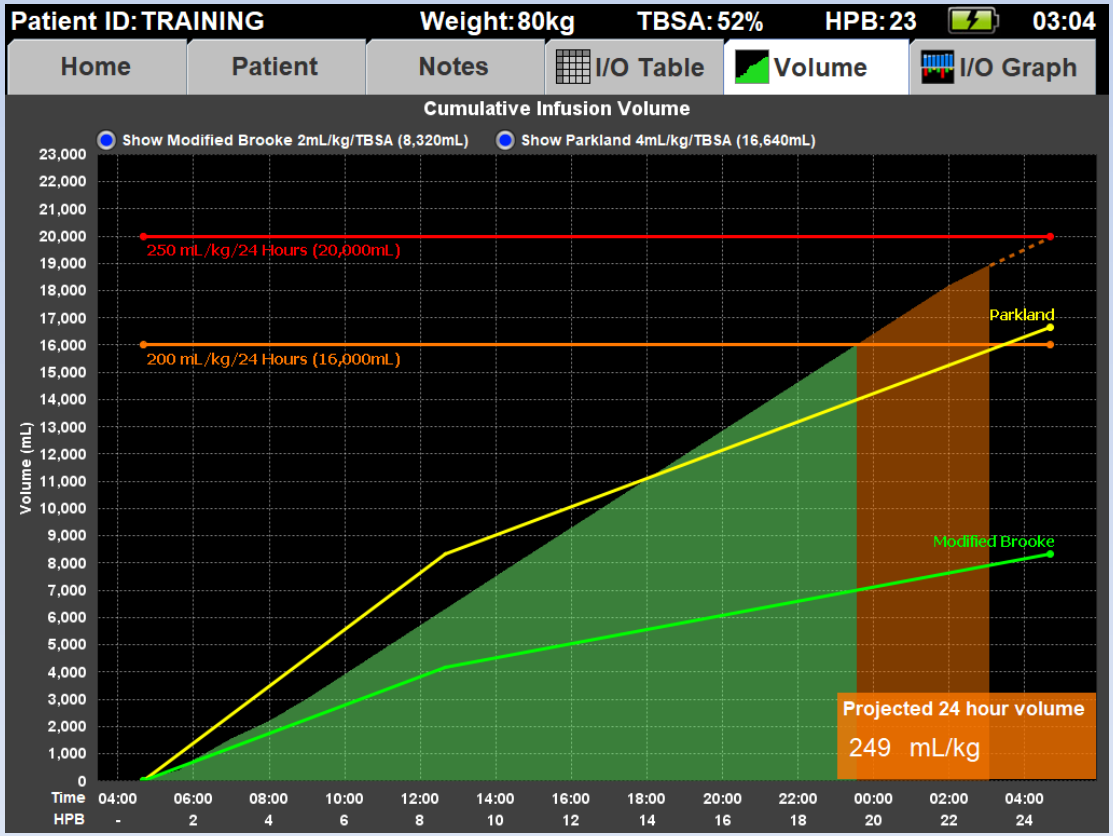
Burn Navigator® RX Training Guide

Adult Example



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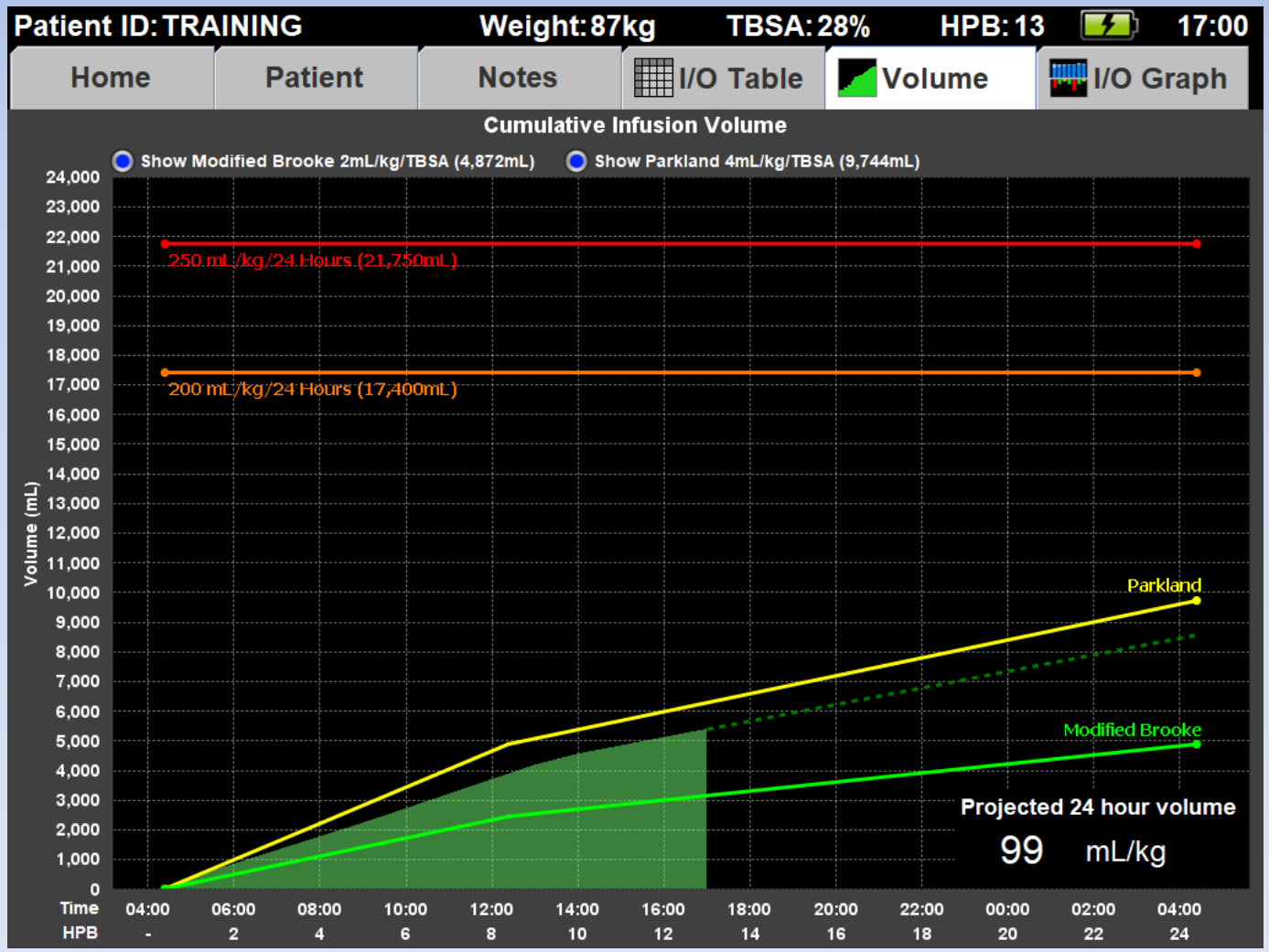
For RX Burn Navigator
Version V.6.1e-V.6.1h

June 2019

What is Burn Navigator?

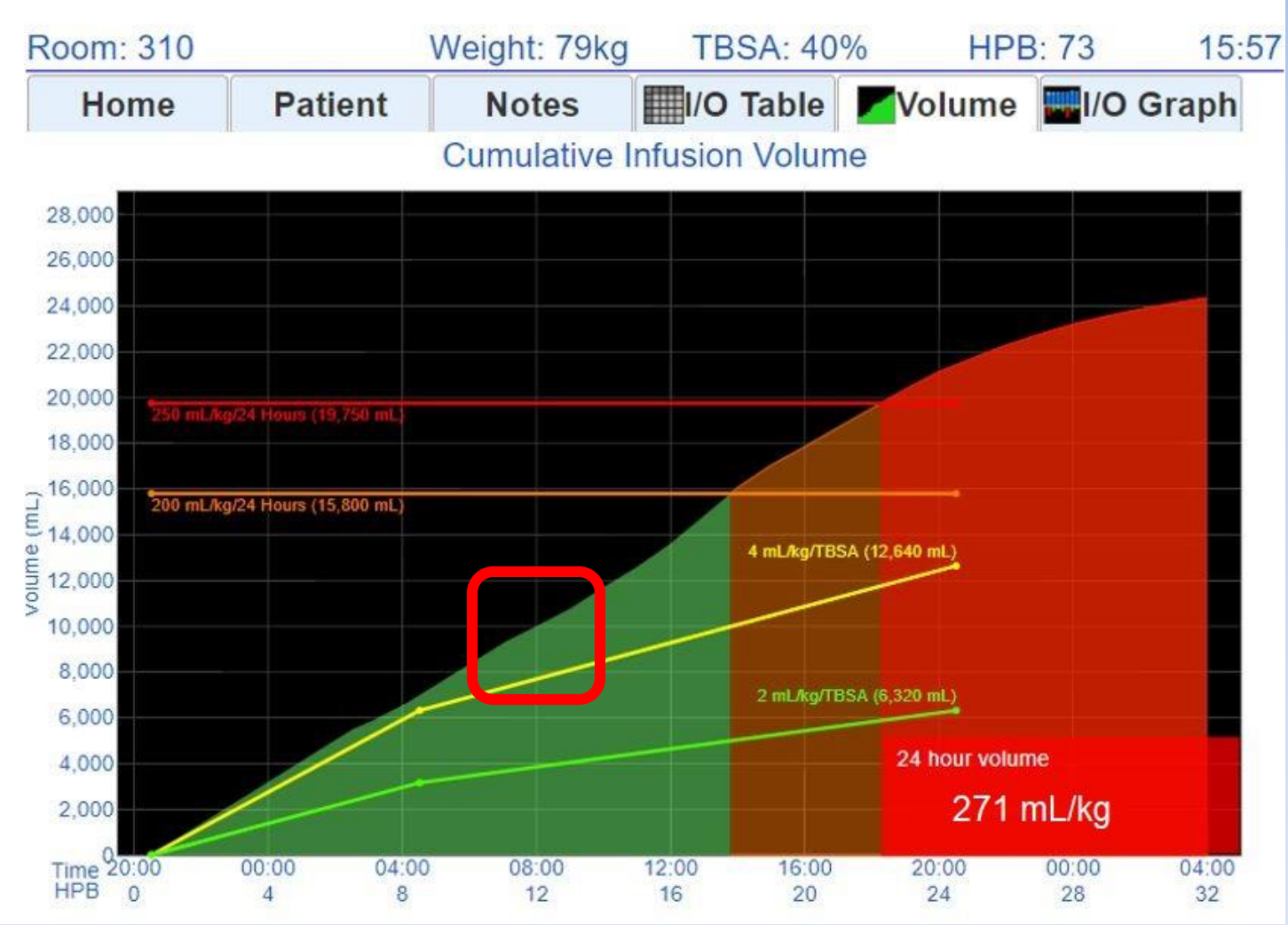
Burn Navigator is a Clinical Decision Support tool to help health care providers manage IV fluid therapy for adult and pediatric severe burn patients.

Monitor Resuscitations



This resuscitation is going well.

Monitor Resuscitations



Intervening when fluids exceed the guideline is key to avoiding too much fluid.

The red box above shows the key time to intervene. (More on this graph later.)

Clinical Data

- **Army's Initial Retrospective Study** (before and after, n=70)[1]
  - 35% additional time in target Urine Output range
  - 24 hour fluids given reduced from 6.5 to 4.2 mL/kg/TBSA
  - 2.5 fewer ventilator days
  - Decreased mortality between cohorts

- **Army Retrospective Review** (n=207)[2]
  - 24 hour fluids given were 3.5 mL/kg/TBSA
  - Mean urine output for initial 24 hours was 55 mL/hr

- **UTMB Retrospective Review** (n=154)[3]
  - AKI incidence reduced from 15% to 6% in first five days (p=.089)

1 Salinas, J et al, Computerized decision support system improves fluid resuscitation following severe burns: An original study, Crit Care Med 2011, 39(9), 2031-8.

2 J Salinas et al, *Review of Patients Resuscitated Using a Computerized Decision Support System in A Burn Intensive Care Unit*. Crit Care Med 2012, 225: Abstract only.

3 Sheaffer J et al, *Incidence of Acute Kidney Injury in Computerized Decision Support System Guided Fluid Resuscitations*, American Burn Association Oral Presentation, 24 March 2017.

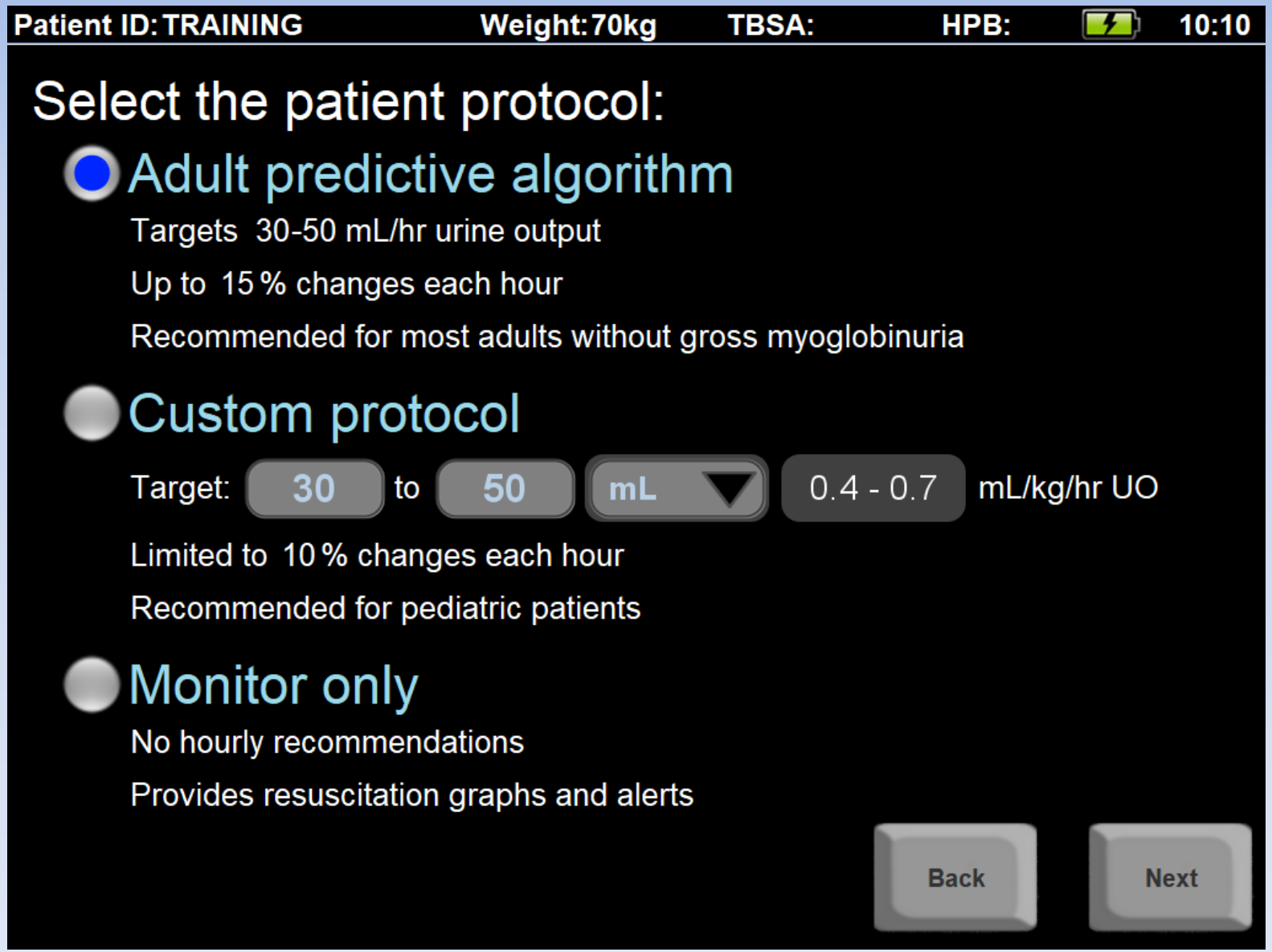
Indications for Use

- The Burn Navigator is indicated for use in the care of adult patients with 20% or more Total Body Surface Area (TBSA) burned, or pediatric patients, 24 months old or older, weighing at least 10 kg with 15% or more TBSA burned, as a fluid resuscitation monitor and calculator for hourly fluid recommendations.

- The Burn Navigator is intended to be used for burn patients of all ages, weights and co-morbidities as a fluid resuscitation monitor.

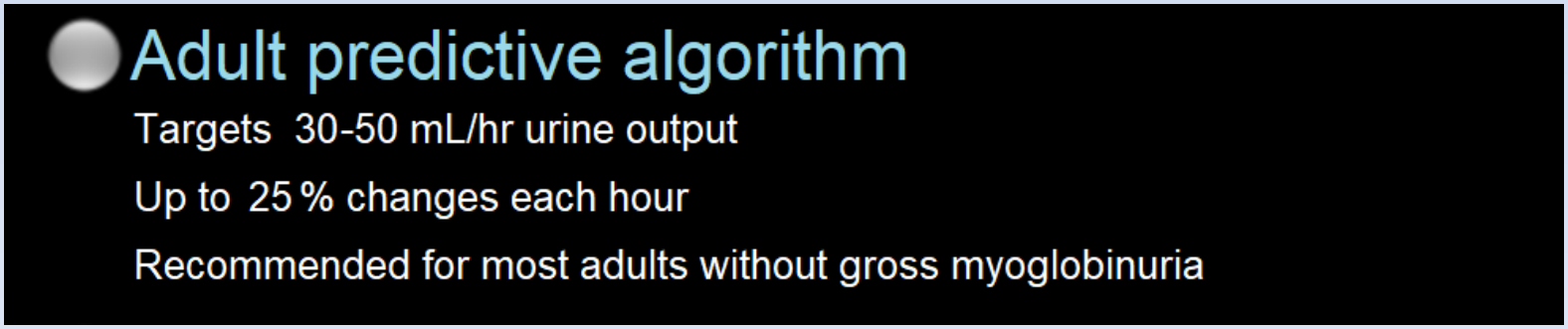
- The Burn Navigator is intended to be initiated within 24 hours of the burn incident and to be used no longer than 72 hours post burn.

Protocols


Patient ID: TRAINING
Weight: 70kg
TBSA:
HPB:
10:10
Select the patient protocol:
Adult predictive algorithm
Targets 30-50 mL/hr urine output
Up to 15 % changes each hour
Recommended for most adults without gross myoglobinuria
Custom protocol
Target: 30 to 50 mL 0.4 - 0.7 mL/kg/hr UO
Limited to 10 % changes each hour
Recommended for pediatric patients
Monitor only
No hourly recommendations
Provides resuscitation graphs and alerts
Back
Next

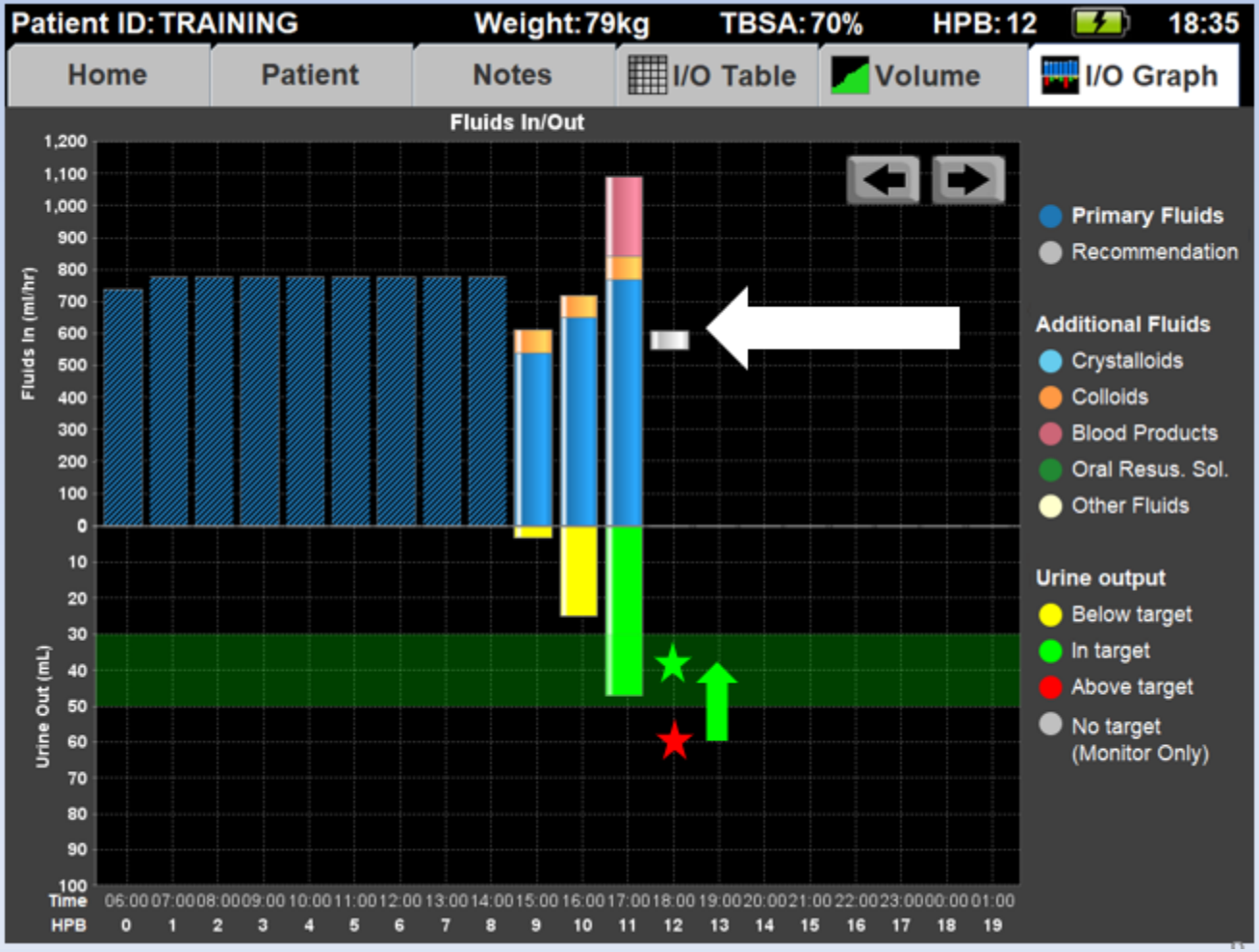
Adult Predictive Protocol

- Uses the **Salinas algorithm** developed by U.S. Army Burn Center[1].
- The Salinas algorithm uses the trend of the last three hours of UO to recommend the next hour's IV infusion rate.
- The Salinas algorithm will go up to the hourly cap chosen by your medical director (e.g., 10%, 15% or 20% each hour).
- This protocol is recommend for most adult patients who do not have resuscitation confounders.



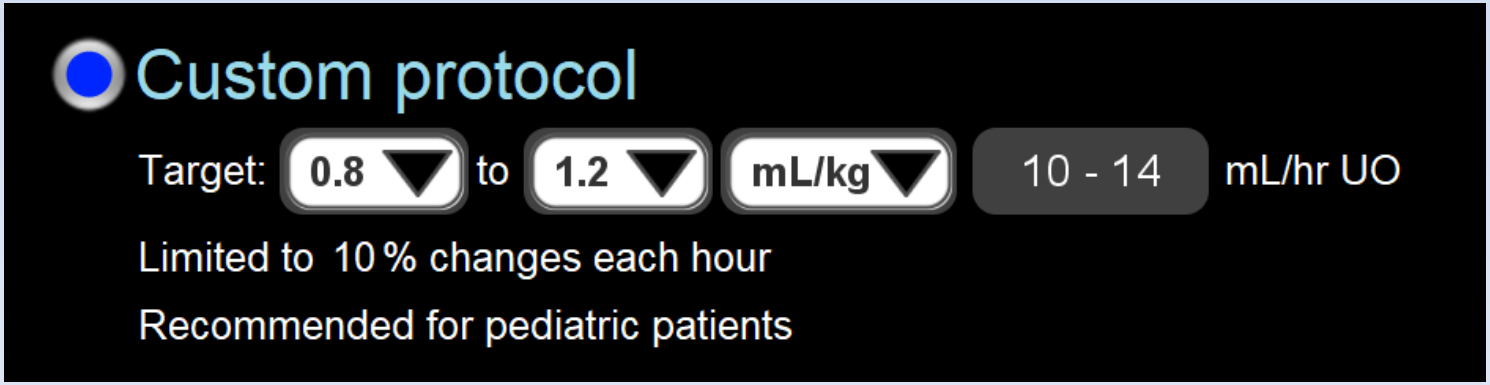
1 Salinas, J et al, Computerized decision support system improves fluid resuscitation following severe burns: An original study, Crit Care Med 2011, 39(9), 2031-8.

Adult Protocol uses a 3-hour trending algorithm



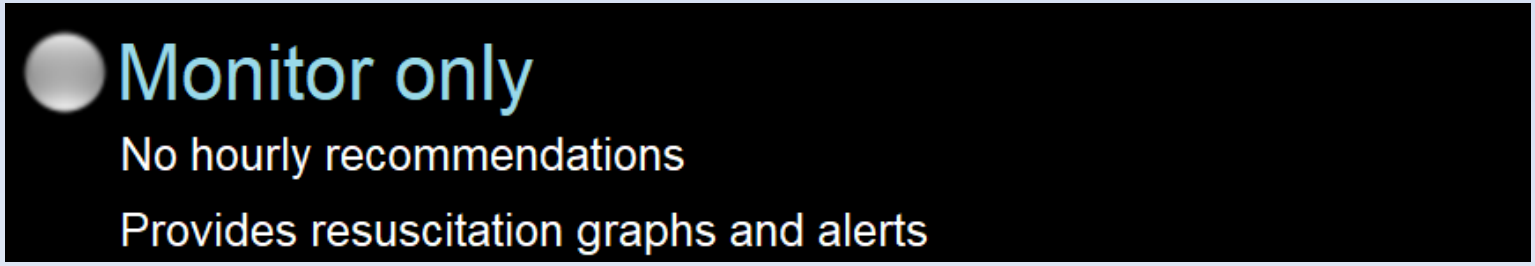
Custom Protocol

- Allows clinicians to set a target Urine Output range in **mL** or **mL/kg** each hour.
- If the patient's UO is not in target, then the Custom Protocol will recommend increasing or decreasing the IV fluid rate by 10%.



Monitor Only

- Monitor Only provides resuscitation graphs, projections and alerts
- Monitor Only does not provide an hourly IV fluid recommendation based on UO
- Choose this protocol when UO is not a good surrogate of general organ perfusion (such as acute renal failure or with diuretics) or if the patient does not have a Foley catheter



Clinical Decision Support (CDS)

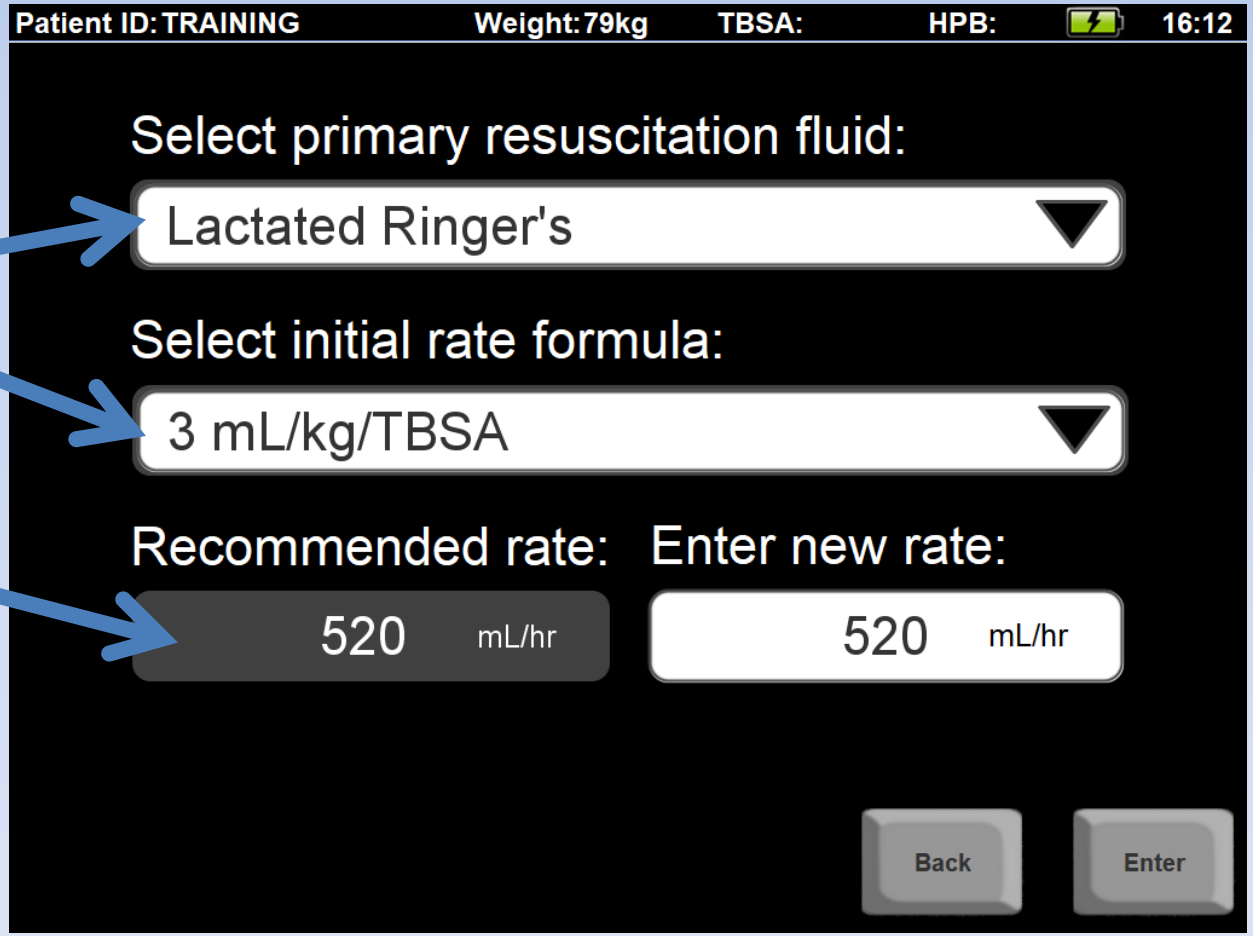
- As a CDS tool, Burn Navigator is not intended to replace clinical decision judgement, rather it informs clinical decision making.

- Users should always rely on their clinical judgment when making decision regarding patient care. The Burn Navigator recommendations are not a substitute for clinical judgment.

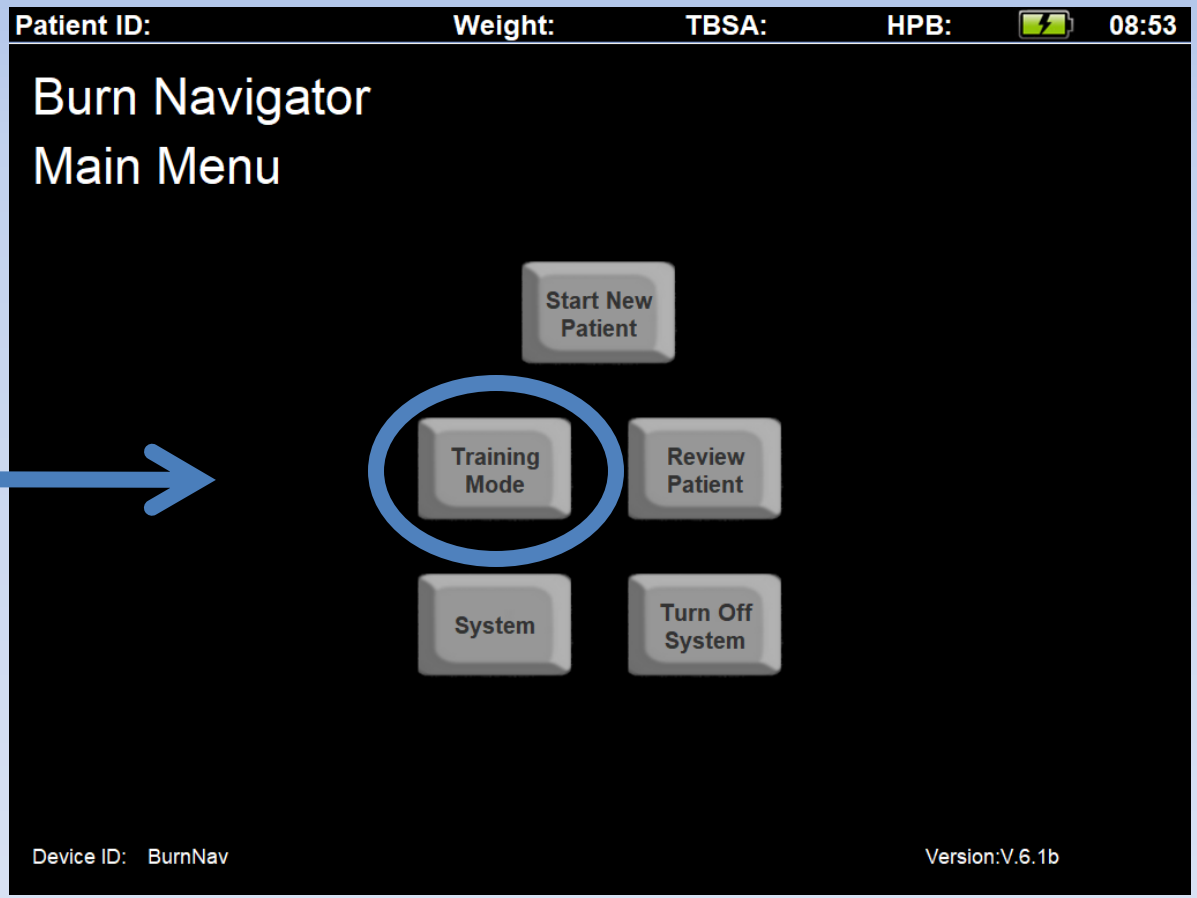
Interface

White fields you **can edit**

Gray fields you **cannot** edit

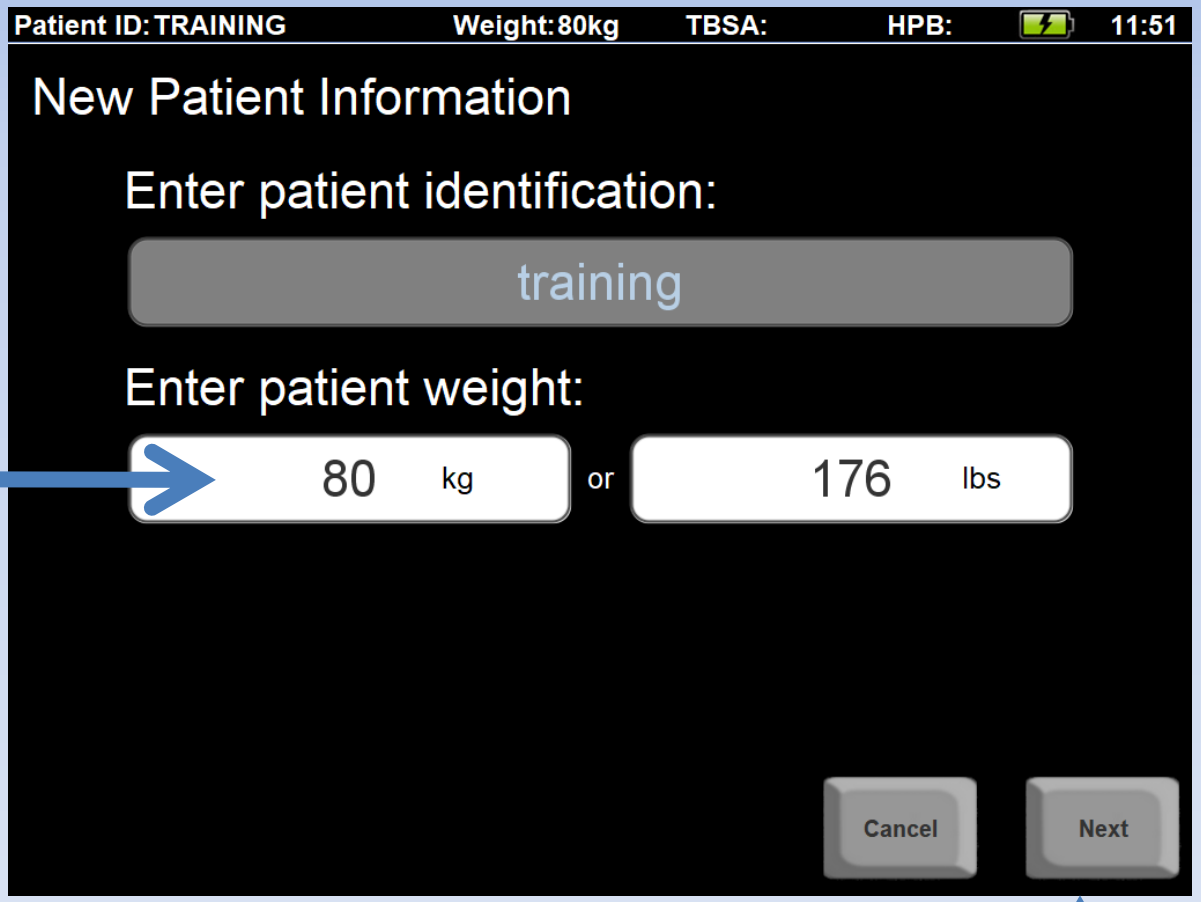


Press
“Training Mode”

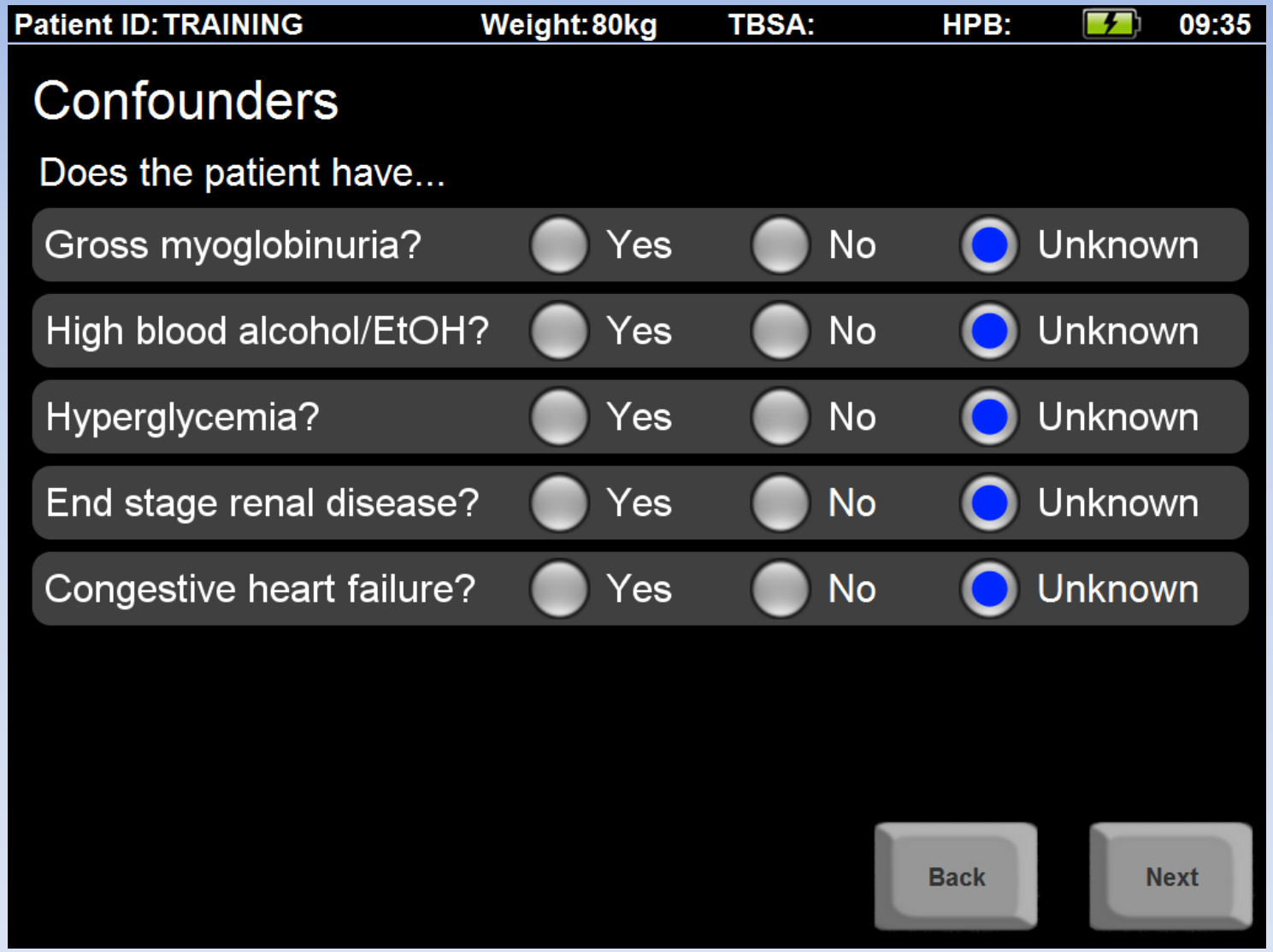


Enter weight

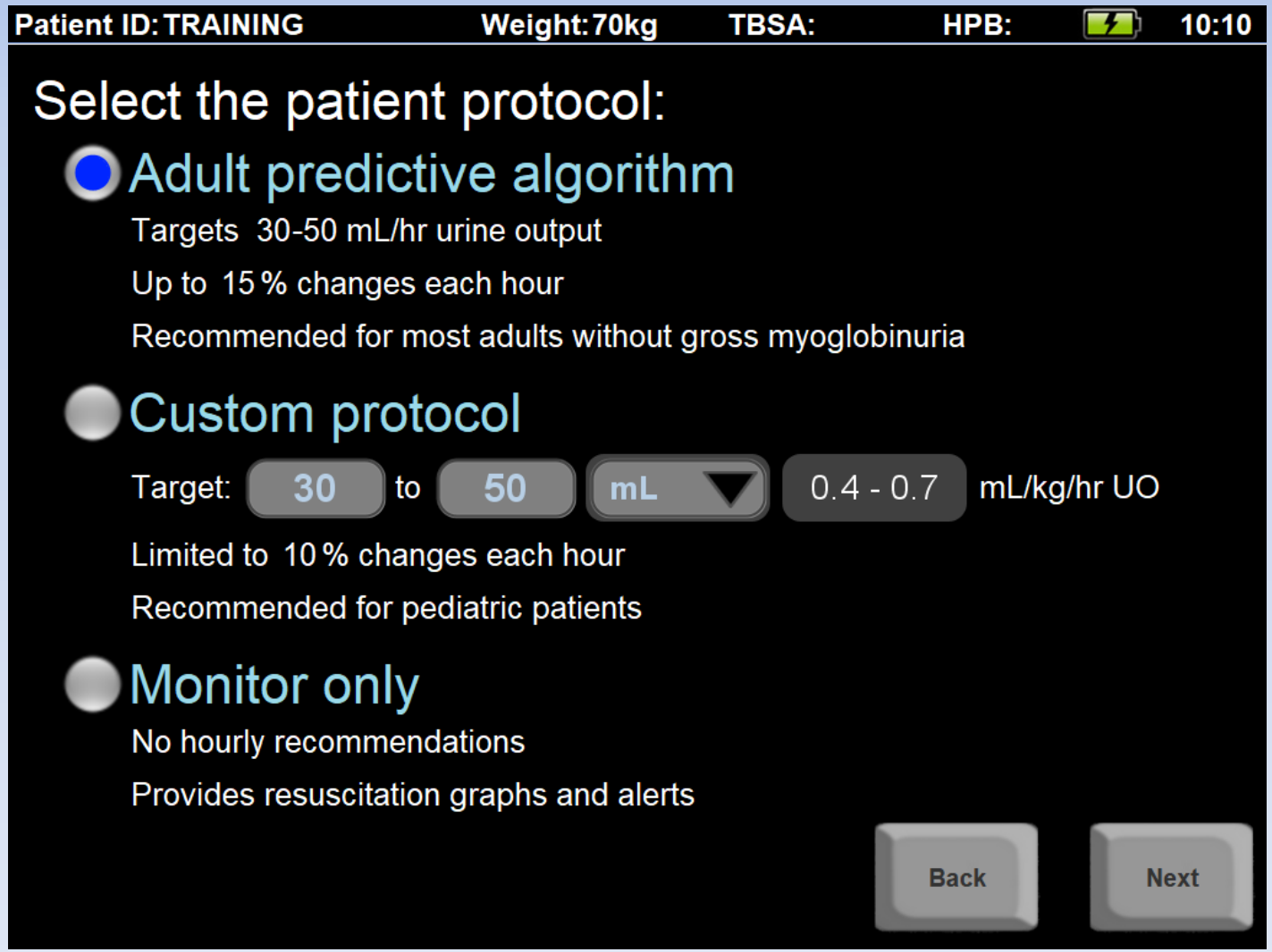
- You can enter **kg** or **lbs.**



Then, press “Next”

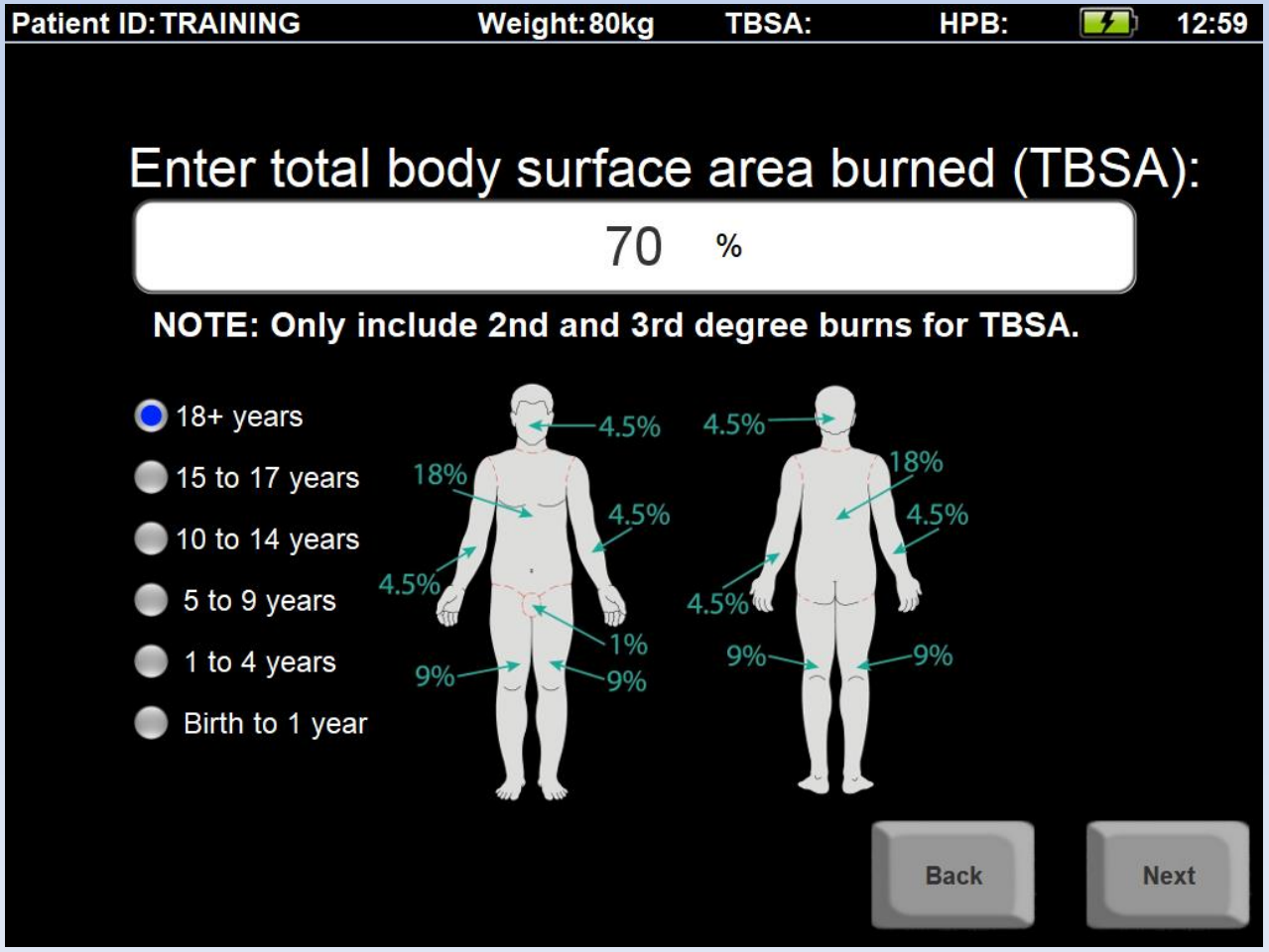

Patient ID: TRAINING
Weight: 80kg
TBSA:
HPB:
09:35
Confounders
Does the patient have...
Gross myoglobinuria? Yes No Unknown
High blood alcohol/EtOH? Yes No Unknown
Hyperglycemia? Yes No Unknown
End stage renal disease? Yes No Unknown
Congestive heart failure? Yes No Unknown
Back
Next

Choose Adult predictive algorithm



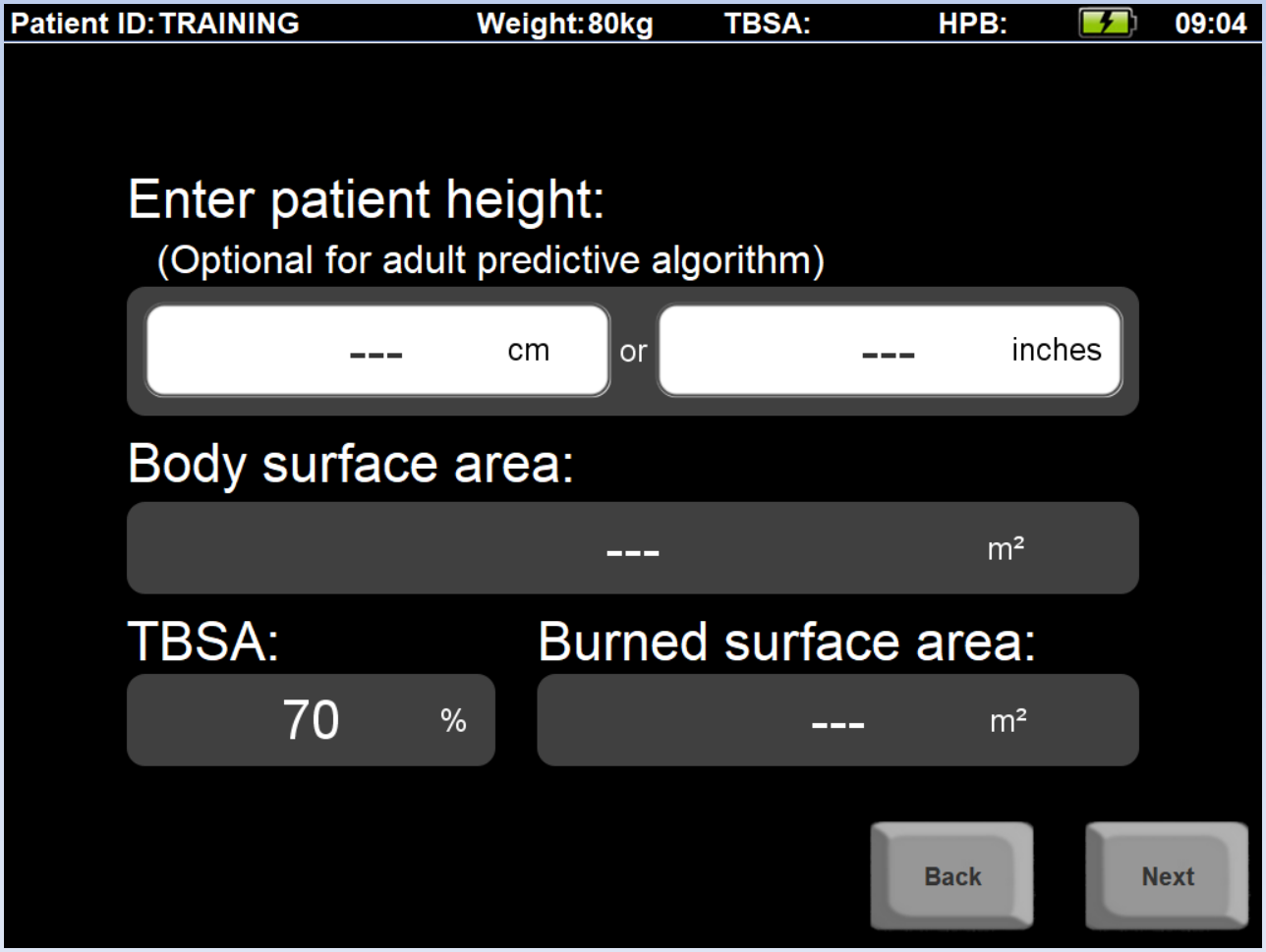
Enter TBSA

- Be as accurate as you can be
- Only count 2nd and 3rd degree



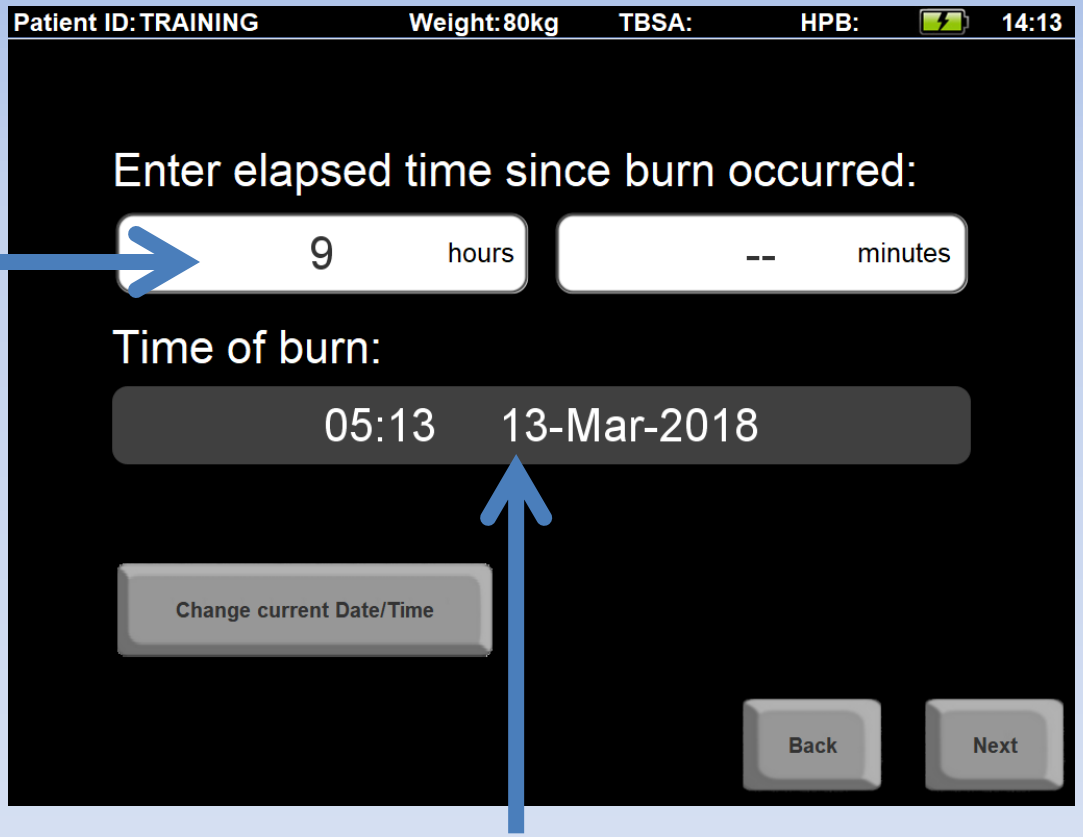
Enter height

(it is optional for adult predictive algorithm)



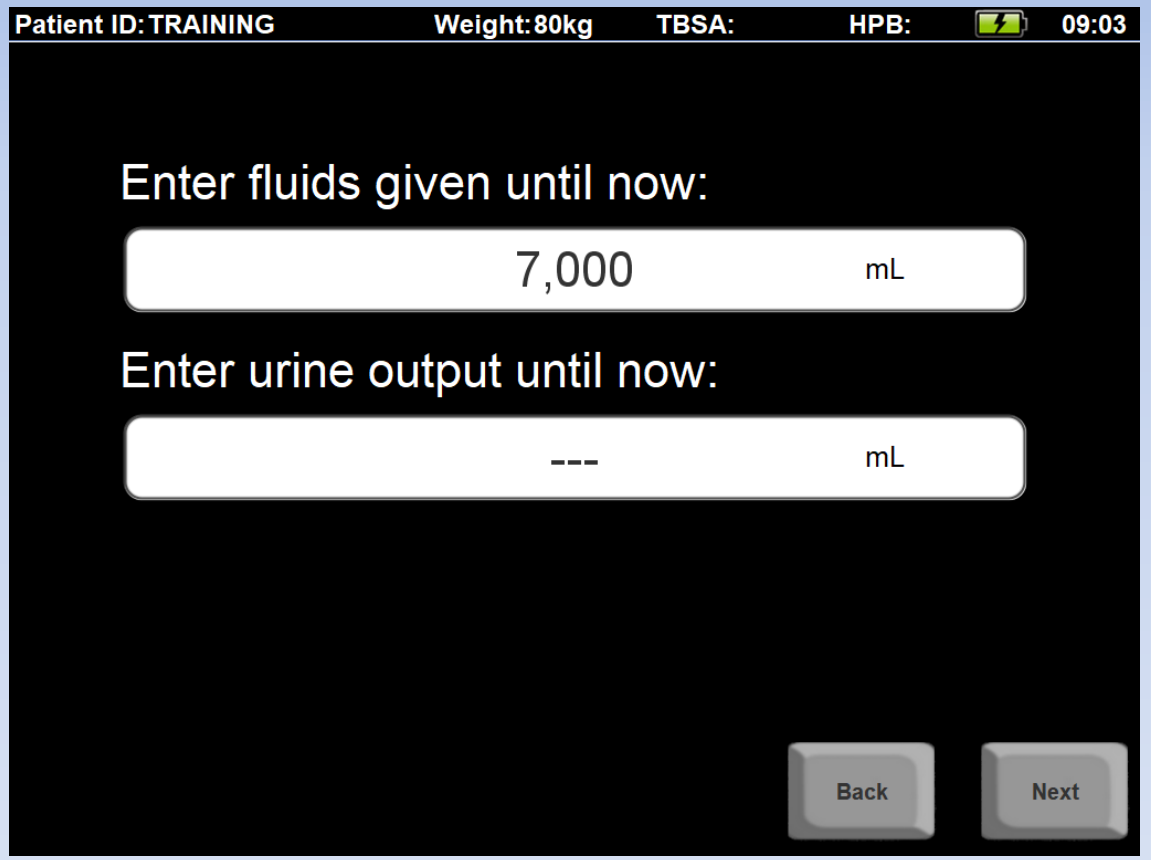
Enter how long ago the patient was burned in <u>hours</u> and <u>minutes</u>

If you don't know, make your best guess



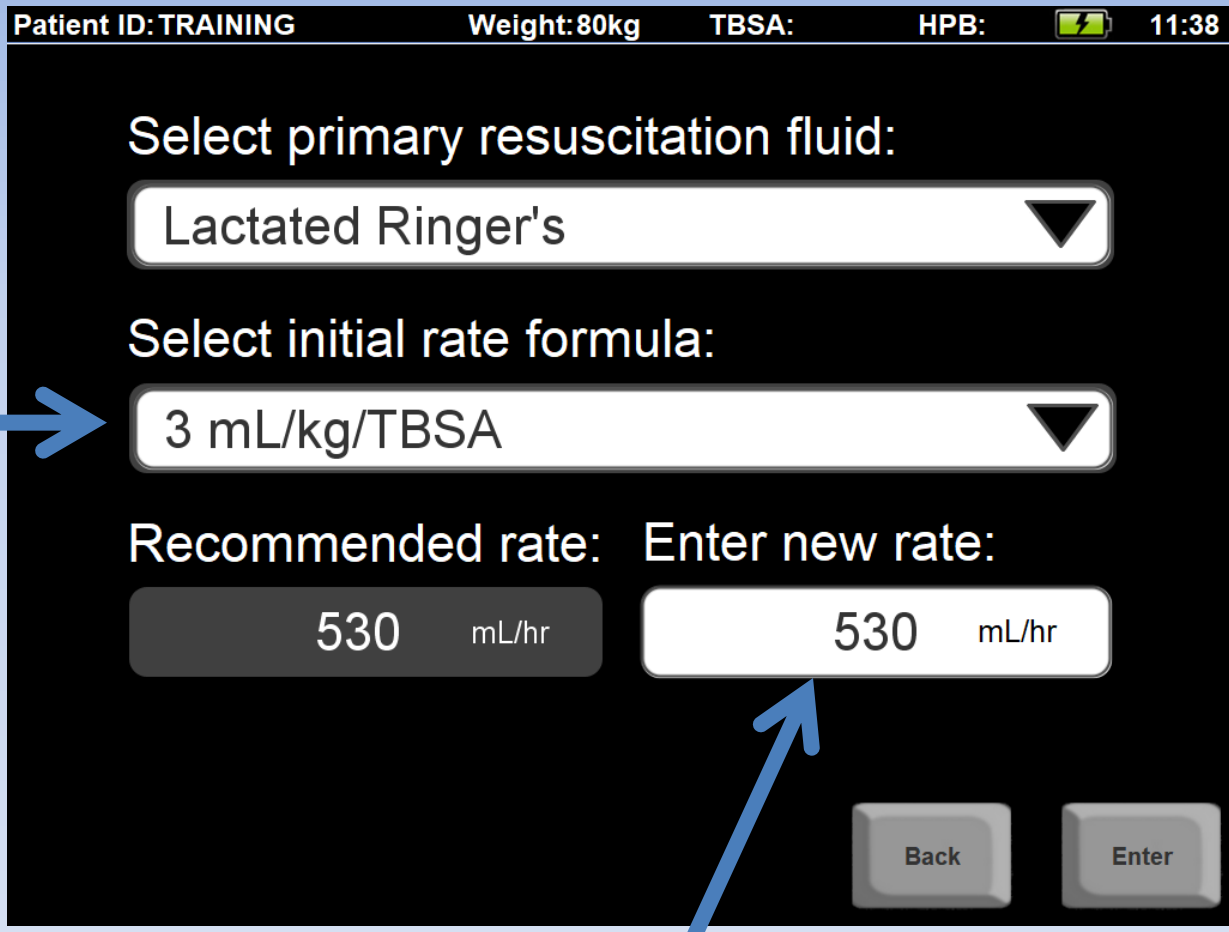
The software will calculate time of burn

Enter
total fluids given
and **urine output**
since the burn
until now



If you don’t know this information now,
you can leave it blank and enter it later

You can select different starting formulas

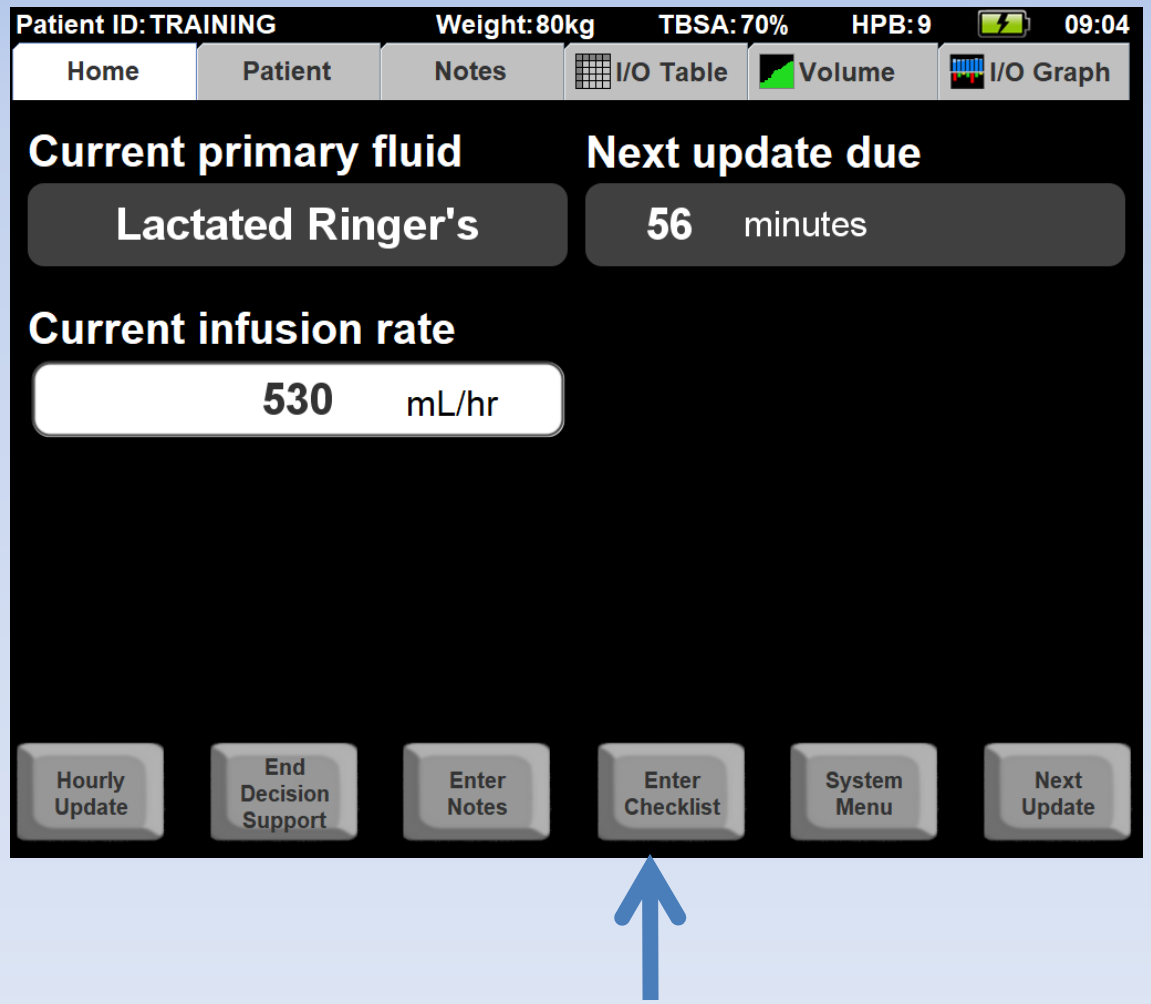


Your physician may want you to start at a different rate. If so, enter the rate here.

Lactated Ringer's is the default fluid. You can change fluid types.

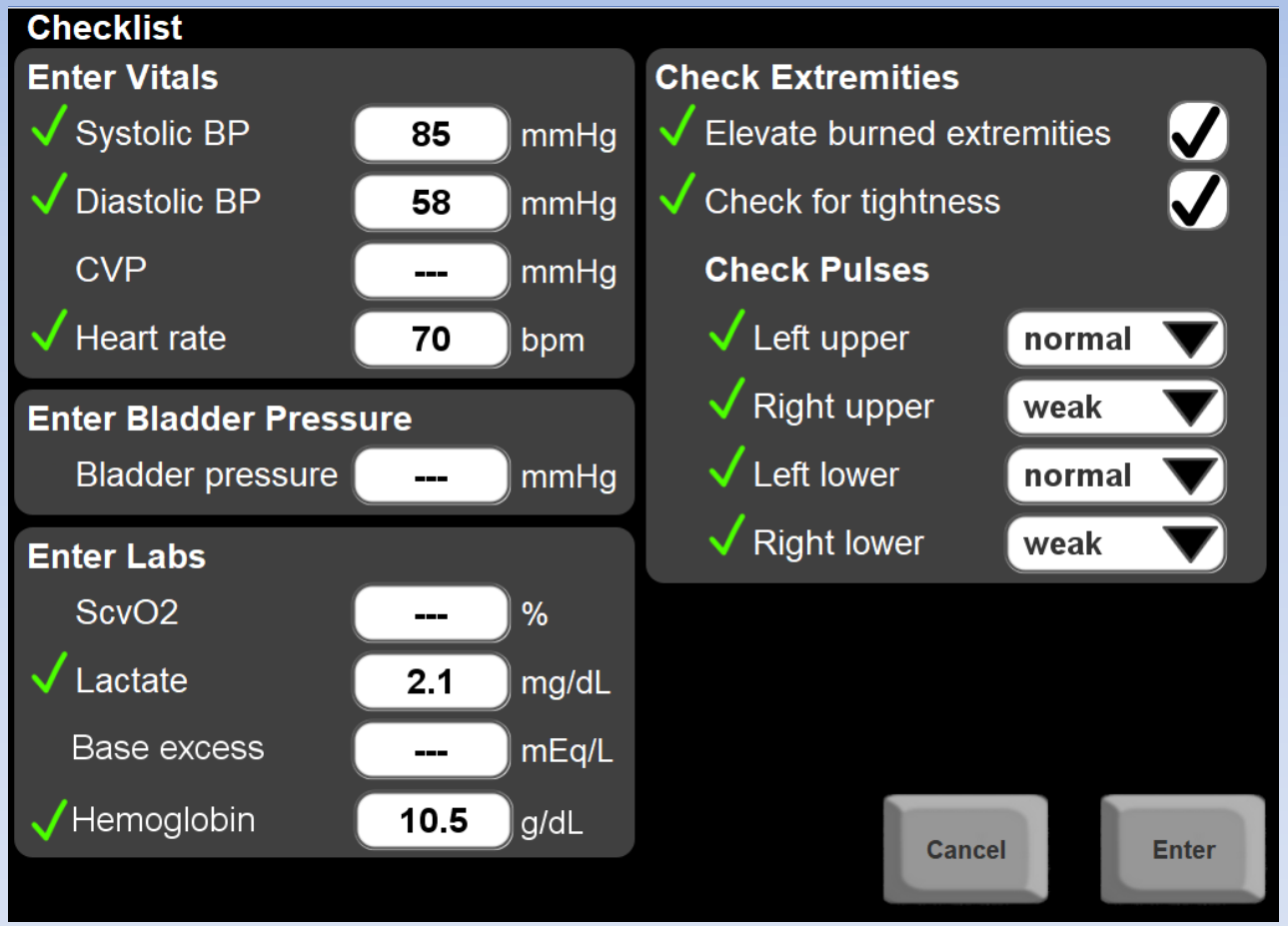
You've completed the new patient setup!

Now you see the Home Screen



Press "Enter Checklist"

Enter checklist information



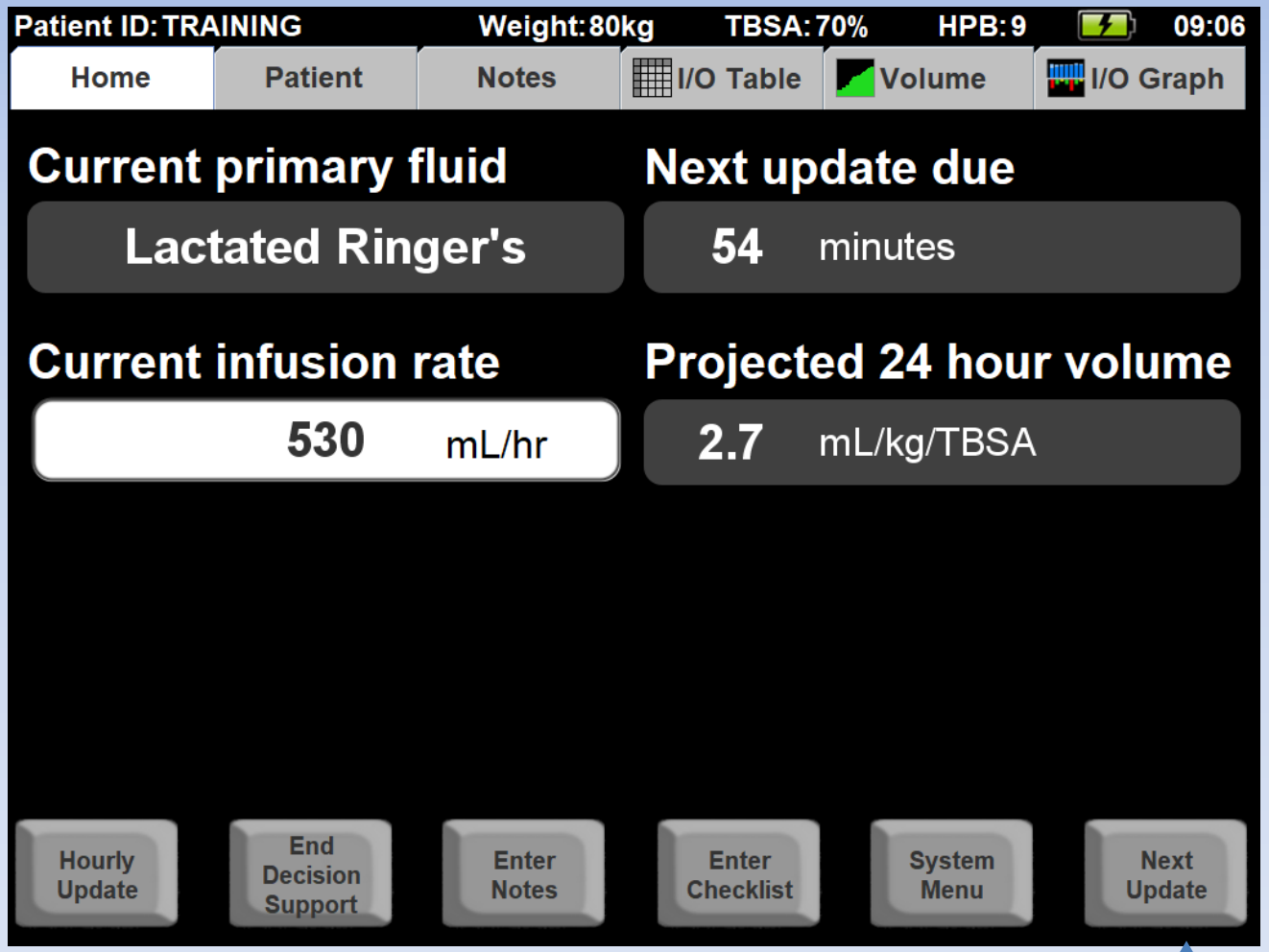
Don't forget these!

Drop-down selections

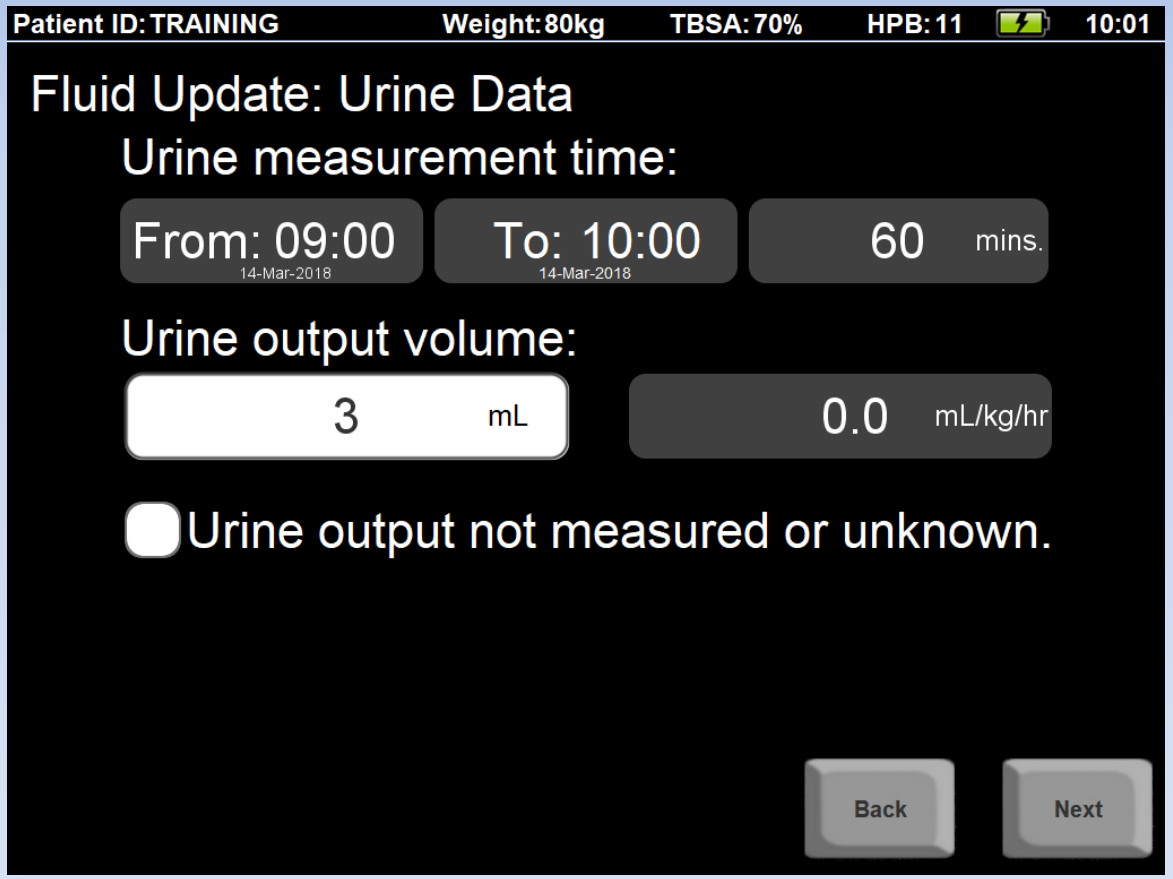
Checklists are recommended:

- When starting a new resuscitation
- Every 6 hours

Advance time to the next update



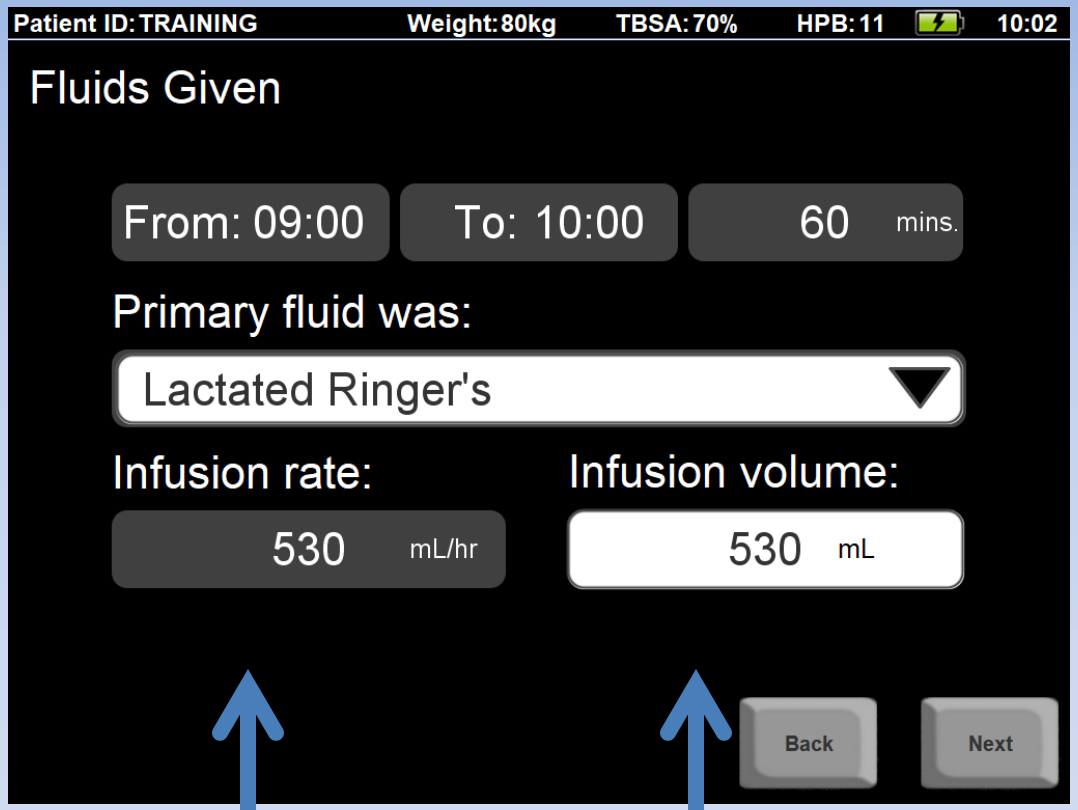
Press “Next Update”



"**From**" time is the end of the last update

"**To**" time is when you collect UO data

Enter 3 mL UO, then press "Next"



The **rate** and **volume** will be different if the time period is not 60 minutes

Average rate for this time period

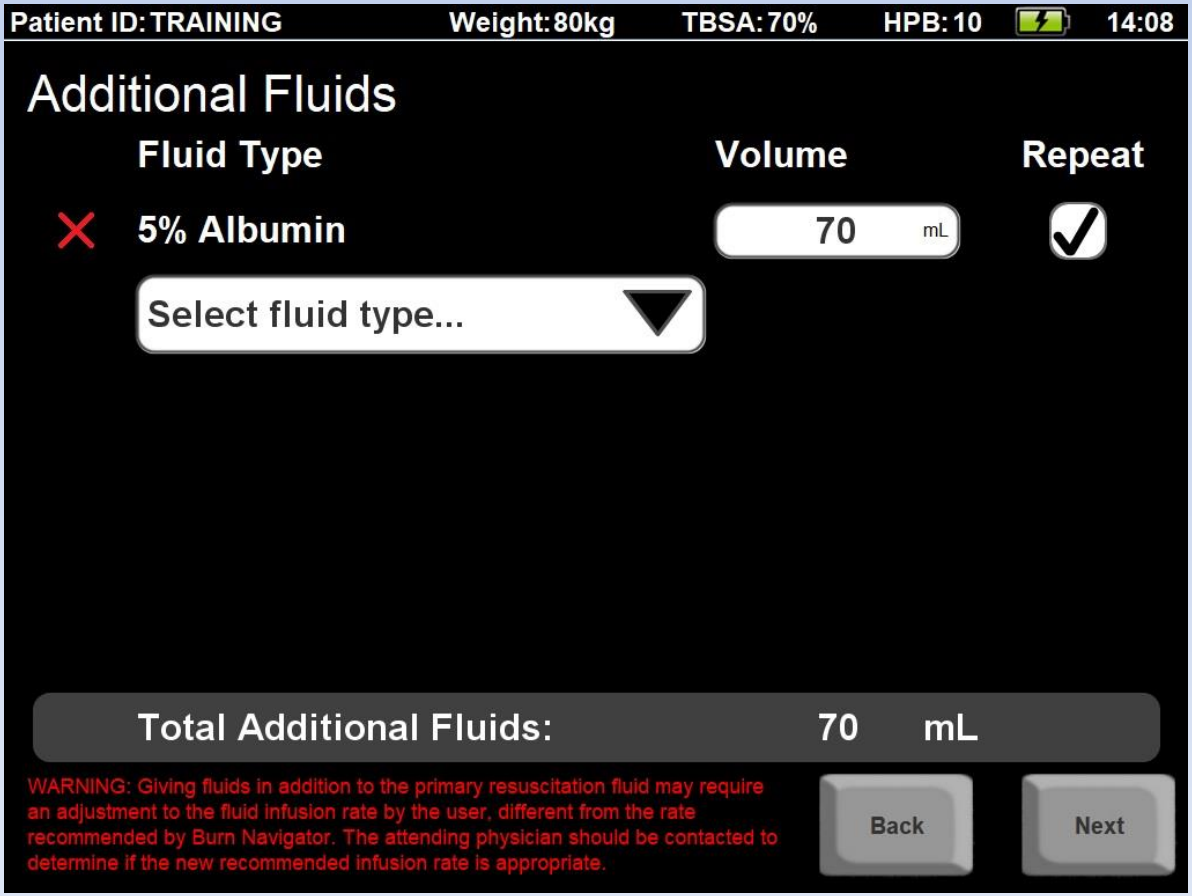
Volume for this time period

If you edit the **volume**, the **average rate** for the time period will be updated

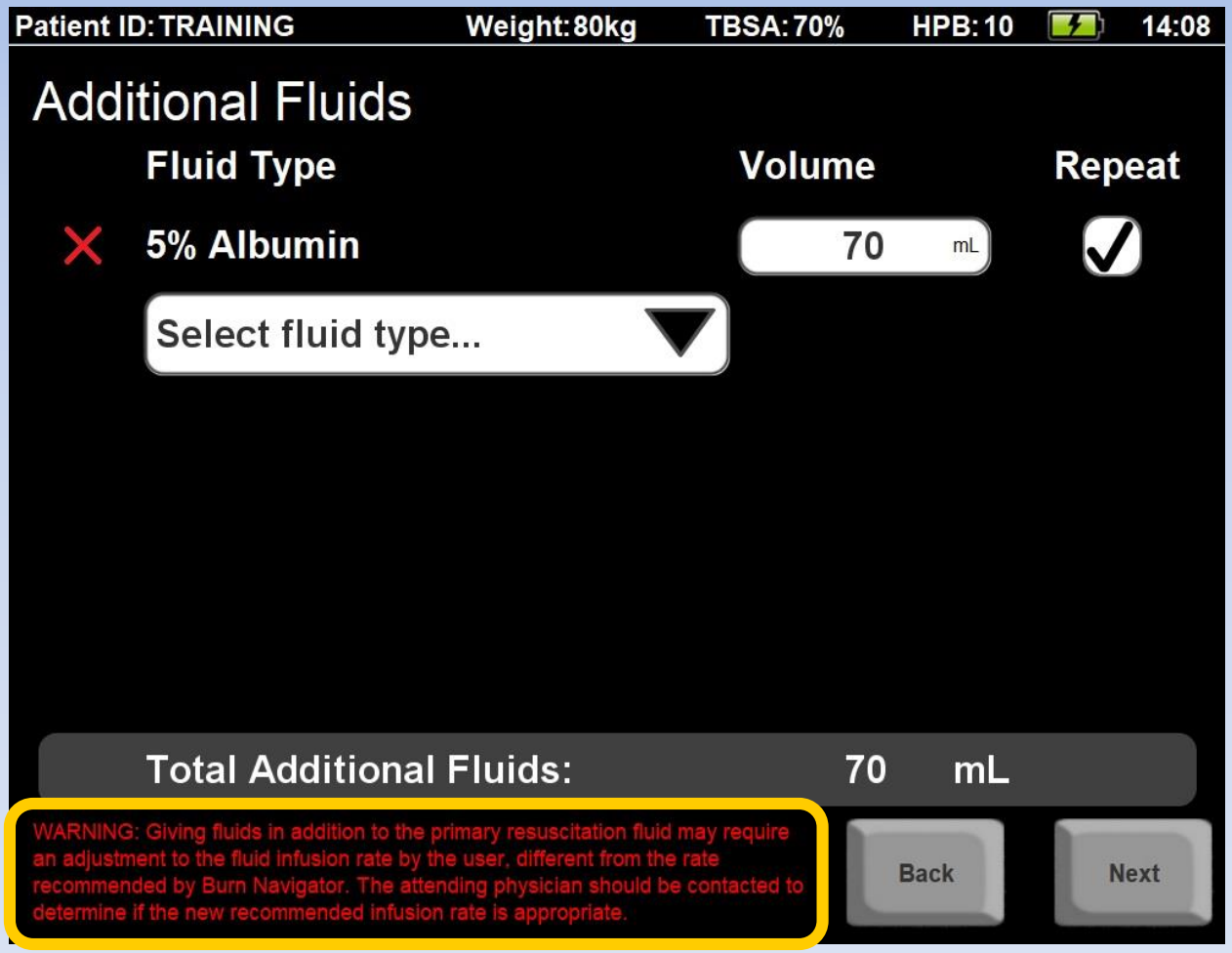
Click “Select a fluid type”

Choose “Albumin 5%”

Enter 70mL and click “Repeat”



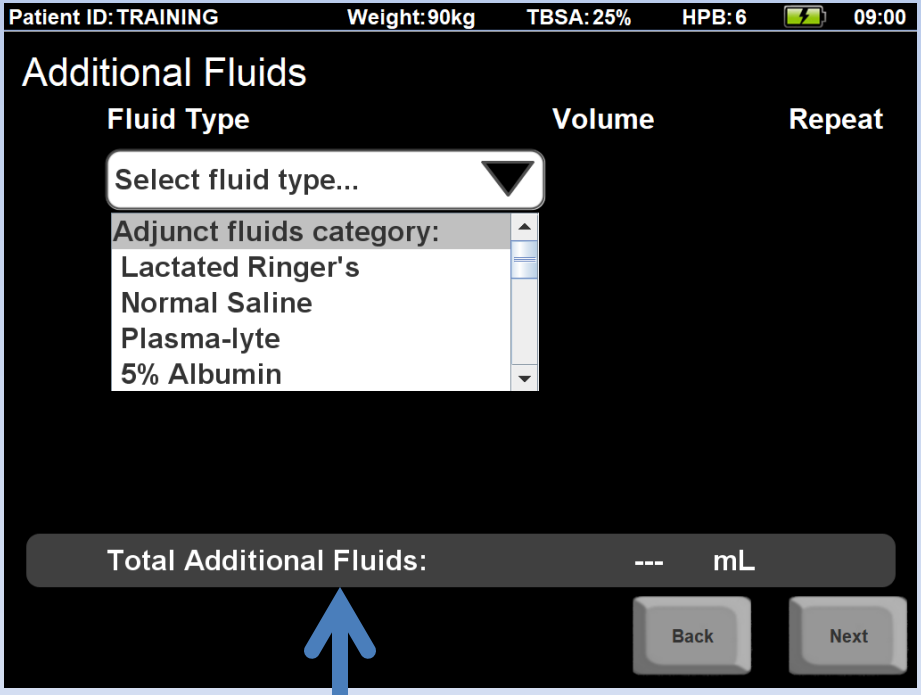
You'll see this warning message anytime additional fluids are given, because the algorithm doesn't take those fluids into account

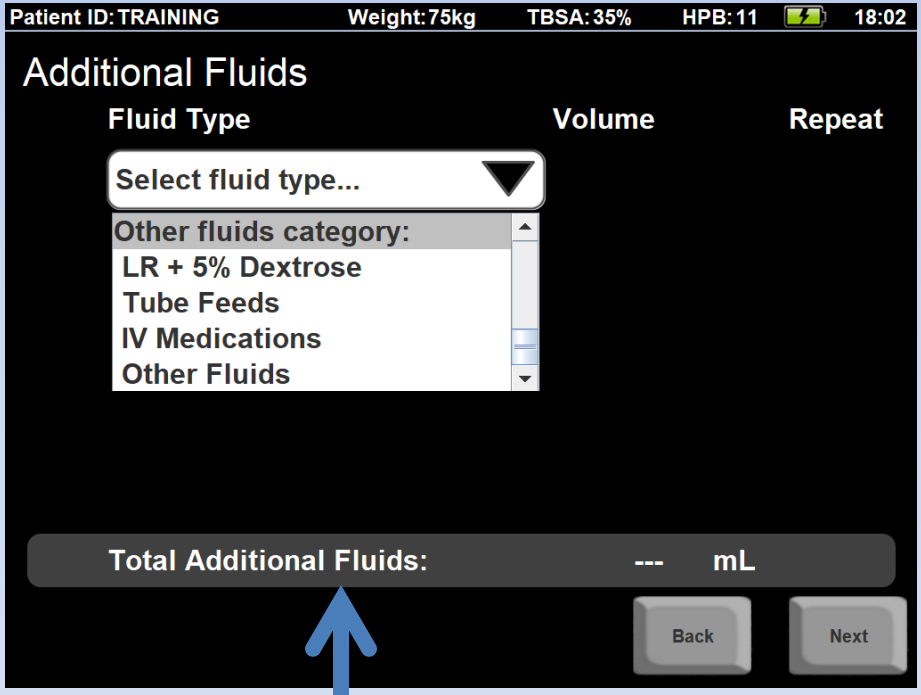


New recommendation

Accept this recommendation by pressing "Enter"

Note that there are two Divisions of Additional Fluids: Adjunct Fluids & Other Fluids



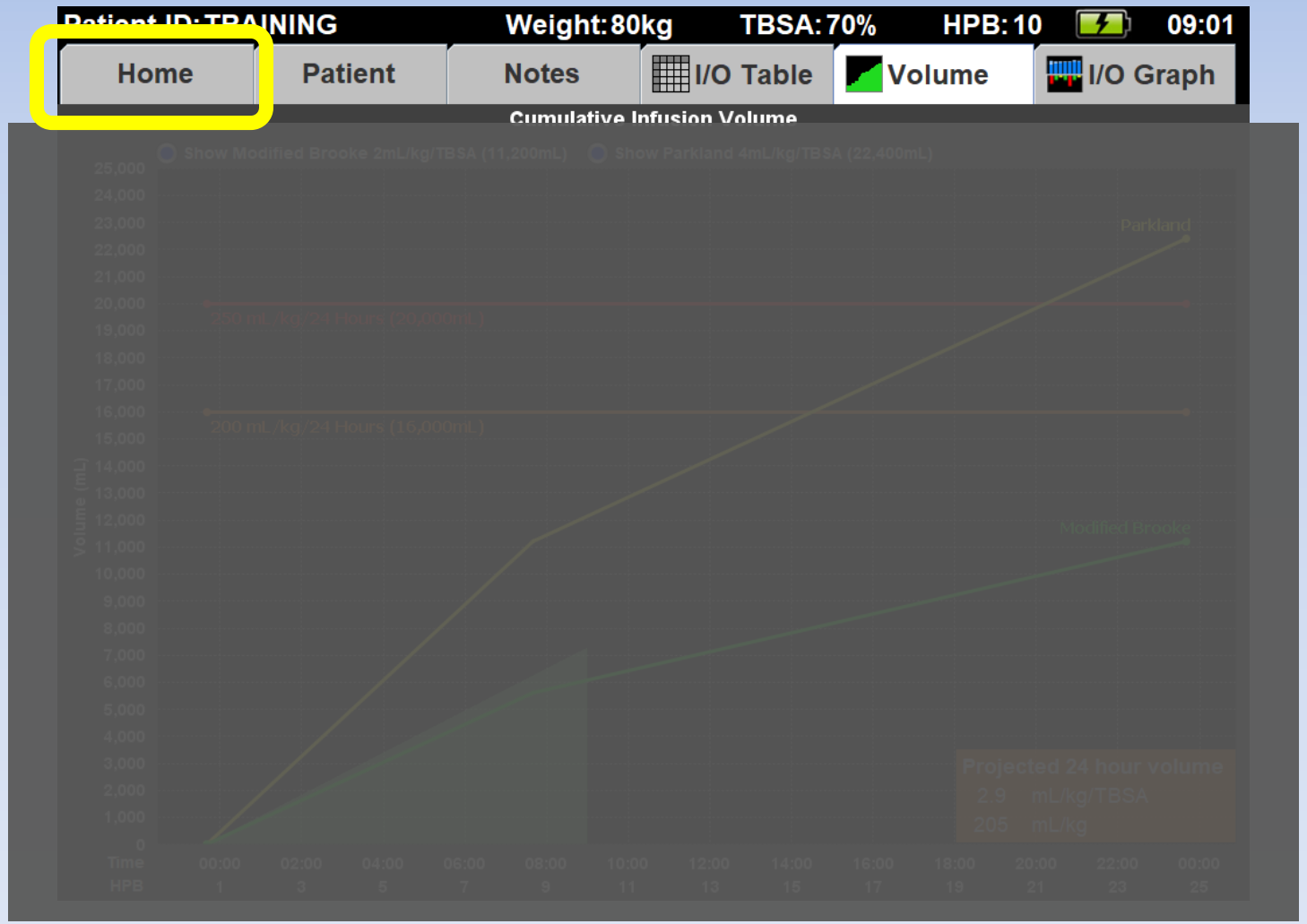


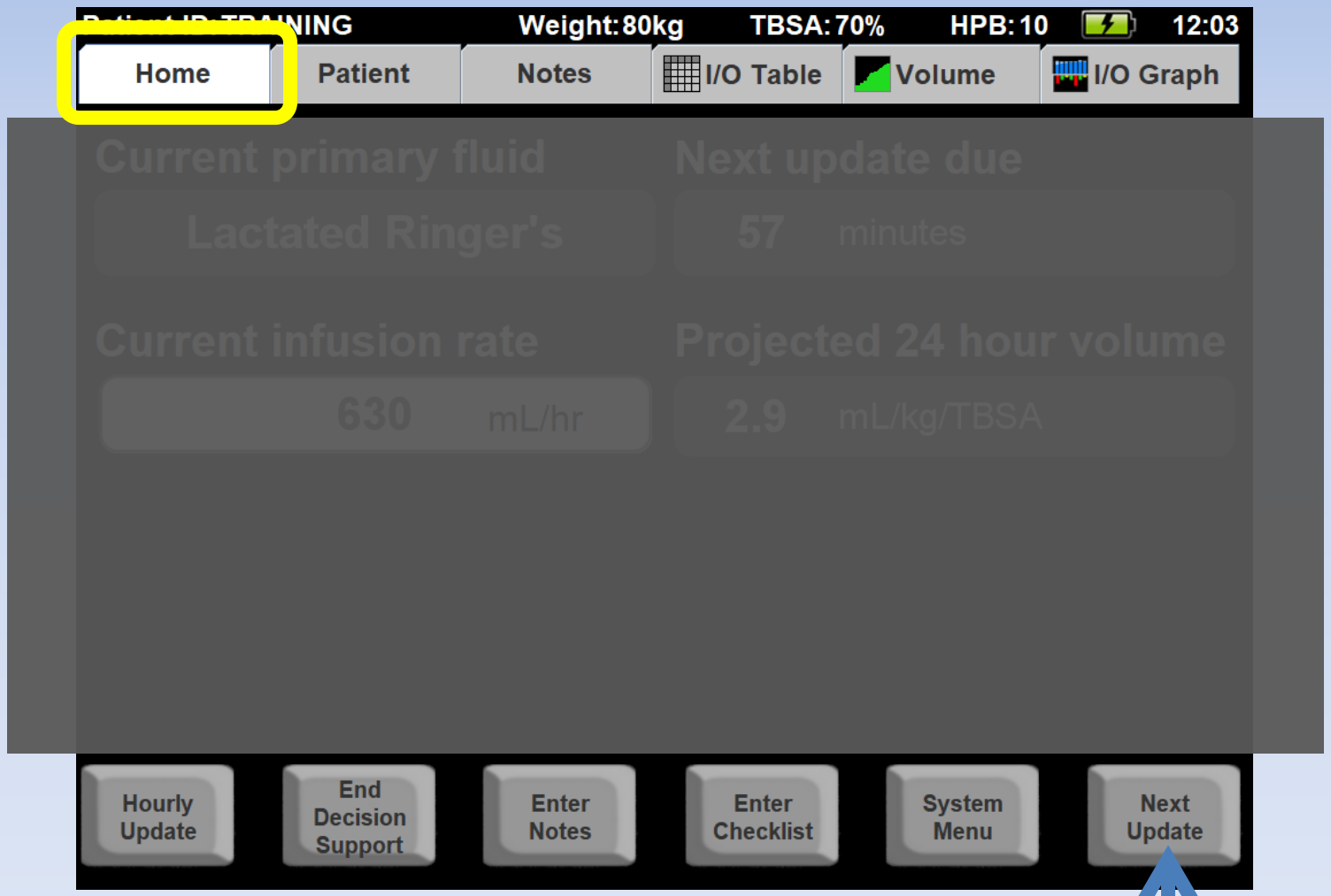
Adjunct fluids are added to the total fluid volume and – if repeated – are included in the 24-hour fluid projection.

Other Fluids are excluded from the Volume Graph and the 24-hour fluid projection.

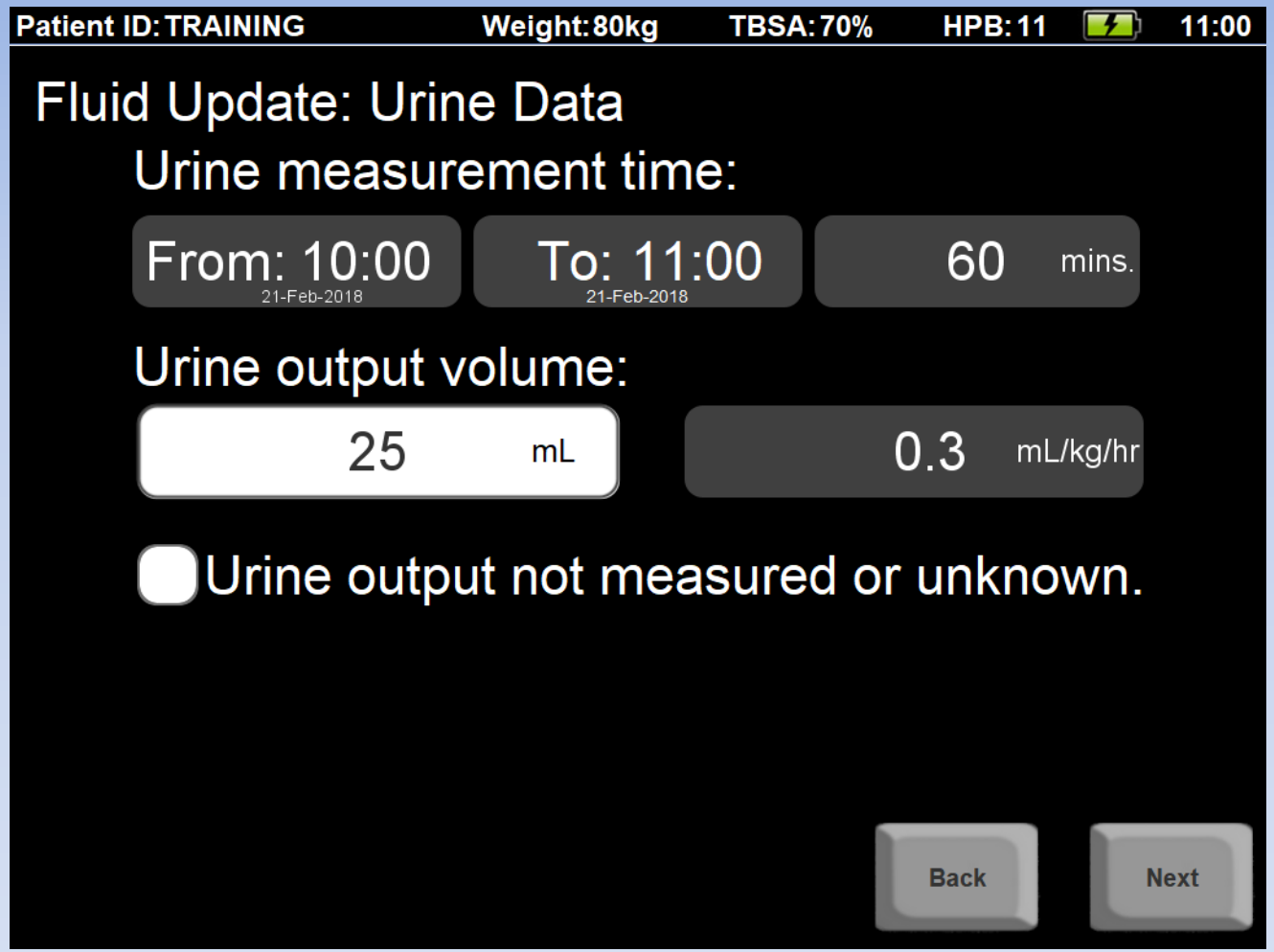
You now see the Volume Graph

Press “Home” to do another update

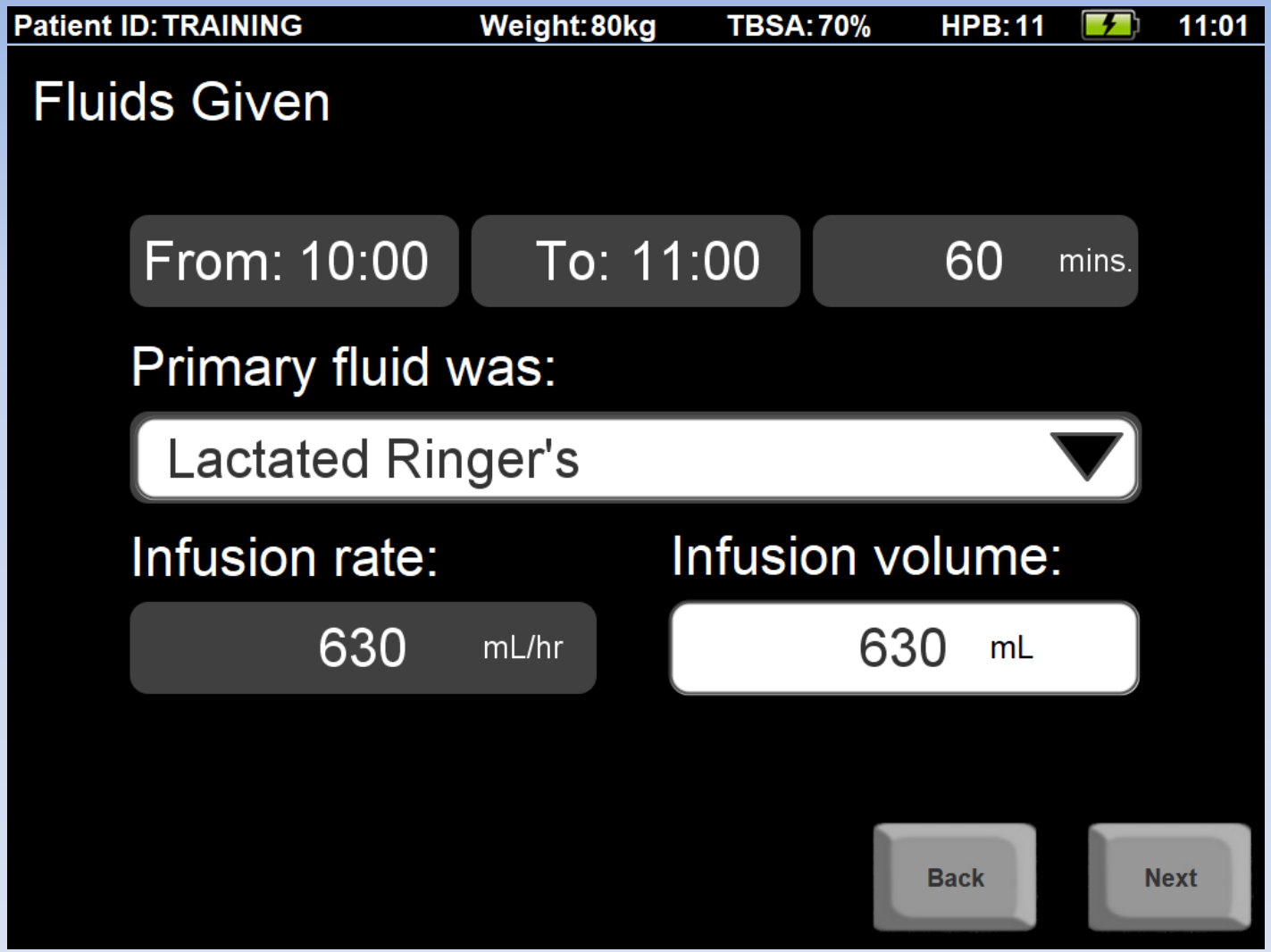




press “Next Update”



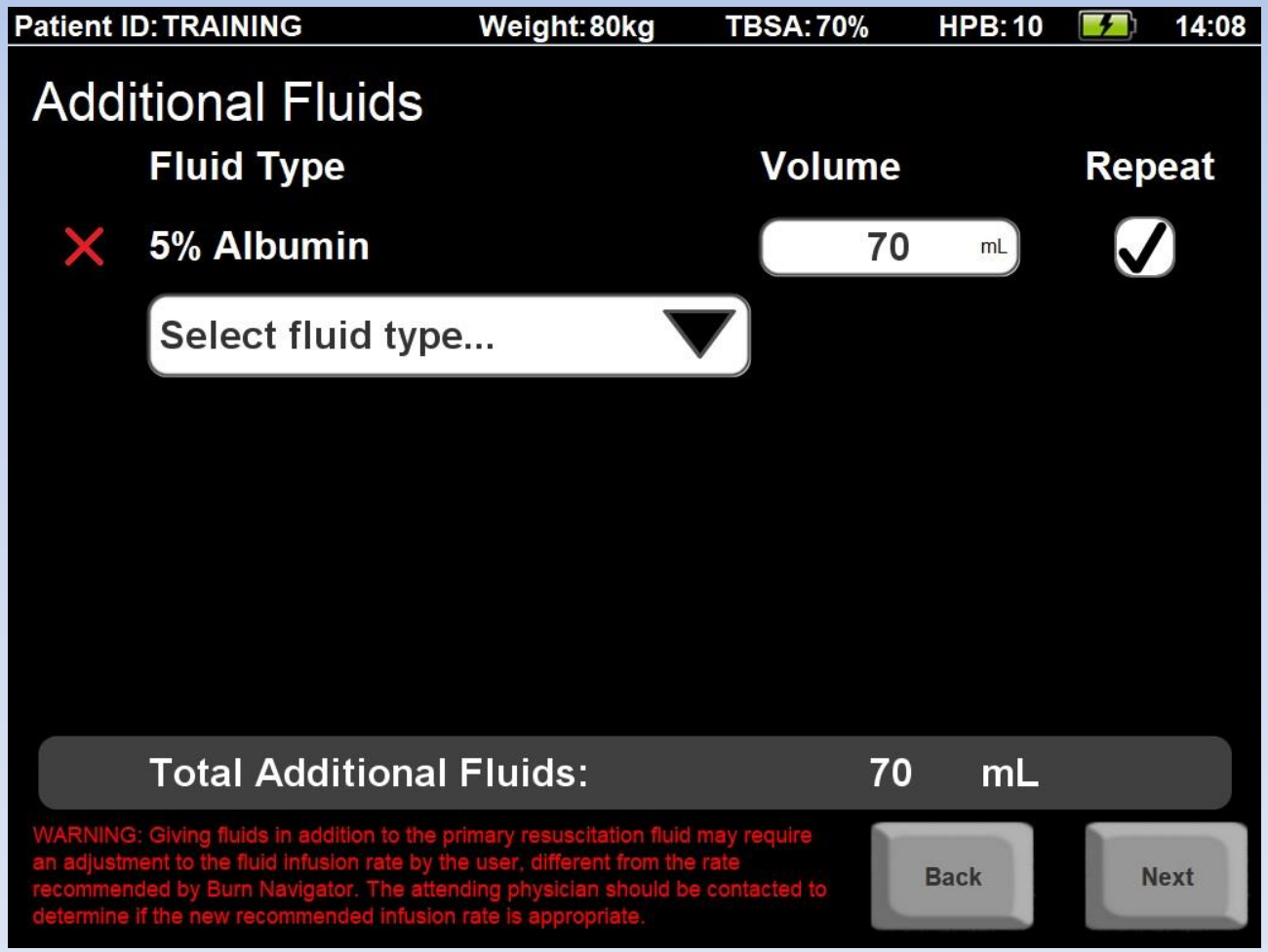
Enter UO,
then press “Next”

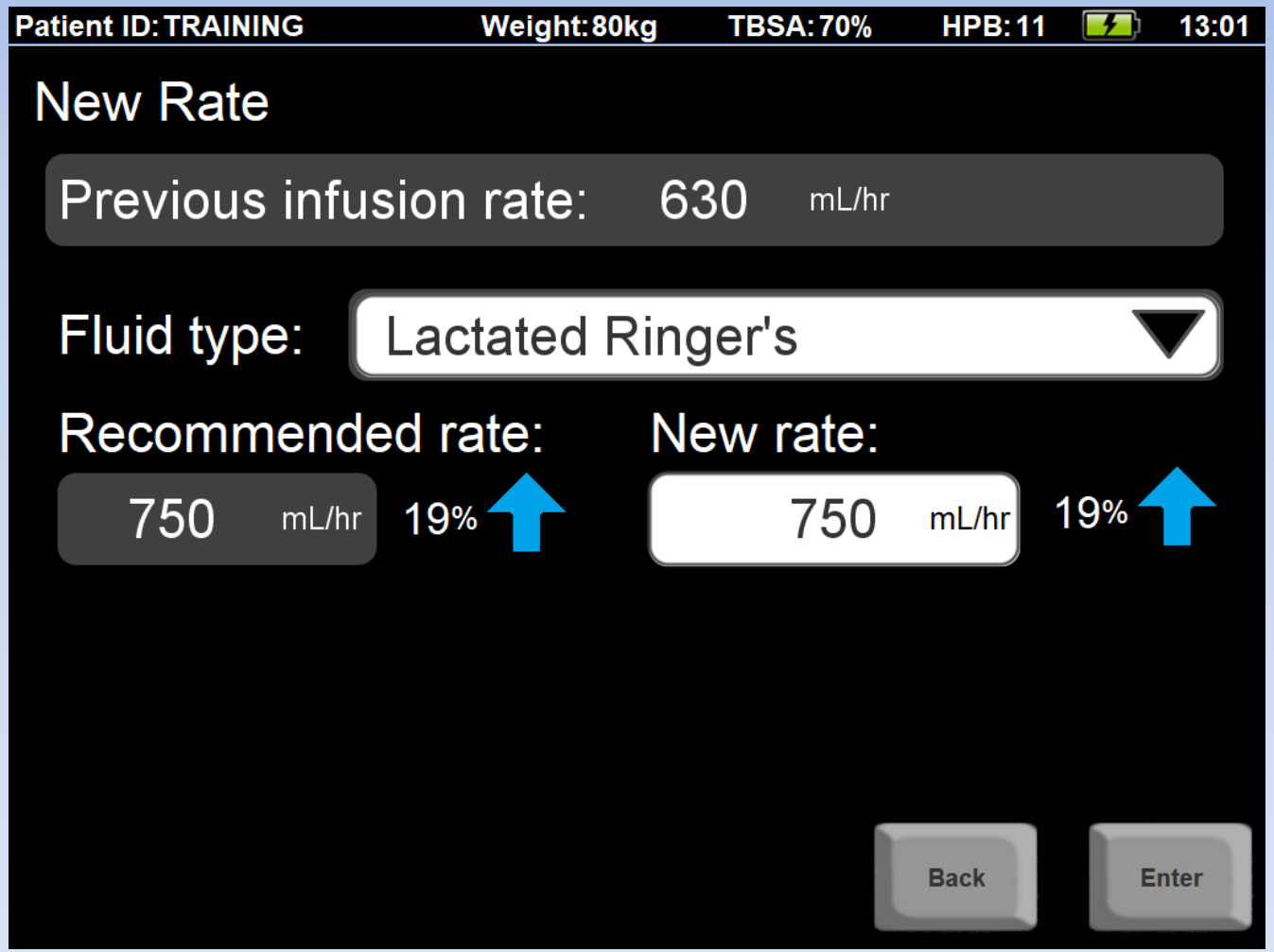


Confirm the pump wasn't changed: **press Next**

Because you chose “Repeat” last time, the Albumin 5% is listed again.

Press “Next”

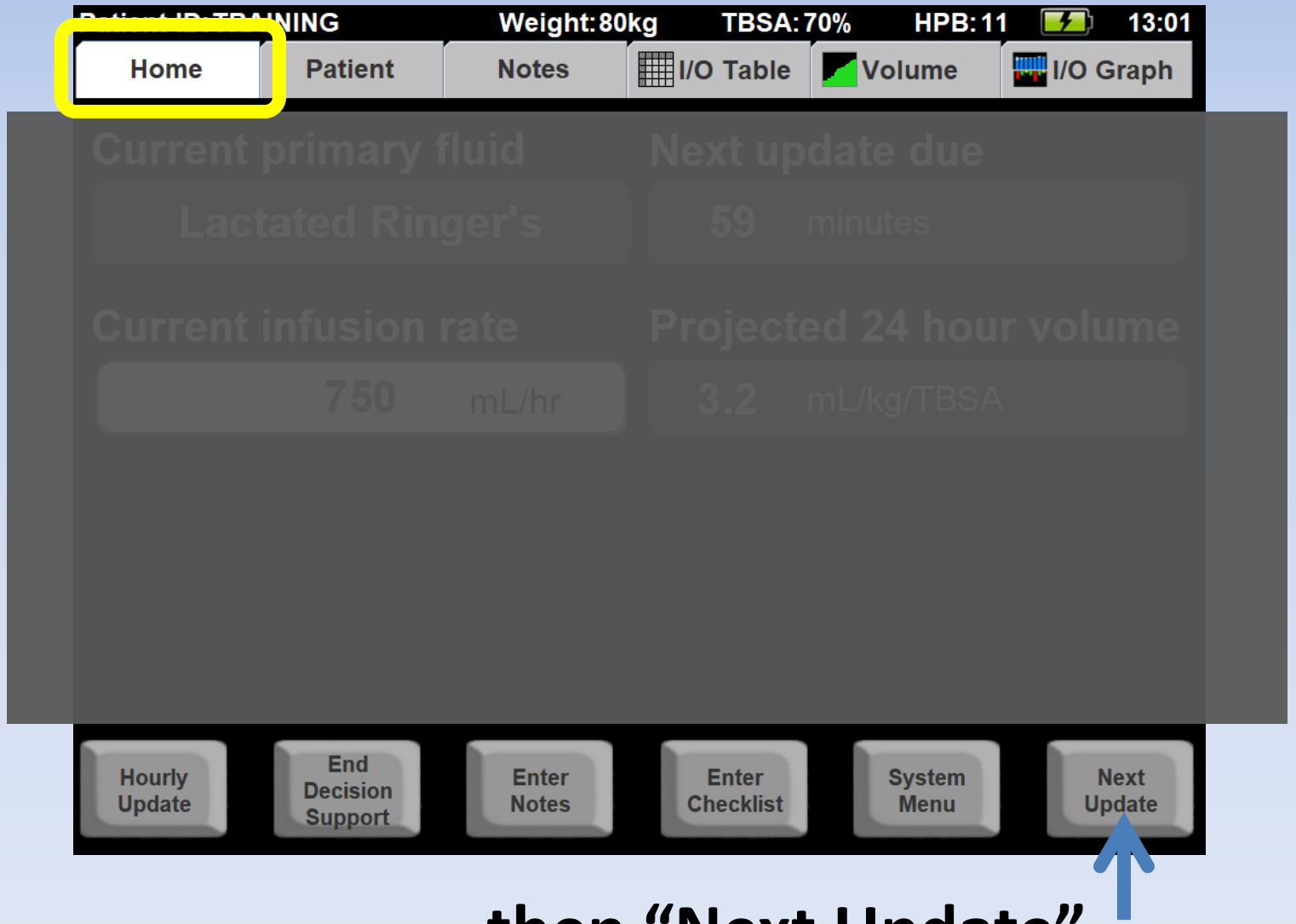




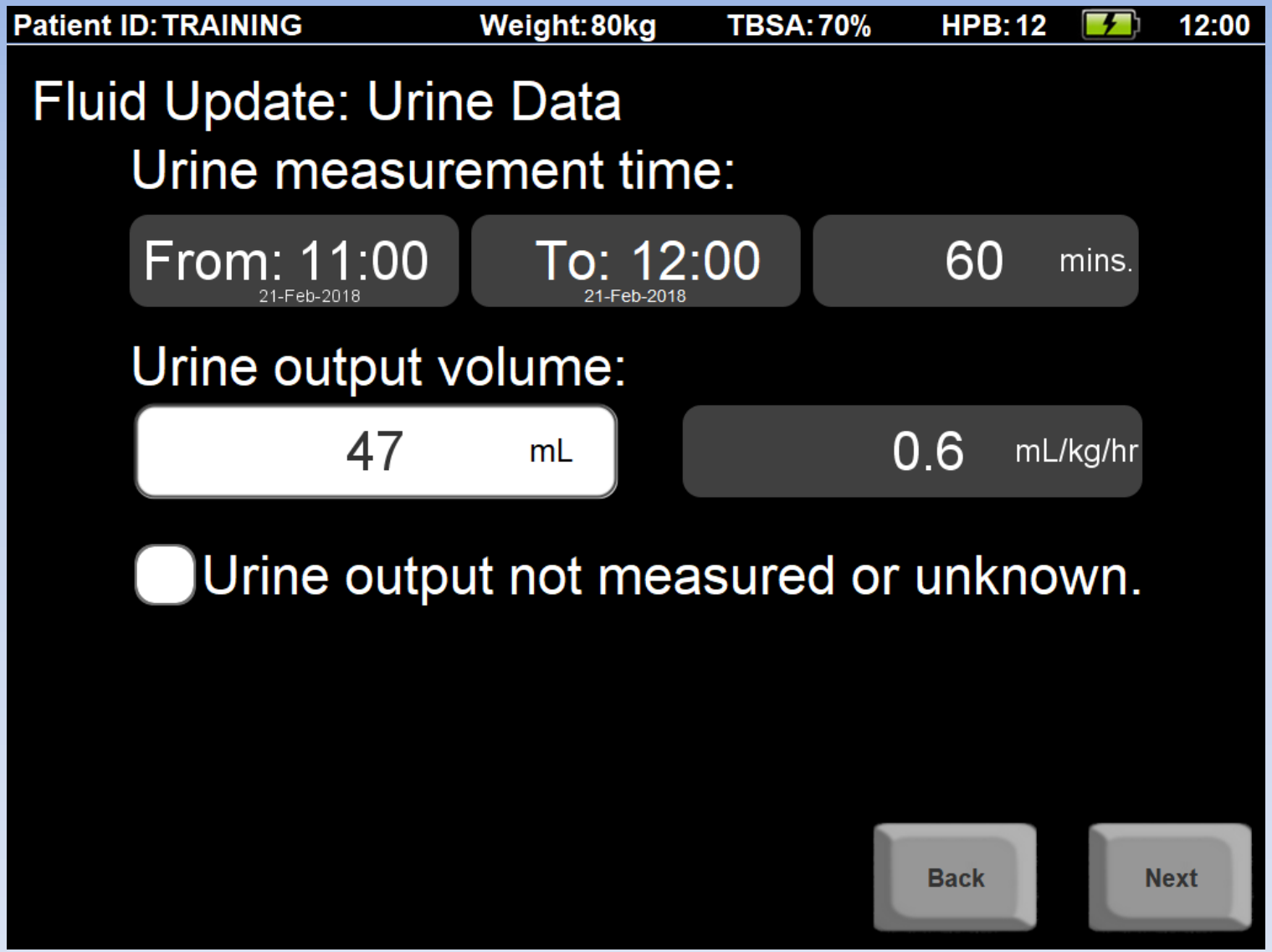
Accept this recommendation

Let’s do one more update

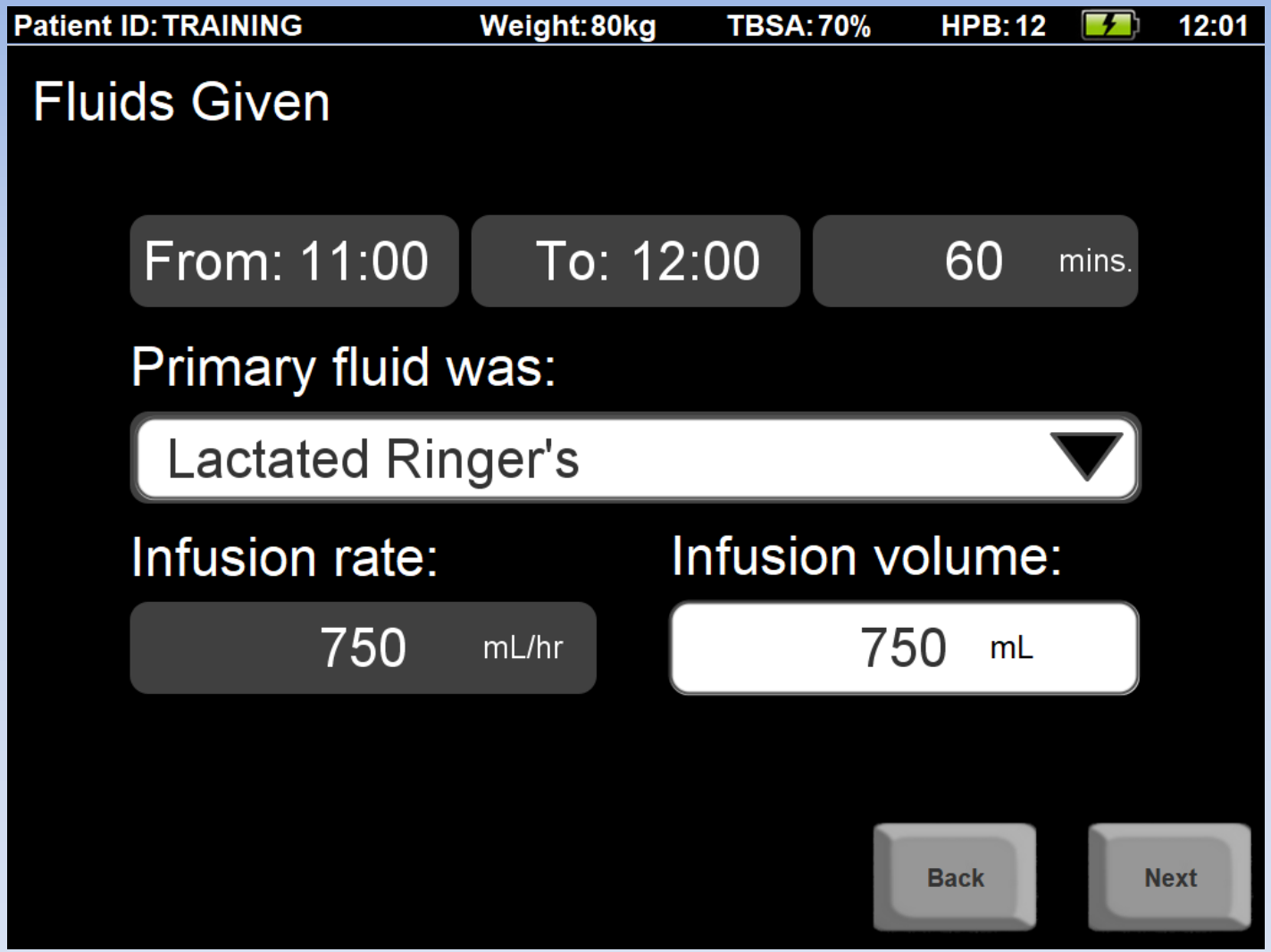
Press “Home”



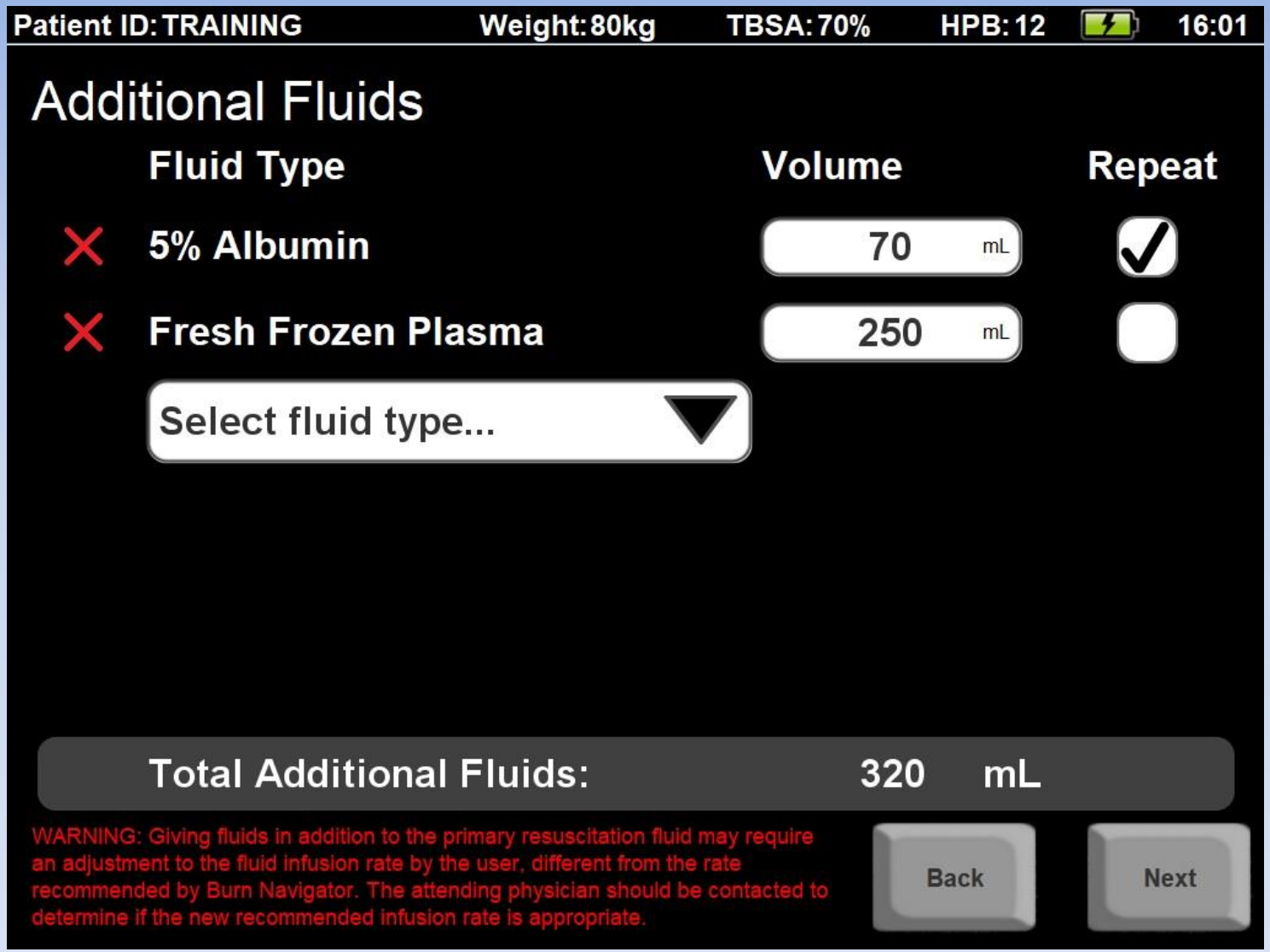
then “Next Update”


Patient ID: TRAINING
Weight: 80kg
TBSA: 70%
HPB: 12
12:00
Fluid Update: Urine Data
Urine measurement time:
From: 11:00
21-Feb-2018
To: 12:00
21-Feb-2018
60
mins.
Urine output volume:
47
mL
0.6
mL/kg/hr
Urine output not measured or unknown.
Back
Next

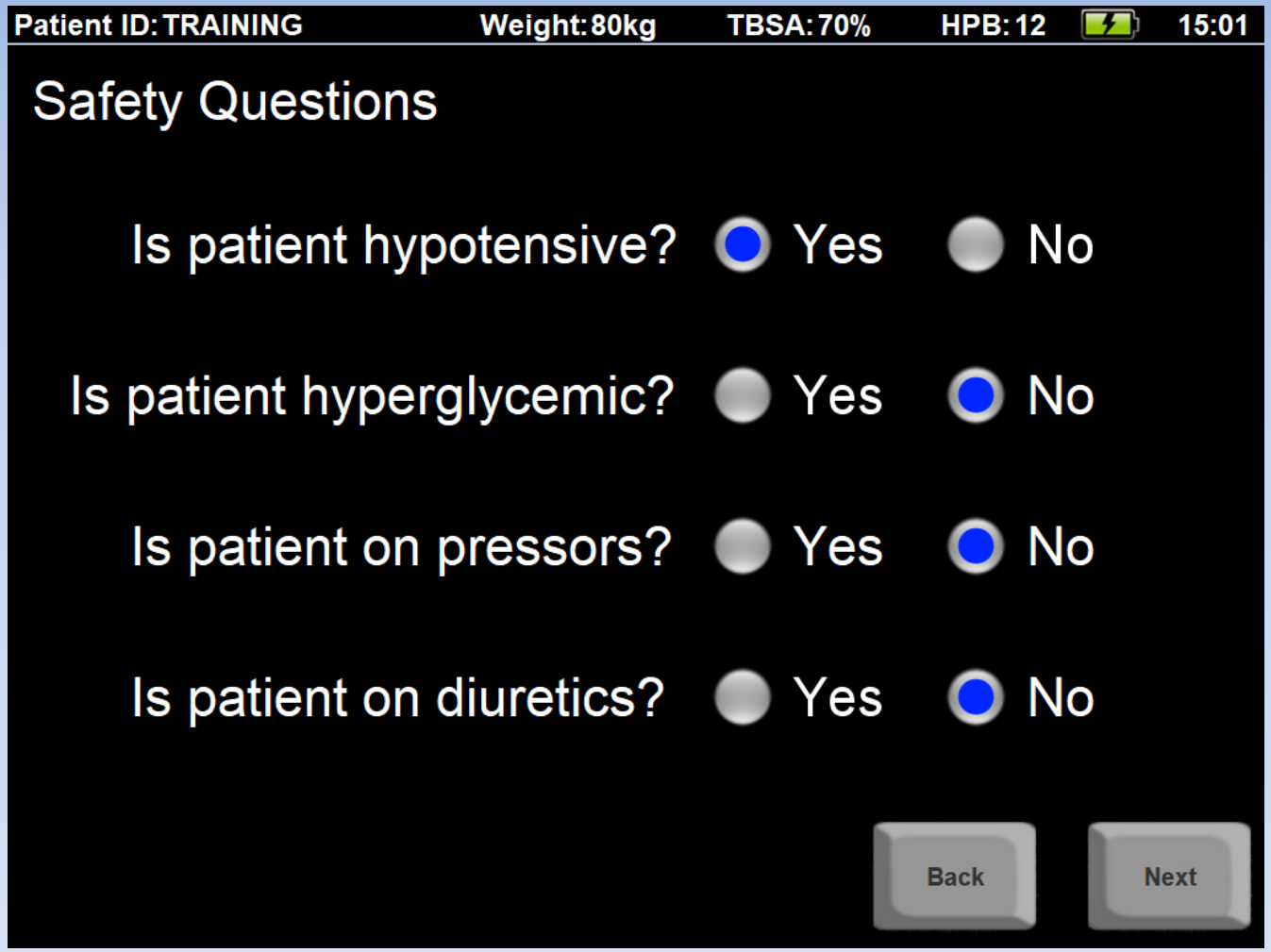
Enter UO



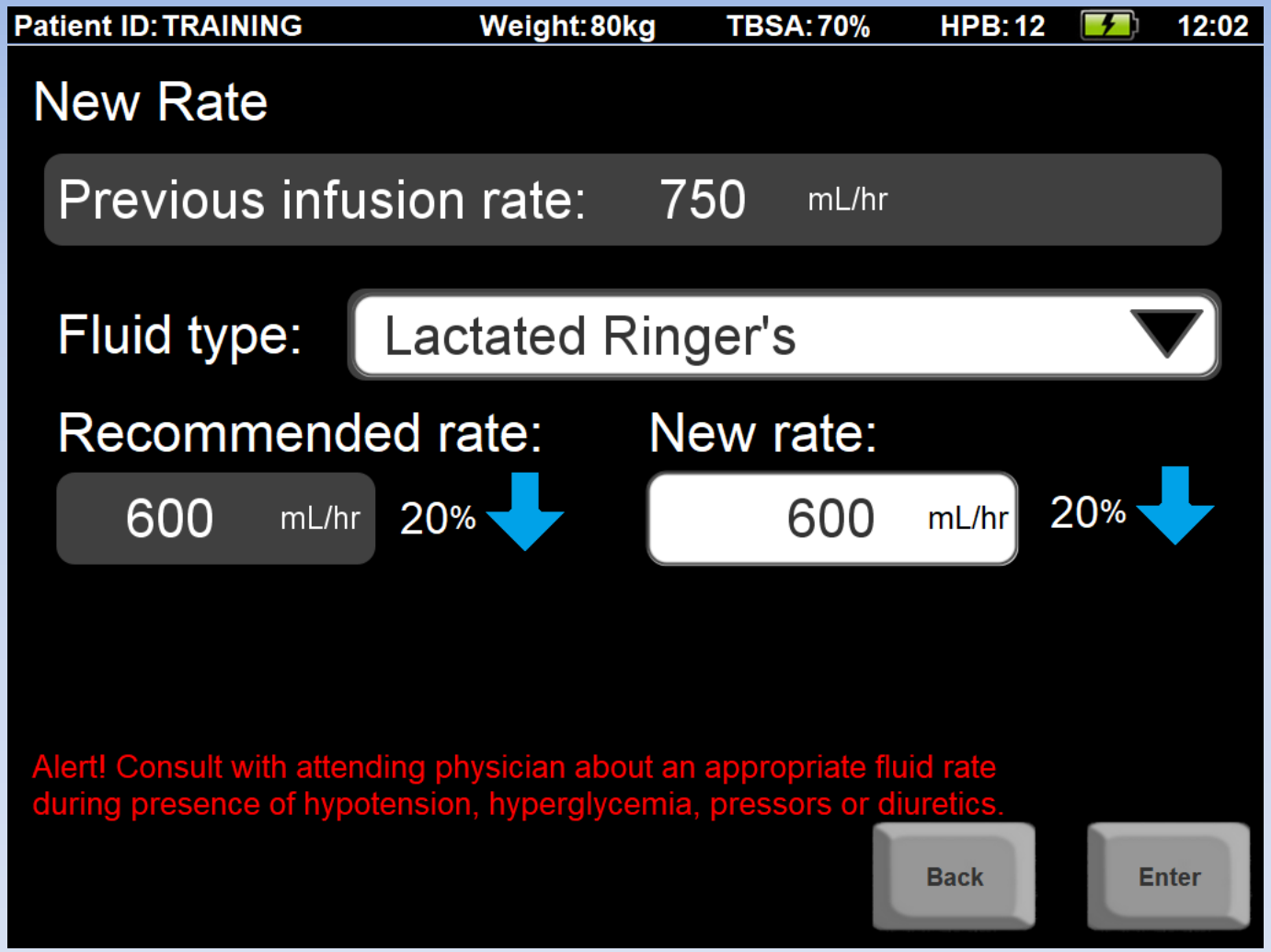
Confirm the pump wasn't changed: **press Next**



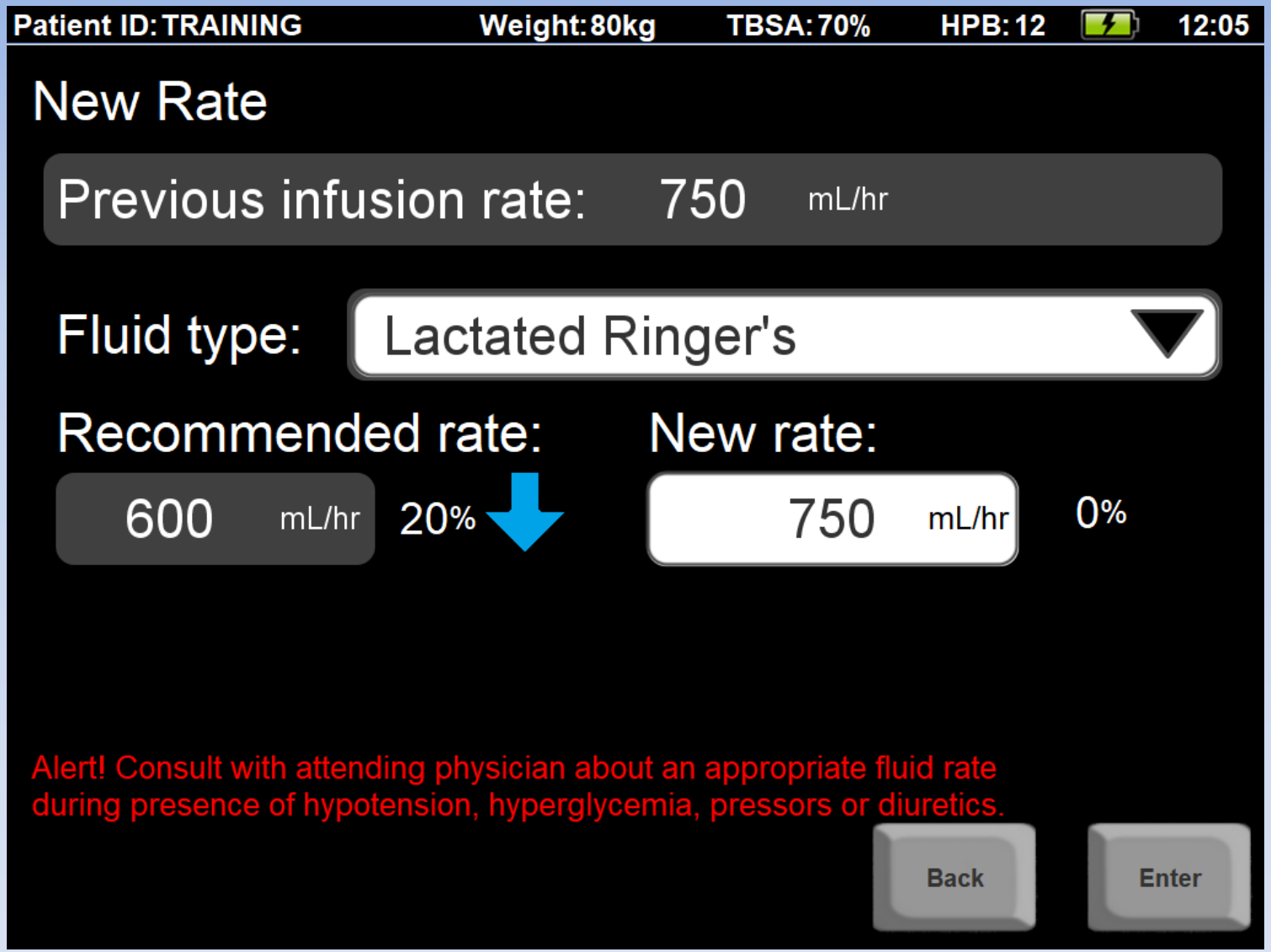
Add FFP, 250 mL
(without repeat)



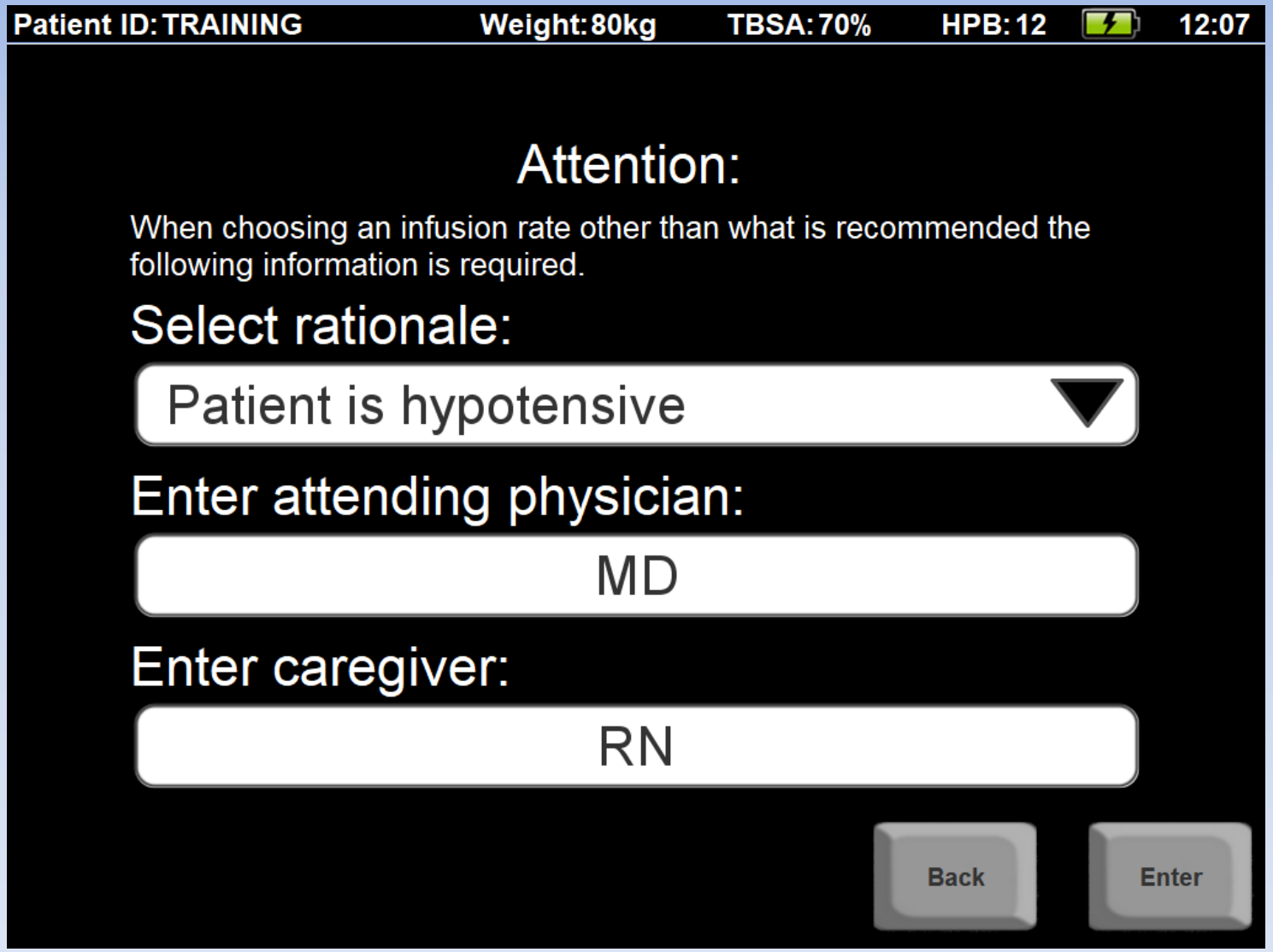
Answer safety questions



If you say “Yes” to a safety question, you’ll see this red text alert



Change “New rate” to be the “Previous” rate (**750 mL/hr**), because patient was hypotensive

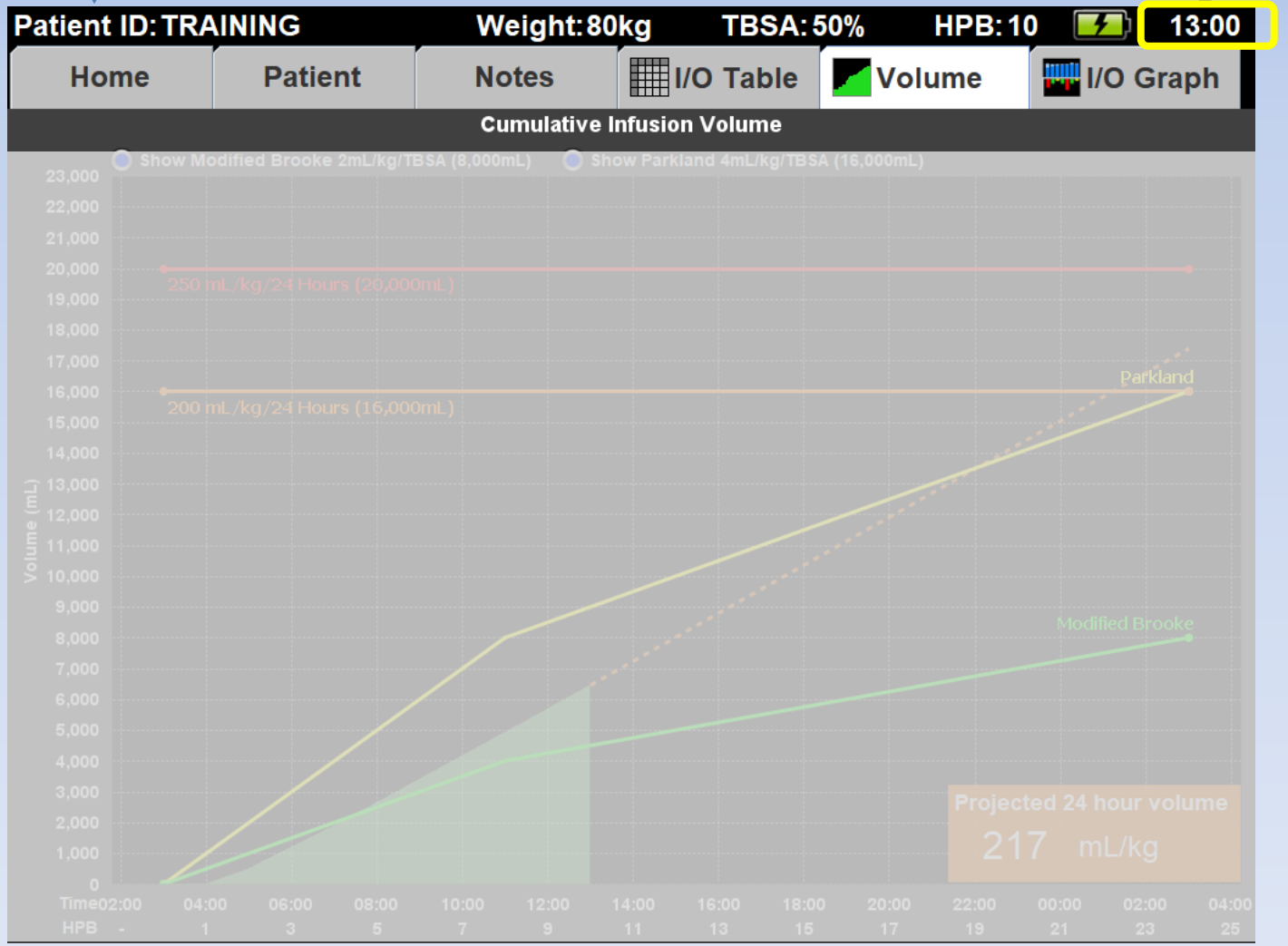


Choose a rationale why the recommendation wasn't accepted (you will see this later in the Notes)

Main Screens

Six main tabs

HPB - Hours Post Burn

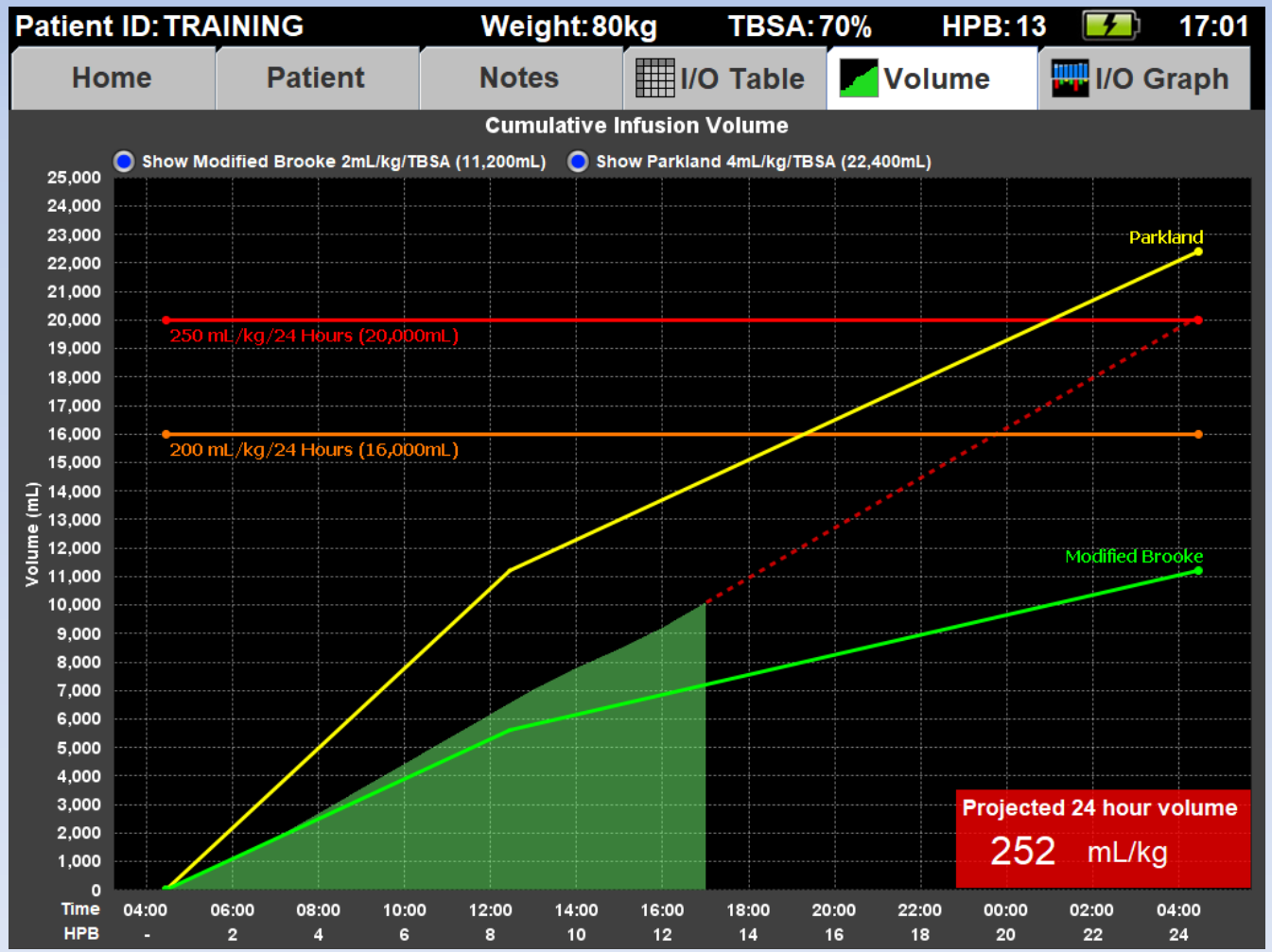


After each update, you'll see the Volume graph

Shown are **all** fluids given to the patient since time of burn

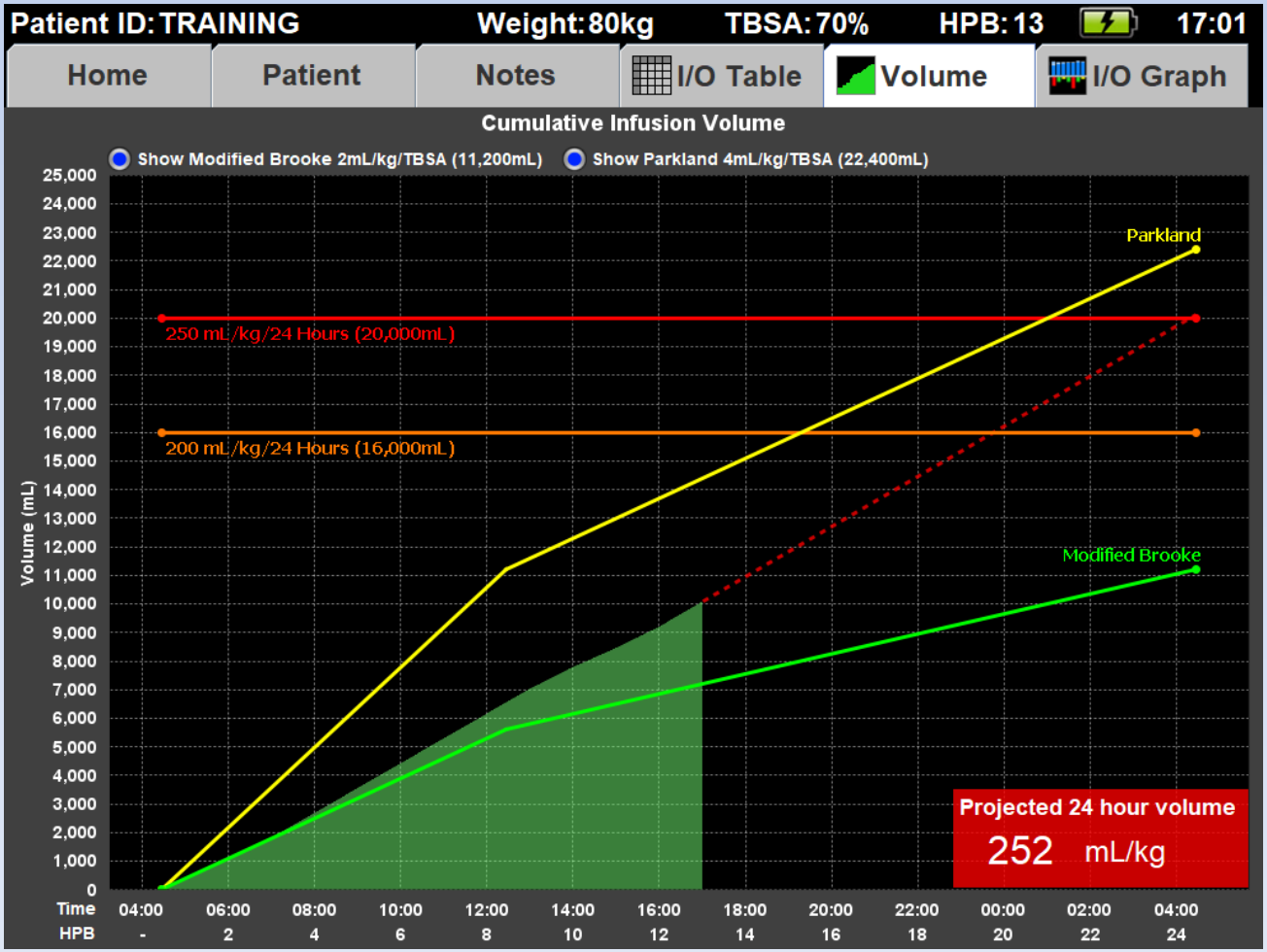
The "**green mountain"** of fluids grows over time

How much fluid has this patient received??



Resuscitation guidelines:

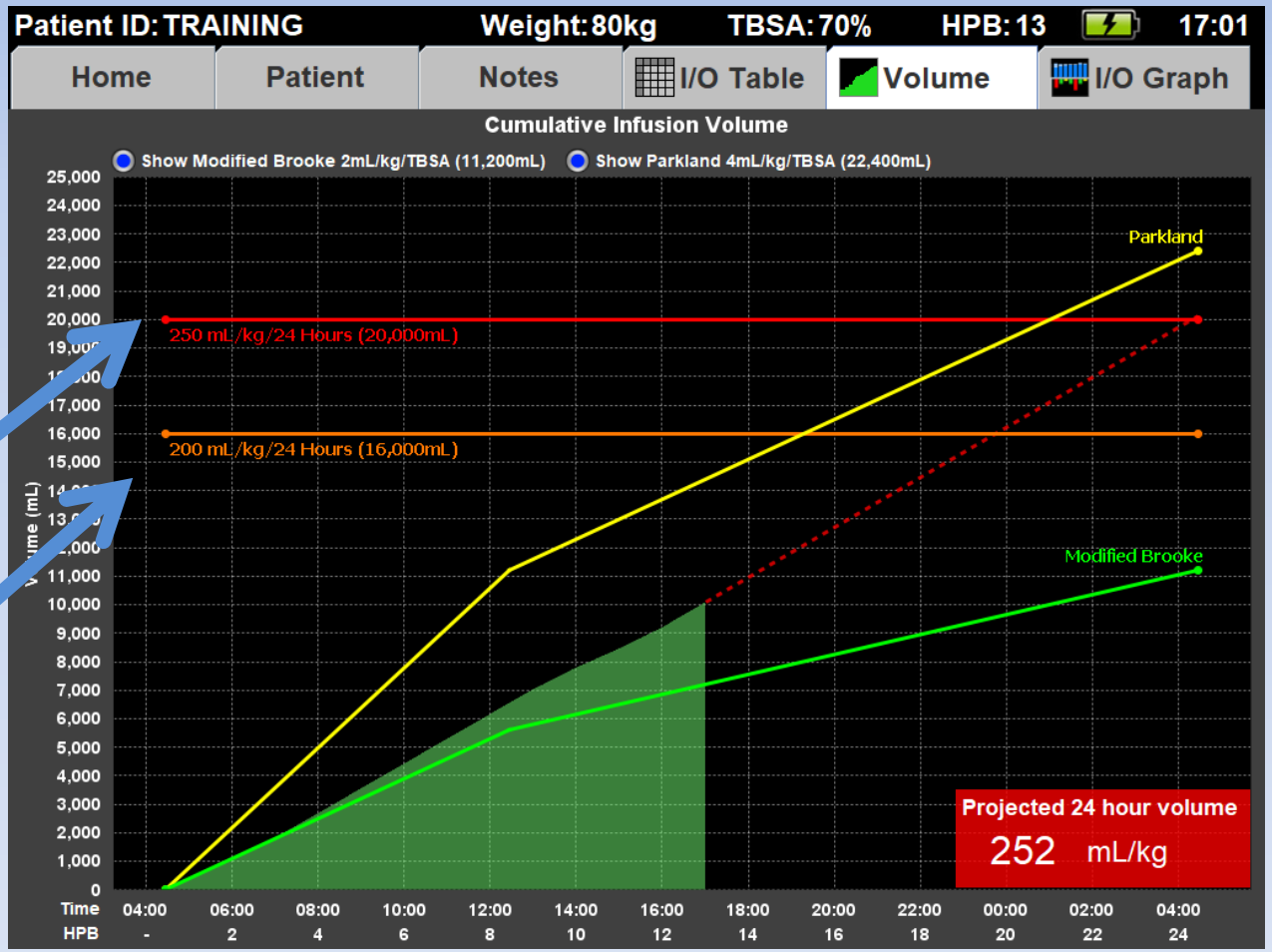
- 4mL/kg/TBSA (Parkland) in yellow
- 2mL/kg/TBSA (Modified Brooke) in green



Alert lines

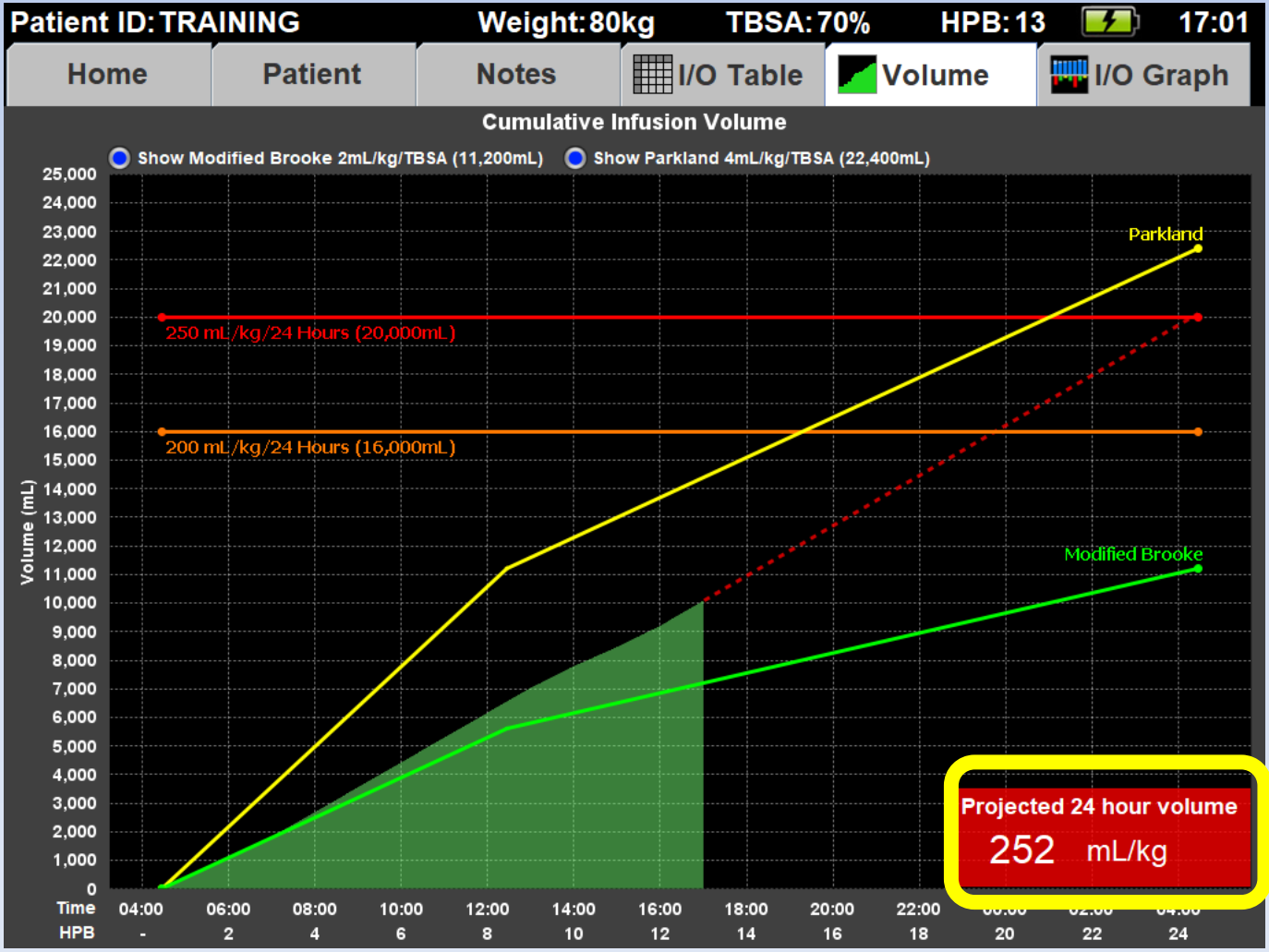
250 mL/kg
in 24 hours
(Ivy Index) in **red**

200 mL/kg
in 24 hours
in **orange**



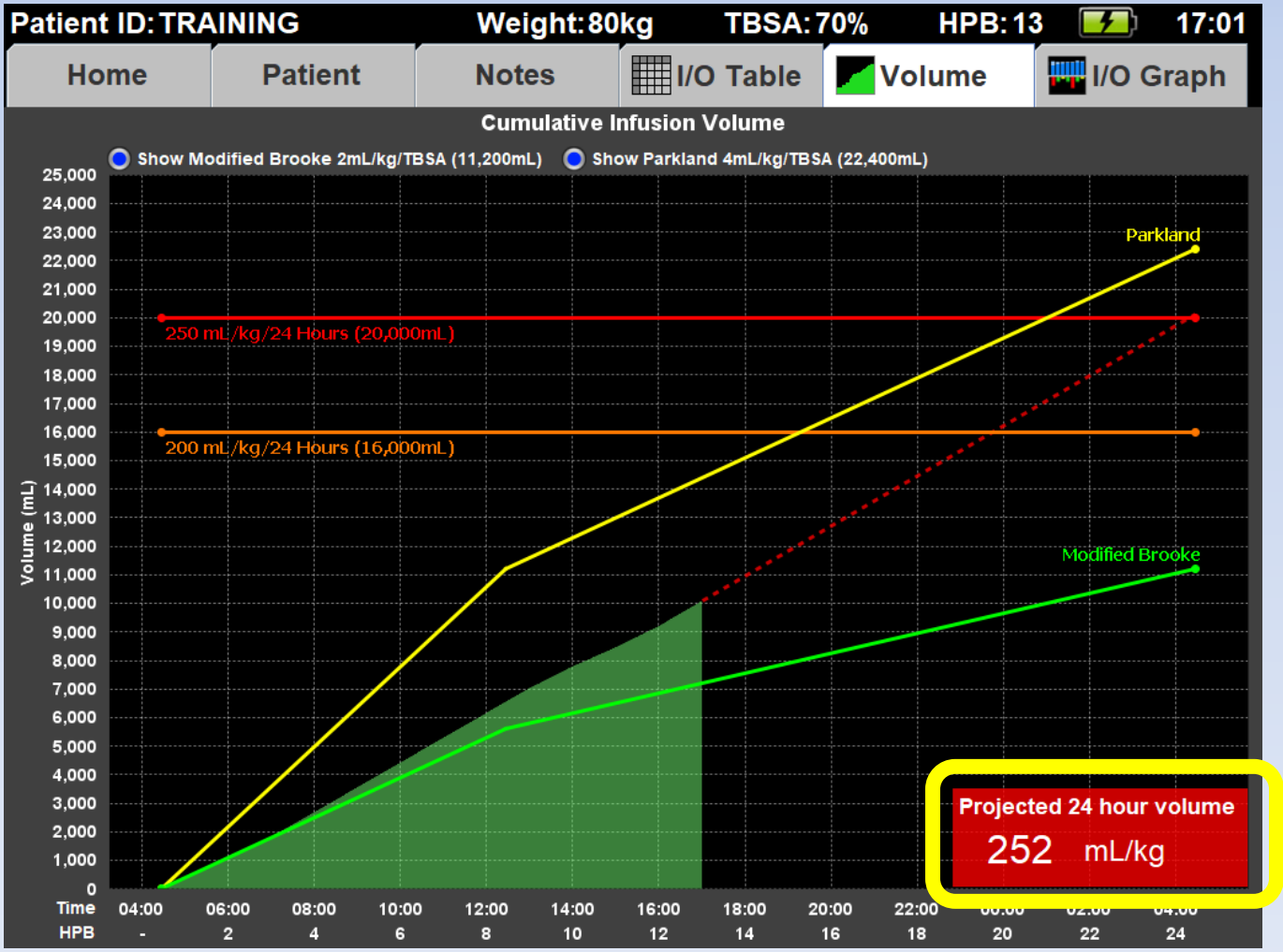
24-hour fluid projections:

- Shows by HPB 10
- Based on current rate & past fluids



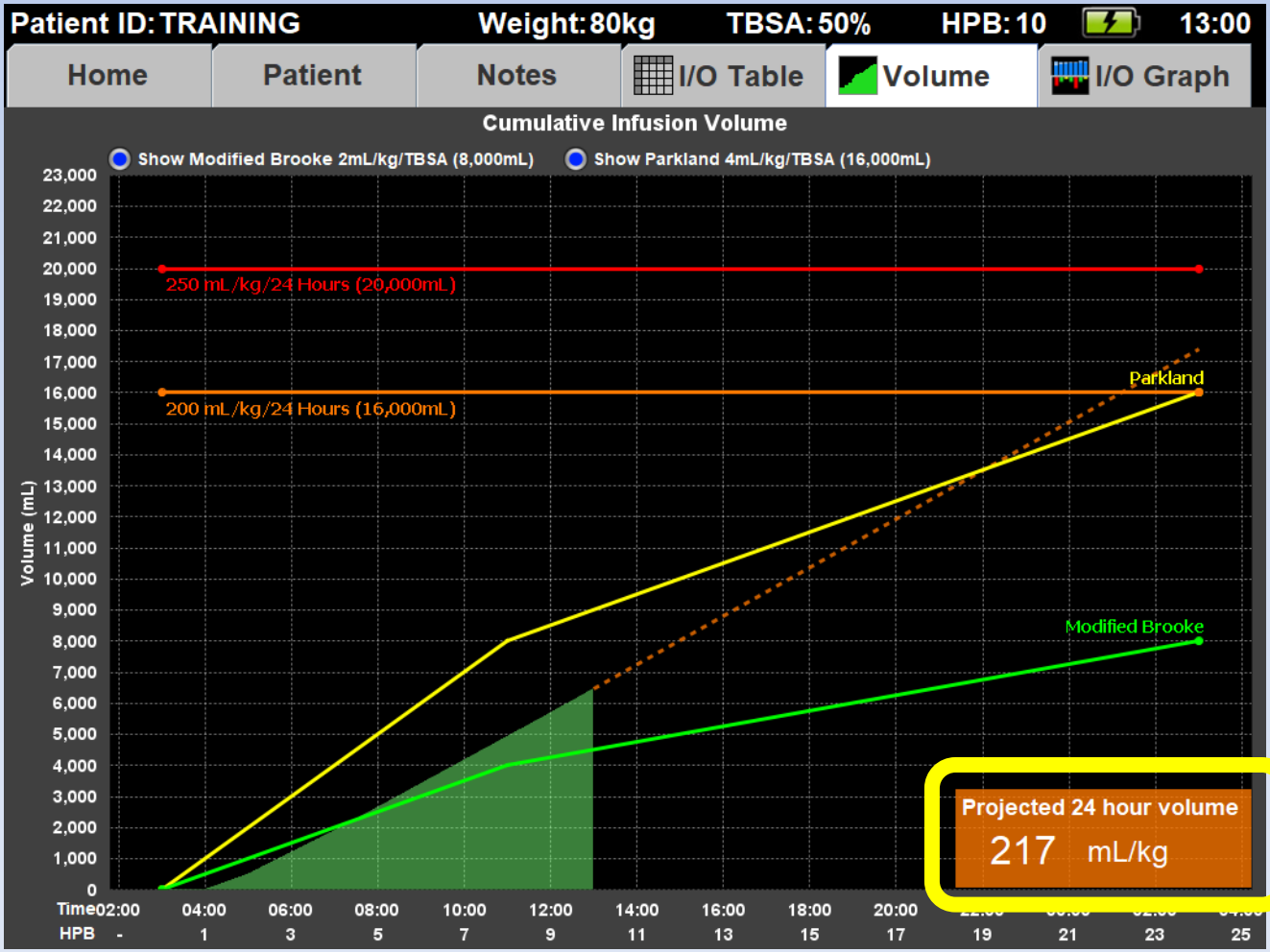
The label will turn red if either:

- ml/kg is above 250, or
- ml/kg/TBSA is above 6.0



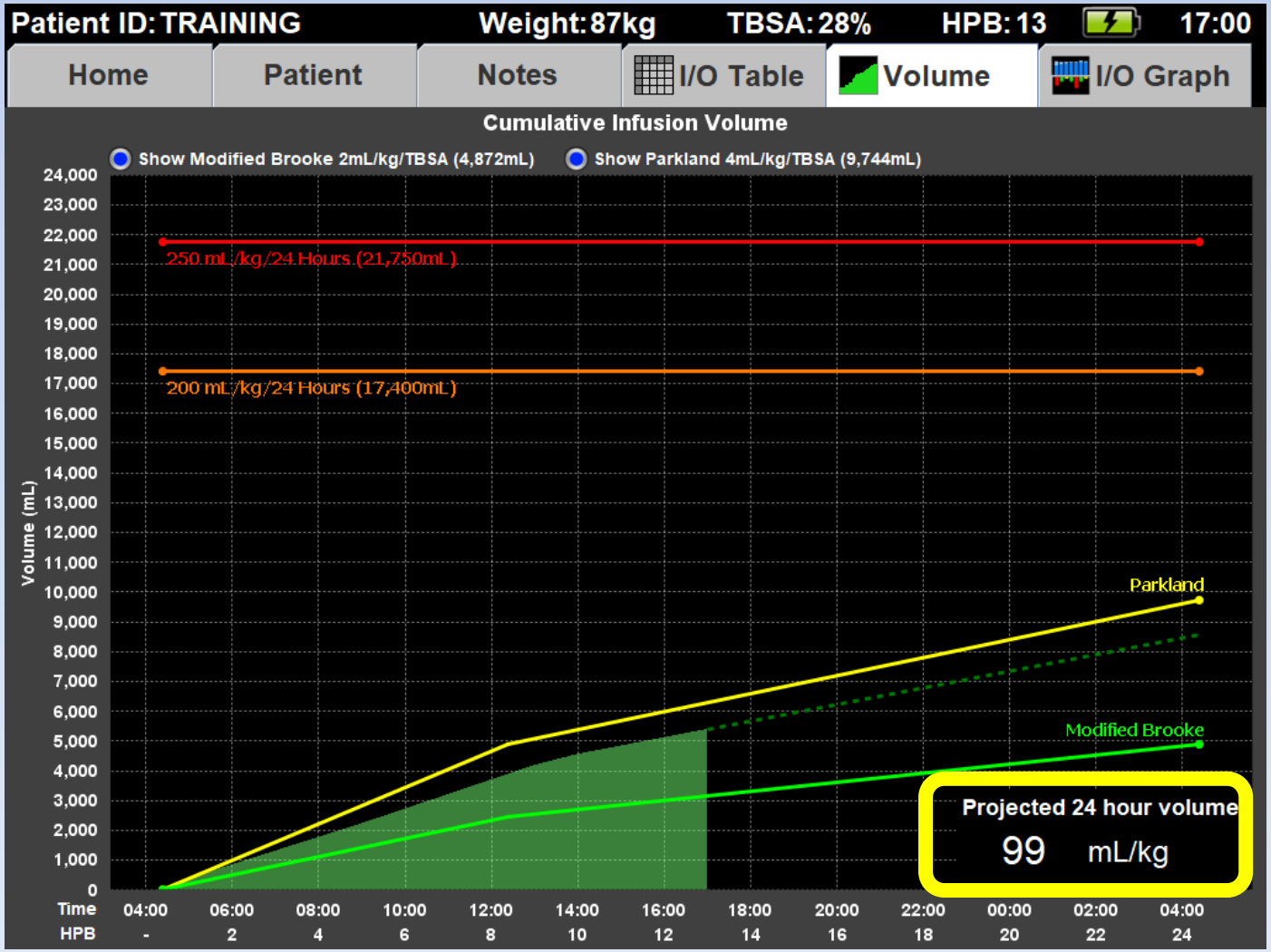
The label will turn <u>orange</u> if:

- ml/kg is between 200 and 250
- ml/kg/TBSA is between 5.0 and 6.0



The label will be <u>black</u> if both:

- ml/kg is less than 200
- ml/kg/TBSA is less than 5.0



Press the “I/O Graph” tab

Pre-Burn Navigator fluids have transparent bars

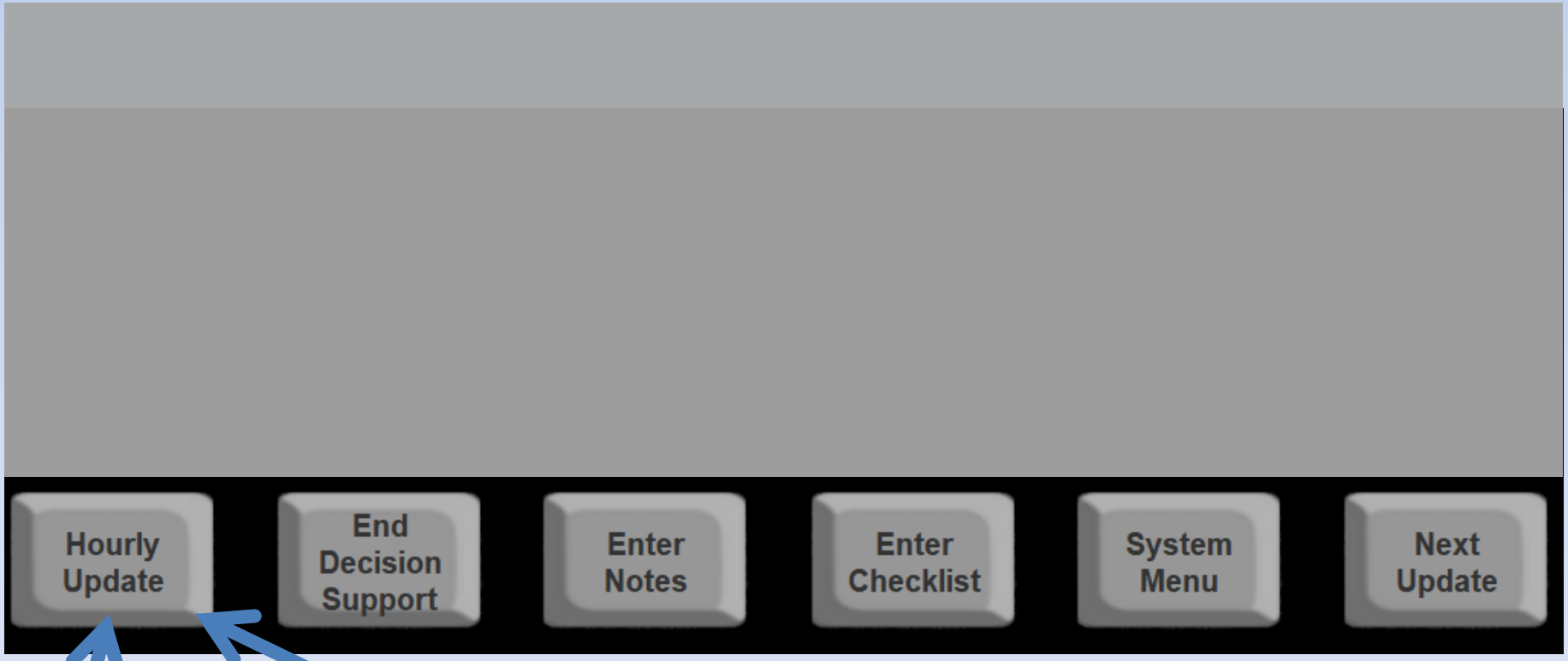
Legend

Home Screen

Press Home

Functional buttons are at the bottom

Hourly Update Button



Enter new fluid update if it is time to do so

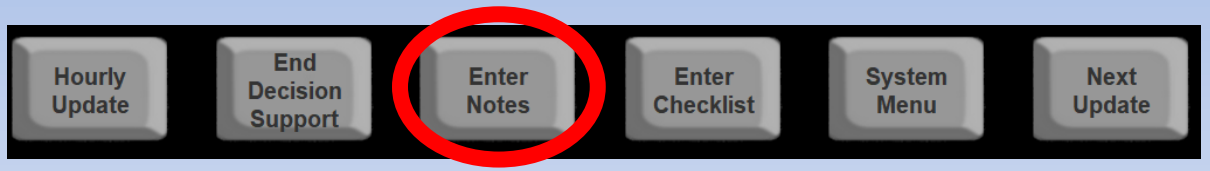
Edit within 10 minutes after an update ('grace period')

End Decision Support Button

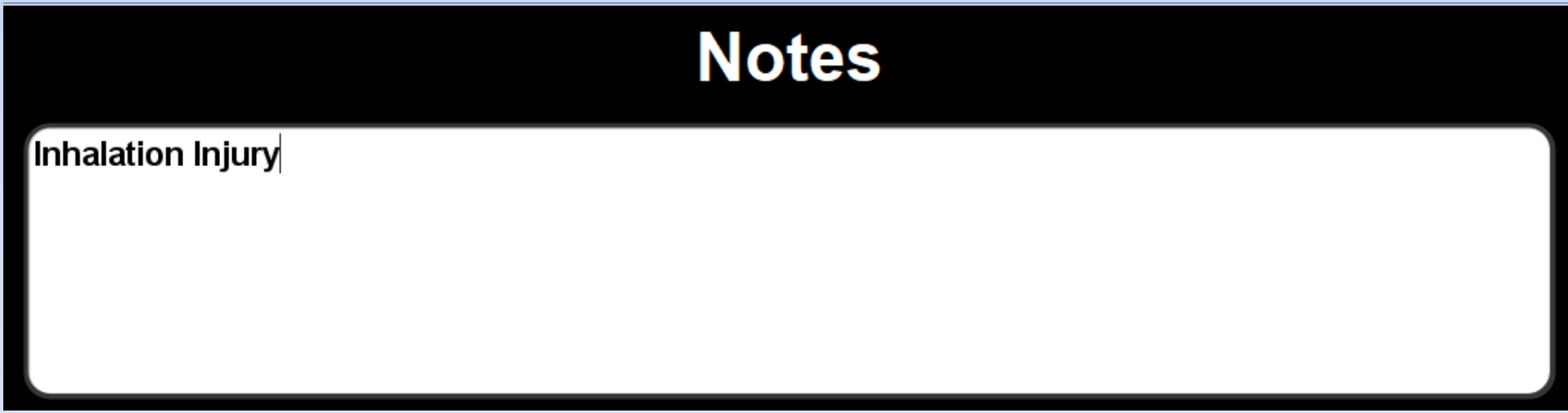
“End Decision Support” will close and inactive the patient file

Careful! Once you’ve ended decision support, you won’t be able to add or edit any patient information!

Enter Notes Button

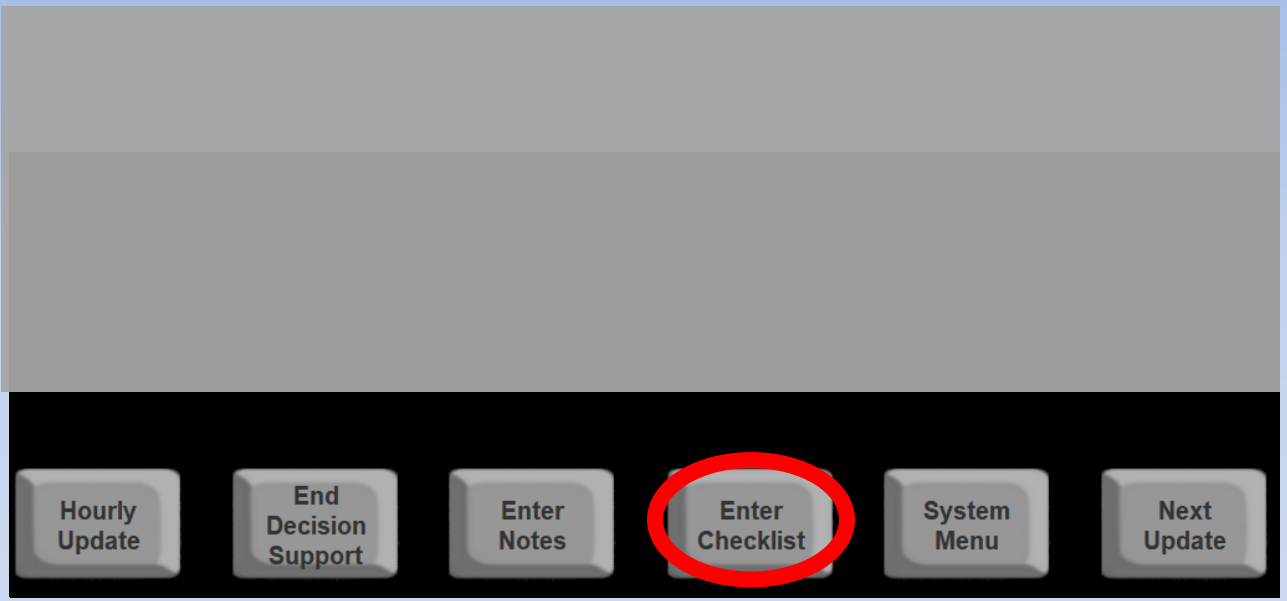


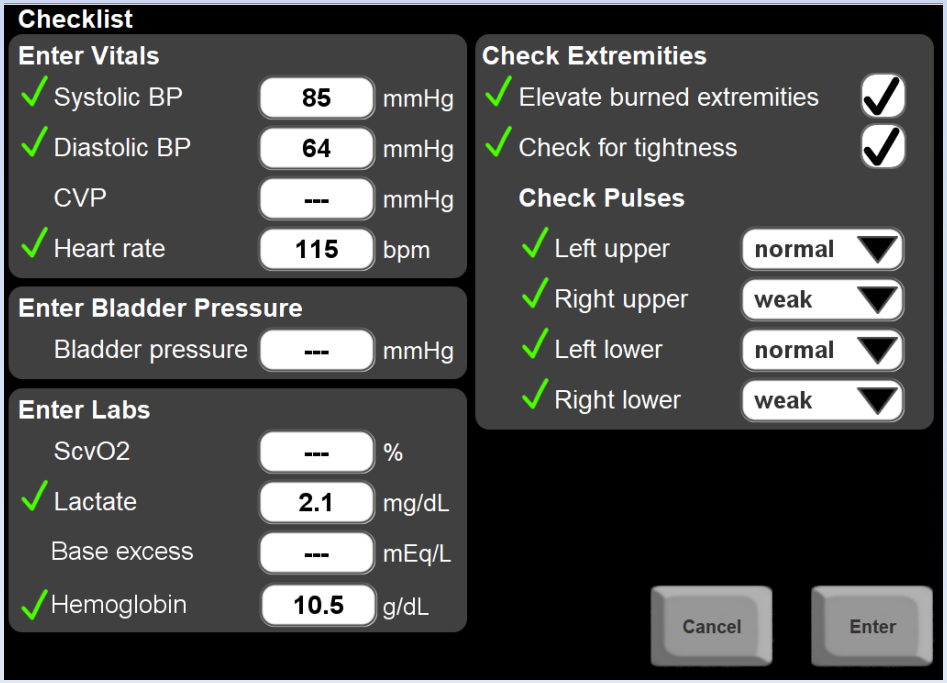
Press “Enter Notes”



Press “Enter” to save the note

Enter Checklist Button



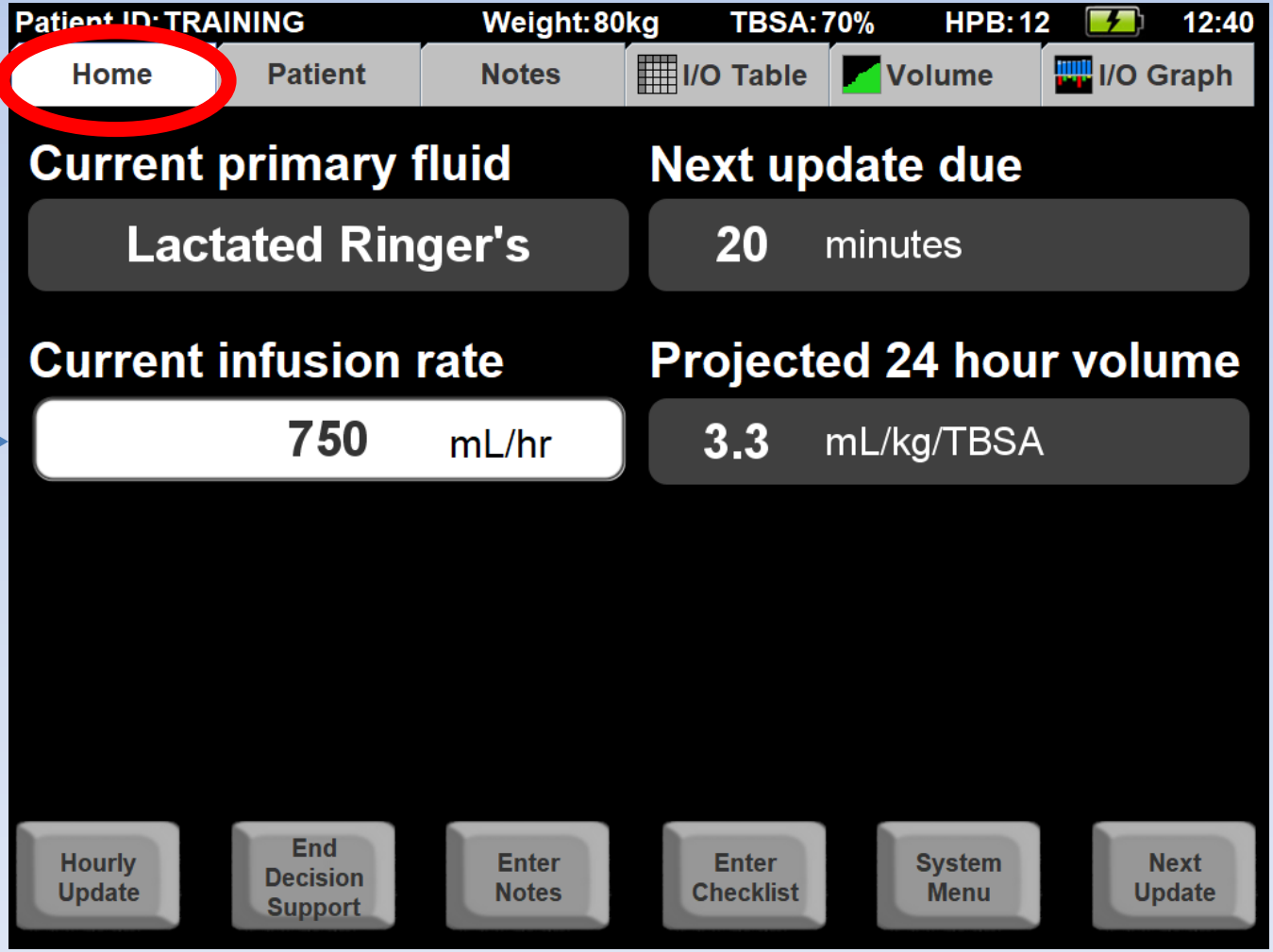


"Enter Checklist" shows the checklist screen

We've already done one, so just continue for now!

Home Screen

You can change current rate here

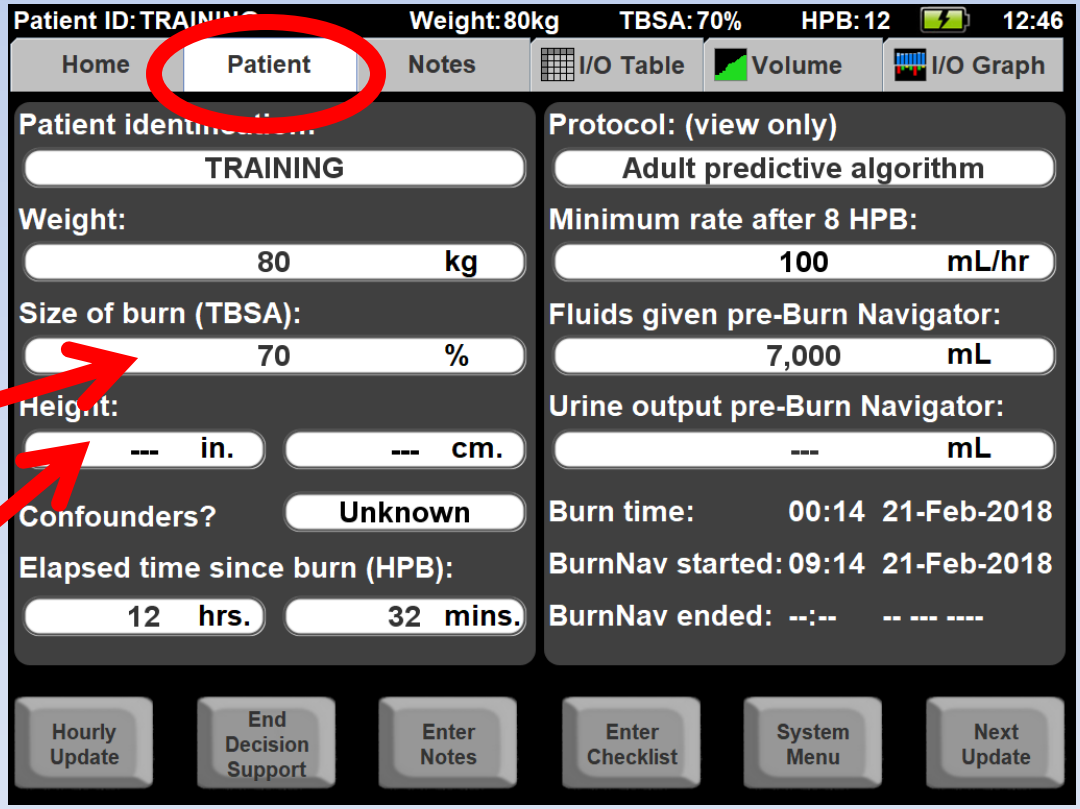


Press the “Patient” tab

This screen lets you edit patient information

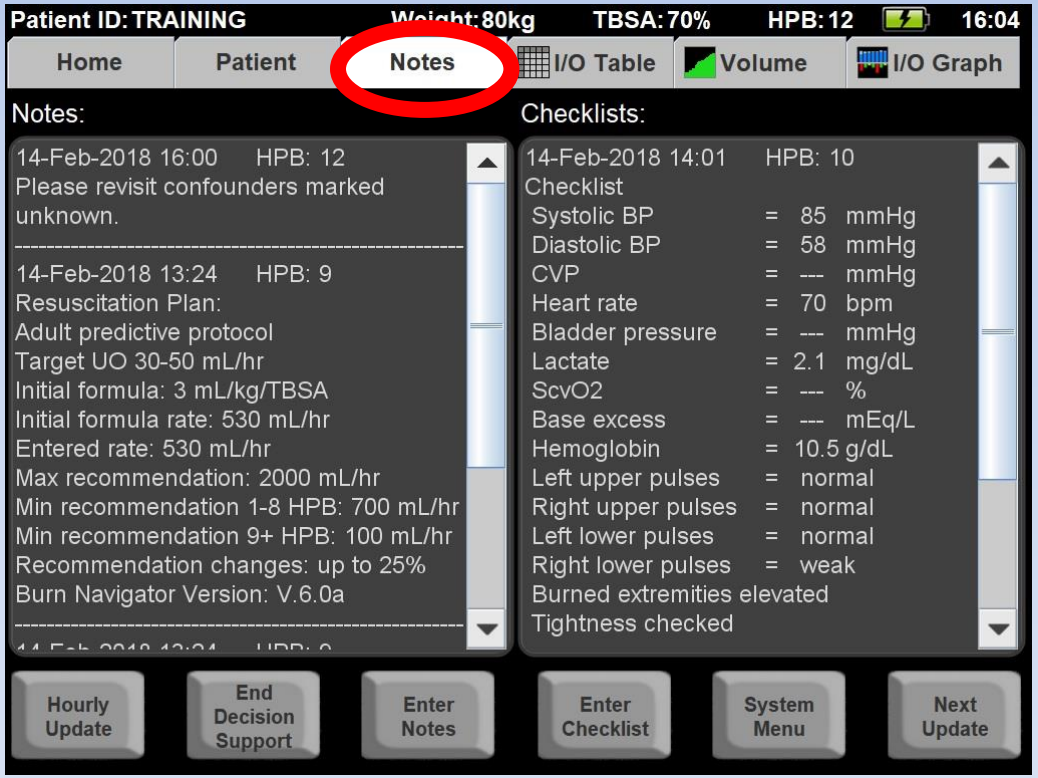
If you’ve mapped a more accurate TBSA, edit it here!

You can now edit the patient height.



Press the “Notes” tab

Your **notes** and system generated notes are **on the left**

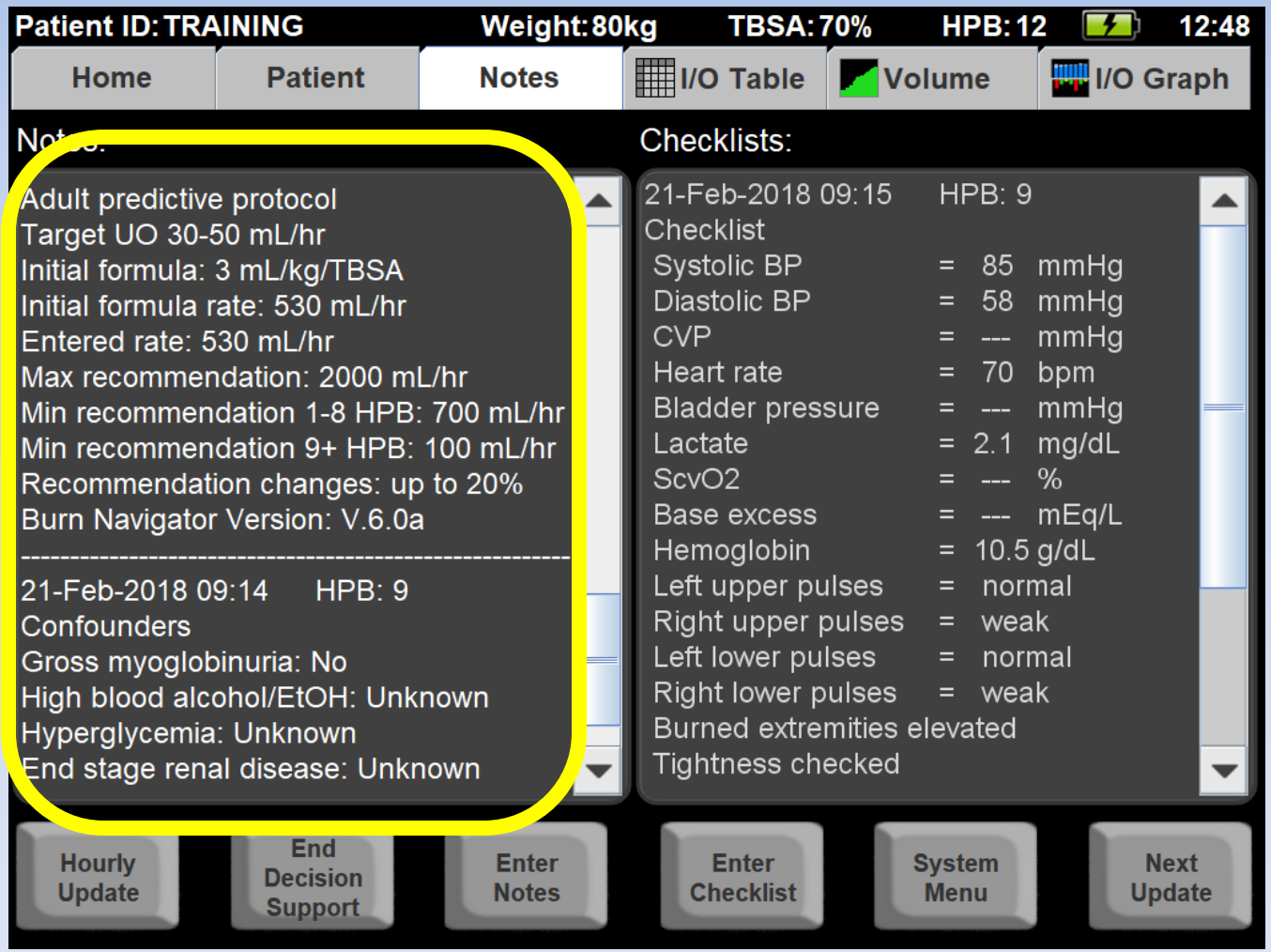


Checklists are on the **right**

The most recent notes and checklists are at the top
Scroll down to see older entries!

Each note and checklist is **time-stamped** with **hour post burn**!

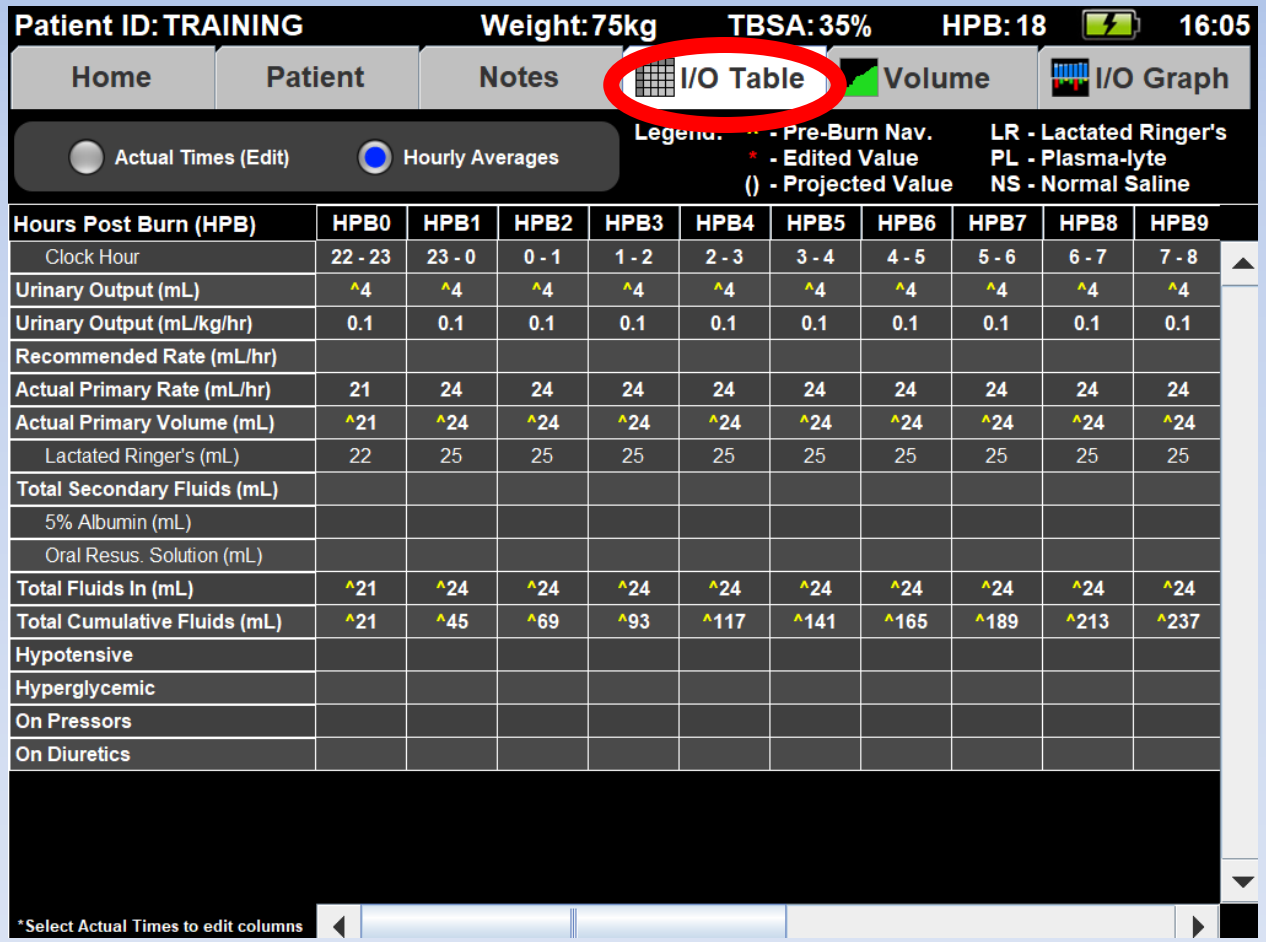
Resuscitation Plan and Confounders are the first notes



Helpful for reviews, training & quality improvement

Press the “I/O Table” tab

The I/O Table is a record of all fluid data



Hours Post Burn (HPB)	HPB0	HPB1	HPB2	HPB3	HPB4	HPB5	HPB6	HPB7	HPB8	HPB9
Clock Hour	22 - 23	23 - 0	0 - 1	1 - 2	2 - 3	3 - 4	4 - 5	5 - 6	6 - 7	7 - 8
Urinary Output (mL)	^4	^4	^4	^4	^4	^4	^4	^4	^4	^4
Urinary Output (mL/kg/hr)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Recommended Rate (mL/hr)										
Actual Primary Rate (mL/hr)	21	24	24	24	24	24	24	24	24	24
Actual Primary Volume (mL)	^21	^24	^24	^24	^24	^24	^24	^24	^24	^24
Lactated Ringer's (mL)	22	25	25	25	25	25	25	25	25	25
Total Secondary Fluids (mL)										
5% Albumin (mL)										
Oral Resus. Solution (mL)										
Total Fluids In (mL)	^21	^24	^24	^24	^24	^24	^24	^24	^24	^24
Total Cumulative Fluids (mL)	^21	^45	^69	^93	^117	^141	^165	^189	^213	^237
Hypotensive										
Hyperglycemic										
On Pressors										
On Diuretics										

“Hourly Averages” view shows you data fitted to clock hours e.g.:

13:00 – 14:00

14:00 – 15:00

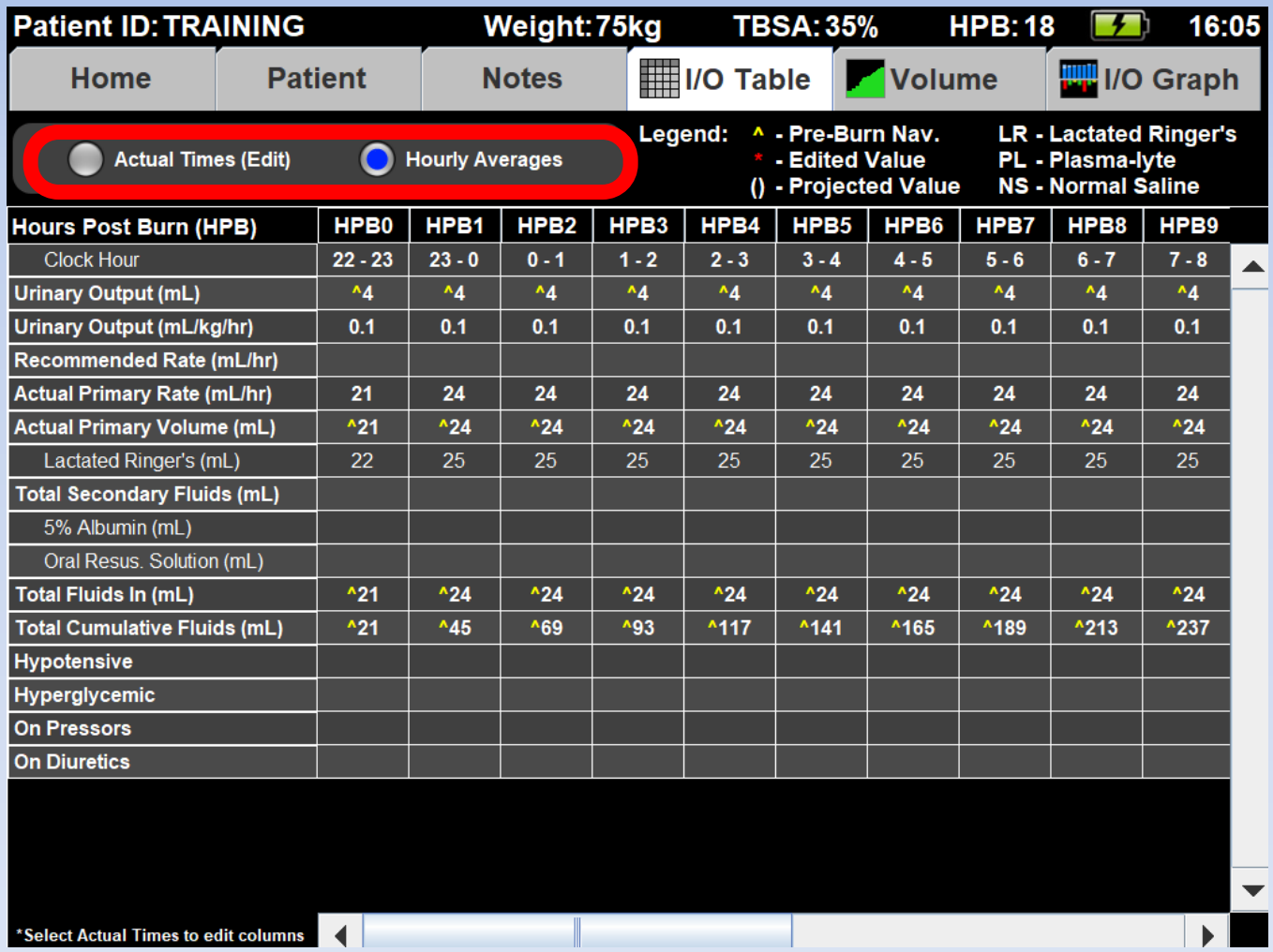
etc.

Hours are labeled by HPB:

Hour Post Burn 1

Hour Post Burn 2

etc.

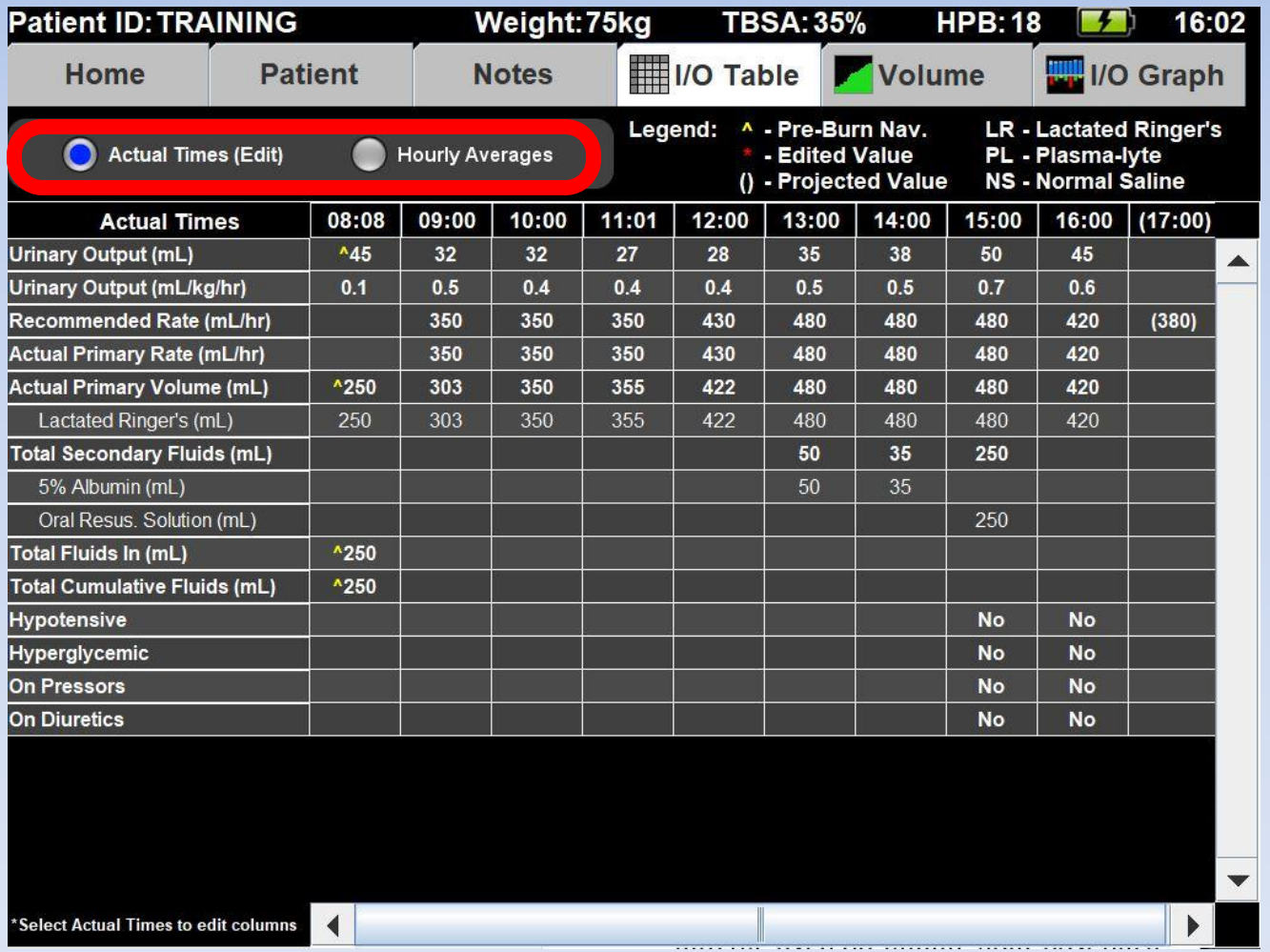


Hours Post Burn (HPB)	HPB0	HPB1	HPB2	HPB3	HPB4	HPB5	HPB6	HPB7	HPB8	HPB9
Clock Hour	22 - 23	23 - 0	0 - 1	1 - 2	2 - 3	3 - 4	4 - 5	5 - 6	6 - 7	7 - 8
Urinary Output (mL)	^4	^4	^4	^4	^4	^4	^4	^4	^4	^4
Urinary Output (mL/kg/hr)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Recommended Rate (mL/hr)										
Actual Primary Rate (mL/hr)	21	24	24	24	24	24	24	24	24	24
Actual Primary Volume (mL)	^21	^24	^24	^24	^24	^24	^24	^24	^24	^24
Lactated Ringer's (mL)	22	25	25	25	25	25	25	25	25	25
Total Secondary Fluids (mL)										
5% Albumin (mL)										
Oral Resus. Solution (mL)										
Total Fluids In (mL)	^21	^24	^24	^24	^24	^24	^24	^24	^24	^24
Total Cumulative Fluids (mL)	^21	^45	^69	^93	^117	^141	^165	^189	^213	^237
Hypotensive										
Hyperglycemic										
On Pressors										
On Diuretics										

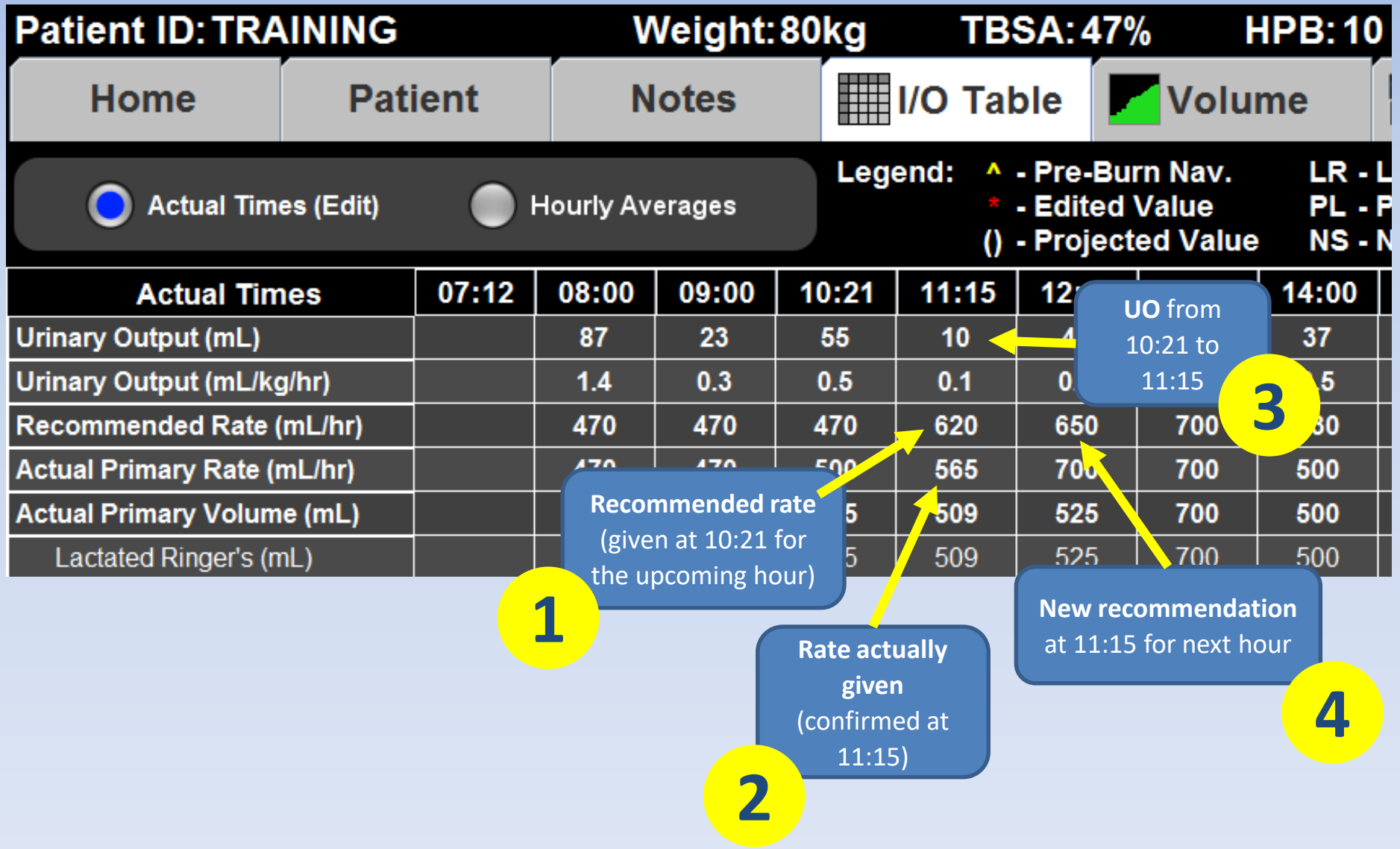
“Actual Times” view shows you the data **when** you entered it, e.g.:

13:00
14:05
15:03
etc.

The columns might <u>not</u> be 60 minutes!!
They could be:
65 min
57 min
60 min
etc.



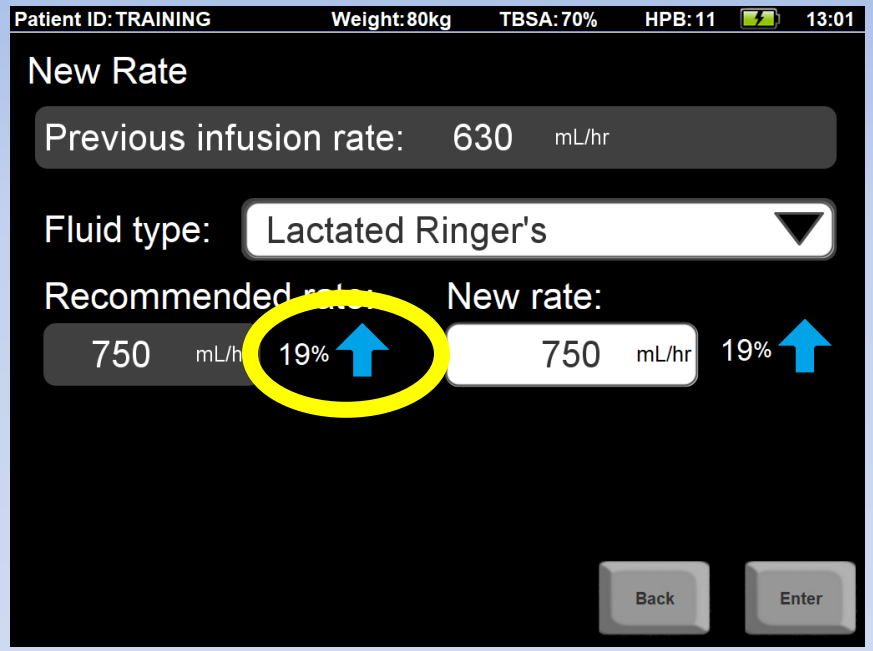
Actual Times	08:08	09:00	10:00	11:01	12:00	13:00	14:00	15:00	16:00	(17:00)
Urinary Output (mL)	^45	32	32	27	28	35	38	50	45	
Urinary Output (mL/kg/hr)	0.1	0.5	0.4	0.4	0.4	0.5	0.5	0.7	0.6	
Recommended Rate (mL/hr)		350	350	350	430	480	480	480	420	(380)
Actual Primary Rate (mL/hr)		350	350	350	430	480	480	480	420	
Actual Primary Volume (mL)	^250	303	350	355	422	480	480	480	420	
Lactated Ringer's (mL)	250	303	350	355	422	480	480	480	420	
Total Secondary Fluids (mL)						50	35	250		
5% Albumin (mL)						50	35			
Oral Resus. Solution (mL)								250		
Total Fluids In (mL)	^250									
Total Cumulative Fluids (mL)	^250									
Hypotensive								No	No	
Hyperglycemic								No	No	
On Pressors								No	No	
On Diuretics								No	No	

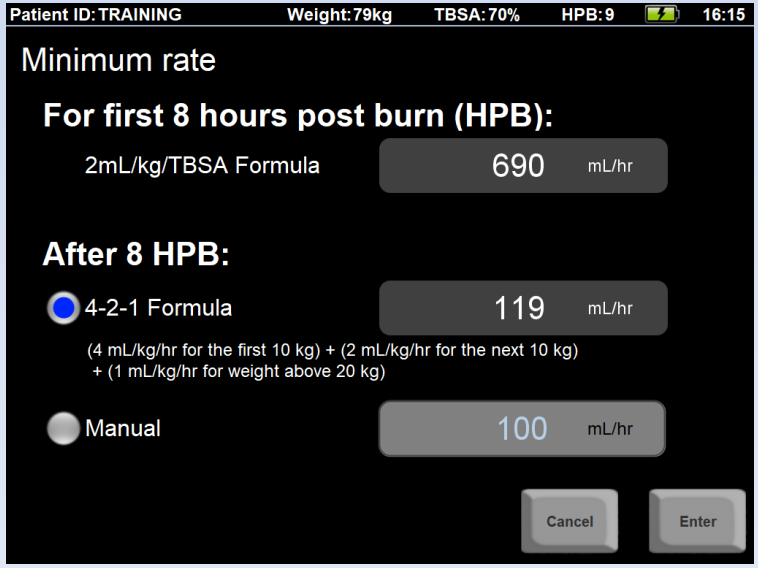

Patient ID: TRAINING
Weight: 80kg
TBSA: 47%
HPB: 10
Home
Patient
Notes
I/O Table
Volume
Actual Times (Edit)
Hourly Averages
Legend:
^ - Pre-Burn Nav.
* - Edited Value
() - Projected Value
LR - L
PL - P
NS - N
Actual Times
07:12
08:00
09:00
10:21
11:15
12
14:00
Urinary Output (mL)
87
23
55
10
37
Urinary Output (mL/kg/hr)
1.4
0.3
0.5
0.1
Recommended Rate (mL/hr)
470
470
470
620
650
700
Actual Primary Rate (mL/hr)
565
700
700
500
Actual Primary Volume (mL)
509
525
700
500
Lactated Ringer's (mL)
509
525
700
500
UO from 10:21 to 11:15
3
Recommended rate (given at 10:21 for the upcoming hour)
1
Rate actually given (confirmed at 11:15)
2
New recommendation at 11:15 for next hour
4

Safety Features

Recommendations:

- Won't change more than the "cap"
- Max recommended: 2,000mL/hr or less



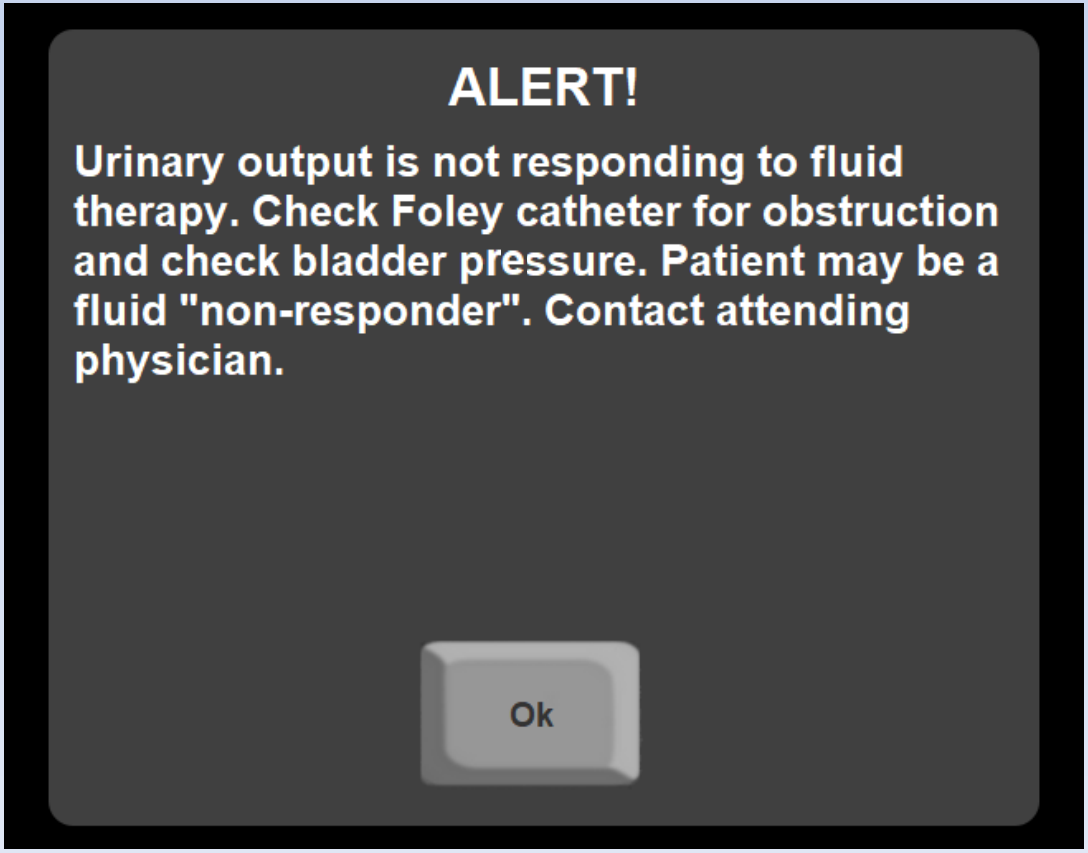


Minimum rates (edit from Patient tab)

Alerts are a Safety Feature

“Non-Responder” Alert

When patients aren’t responding to fluid therapy



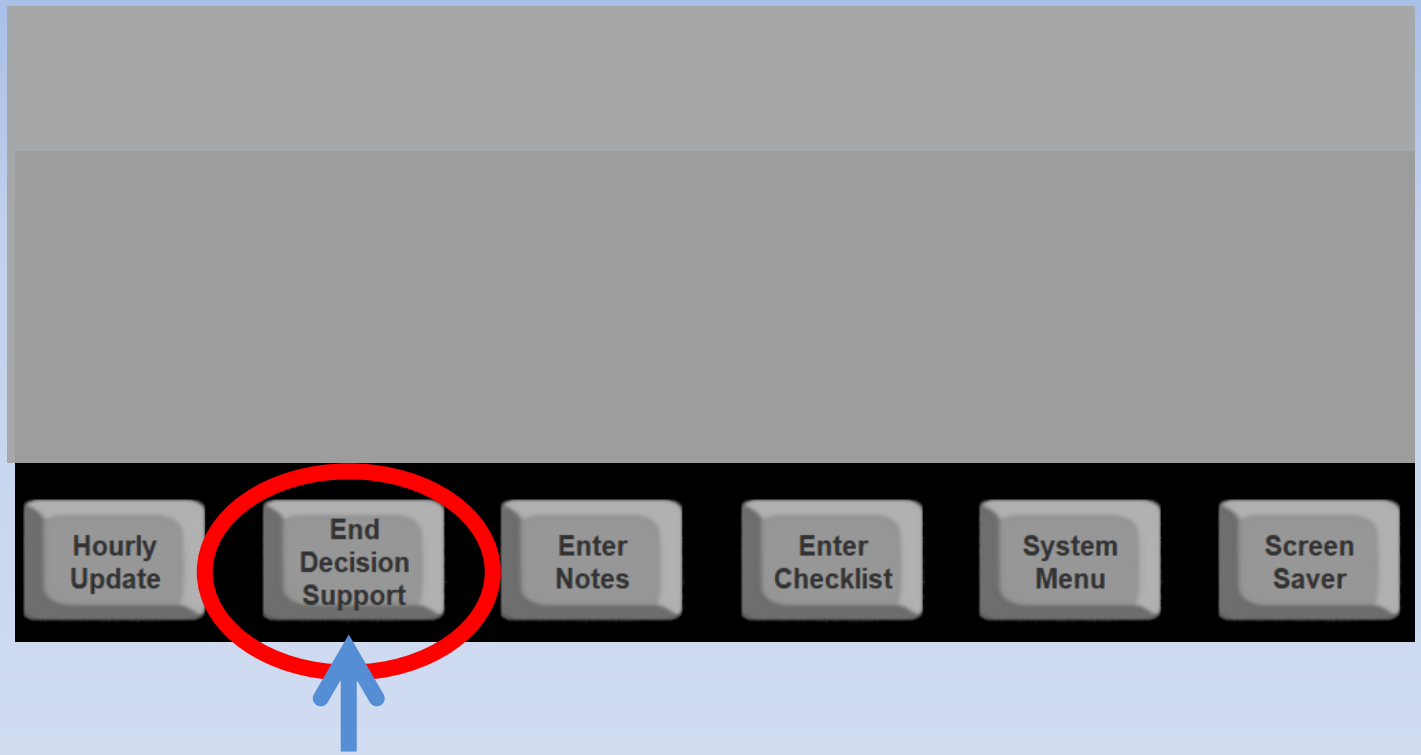
Checklists are also a Safety Feature

Other indicators of **under-resuscitation** or **over-resuscitation**

Keep in Mind!

Recommendations are only recommendations!

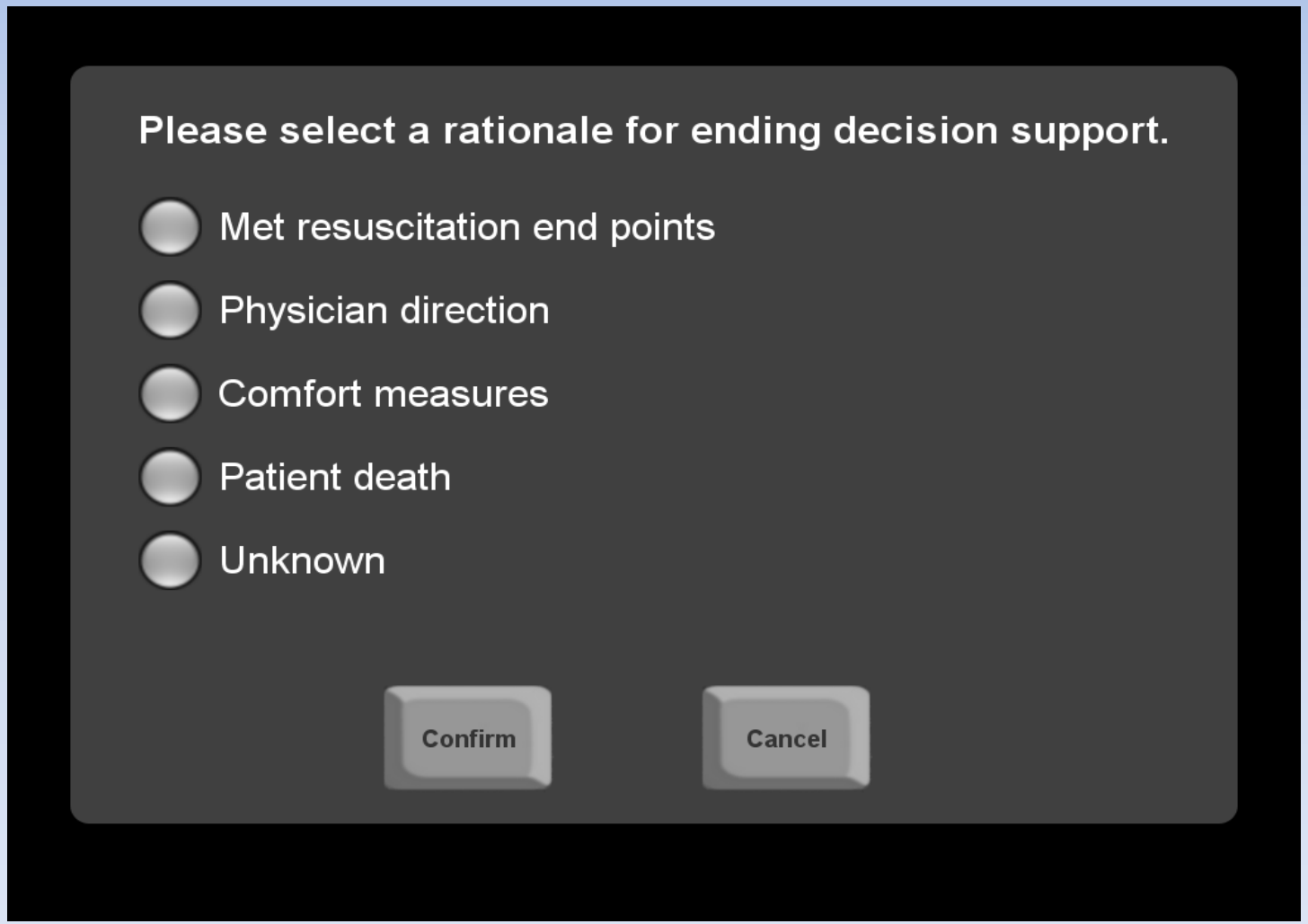
Understand the whole clinical picture, communicate with the attending physician, and do what's best for the patient



When resuscitation is over, press

“End Decision Support”

End Decision Support Rationale

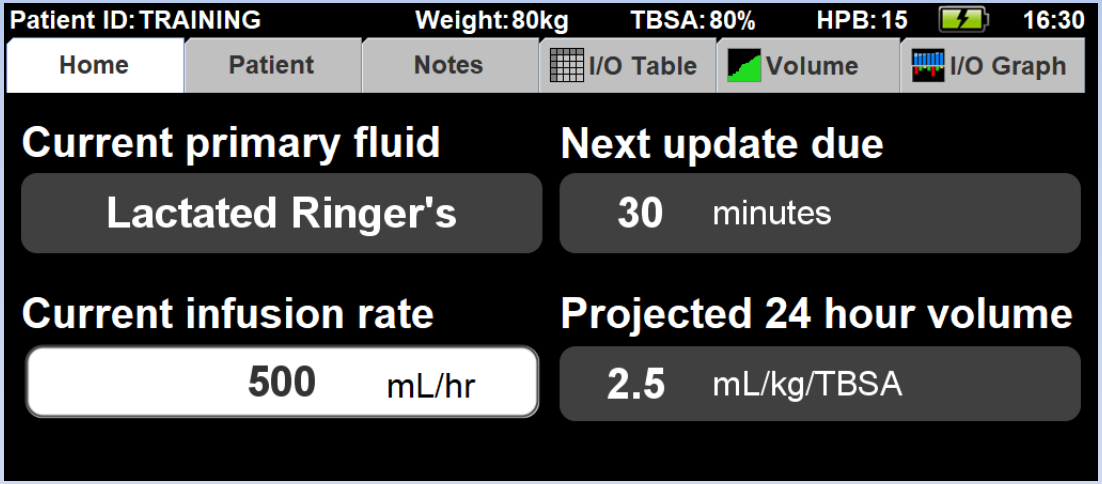


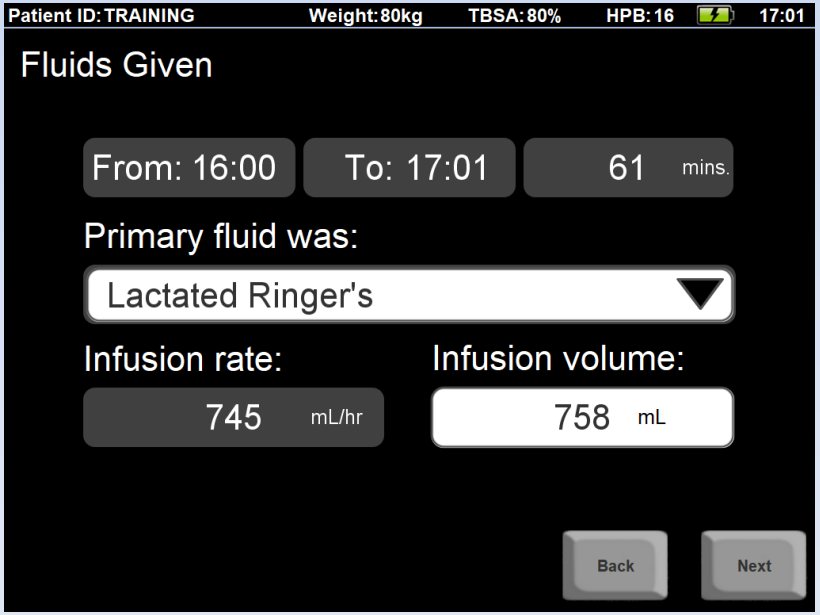
Your selection will be added to the Notes

FAQs

What if I change the pump rate in the middle of the hour?

If you change the rate from the HOME screen …



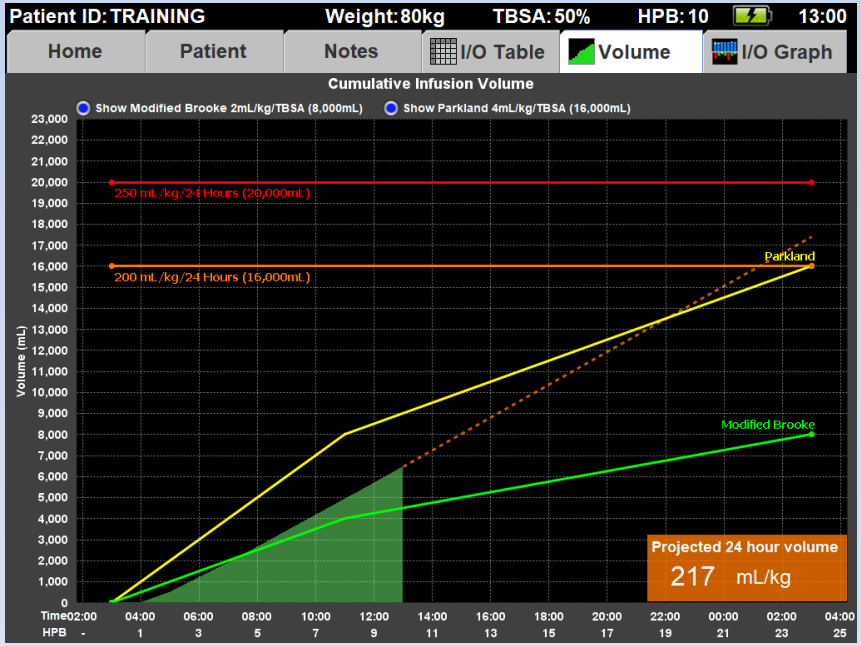


…the **<u>average rate</u>** and **<u>volume</u>** are calculated for that hour for you in the next update!

Arcos™

Burn Navigator®

Questions?



Arcos customer support:

877.542.8025

support@arcosmedical.com