

Un-fractionated HEPARIN infusion

‘Injecting system into practice’

Lesley Hawke
Waitemata DHB

“World wide evidence that concentrated injectable medicines have been involved in medication incidents resulting in death or serious harm”

WHO 2007





WHO recommendations for concentrated injectables

- *Minimize storage/preparation of concentrates on clinical units*
- *Encourage ready-to-use products*
- *Standardize procedure if concentrated medicines must be used on clinical units*

Presentation Overview

- **Background**
- **1st audit of practice by 3 Auckland DHBs 2005 results and recommendations**
- **2nd audit following WDHB implementation of premix bag, May 2009**
- **3rd audit of WDHB implementation of new chart, Sep 2009**
- **Compare 3 audits & looking ahead**

Heparin – background

1916 Discovered

1935 First clinical trials in humans

1938 Medicinal use as anticoagulant

1967 Mode of action discovered

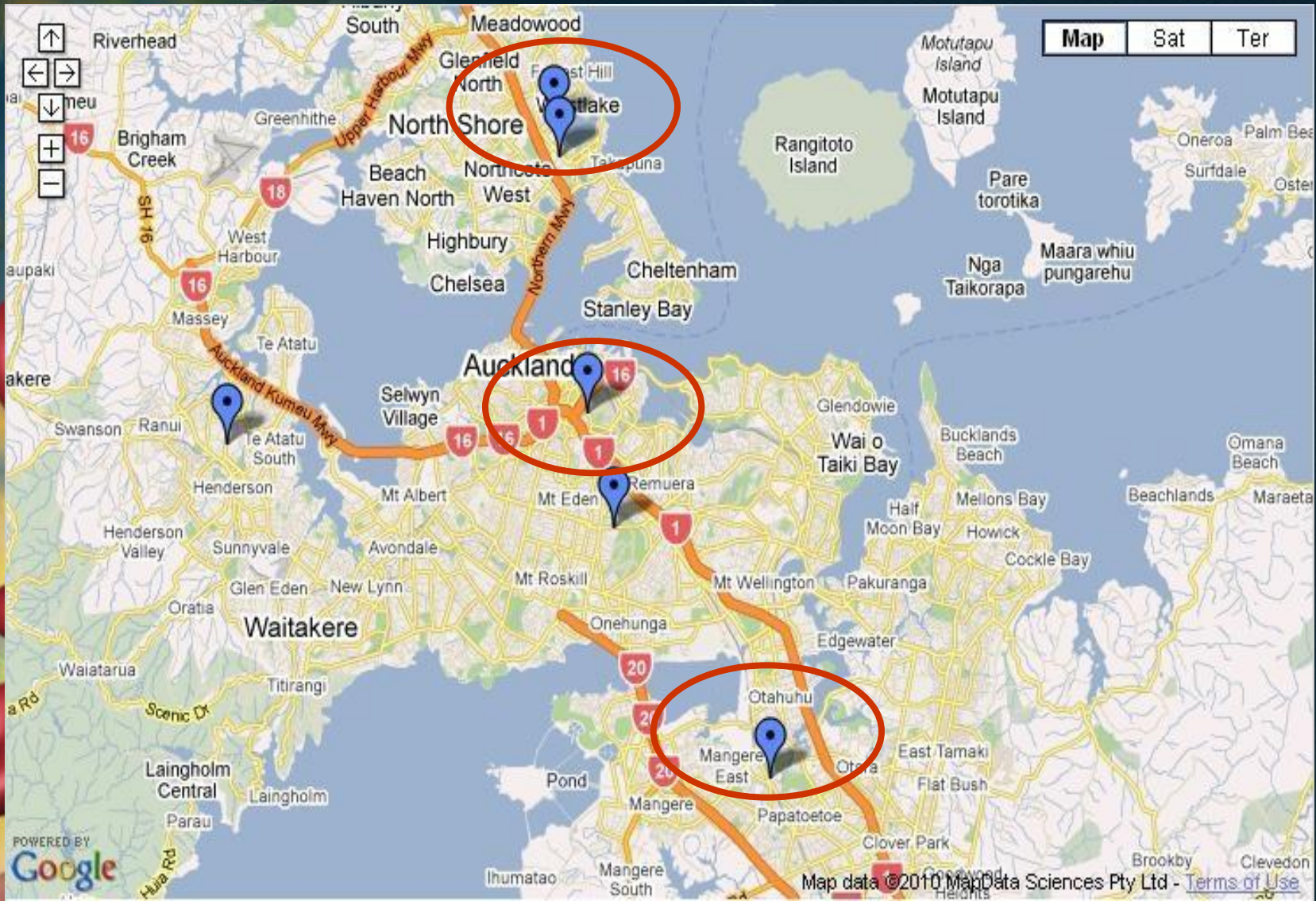
1990s Introduction of LMW Heparin and corresponding decreasing use of UFH

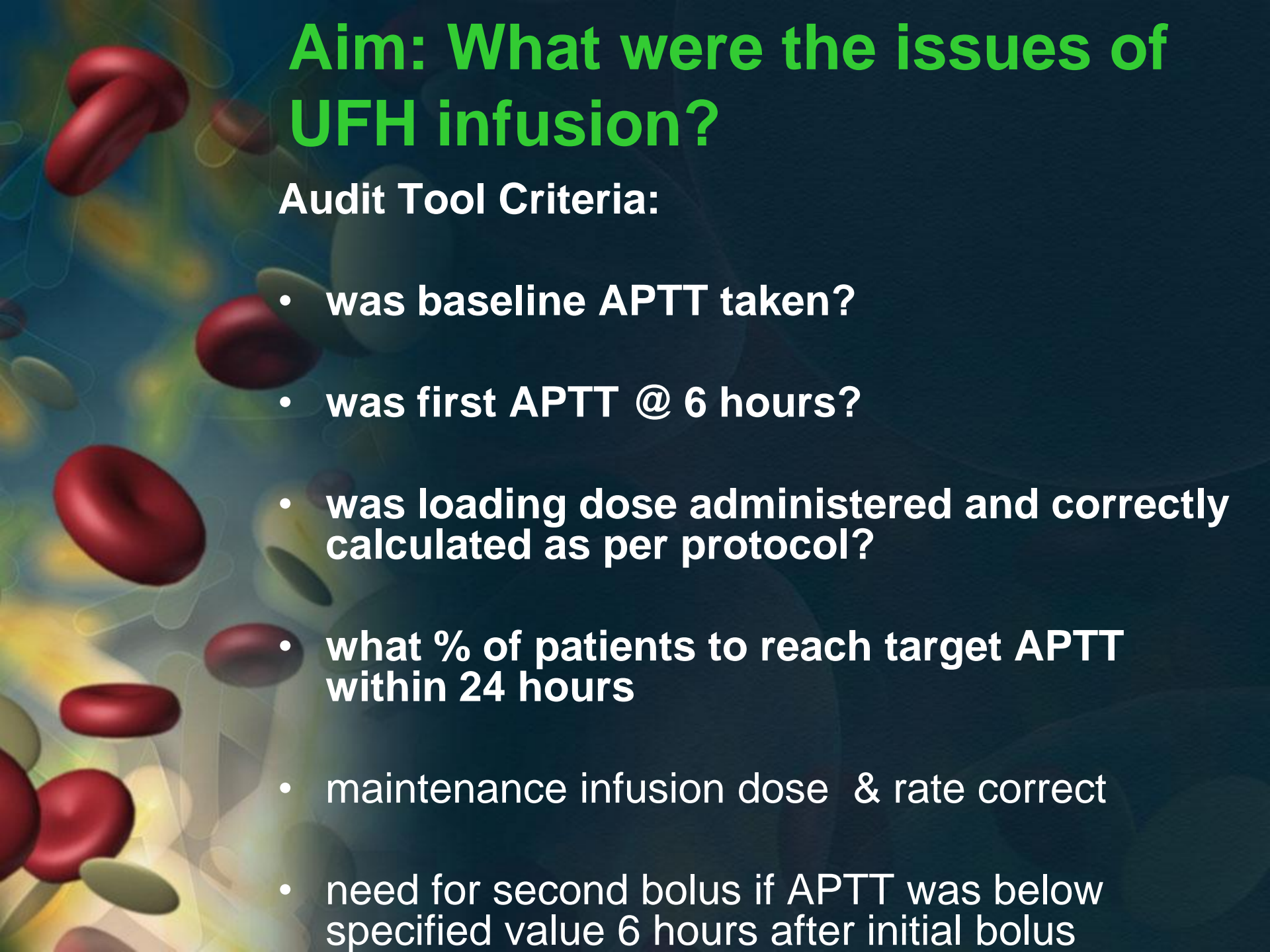
Heparin – background, cont.

- Fast acting injectable anticoagulant
- For acute treatment and when necessary to stop/start anticoagulation for procedures and operations.
- Narrow therapeutic index and wide dose variation
- Monitor APTT frequently + dose adjustment
- Loss of user experience due to ↑ use LMW Heparins

1st Audit @ 3 Auckland DHBs, 2005

Waitemata, Auckland & Counties Manukau



A microscopic view of blood cells, including red blood cells and white blood cells, against a dark blue background with a grid pattern.

Aim: What were the issues of UFH infusion?

Audit Tool Criteria:

- was baseline APTT taken?**
- was first APTT @ 6 hours?**
- was loading dose administered and correctly calculated as per protocol?**
- what % of patients to reach target APTT within 24 hours**
- maintenance infusion dose & rate correct**
- need for second bolus if APTT was below specified value 6 hours after initial bolus**

Results - Ist Audit - 2005 *

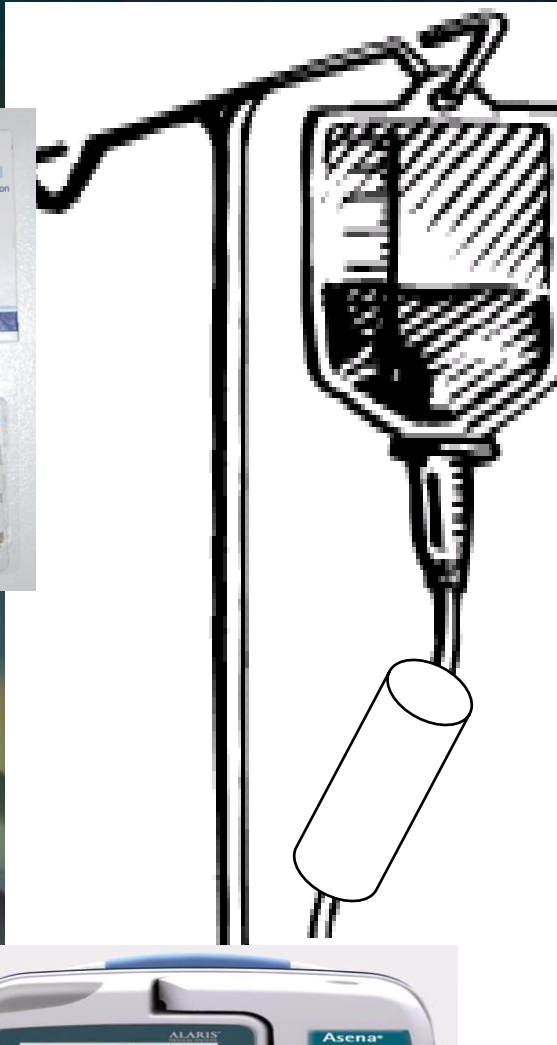
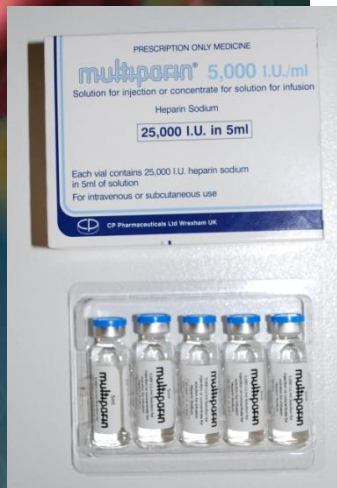
Audit Tool Criteria	% n = 61
APTT testing @ baseline	51%
Loading dose administered according to protocol	90%
APTT testing @ 6hours	64%
Target APTT by 24hours	51%

* Inter-regional collaboration for Errors & Near misses with Un-fractionated Heparin; Loe E.A et al. Sep 2008 JPPR



1st Audit Recommendations

- 1. Develop one protocol/nomogram**
- 2. Redesign the UFH infusion chart to include prompts for monitoring and dose adjustment**
- 3. Introduce a premix standard heparin bag**
- 4. Add Heparin to house officer induction training on high use medication**
- 5. Re-audit once system changes implemented**



WDHB method in April 2009

- **Loading dose:**
5000u in 1ml
from multi-dose vial
25,000u in 5 ml.
- **Infusion : 10,000u in
100ml Normal Saline
made in burette**
from multi-dose vial
and N/Saline bag
- **Programmable
Pump: administer @
1200u/hr**

(80+) Pyxis Machines in all Clinical Areas



Remember 2008

- **The possibility of global shortages of Heparin forced a review of products we currently used!**



Recommendation 3: Premixed Heparin Bag

Single use loading dose
ampoule 5000u in 1ml

Premix infusion Heparin
100iu/mL in 250ml
Normal saline

Financial & safety
implications?

Financial + safety

Products	multidose vial, 100ml burette N/S bag, nursing time (50mins) (BEFORE)	bolus ampoule, premix bag, nursing time (10mins) (AFTER)	Safety Benefits
Loading dose	\$0.88	\$2.84	Less chance of contamination and calculation or preparation errors
Infusion for 250ml volume	4.41 + 5.40 +0.89 + 26 = \$36.70	7.32 + 6 = \$13.32	
Total	\$37.58	\$16.16	

Yes Go Ahead

Change of HEPARIN

Heparin 25,000 units in 5mL multi-dose vial has been withdrawn from use at WDHB (pictured left).



Replaced by

**IV Bolus Injection
Heparin
5,000 units in 1mL
ampoule
and**

**Intravenous Infusion
Heparin
100 units in 1 mL**

**(25,000 units in 250mL
ready-to-use bag
- blue sleeve)**

***N.B Use updated Heparin
Protocol - Mar 2009
and volumetric pump.***



FOR ANY ENQUIRIES REGARDING HEPARIN OR ANY OTHER MEDICATIONS,
CONTACT THE INPATIENT PHARMACY ON EXT. 2626 (NSH) OR 6882 (WTH).

Plan

**New Protocol for new
products, no other
changes req'd**

Poster

**Education @ nurses
handover meetings**

**Changeover
coordinated in Pyxis**

**Audit of first 20
patients**

Premix bag (+ bolus ampoule)

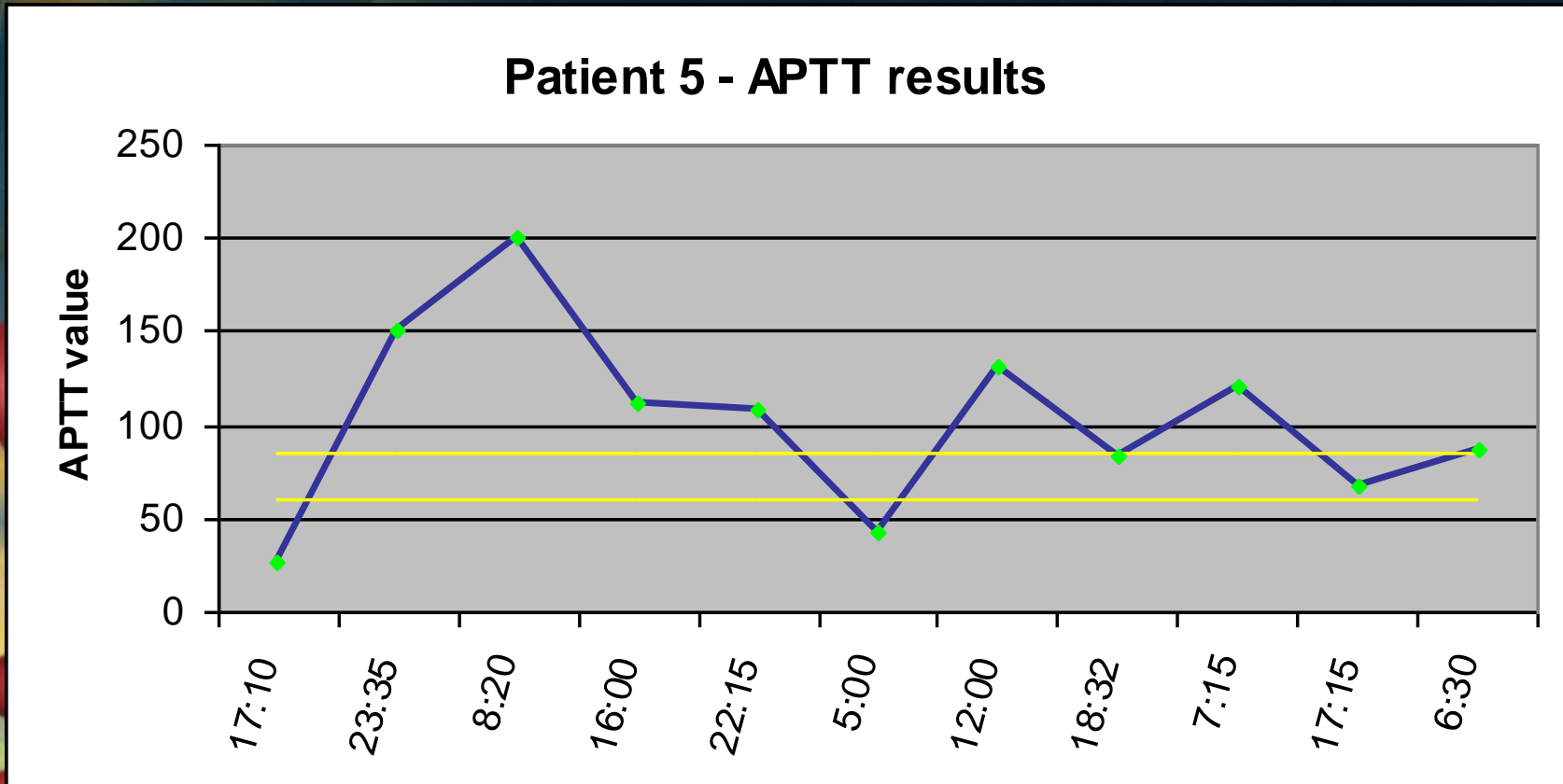
2nd Audit, May 2009

Audit Tool Criteria	n 61 2005	n (17)
APTT testing @ baseline	51%	58%
Loading dose administered according to protocol	90%	82%
APTT testing @ 6hours	64%	58%
Target APTT by 24hours	51%	58%

What was happening??

Typical case - Patient # 5

- Loading dose 5000U, start rate 1200u/hr premix bag.
- 6 hourly bloods taken & 12 hourly bloods taken



Bloods not recorded on chart until after 12hourly results, and infusion rate not changed until 17 hours after start



#5

First Name: _____ Gender: _____
 Surname: _____
 AMHX PATIENT LABEL HERE
 Date of Birth: _____ NHF #: _____
 Ward / Clinic: _____ Consultant: _____

Anticoagulant Chart – Heparin Infusion

TARGET APTT: 60-85		ORDERED BY		GIVEN BY			
Date	Time	APTT	Signature	Date	Time	Dose/Rate	Signature
23/4/09	09:00			23/04	17:45	25,000 UL heparin in 250ml-N/saline to give 100u/ml 12ml/hr	[Signature]
<p>25000u heparin in 250 mL NSaline to give 100u/mL Start infusion at 12mL/hr = 1200u/hr Redcheck APTT 6 hrs. J.L.</p>							
24/4/09	10:10	7000		11:50		Heparin Restarted @ 10ml/hr	[Signature]
<p>Stop heparin for 1 hour then restart at 10 mL/hr = 1000u/hr Redcheck APTT 4 pm J.L.</p>							
<p>PARAMETER (where applicable) NOTIFY DOCTOR IF: APTT < ></p>							
Dr's Name		Signature:					

Anticoagulant Chart - Heparin Infusion

Original Chart

APTT range, parameters and results written by Doctor.

No protocol prompts and full instructions written in by Doctor

2nd Audit discussion points

- 4 patients had APTT > 150 within 24h (23.5%)
- Infusion rates continued & not changed - was this a case of “hang it and forget it” ?
- What changes could be made that would prompt action to APTT results and compliance with protocol?
- How could we reduce
 - > potential for harm
 - > delay to care
 - > increased length of stay?

Remember the 2005 recommendations

1. Develop one protocol/nomogram ✓
2. Redesign the UFH infusion chart to include prompts for monitoring and dose adjustment
3. Introduce a premix standard heparin bag ✓
4. Add Heparin to house officer induction training on high use medication
5. Re-audit once system changes implemented ✓

3rd Audit, Sep 2009, after new chart introduction and grand round presentation.

Audit Tool Criteria	n (61) 2005	n (17) April 2009	n (20) Sep 2009
APTT testing @ baseline	51%	58%	90%
Loading dose administered according to protocol	90%	82%	85%
APTT testing @ 6hours	64%	58%	90%
Target APTT by 24hours	51%	58%	70%

Did we make a difference? 2nd and 3rd audit.

Each Patient's APTT @ 24 hours

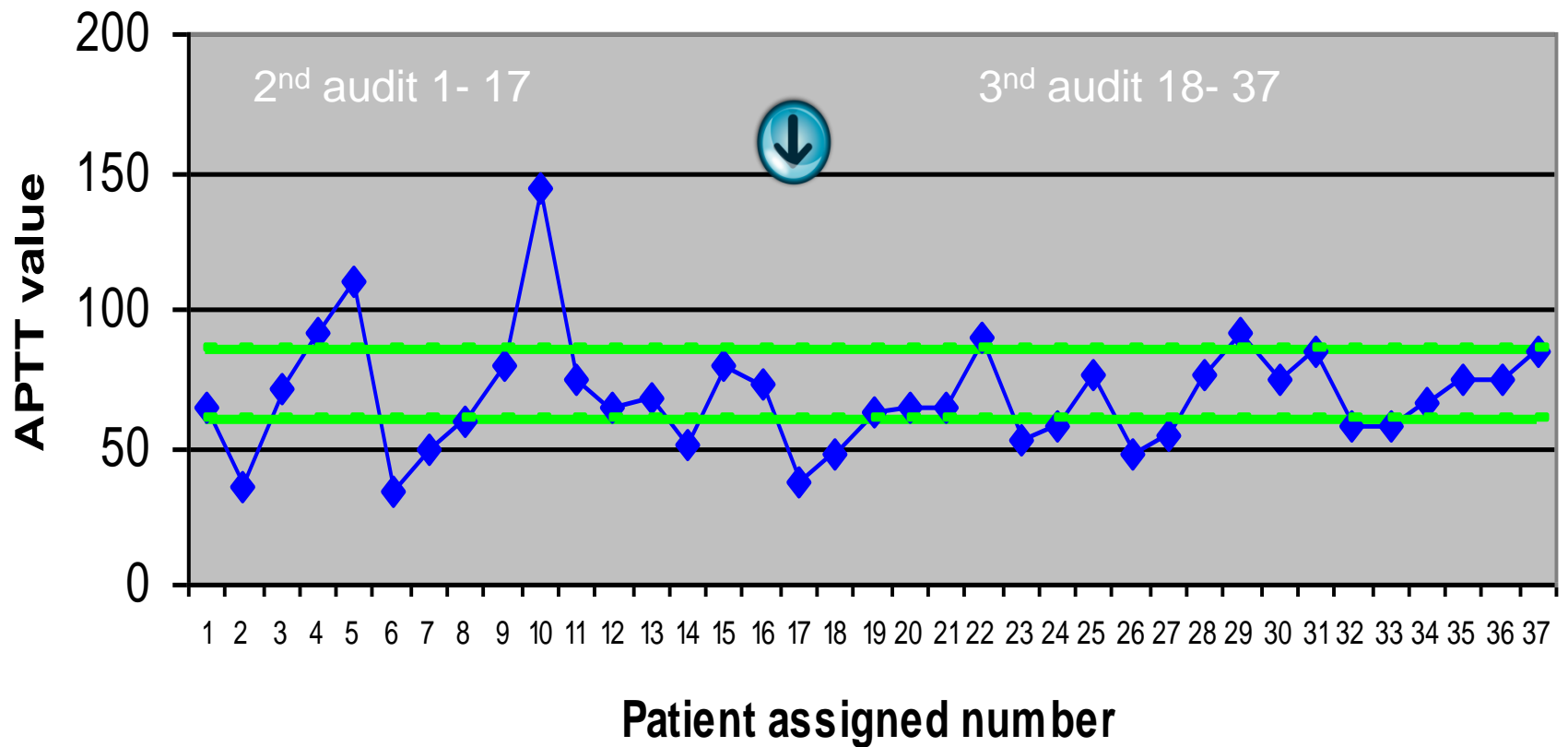


Chart feedback from all user comments:

- **no need to print off protocol every time**
- **reminds us to follow up on getting APTT result**
- **the recording of APTT was more obvious**
- **helps us follow the protocol as response to APTT results**
- **Can more easily see trend of the heparin infusion rate changes**

Slight set back - bag change Nov 2009

<p>Products</p>	<p>multic 100m N/S b nursi (50m (BEF</p>	 <p>Waitemata District Health Board <i>Te Wai Awhina</i></p> <p>Appearance of HEPARIN Bags</p> <p>Intravenous Infusion Heparin 100 units in 1 mL (25,000 units in 250mL normal saline)</p> <p>Currently there are two formats available:</p> <ol style="list-style-type: none"> 1. Blue sleeve bag (discontinued by manufacturer) 2. White over-labelled bag (replacement bag— New) <div style="display: flex; justify-content: space-around;"> <div data-bbox="579 671 859 1178">  <p>Original bag Discontinued</p> </div> <div data-bbox="927 671 1275 1178">  <p>NEW Replacement Bag</p> </div> </div> <p>Note: Both bags can be used & are interchangeable</p> <p>FOR ANY ENQUIRIES REGARDING HEPARIN OR ANY OTHER MEDICATIONS, CONTACT THE INPATIENT PHARMACY ON EXT. 2626 (NSH) OR 6882 (WTH).</p> <p><small>Written by L. Hawke, Waitemata District Health Board Hospital Pharmacy © Sep 2009.</small></p>	<p>bolus ampoule, premix bag, nursing time (10mins) (NEW BAG)</p>
<p>bolus</p>	<p>\$0.88</p>		<p>\$2.84</p>
<p>Infusion for 250ml volume</p>	<p>\$36.7</p>		<p>\$24.18</p>
<p>Total</p>	<p>\$37.5</p>		<p>\$27.02</p>

House Officer online quiz and teaching module

Presentation Reader - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites

Address http://intranet/pharmacy/chart_reading/module1/read.asp?page=Heparin Go Links

Heparin

> **1. Heparin**

This module will include:

- Where to find the protocol
- Indications and dosing
- Heparin bags and infusion charts
- Observation and monitoring
- Contraindications and precautions
- Adverse effects and HIT
- Charting examples
- Summary

presentation list start next> end

notes

This background information aims to assist with the prescribing of unfractionated heparin at WDHB. Please refer to the protocol for more detail, ask your consultant or the thrombosis team.

Done Local intranet

Start Calendar - Microsoft Ou... Screen shots! - Messag... Concerto Portal 6.3 - W... Quiz - Welcome - Micros... Presentation Reader... 10:42 Wednesday

Conclusions

1. Implemented 2005 recommendations with good results.
2. The change of the chart with directive prompts made the most positive impact on patient safety and treatment.
3. Looking forward we need to:
 - Add Heparin and other high risk medicines to HO orientation training
 - Re- audit to ensure standard is maintained.

I wish to acknowledge and thank:

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for their advice and the use of the paper “Inter-Regional
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