O_h Heck:
Bombay Phenotype in Pregnancy

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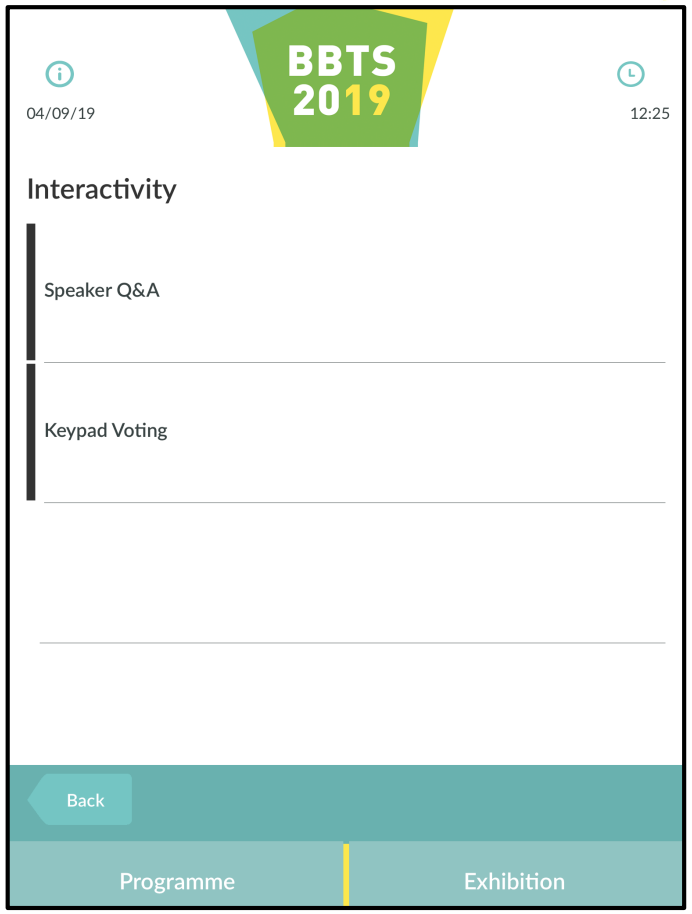
How to use keypad voting

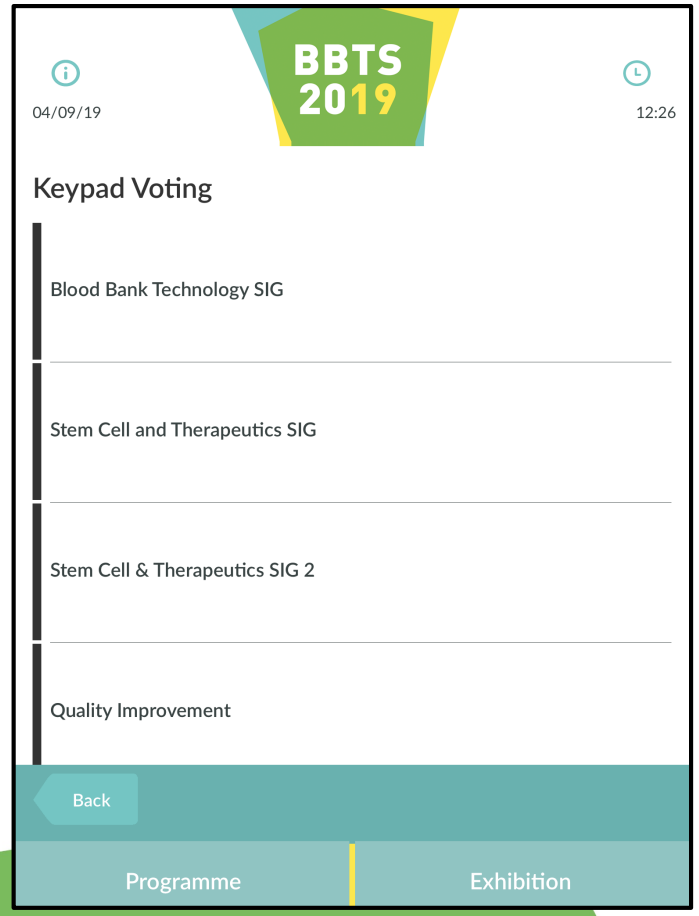
1. Click on the side button ‘Interactivity’.

2. Choose Keypad voting



How to use keypad voting

3. Choose your session



4. Choose your answer and press submit

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Disclaimer

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Patient Case

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Booking Sample

- A sample was referred to RCI on a 9/40 antenatal patient.
- Hospital blood bank report pan reactive antibody.
- Patient is known to RCI
  - Last seen six years previously; also antenatal
  - Known O_h (Bombay) phenotype with anti-H
  - Full type available on file:
    - D+ C+ c+ E- e+ M+ N- S- s+ P1+ K- k+ Kp(a+b+) Le(a+b-) Fy(a+b+) Jk(a+b-) Lu(a-b+)

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Results: Antibody Panels

	Panel 1															Gel	Enz
	Rh	M	N	S	s	P1	Lua	K	k	Kpa	Lea	Leb	Fya	Fyb	Jka	Jkb		
1	$R_1^WR_1$	0	+	0	+	0	0	0	+	+	0	+	+	0	0	+	5	5
2	R_1R_1	+	0	+	0	4	0	+	+	0	0	+	0	+	+	0	5	5
3	R_2R_2	+	0	0	+	4	0	0	+	0	+	0	+	0	+	0	5	5
4	r'r	0	+	+	+	2	0	0	+	0	+	0	0	+	0	+	5	5
5	r''r	0	+	+	0	4	0	0	+	0	0	+	0	+	0	+	5	5
6	rr	+	+	0	+	3	0	+	0	0	0	+	+	0	+	0	5	5
7	rr	0	+	0	+	3	0	+	+	0	+	0	+	0	0	+	5	5
8	rr	+	0	0	+	0	0	0	+	+	0	+	0	+	0	+	5	5
9	rr	+	0	+	0	3	+	0	+	0	0	+	0	+	+	0	5	5
10	rr	0	+	+	0	0	0	0	+	0	0	+	+	0	+	0	5	5
															AUTO		0	---

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Results: Extended Group

Anti-A	Anti-B	Anti-A,B	Anti-D1	Anti-D2	Anti-H	Auto	A_1 Cells	A_2 Cells	B Cells	O Cells
0	0	0	5+	5+	0	0	5+	5+	5+	5+

Saline tube at ambient temperature

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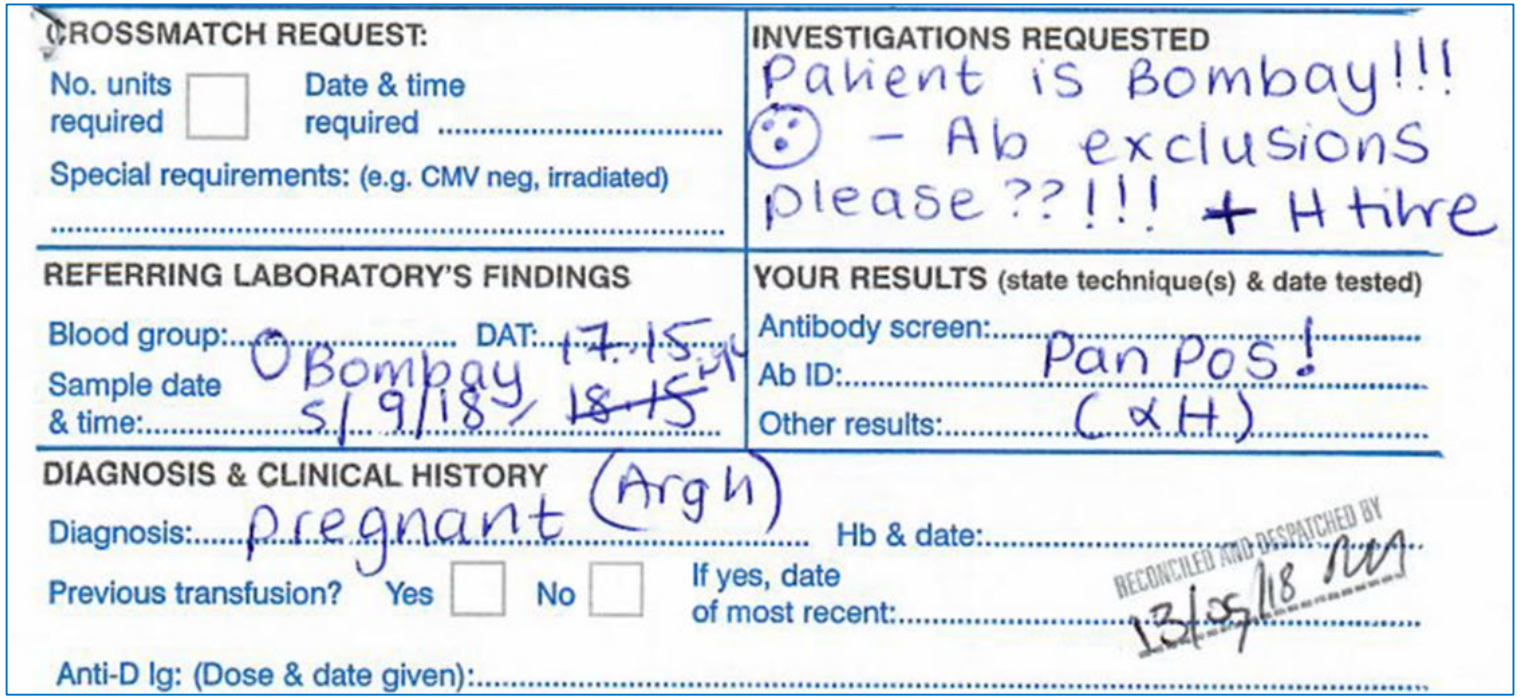
What's Our Protocol?

- This case caused quite a discussion!
- So, what would you do?



CROSSMATCH REQUEST:
No. units required ☐ Date & time required .....
Special requirements: (e.g. CMV neg, irradiated)
.....

INVESTIGATIONS REQUESTED
Patient is Bombay!!! ☹ - Ab exclusions please??!!! + H titre

REFERRING LABORATORY'S FINDINGS
Blood group: O Bombay DAT: 17.15
Sample date & time: 5/9/18 ~~18.15~~

YOUR RESULTS (state technique(s) & date tested)
Antibody screen: Pan Pos!
Ab ID:
Other results: (αH)

DIAGNOSIS & CLINICAL HISTORY
Diagnosis: pregnant (Argh)
Hb & date:
Previous transfusion? Yes ☐ No ☐
If yes, date of most recent:
RECONCILED AND DESPATCHED BY 13/05/18
Anti-D Ig: (Dose & date given):

RCI Referral Form

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Antenatal Investigations

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Q1: How Do We Exclude Other Alloantibodies?

1. Test vs a panel of O_h cells (requires referral to IBGRL*)
2. Treat plasma with 0.01M DTT (denatures IgMs), then test
3. Perform warm (37ºC) alloadsorptions; test adsorbed plasma
4. Perform cold (4ºC) alloadsorptions; test adsorbed plasma

* International Blood Group Reference Laboratory

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Q1: How Do We Exclude Other Alloantibodies?

We Chose Option 4: Perform cold (4ºC) alloadsorptions

- Cold adsorptions optimal for removal of IgM anti-H
- Adsorption cells phenotype-matched and papain treated
  - Patient negative for E, K, S, Jkb (and N, Leb, Lua)
  - Adsorption cells: R1R1 or rr, K- Jk(b-) selected
- Anti-H removed after two rounds of adsorptions
  - No additional alloantibodies detected by BioRad Gel IAT

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Q2: Should We Titrate the anti-H?

1. Yes; Titrate untreated, native plasma (IgG and IgM) *
2. Yes; Titrate DTT-treated plasma (IgG only) *
3. Yes; Titrate by Tube IAT at Strict 37ºC
4. No; as there is no standard technique for anti-H titration
5. No; consider anti-H as analogous to anti-A or –B

* Titrations performed by BioRad Gel IAT

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Q2: Should We Titrate the anti-H?

We Chose Option 5: No (consider anti-H as analogous to anti-A or -B)

- How useful is an anti-H titre?
  - HDFN caused by anti-H analogous to that caused by Anti-A or -B
  - Antibodies usually predominantly IgM; wont cross placenta
  - Newborns have much lower levels of ABH expression than adults
  - Placental tissue expresses ABH; adsorbs antibody
  - We don't titrate anti-A or -B in pregnancy, so why titrate anti-H?
- Anti-H titres not well correlated with HDFN risk or directly predictive of clinical outcomes *

* Bullock, *et al* (2018)

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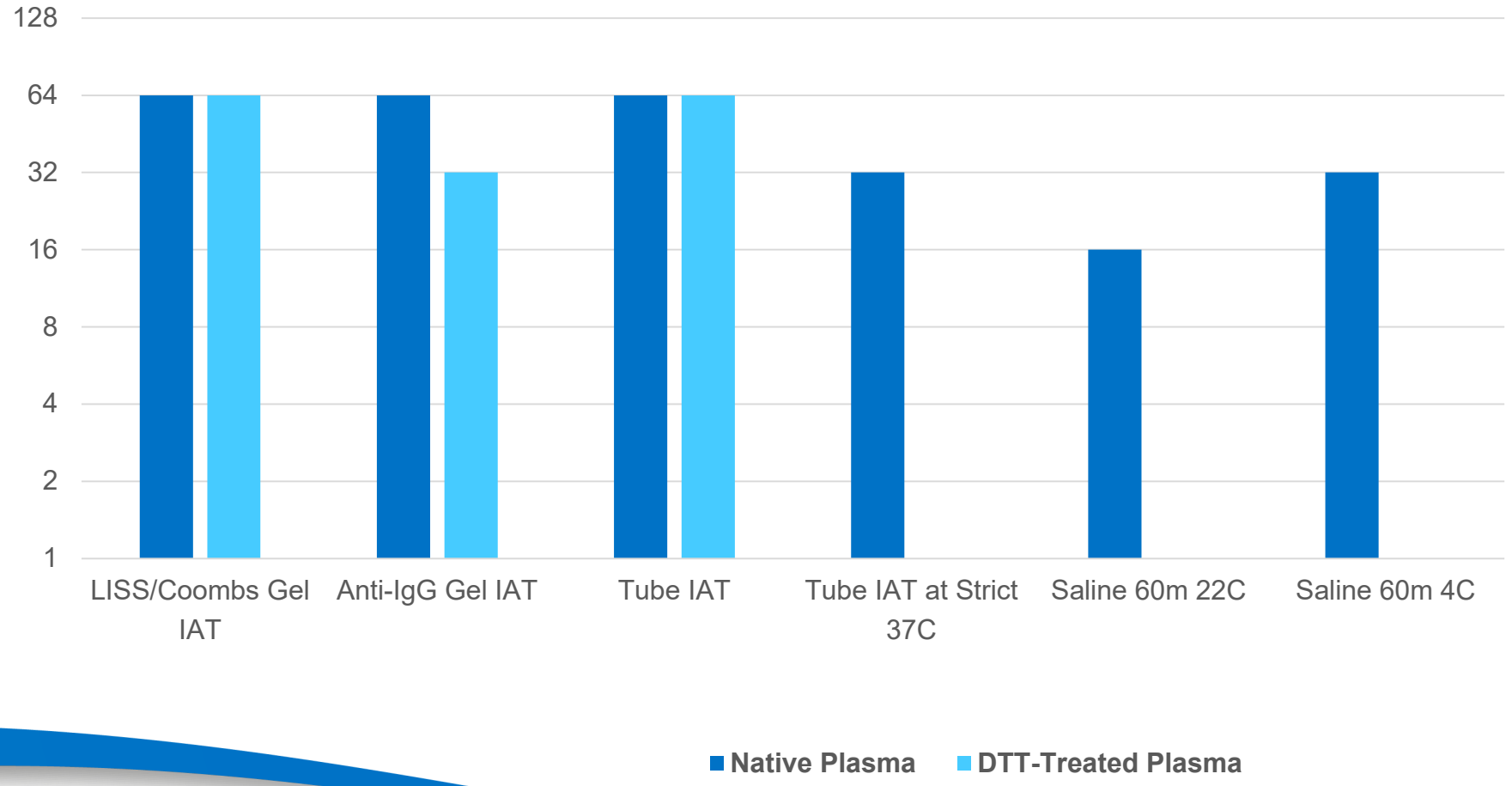
Titrations at 28/40 (for interest)



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Q3: What Follow-up Frequency Should We Advise? *

1. Test at booking, 28/40 and delivery only?
2. Test every 4 weeks up to 28/40; and every 2 weeks to delivery?
3. Follow up at a different frequency?
4. No need for repeat samples?

* assuming no additional alloantibodies detected

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Q3: What Follow-up Frequency Should We Advise?

We Chose Option 1: booking, 28/40 and delivery

- Again, analogous to anti-A or –B
- If additional specificities found, follow-up as appropriate for that specificity as per BSH Guidelines
- The critical sample is the pre-delivery sample as we are most concerned about blood provision (see later)

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Blood Provision at Delivery

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How Do We Provide Blood Cover?

- Significant risk of severe haemolytic transfusion reaction if transfused random donor units
- Therefore, we MUST supply O_h units to cover delivery

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Sourcing O_h Units

- Ideally would like “wet” O_h units
  - Known O_h donors contacted in third trimester and asked to donate
  - There are six O_h donors on the database – four of which are “active”
  - Only had one reply; but donor did not attend appointment
- Thaw frozen units from National Frozen Blood Bank (NFBB)
  - There were 15 O_h units at the NFBB (Dec ‘18)
  - Thawing two units takes four hours
  - Transport time from NFBB to Filton is three to four hours
  - Thawed units expire after 72 hours (some older stock, 24 hours)

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Clinical Management of Delivery

- For clinical MDT to decide on options
  - For full discussion with patient
  - Patient makes final, fully informed choice
- Patient Blood Management measures should be considered
  - Pre-delivery Hb optimisation
  - Cell salvage, if available and appropriate
- It was decided patient would be induced at 37/40

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Pre-Delivery Sampling

- Multiple discussions between RCI, Hospital Lab and medics to arrange plan for sampling and crossmatching at delivery
- Considerations:
  - Due for induction on a Tuesday
  - Induction not always successful on first attempt
  - Samples only valid for 72 hours due to pregnancy
  - Need to check antibody ID before thawing units
  - Time required for thawing, transport to RCI, matching, transport to Hospital
  - Thawed units expire after 72 hours
  - Desirable to avoid *ad hoc* transports where possible (cost to Hospital)

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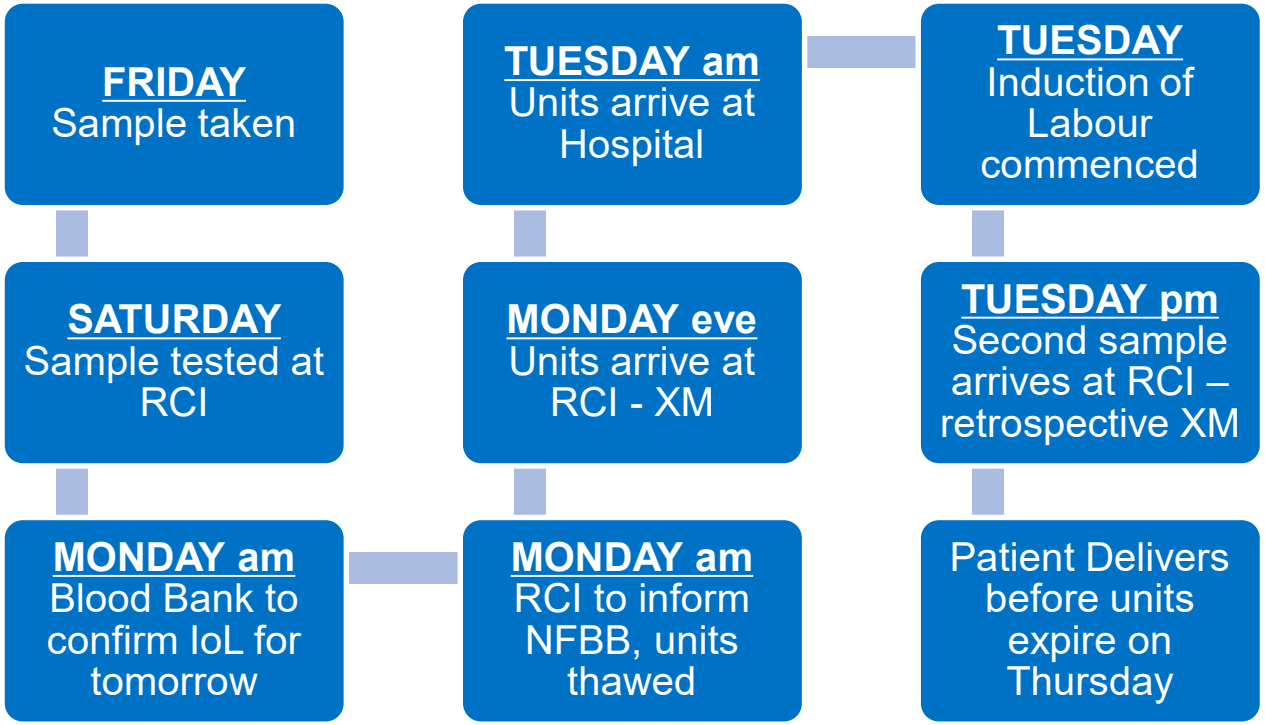
Blood Provision Plan



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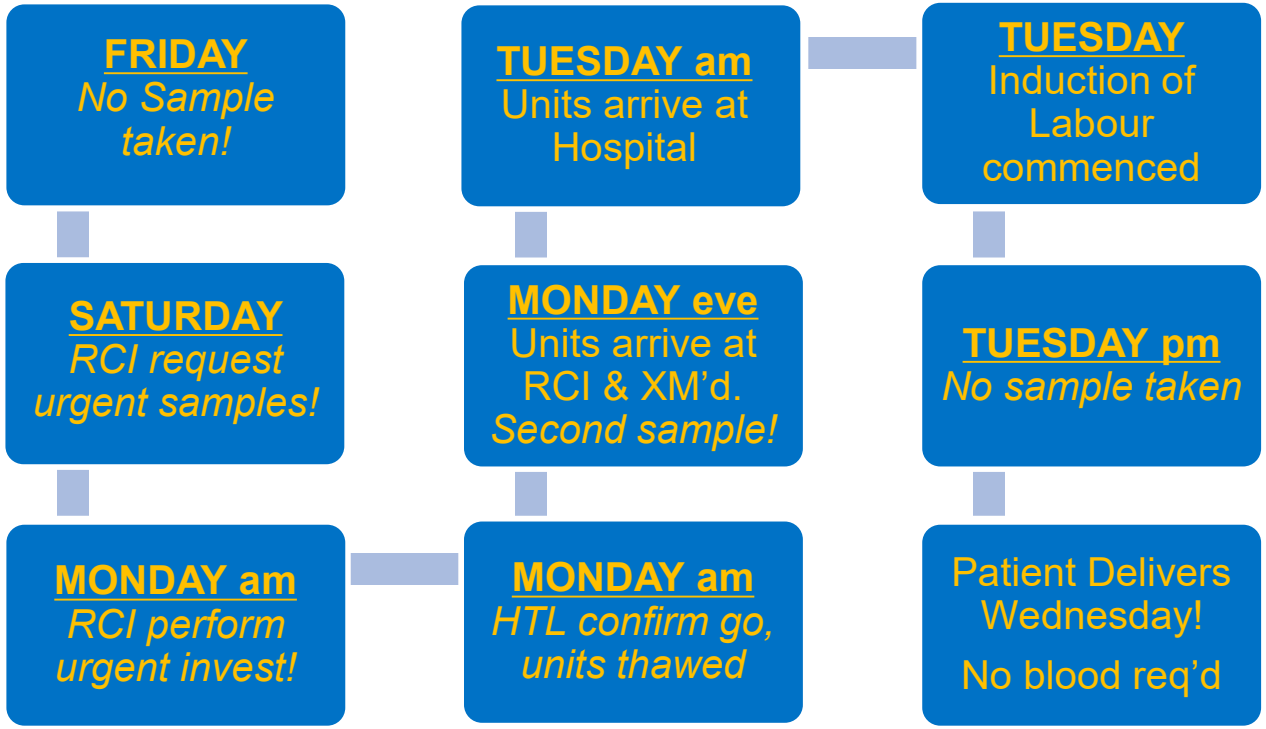
Blood Provision ~~Plan~~ "Plan"



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Conclusions

- Anti-H in pregnancy can be seen as analogous to anti-A and anti-B in terms of antenatal testing
  - Risk of HDFN is relatively low, and titres aren't directly predictive
- It is critical blood provision is planned in advance
  - Must have O_h blood available
  - This will require co-ordination between the Hospital, NHSBT and the obstetric teams.
  - **Everyone involved needs to be aware of the difficulty in obtaining blood and the precious nature of any thawed units.**

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Thanks and References

This case involved many individuals working together to provide appropriate antenatal care and suitable blood cover for this patient

- Hospital Blood Bank Staff
- RCI BMS Staff
- IBGRL BMS Staff
- NFBB Staff
- Hospital Consultants (Obs / Haem)
- NHSBT Medical Officers
- Hospital and Community Midwives
- Hospital Services

References

- Bullock, *et al* (2018) Bombay phenotype (O_h) and high-titer anti-H in pregnancy: two case reports and a review of the literature *Transfusion* **58(12)**: 2766-2772
- Reid, M; Lomas-Francis, C & Olsson, M (2012) The Blood Group Antigen Factsbook (third edition) Academic Press, UK