to research data

* + 1. **Activities with data**

Existing health data will be collated using WebPAS Bilaunch program. Using BiLaunch, an excel spreadsheet with identifiable information/data will be produced for organization/inclusion/exclusion for sub-grouping. Once all appropriate patients are retrospectively identified for inclusion for this research project, all identifiable information will be deleted from the excel document. This excel spreadsheet will be converted to .CSV format, and then transferred to REDCap servers and format for data analysis and reporting. The Excel spreadsheet will be deleted and no copies will be saved or archived.

The only data set that will be stored and used for analysis and reporting will be the REDCap version which will not have any identifiable information/ data. Aggregation of data will be performed in REDCap.

Only non-identifiable aggregated data will be stored on secure local SJGMPPH REDCap electronic servers. Only non-identifiable aggregated data will be used for analysis and reporting in any notes/publications from this research project.  The dataset on REDCap is 2 factor authentication password protected and will be the only data set stored and used for analysis and report writing.

All information / data will be accessed via computers based in SJGMPPH connected to local hospital servers. All reports produced as a result of the research project will be stored on P drive local hospital servers (DATA (Midland) (P:)). Access to these reports for drafting and editing may be available for the researchers using approved external access secure password protection for login and two factor authentication.

All data collection protocols will comply with Good Clinical Practices Guidelines to assure reliability and credibility of data collected.

Stata 15 will be used for statistical analysis. Non-identifiable REDCap data will be downloaded in .csv format to Stata15. Data used for analysis will be destroyed and not stored in any external/personal drive. SJGMPPH REDCap will remain the sole data storage system. The researchers of this project have access to a biostatistician from Curtin University School of Physiotherapy for advice and guidance on appropriate data analysis modelling as required. Should advice and guidance be required from the biostatistician, they will only have access to aggregated non-identifiable data.

Data will not be emailed to an external email address.

All research materials and data set on REDCap will be stored on local hospital REDCap server for a minimum of five years after analysis completion as per Government of Western Australian Health Department Information Retention and Disposal Policy.

Custody of the stored data belongs to St John of God Healthcare and will be used for research purposes only by the researchers performing data analysis (AS, KR, KK)

Access of identifiable information will only be viewed for the purposes of retrospective inclusion/exclusion of participants and to sub-group for secondary analysis. Once organisation of data has been performed, identifiable information/ data will be deleted from the data set. This data set will be transferred to local REDCap servers and will only contain non-identifiable data.

Participants may access the outcomes of the project via any published reports/articles/posters produced as part of the research project.

No identifiable information will be analysed or reported on, therefore there are no ethical considerations should participants view any publications as a result of the research project.

**6.5 Potential for bias:**

Selection bias: All patients presenting to SJGMPPH ED and triaged to vertical clinical stream during the study period will be included in the study. The ASP's will select in-scope patients to assess and treat as per standard clinical practice and scope of ASP's at SJGMPPH ED.

Confusing bias: Patient flow can be affected by many factors including the total number of patients in ED, the acuity of patients in ED, patient time of arrival, the number and experience of staff working in ED. We propose to collect these factors during the baseline and intervention periods to allow for analysis and comparison

1. **Relevance to SJGHC’s Missions and Values**

Expanding the hours of service and staffing levels of ASP’s in SJGMPPH ED aims to build on the excellent service ASP’s and other ED clinicians already deliver. Improving access for patients who present to SJGMPPG ED with MSK pain or injury demonstrates the commitment of the hospital and SJG to optimising the patient journey, which exemplifies hospitality and respect

1. **Budget and Justification**

The grant monies received would be spent on the intervention for this project which comprise of wages for five additional ASP shifts. This amounts to $3876. The remaining $124 of grant money would be spent on ASP wages to allow time for data collation, analysis and report writing.

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**Appendix A – St John of God Midland Public and Private Hospital Emergency Department streaming criteria**

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