

# Somno Product Architecture and User Research Findings

11th June 2018

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# Problem statement

## PROBLEM STATEMENT

A digital system to help anaesthetists to accurately and efficiently record patient observations, procedures and medications before and during operations in order to reduce the burden of non-direct patient care and create good quality data on anaesthetic procedures.

# User roles

# User roles

## ANAESTHETISTS

As the primary user, anaesthetists will need to interact with the whole system in order to record the details of the pre-operative anaesthetic assessment, and then use the system during an operation to monitor patient observations and record medications and procedures used.

## ANAESTHETIC ASSISTANTS

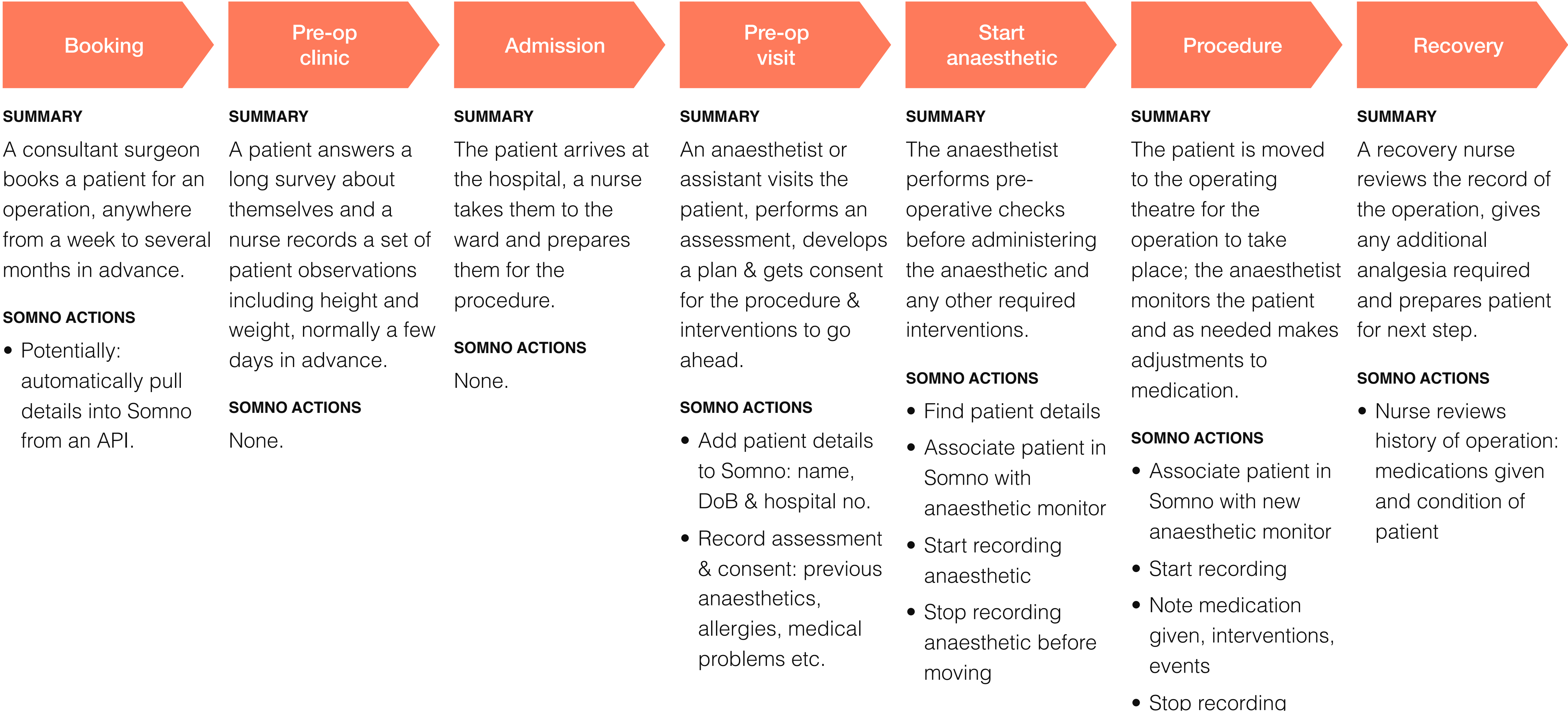
A secondary user, anaesthetic assistants may use the system to help with booking in patients and conducting pre-operative assessments.

## RECOVERY NURSES

Another secondary user, recovery nurses will use the system to check on what happened during an operation in order to decide how best to help the patient recover after a procedure is complete.

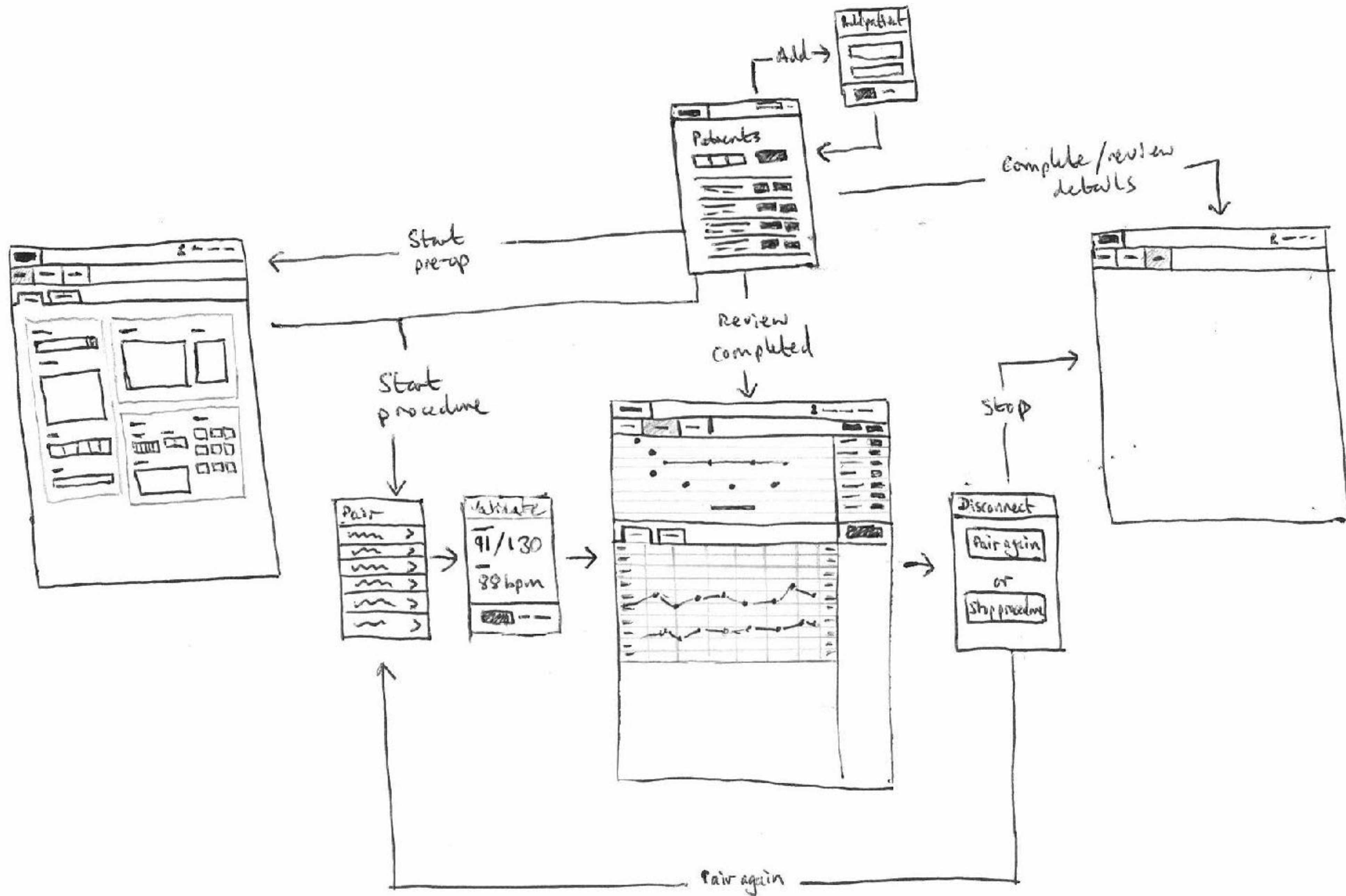
# User journey map

# User journey map





# User interface structure & flow

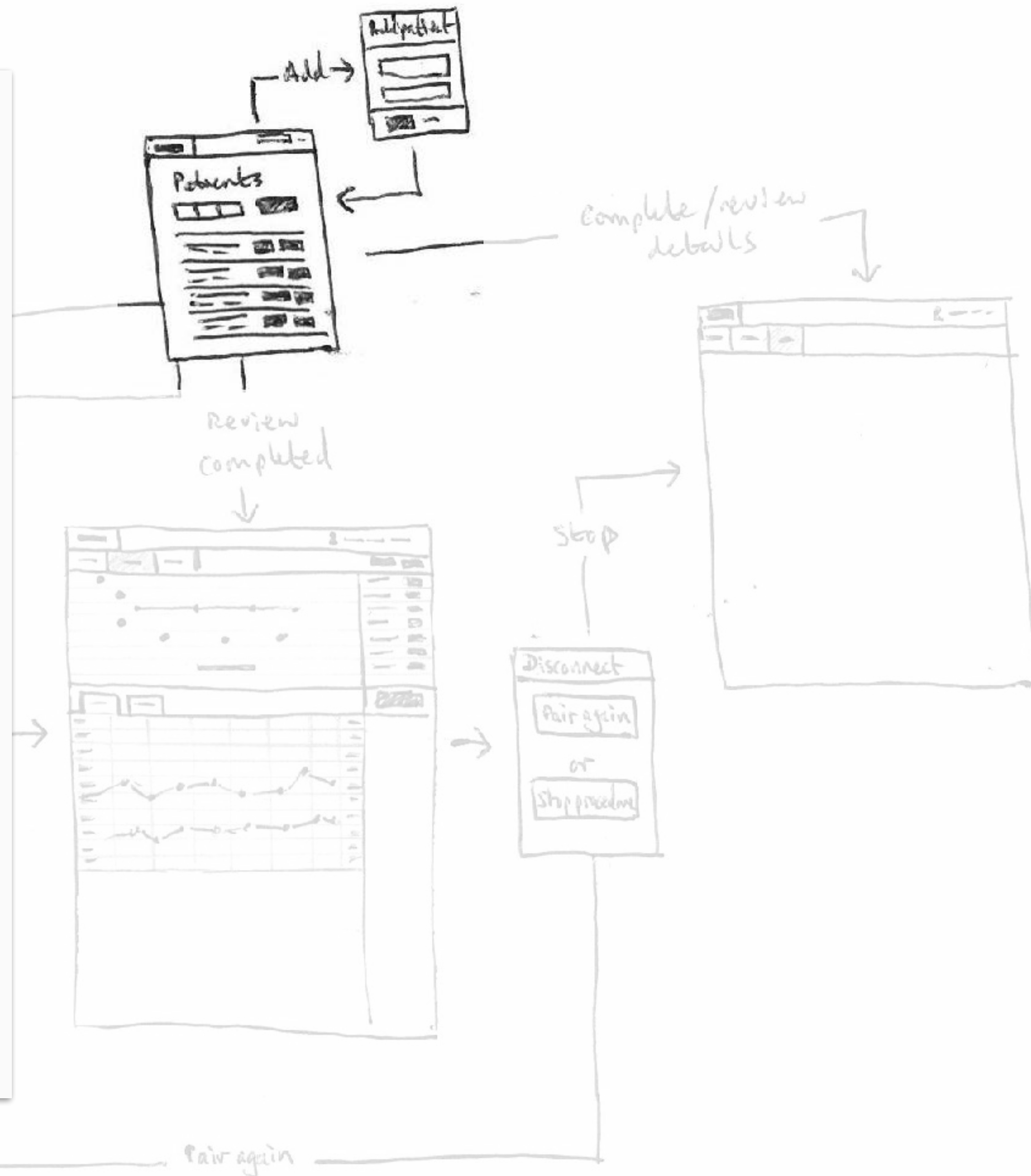


# Patient Dashboard

This component presents a list of patients or procedures that can be filtered by three options: future procedures, today's procedures and completed procedures.

For each patient, you can see their name, hospital number, date of birth, name of procedure and two actions: start pre-operative assessment or start procedure.

Clicking on the Add patient button in the top right presents a modal dialogue allowing you to create a new patient by entering their hospital number and name of procedure.



## Pre-op assessment

After clicking on start pre-op from the dashboard, you are taken to the pre-op assessment component which presents two tabs.

The first contains a series of fields to collect data such as past medical history, current medications, allergies and so on.

The second contains information about consents required and whether they have been collected.

It is currently expected that this page will always be in its editing state and not require the user to explicitly save their changes.



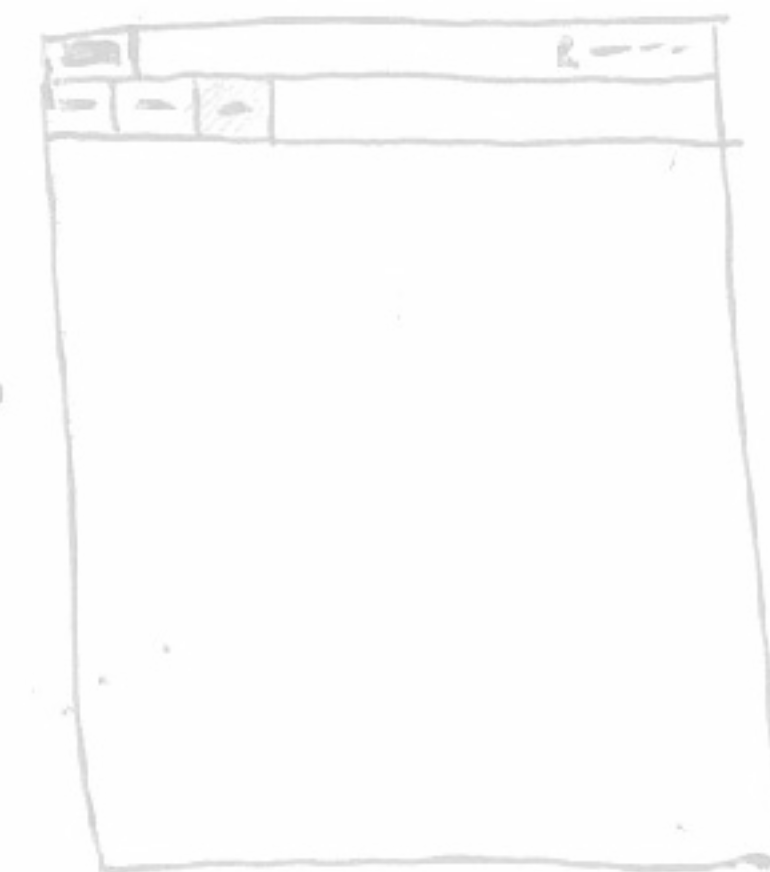
Start  
pre-op

Start  
procedure



Pair again

Use/review  
details

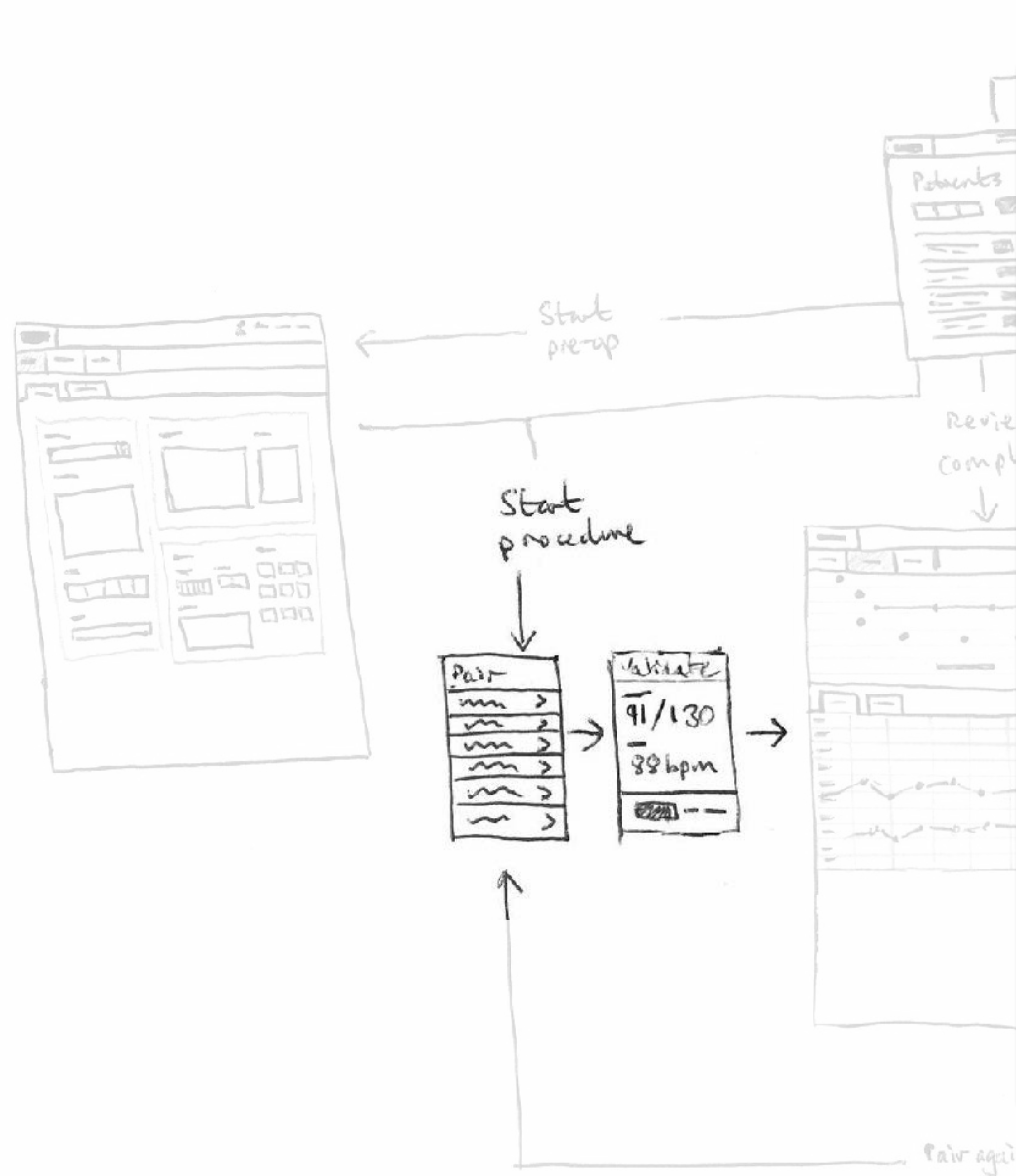


## Start procedure

After clicking on “Start procedure” from the patient dashboard, or the chart tab on the pre-op page, the user will be taken to the chart screen with a modal listing anaesthetic monitors available for pairing.

After selecting a monitor, the overlay will show a couple of key patient observations from the paired monitor so the anaesthetist can compare with what they are seeing in front of them.

If the observations seen are the right ones, the anaesthetist will click “Start recording” and the system will begin recording data.

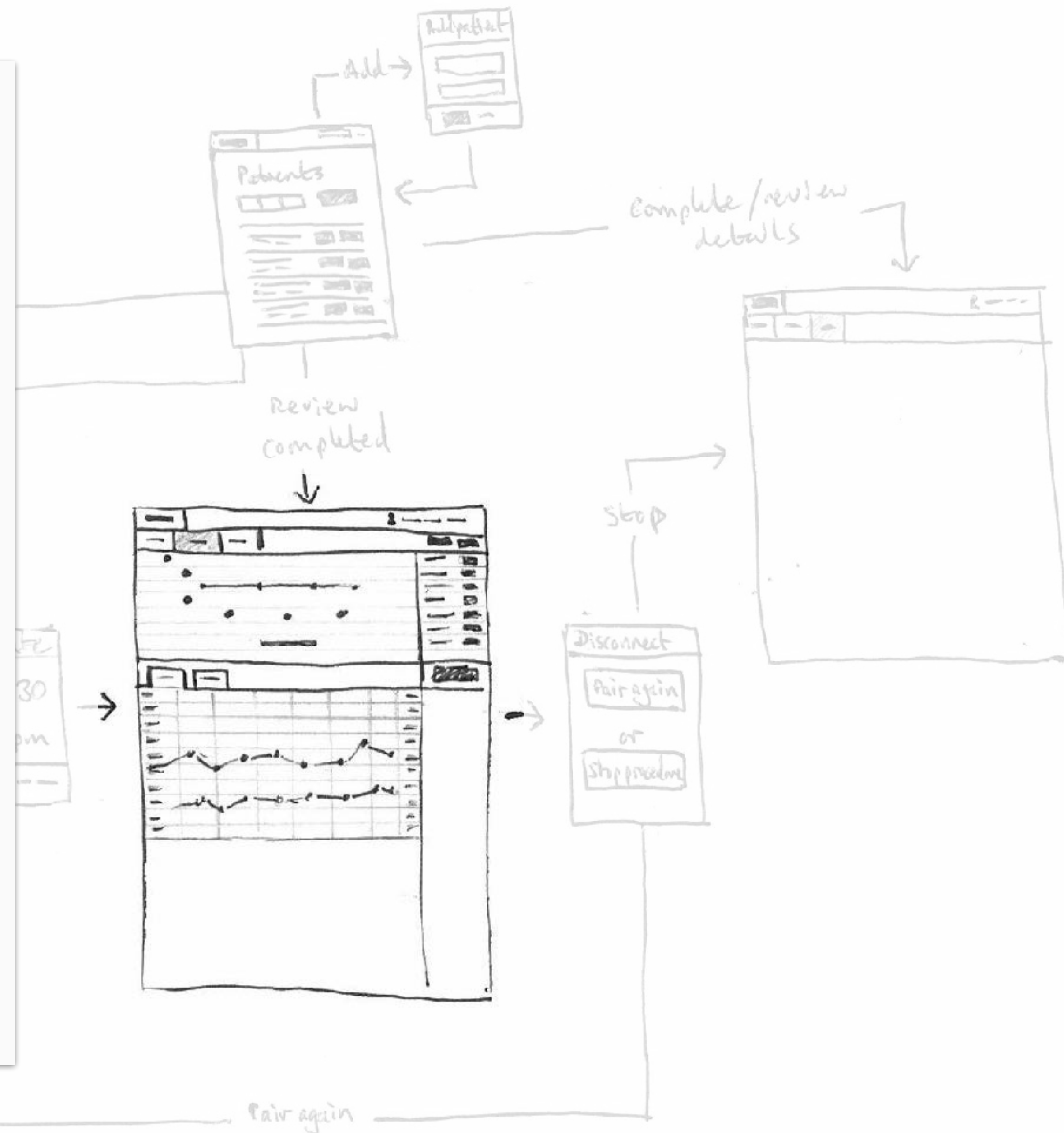


# Anaesthetic chart I

When a procedure is in progress, the chart will update automatically with data from the monitor.

Medications given are shown at the top and visible throughout. The anaesthetist will be able to add details of drugs given to the patient, add new boluses for drugs already given and change the details of an existing infusion with a couple of clicks or taps.

Basic physical observations are shown on one tab, with details of gases and ventilation shown on a second.

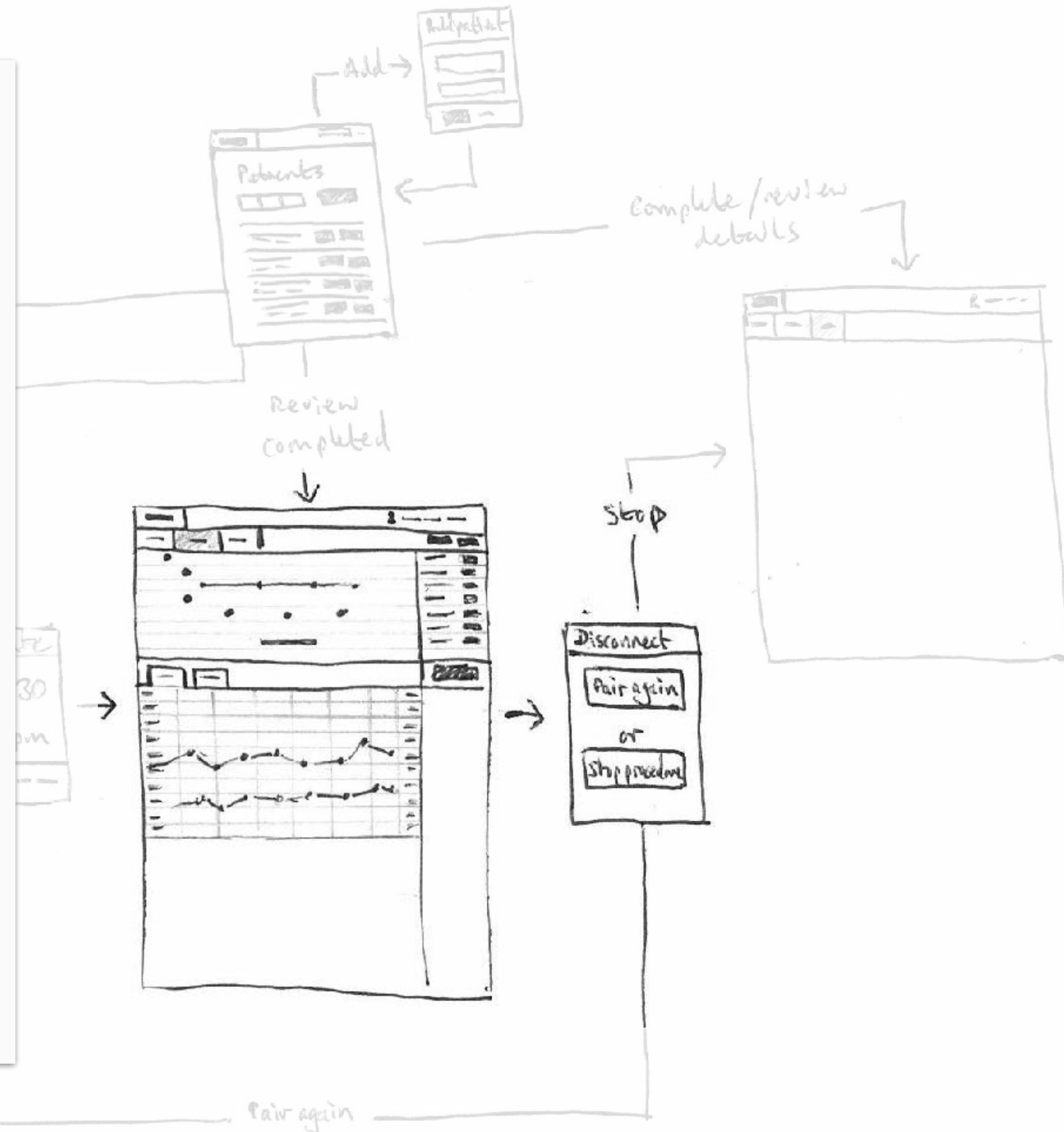




## Anaesthetic chart II

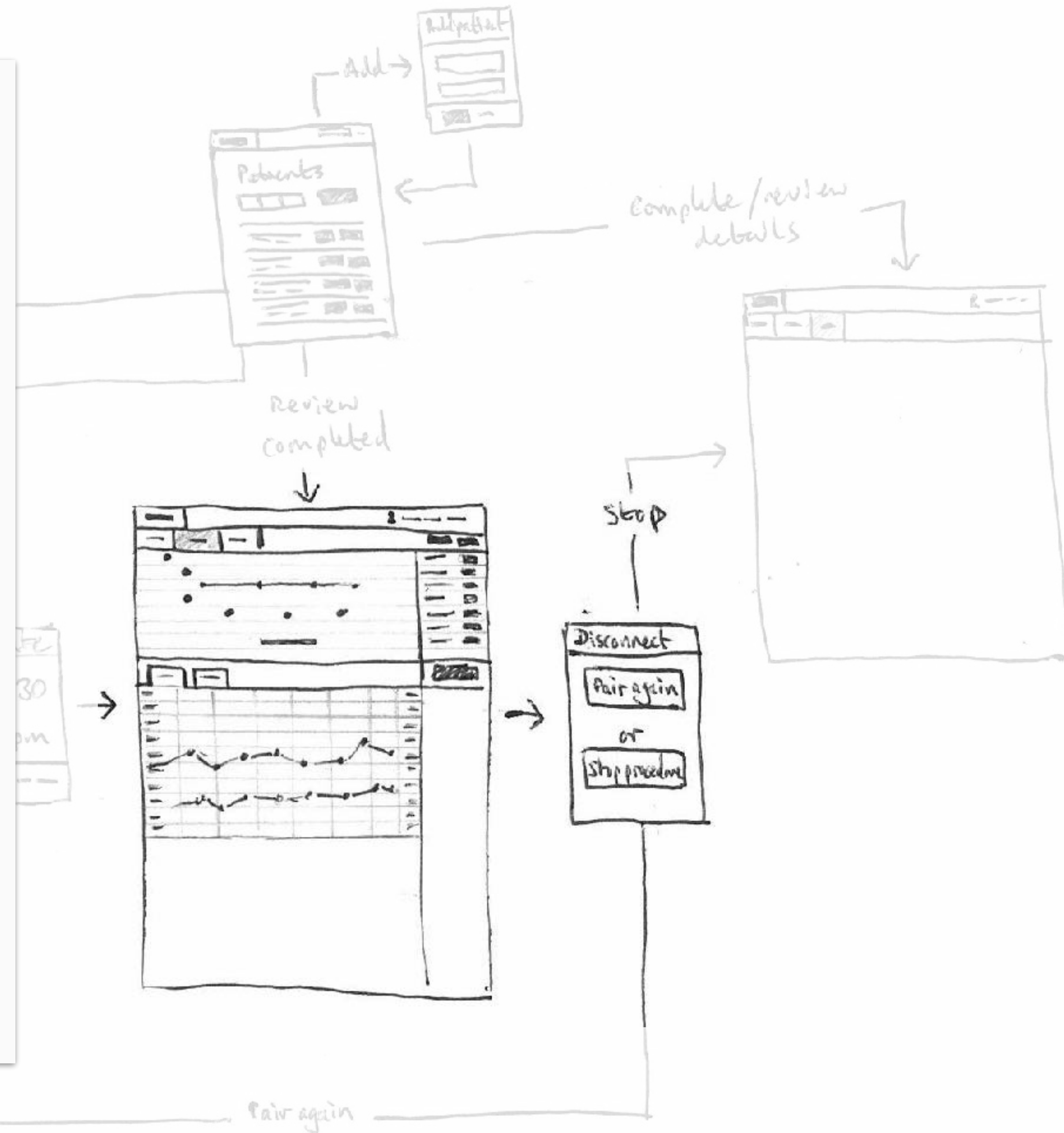
If something notable happens, such as the transfer from the anaesthetic room to theatre, this can be added as an event—which will appear on the chart—either at the time or later.

If the anaesthetist needs to disconnect from one monitor and connect to a different one, they can click the “Disconnect” button in the top right. They will then be asked if they want to “Pair again” or “Stop procedure”. If the former, they will be taken back to the “Pair” modal to select a new monitor after which they will have to validate that it is the correct monitor.



## Anaesthetic chart III

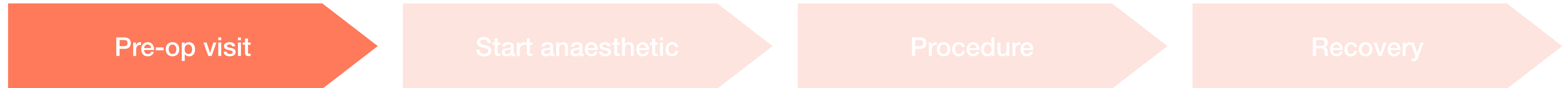
If the procedure is stopped they are taken to the “Anaesthetic details” screen where they can enter additional information such as specific interventions performed.





# User interview findings

# Findings



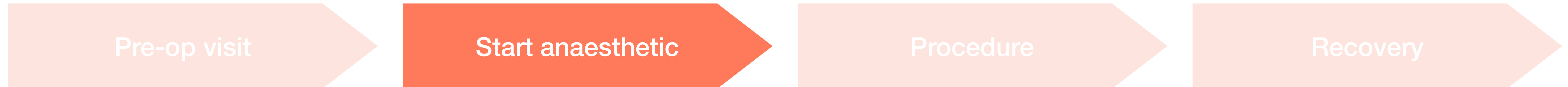
## Findings

- Anaesthetists do pre-ops one after the other at the start of a shift.
- Some anaesthetists will first review the detailed pre-assessment notes and copy across relevant information to spend more time talking to the patient.
- The discussion with a patient during a pre-op visit does not move linearly through a series of topics, but moves naturally between them, guided by the anaesthetist.
- Sometimes there's a lack of physical space to work in, but often there's a small table to rest on.
- Most anaesthetists write directly onto the chart.
- Almost all interviewees felt the form should include a section for information on smoking and alcohol and a few felt it was missing something on fasting status.

## Prototype implications

- The prototype needs a way of allowing an anaesthetist to quickly switch between patients and add new ones.
- The prototype should present all fields together and not force the anaesthetist to go through them in a specific order.
- Physical use of a digital chart could be tricky depending on the hospital. One interviewee suggested using a “computer on a trolley”.
- The prototype should also include smoking/alcohol and fasting period, as well as adding in jaw protrusion and mouth opening under dentician.

# Findings



## Findings

- All the anaesthetists spoken to said that although the patient is connected to a monitor in the anaesthetic room, there is not any spare time in which to start writing down observations and procedures on an anaesthetic chart.
- These are instead written down once the operation is underway and the patient in a stable state. The anaesthetist will scroll back through the monitor's records to note down previous observations. If the monitoring is not modular, they have to go back into the anaesthetic room to read them off the monitor in there.
- Sometimes, the monitor in the anaesthetic room has already been reset by a nurse and the observations are lost.
- All interviewees thought the approach to pairing and validation was reasonable, but not completely foolproof if monitors are moved between rooms, particularly when multiple operations are starting at the same time.

## Prototype implications

- Using Somno to start recording observations in the anaesthetic room represents a shift in behaviour as they don't currently record at this stage. Some thought needs to go in to how to trigger people to remember to pair Somno with a monitor at the start of an anaesthetic.
- Anyone using this system in anger should be told that it's important to match the observations exactly and not approximately.

# Findings



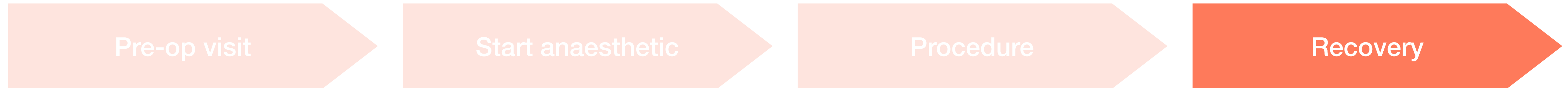
## Findings

- While observations can normally be retrieved from monitors when catching up on obs from the start of the anaesthetic, procedures have to be written down from memory.
- Some anaesthetists don't record observations live, but instead wait for 20-30 minutes and then scroll back through the monitor's history and write them down in chunks.
- Sometimes a surgeon will e.g. knock a sensor of a patient causing the saturation obs to be meaningless, or electrical interference can interfere with heart rate monitoring.
- At the end of an operation, the intensity of activity increases again and the anaesthetist is likely to get behind on writing down obs, needing to catch up when the operation has finished.
- Some anaesthetists print their chart from the monitor at the end, instead of recording live.

## Prototype implications

- Anaesthetists need to cope with erroneous readings; either through editing observations (although a reason would need to be supplied and logs kept of changes) or through adding explanatory notes.
- The first version of the prototype didn't have an area for showing fluids such as dextrose, Hartmann's or blood products. This needs to be added in.
- Also, anaesthetists may need to record other observations from monitoring equipment that is not networked: for example, body temperature and urine output. An area needs to be provided for this.

# Findings



## Findings

- The anaesthetist is responsible for taking the patient to recovery and looking after them on the way. Professional standards say the patient should be monitored during the transfer, but whether this happens or not is down to the equipment available in the hospital.
- At recovery, the anaesthetist hands the patient over to the nurse, describing any notable features of the patient or the operation and any specific requirements for their recovery care,
- The recovery nurse continues basic monitoring, normally on their own chart, but very occasionally on the same chart as the anaesthetist.

## Prototype implications

- Recovery nurses will need some way of reviewing the complete anaesthetic chart, either on a printed out copy (some hospitals have printers in recovery) or through digital access.
- More generally, the chart also needs to find its way into a patient's records, either as a printed out copy or in an electronic form (which could be a PDF) for hospitals using electronic care records.

# Wireframes



Mockups of the digital anaesthetic chart can be seen  
at the following URL:

[https://invis.io/PSKMC2KM9TG#/302290312\\_1\\_Pre-Op](https://invis.io/PSKMC2KM9TG#/302290312_1_Pre-Op)

**Send questions to:**  
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