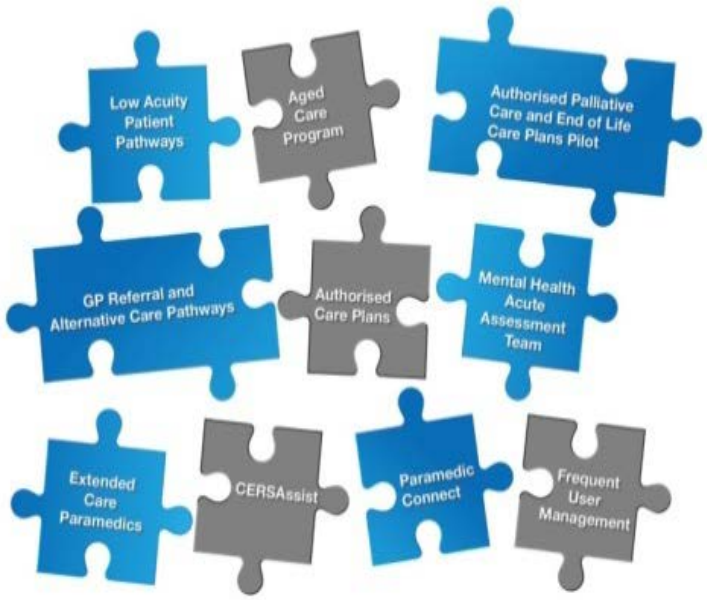
NSW Ambulance

Health
Illawarra Shoalhaven
Local Health Network

NSW Ambulance and Wollongong Hospital Integrated Care Initiative Plan

Pre-Hospital Phlebotomy Trial



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Director Clinical Innovation	Graeme Malone		
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Zone Manager, Illawarra Zone	Joshua Atkins		

APPROVALS

This document requires the following approvals

POSITION	NAME	SIGNATURE	DATE OF ISSUE	VERSION
Director Clinical Innovation	Graeme Malone			
A/Deputy Director Operations, Illawarra and South West Sydney Sector	Paul Edwards			
Zone Manager, Illawarra Zone	Joshua Atkins			

1. INTRODUCTION

1.1 Initiative details

Initiative title	Pre-Hospital Phlebotomy Trial
Initiative sponsor	Paul Edwards (ZM Illawarra)
Initiative lead	Sarah Moxon (HRM ISLHD)
Initiative clinical coordinator	Graeme Malone (Director Clinical Innovation)
Proposed start date	5th March 2018
End date	5th September 2018

1.2 Team members

NAME	ROLES IN THE PROJECT
Sarah Moxon	Project lead
Paul Edwards	Operational coordinator
Graeme Malone	Clinical coordinator
DOM Paul Delamont	Operational oversight
DOM Norman Rees	Operational oversight
Kirsty England	Paramedic Educator
Susan Gow	Clinical Training Officer

ILLAWARRA SHOALHAVEN LHD	
Dr Soo Ming Phang	ED Staff Specialist
Prof Kate Curtis	ED Clinical Nurse Consultant
Jessica Hennessy	Wollongong Hospital ED NUM
Ben Wakeling	Wollongong Hospital Whole of Health Program Lead
SEALS Pathology	

The purpose of this plan is to provide a framework to support a coordinated and systematic approach to implementing and evaluating the Pre-Hospital Phlebotomy Integrated Care Initiative in Illawarra Zone.

This initiative aims to determine if Pre-Hospital Phlebotomy reduces time for pathology results and enhances the efficiency of patient flow for patients arriving via ambulance to the ED.

2. CASE FOR INTEGRATED CARE INITIATIVE

As part of the Whole of Health Project, the *Who Owns the Timeline* Study was conducted by Wollongong Hospital in May 2016. This was a 34 hour snapshot of Wollongong Hospital's Emergency Department, intended to capture the timeline of key decisions/actions within ED from triage time to admission/discharge. The time taken for patients to get pathology results was found to be 2 – 3 hours. This was identified as one of the issues impacting on the flow of patients through the ED.

NSW Ambulance was approached by Wollongong Hospital to participate in the Pre-Hospital Phlebotomy Trial as a strategy to reduce time to blood result availability for ED patients, and hence improve patient flow at Wollongong Hospital ED.

2.1 Integrated Care Initiative Statement

- Patient flow is an issue that impacts greatly on ambulance access to emergency department. Throughout each stage of the patient journey, delays have flow on effects which lead to further delays for other patients, and ultimately lead to delays in ambulance provision to the community.
- A patient's stay in the emergency department represents a vital phase in the patient journey, either leading to admission to a hospital ward, or discharge home with or without further referrals. The goal for length of stay in the emergency department is under 4 hours.
- The Who Owns the Timeline Study conducted at Wollongong Hospital in 2016 found that the time to blood result availability was 2 – 3 hours for admitted patients, and 3 hours for non-admitted patients.
- If this timeframe was reduced, admissions and discharges could occur more quickly, which could reduce ambulance transfer of care delays in the ED

2.2 Goal

The goal of the Pre-Hospital Phlebotomy Trial is to:

- Introduce the practice of taking a nominal set of blood samples from a patient prior to arriving at hospital, which can form part of the ED assessment of the patient
- Contribute to improved patient flow through emergency department through reduced time to blood results
- Improve patient journey by reducing the requirement for additional venepuncture at hospital for the purpose of taking blood

2.3 Objectives

- Provide clearly identified, usable blood samples to Wollongong Hospital ED obtained prior to arrival of patient at ED
- Reduce time to blood result availability for patients seen in the emergency department at Wollongong Hospital by performing pre-hospital phlebotomy
- Minimise impact of clinical procedure on scene time and turnaround time

3. PROJECT SCOPE

3.1 Scope

IN SCOPE	OUT OF SCOPE
Develop procedure for pre-hospital phlebotomy in consultation with Wollongong Hospital	Cannulating patients specifically for the purpose of taking blood where they wouldn't otherwise be cannulated
The following stations will be invited to participate in the project: Helensburgh, Bulli, Wollongong, Warrawong, Dapto and Oak Flats	The following stations will not be included in the project due to distance from Wollongong Hospital: Kiama, Bomaderry, Culburra, Ulladulla, Huskisson, Kangaroo Valley
The trial will be limited to paramedic specialists for the initial 3 months of the trial, after which involvement may be expanded to include all P1 paramedics from the above listed stations	
Evaluation of impacts on case times, and paramedic feedback will be conducted by HRM	
Paramedic educators will receive training from Wolllongong Hospital on the procedure	
Paramedic educators to facilitate training with Paramedic specialists involved in the initial 3 months of the trial	

3.2 Assumptions, Constraints and Dependencies

ASSUMPTIONS

- Wollongong Hospital will provide all consumables (blood tubes, sample adaptor, biohazard bags and pathology forms)

CONSTRAINTS

- Paramedics are only to take blood samples from those patients who require cannulation for another reason, patients are not to be cannulated for the purpose of collecting blood samples

DEPENDENCIES

- The decision whether to use blood samples collected by paramedics will be made by the ED physician
- Evaluation of time to blood result availability and other hospital performance improvement measures will be conducted by Wollongong Hospital

4. GOVERNANCE STRUCTURE

4.1 Key Stakeholders

STAKEHOLDER	LEVEL OF ENGAGEMENT	MANAGEMENT STRATEGY
Paramedic Specialists involved in trial	• Consultation prior to trial implementation • Education on procedure • Implementation of trial • Evaluation of trial	• Introductory email inviting feedback and indication of willingness to participate in trial • Face to face discussion at station meetings • Monthly email updates of trial progress • Evaluation form at end of trial
Illawarra Zone DOMs	Engage	• Consultation prior to trial implementation • Representative at steering committee meetings
Illawarra Zone Station Officers	Engage	• Introductory email inviting feedback • Face to face discussion at station meetings • Monthly email updates of trial progress
ISWS Sector Management	Engage	• Approval of Initiative Plan and Brief • Update given at monthly Sector Clinical Performance meetings
Wollongong Hospital ED	Co-design trial	• Steering committee meetings
Patients involved in trial	Inform and seek consent	• Information sheet • Consent documented on eMR/PHCR

5. FINANCIALS

5.1 Budget & Expenditure

DESCRIPTION	WORKFORCE			MATERIALS/EQUIPMENT			TOTAL
	Quantity	Unit Cost	Total	Quantity	Unit Cost	Total	
Paramedic Specialists	already rostered						n/a
Blood tubes & bags				provided by Wollongong Hospital			n/a
						Total Cost	**$ 0**

5.2 Other Resources

RESOURCE REQUIRED	REASON	COST
Paramedic Educator	Provide training to Paramedic Specialists on phlebotomy procedure	n/a
Qlikview	Data collection for evaluation of trial impact on case times	n/a

6. RISKS AND ISSUES LOG

RISK/ISSUE	DESCRIPTION	MITIGATION STRATEGY
Patient consent	• Patient not adequately informed • Consent not adequately documented	• Record patient signature on pathology form • Paramedics trained to record consent for pre-hospital phlebotomy in PHCR/eMR as part of clinical procedure • Information sheet provided to patient
Adverse clinical outcomes	Risks associated with venupuncture	• Risk mitigation strategies in place for cannulation skill • Only patients who are being cannulated under ambulance protocol will be included in trial (i.e. patients will not be cannulated for the express reason of taking blood)
Impact on case times	Increased scene time due to additional clinical procedure	• Consultation with Wollongong Hospital CNC about time required for procedure • Review of Qlikview data to evaluate impact on scene times
Blood samples not accepted by hospital	• Blood samples may not be accepted by staff at hospital • Negative perception by Paramedics if samples not accepted	• Wollongong Hospital nursing and medical staff engaged and informed about trial • Consultation with Paramedics that there may be numerous reasons for samples not being accepted and this is not reflective on the quality of sample or paramedic practice • Ensure samples are well identified by adhering patient label to sample on arrival at hospital • Hospital responsible for disposal of any blood samples not accepted • Activity log to include whether blood sample was accepted at handover, and any issues to be reported to HRM
Consumable availability	• Consumables not available for restock at hospital	• Hospital responsible for providing supply of consumables in ambulance room for restocking • HRM contact number given to paramedics if any issues encountered
Data collection	Cases utilising the pre-hospital phlebotomy procedure may be missed if not identified through eMR documentation, or if documented on PHCR	• Activity log to be placed at Wollongong Hospital next to consumable restocking area, for crews to complete case details when restocking consumables

7. COMMUNICATION

WHAT INFORMATION IS TO BE COMMUNICATED?	STAKEHOLDER	WHEN? TIMING	HOW? FORMAT/MEDIUM	WHO IS RESPONSIBLE?
Draft clinical procedure	Paramedic Educators	December 2017	• Email • Follow up discussion	HRM
Introduction to trial and invitation to be involved	Paramedic specialists, SOs & DOMs	January 2018 Prior to project commencing	• Email & flyer at station • Station meetings	HRM DOMs to promote
Clinical procedure	Paramedic specialists	January 2018 Prior to project commencing	• Email & flyer at station • Station meetings	Paramedic Educators
Patient fact sheet	Patients	During patient contact	Printed fact sheet	Paramedic specialists
Trial updates	All Illawarra Zone staff	Monthly during trial	Email	HRM
Trial completion	All Illawarra Zone staff	At completion of trial	Email	HRM
Trial evaluation	All Illawarra Zone staff	After completion of trial	• Email • Feedback sought at station meetings	HRM
Issues arising during trial	Wollongong Hospital	Throughout trial where necessary	• Email • Face to face discussion	HRM

8. EVALUATION

OBJECTIVES	QUESTIONS	INFORMATION REQUIRED	DATA SOURCE
1. Provide clearly identified, usable blood samples to Wollongong Hospital ED obtained prior to arrival of patient	Have blood samples obtained by NSWA been used by Wollongong Hospital ED for patient assessment?	• Number of blood samples taken by NSWA • Number of blood samples accepted at clinical handover • Number of blood samples sent to pathology from trial group	• Activity log placed at hospital at consumable restocking area • Wollongong Hospital/Pathology data
2. Reduce time to blood result availability	Has the average time to blood result availability improved for this cohort of patients?	• Time to blood result availability • Trial patient cohort	This information will be collected and evaluated by Wollongong Hospital
3. Minimise impact of clinical procedure on scene time and turnaround time	Have scene time and turnaround time increased for cases performing pre-hospital phlebotomy procedure?	• Scene time • Turnaround time (TAT)	• Activity log placed at hospital • Qlikview

The evaluation will be collected and written up by the project lead, and will be communicated to:

- The project team (NSWA and Wollongong Hospital)
- ISWS Sector Management team
- Paramedics in the Illawarra Zone

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PathWest Recommended Order of Draw

Recommended Order of Draw	Cap Colour(s)
1. Blood Cultures	
2. Sodium Citrate*	
3. Sodium Citrate (ESR tube) **N.B** can be collected at the end of the draw as tests performed on this tube are not compromised by other additives**.**	
4. ACD	
5. Serum with or without clot activator, with or without gel	
6. Heparin with or without gel plasma separator	
7. EDTA with or without gel separator	
8. PTH (EDTA with gel)	
9. Trace metals EDTA If collecting for Chromium, Zinc and Cobalt, collect separately using a new luer adapter to avoid contamination	
10. Fluoride	
11. Lithium Heparin Gas Syringe For venous /arterial blood gas collection Collect separately using a new luer adapter to avoid contamination Please consult your local laboratory for specific site requirements	

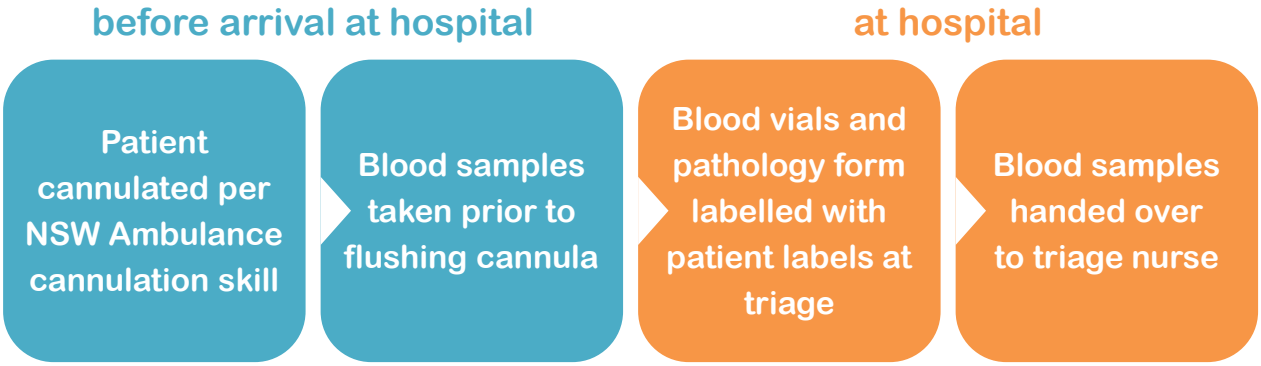
***** Use of a winged collection set requires the collection of a discard tube if the first tube to be collected is a blue top Sodium Citrate tube. This discard tube will prime the tubing of the collection set and ensure that the correct anticoagulant/blood ratio is maintained. The discard tube should be a non-additive or light blue coloured tube and need not be filled.

NSW Ambulance and Wollongong Hospital Pre-Hospital Phlebotomy Trial

The Pre-Hospital Phlebotomy Trial is an Integrated Care Initiative that aims to

- Reduce time to blood result availability for Emergency Department patients
- Reduce offload delays due to improved patient flow through Emergency Department
- Improve the patient journey by reducing the requirement for additional venepuncture at hospital for the purpose of taking blood

The trial will involve Paramedics from the Illawarra Shoalhaven Zone.



A skill sheet outlining the procedure in detail has been developed in consultation with NSW Ambulance Clinical Services and Wollongong Hospital

Paramedics involved in the trial will be given an orientation at Wollongong, Shellharbour and Shoalhaven Hospital.

If you have any questions please contact your DOM or HRM Adam Walker on 0421 610 519

NSW Ambulance and Wollongong Hospital Pre-Hospital Phlebotomy Trial

NSW Ambulance and Wollongong Hospital are undertaking a trial to improve your journey through the Emergency Department.

The goal of the trial is to reduce the time waiting for pathology results in the Emergency Department by taking a basic set of blood samples prior to arrival at the hospital.

It is hoped that this practice will lead to you spending less time in the Emergency Department, and receive definitive treatment sooner.

Why have I been chosen?

You have been invited to participate in the trial because you require IV cannulation according to NSW Ambulance protocol in relation to your current treatment.

Your involvement is completely voluntary and you can decline to have blood samples taken if you wish.

Blood samples will be used at the hospital for a range of tests relating to your presenting condition

Blood samples will not be used for drug and alcohol testing

If you have any questions or concerns, please contact NSW Ambulance Illawarra Zone office on (02) 4227 0222

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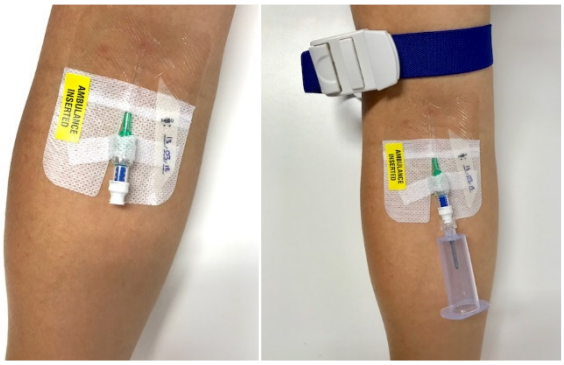
WOLLONGONG HOSPITAL PRE-HOSPITAL PHLEBOTOMY TRIAL — PROCEDURE

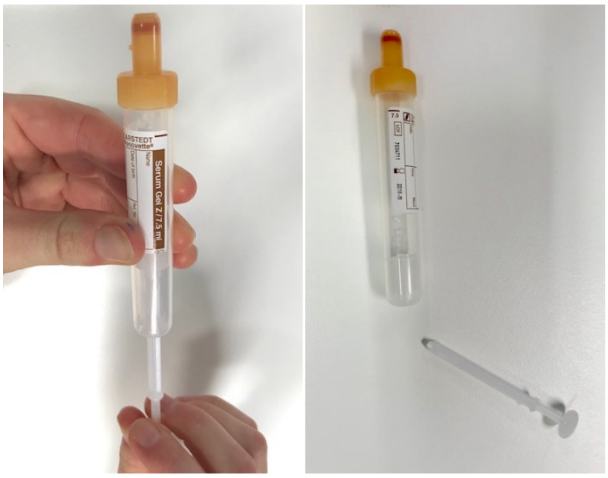
This initiative aims to determine if Pre-Hospital Phlebotomy reduces time for pathology results and enhances the efficiency of patient flow for patients arriving via ambulance to the ED

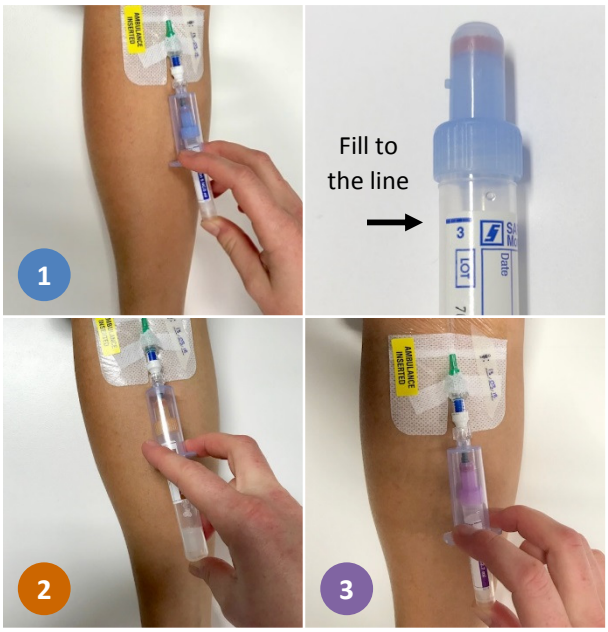
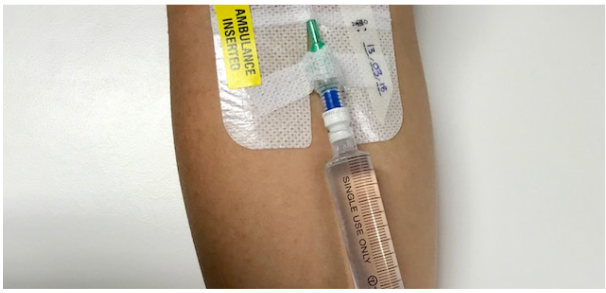
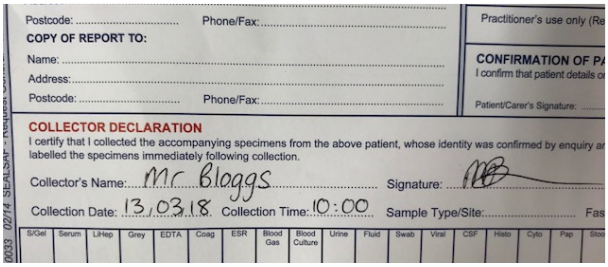
Indication	Any patient who requires cannulation under NSW Ambulance protocol, and displays competency and capacity to give informed consent to have blood samples taken
Prepare patient	• Confirm competency and capacity • Explain procedure to patient and gain informed consent • Provide information sheet to patient if appropriate

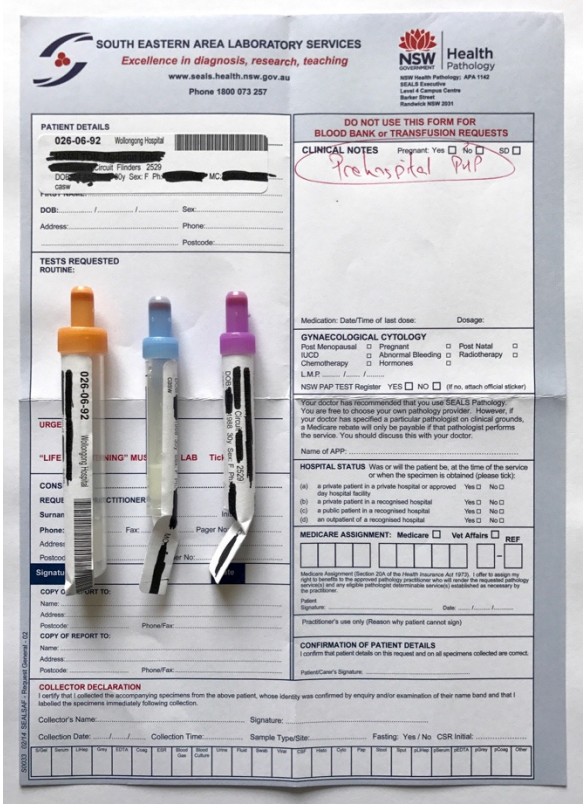
Prepare equipment	Prepare equipment required for cannulation and blood sample
	• Cannulation equipment per IV cannulation skill 108.2.1
	• Red specimen bag
	• Pathology form
	• Adaptor (Saf-T Holder Device)
	• Blood collection tubes
	  ○ Blue (Coagulation 9 NC/3mL)
	  ○ Brown (Serum Gel Z/7.5mL)
	  ○ Purple (EDTA KE/2.7mL)

Cannulate and attach adaptor	Perform cannulation per skill 108.2.1 • Perform hand hygiene prior to procedure and use aseptic technique • 18 gauge or larger is preferred however not essential • Do not flush cannula Attach adaptor to bung (Saf-T Holder Device) Re-apply tourniquet
Prepare blood collection tubes	Pull plunger of each tube until it clicks into fully extended position (this creates a vacuum in the tube) Snap off plunger from each tube and discard plunger in general waste bin





Take blood samples	Insert and fill blood collection tubes in the following order: 1. Blue (Coagulation 9 NC/3mL)* 2. Brown (Serum Gel Z/7.5mL) 3. Purple (EDTA KE/2.7mL) * The blue tube must be filled to the 3mL line. Other tubes should be filled to the line if possible	
Flush cannula	Remove tourniquet and flush cannula with 10mL normal saline	
Sign collector declaration	Fill out and sign collector declaration at bottom left hand side of pathology form, including collection date and time	
Place samples in bag	Place blood samples into red specimen bag and seal bag Place pathology form in back pocket of specimen bag	

Label samples at hospital	During triage, inform triage nurse that you have taken blood samples as part of the pre-hospital phlebotomy trial Request 4x patient labels from hospital staff Confirm details on label with patient Place a patient label on each tube, and in the *patient details* section of pathology form Write "Ambulance PHP" in the *clinical notes* section of pathology form (this allows identification of trial samples so that trial results can be analysed)	
Place labelled samples in bag	Place labelled samples back in red specimen bag Place pathology form in back pocket of specimen bag Hand over specimen bag to triage nurse	
Restock supplies	Restock blood sample kit from ambulance room at Wollongong Hospital. Two complete kits are to be kept in each vehicle (1 in green medications kit, 1 in vehicle) Write case details in Activity Log, kept with restocking supplies in ambulance room	
Document in eMR/PHCR	Document in patient record: • Blood samples taken as part of Wollongong Hospital PHP trial • Patient was provided information on trial, and gave consent to have blood samples taken	

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PathWest Specimen Tube Collection Guide in Recommended Order of Draw

Notes

1. Venous blood gases (VBG) should be collected as per the procedure for Zinc collections.
2. **Haemolysis Warning** - Never inject blood into the collection tube through a needle from a syringe.
3. Always mix the blood with anticoagulants by gently inverting the tube 6-8 times.
4. Do **not** shake tubes (exception is Quantiferon)
5. Do **not** top up or transfer blood from one tube from another.
6. **Full patient identification** is required for all pathology specimens (i.e.: **full name and UMRN or full name and DOB**)
7. **This is a guide only.** If you have any queries or require further information, please refer to the PathWest Test Directory or contact your local laboratory prior to sample collection.

TUBE CONTENT	VOLUME	TESTS / DETERMINATIONS	INSTRUCTIONS
 Blood Cultures	8 -10 mls in each container	Blood cultures Investigation of a systemic bacterial or fungal infection	Must be collected using strict aseptic technique. First collect aerobic (grey/blue top) container followed by the anaerobic (purple/pink top)
 Sodium Citrate	2.7 ml	INR, Prothrombin Time, APTT, Coagulation profile. (2.0 ml and 1.8 ml size tubes also available) **NB. Please refer to your local testing laboratory for D-Dimer collection requirements.**	Fill to the clear fill line marked on the tube. Send to the Lab within 4 hours of collection otherwise separate the centrifuged plasma within 4 hours of collection and transport chilled.

PathWest Specimen Tube Collection Guide in Recommended Order of Draw

 Sodium Citrate	1.36 ml	Erythrocyte Sedimentation Rate (ESR) (Note: 1.8 ml tubes are used at regional PathWest laboratories and cannot be forwarded to the QE11 Nedlands laboratory for testing)	Must fill tube to midway between marked lines **N.B** can be collected at the end of the draw as tests performed on this tube not compromised by other additives.
 ACD	9.0 ml	HLA Typing – please check on line Specimen collection Manual before collection	Store at room temperature.
 Serum (+clot activator CAT)	6.0 ml	Therapeutic drug levels, antibiotic assays and drugs of abuse **Note** - a red top non-gel serum tube is preferred when collecting **outside** the metropolitan area. For collections in the metropolitan area please use a lithium heparin (dark green top – see below) **Lithium assays can only be performed on a serum (red top) tube**	Record the time of last dose on the request form and the collection date and time for all antibiotic assays & drug levels
 Serum (+clot activator CAT) **OR**  Serum with Gel (+clot activator - SST II)	6.0 ml ------- ---- 8.5 ml	Vitamin B12, Serum Folate For collection requiring Thiamine or Red Cell Folate, additional samples will be required – please refer to EDTA ---------- Syphilis serology , Hepatitis serology, HIV, Viral serology, RRV, Arbovirus, CMV, Murray Valley Encephalitis, Q Fever, EBV, ANF, ASOT, RAST, Anti-DNaseB, TFT (T4 + TSH), PSA, Rheumatoid Factor (RF), , BHCG (Qualitative/Quantitative), Autoantibodies, Protein Electrophoresis, Most Hormones (FSH, LH, E2 etc), IM Screen (Monospot).	---------- N/A

PathWest Specimen Tube Collection Guide in Recommended Order of Draw

 Lithium Heparin (LH)	4.0 ml	Therapeutic drug levels, antibiotic assays and drugs of abuse **Note:** A dark green top non-gel lithium heparin tube is preferred for samples collected **within** the metropolitan area. For samples collected outside the metropolitan area please use a serum (red top tube – see above) **Do NOT collect Lithium Heparin (Green top) tubes for Lithium assays.**	Record the time of last dose on the request form and the collection date and time for all antibiotic assays & drug levels
		Troponin T – Please collect a separate tube. Note:-proBNP– will also require a separate tube if tested in non-metropolitan laboratory. **NB. Please refer to your local testing laboratory for D-Dimer collection requirements.** **Do NOT collect gel tubes for Troponin T or D-dimer assays**	Do **not spin and** separate samples for Troponin, NT-proBNP or D-Dimer.

PathWest Specimen Tube Collection Guide in Recommended Order of Draw

 Lithium Heparin (LH) **OR**  Lithium Heparin Plasma with Gel (LH PST II)	8.0 ml	Biochemistry: UEC, LFT, Cardiac Enzymes, Lipids (Chol/Trig), HDL, Gamma GT, Calcium, Bicarbonate, Magnesium, Lipase, Uric Acid, Phosphate, CRP, Protein. NOTE: Iron Studies (Fe), Thyroid Studies (TFT), Hormones, PSA, Alcohol and some therapeutic drug levels can also be performed on this tube.	**Calcium – Avoid venous occlusion during collection by releasing tourniquet ASAP.** The UEC and Phosphate must be performed within 4 hours of collection otherwise separate the centrifuged plasma within 4 hours of collection then store and transport chilled. Unseparated samples **should not** be refrigerated but kept at room temperature until analysed
 EDTA (K2E)	4.0 ml	Haematology; FBC, Hb, Platelets, WCC, Reticulocytes, Glycated Hb (HbA1c), Malarial Parasites, G6PD Screen, Red Cell Folate, Cyclosporin, Hb electrophoresis. Heavy Metal Screen (2 tubes for mercury), FK506. Thiamine …… BNP will require EDTA plasma if tested at Nedlands. (Note Pro-BNP can be tested in some non-metropolitan laboratories. Please check with your local laboratory before collection)	**Do not** separate For Thiamine – please consult your local laboratory for collection requirements. …… Separate for BNP
	2 x 4.0 ml or 6.0 ml or 9.0 ml	Blood Group, Maternal antibody screen, Rhesus (Rh), Cross-match, Antibody Screen, Group & Hold, FMH, Kleihauer, Direct Coombs Test, Cord blood, PCR Studies	Specimen labels and request forms **must** have identical patient identification and include the collector's signature, date and time of collection. A formal declaration printed on the request form **must** be signed by the collector. **Samples that do not meet these requirements will be discarded.**

PathWest Specimen Tube Collection Guide in Recommended Order of Draw

 EDTA Gel (K2E)	6.0 ml	Parathyroid Hormone (PTH) If an EDTA Gel tube is not available, please contact your local testing laboratory for further advice.	Do not confuse with PTH related protein (PTHrp) which requires a special tube. Please contact your local laboratory.
 EDTA Trace Metal	6.0 ml	If an EDTA Trace Metal tube is not available, please contact your local testing laboratory for further advice. Zinc **must** be collected separately using a new luer adapter (see instructions) to reduce the risk of trace metal contamination from rubber bungs in other tubes. If other tubes are required the following instructions must be followed to avoid a double venepuncture:	For collections requiring a Trace Metal tube, please use a Winged Infusion Set (Butterfly Needle) and prepare a second (replacement) luer adapter. The first luer adapter must be changed immediately prior to collecting the Trace Metal tube to prevent contamination. Subsequent tubes can then continue to be collected as per the recommended order of draw. Please consult your local specimen collection team if assistance is required.
 Fluoride	2.0 ml	Glucose only (Can be used for Glycated Hb)	Fill only to the mark. Do **not** separate.
 Lithium Heparin Blood Gas	1.5 ml	Arterial Venous Blood Gas collections Please refer to your local laboratory for site specific information regarding collection and transport of Blood gas samples	Collect separately using a new luer adapter to avoid contamination Please consult your local laboratory for specific site requirements .

For all other tests or enquiries, please call 13 PATH (137284) or refer to your local PathWest Laboratory or the online PathWest Test Directory as special procedures may apply.

For transportation requirements, please refer to your local PathWest Laboratory.

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