



**Bedside Nutrition Monitoring Tool  
Instruction Manual**  
Intended Audience: ICU dietitians

The **PEPUP** Collaborative

An exclusive opportunity for Intensive Care Units across Canada

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## Glossary

|   |   |
|---|---|
| ICU   | Intensive Care Unit                                       |
| SOFA  | Sequential Organ Failure Assessment                       |
| APACHE  | Acute Physiology and Chronic Health Evaluation            |
| PaO <sub>2</sub> /FiO <sub>2</sub><br>Concentration | Pressure of Arterial Oxygen to Fractional Inspired Oxygen |
| EN  | Enteral Nutrition   |
| PN  | Parenteral Nutrition                                      |

## Introduction

The Bedside Nutrition Monitoring Tool is an electronic tool developed for the The PEP uP (Enhanced **P**rotein-**E**nergy **P**rovision via the Enteral **R**oute Feeding **P**rotocol) Nutrition Collaborative. You are one of the four pilot sites that have been chosen to participate in this collaborative.

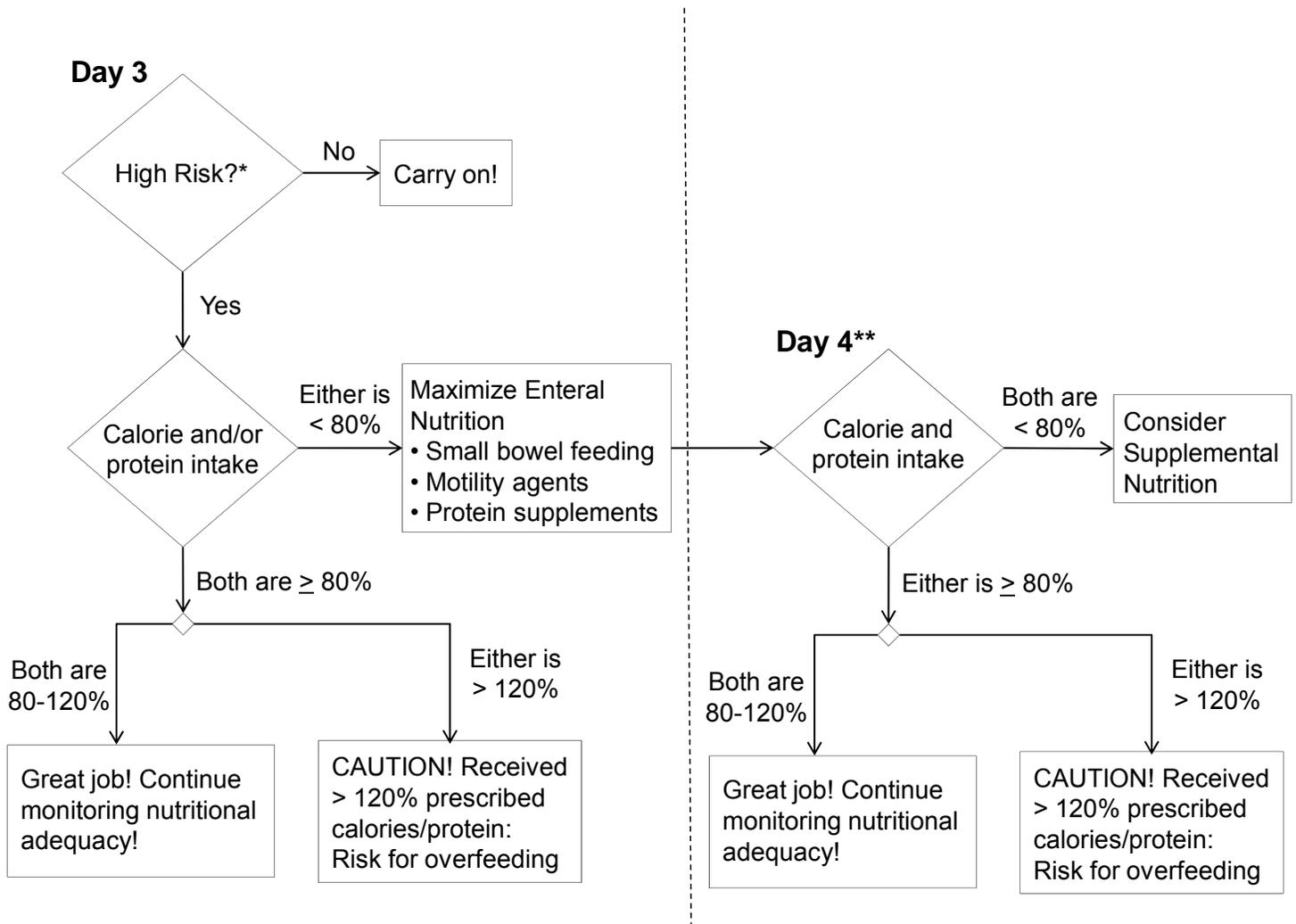
This monitoring tool has been designed for use by the ICU dietitian to assist in monitoring the amount of nutrition delivered and the calorie and protein deficits accumulated over the patient's ICU stay. By showing cumulative deficits using visual graphs and figures the tool will enable the ICU dietitian to describe the delivery of nutrition to date with the medical team. The built in prompts will assist the dietitian in making decisions about modifying the rate and volume of overall nutrition received. We encourage that the information generated by the tool be shared widely with physicians, nurses and other members of in efforts to educate the medical team about nutrition in the ICU.

The ultimate goal of this tool is to help improve current nutrition practices in your ICU, along with other quality improvement strategies i.e. the PEP uP volume based protocol & other PEP uP Tools. It is hoped that this will result in better nutritional intake and ultimately better patient outcomes.

This instruction manual will help you learn how to use the Tool by entering pertinent patient data. If you have any further questions on how to use the Bedside Nutrition Monitoring Tool, please feel free to contact us (see **Contacts** on page 2).

The Bedside Nutrition Monitoring Tool is designed based on the algorithm in Figure 1.

Figure 1: Bedside Nutrition Monitoring Tool Algorithm



\*High risk is defined as either:

- NUTRIC score 5-9 & malnutrition score  $\geq 2$
- NUTRIC score 5-9 & malnutrition score 0-1
- NUTRIC score 1-4 & malnutrition score  $\geq 2$

\*\*Day 4 prompts will only show if the patient was at high risk and had <80% calories or protein on Day 3

# General Overview for using the Samsung Galaxy Tablet

*Note:* You require wireless internet to use the Bedside Nutrition Monitoring Tool on the tablet. If you do not have wireless internet in your ICU, please refer to the computer instructions.

You have been provided with a Samsung Galaxy Tab 2 that already has the bedside nutrition monitoring tool set up. We recommend you refer to the Samsung instruction manual that accompanies your tablet to learn how to operate the tablet. Below we have included a few pointers to help you start using the Bedside Nutrition Monitoring Tool.

- **Power button:** located on the upper right-hand side of the tablet.
  - Hold the button to turn the tablet on
  - Hold the button to power off the tablet and select **Power off → OK**.
  - Tap the button to lock the screen but not power off the tablet.
  - Tap the button and swipe the screen to unlock the screen.
  
- **Home screen:** you will see 3 links here for easy access
  - The Bedside Nutrition Monitoring Tool
  - Critical Care Nutrition
  - Clinical Evaluation Research Unit (CERU) homepage
  
- **Screen Zoom:** You can zoom in and out on the screen the same way you would with an iPhone, iPad, or other touch screen device. Move your pointer finger and thumb away from each other to zoom out, or towards each other to zoom in.
  
- **The remaining battery life** of the tablet is displayed in the battery icon in the bottom right hand corner of the screen. Tap the battery icon to view the percent of battery remaining. Remember to charge the tablet, preferably daily. The tablet comes with a USB and wall charger.
  
- **Instruction and troubleshooting** manuals can also be found at [www.samsung.ca](http://www.samsung.ca).
  - Go to **Support → Manuals and Downloads**
  - For 'Type', select **Mobile Phone** for 'Subtype' select **Tablet**
  - For 'Model Number', select **Galaxy Tab 2 7.0**
  - Help with using your tablet is available under **Troubleshooting**
  
- We recommend you attach a label to the tablet with your ICU address and information for a contact person in case the tablet is misplaced.

# Bedside Nutrition Monitoring Tool Instructions: Tablet Version 1

The following instructions are written for the tablet version of the tool. If using a desktop or laptop computer, refer to the computer instructions.

## 1. Navigating Between Pages

When you are using the Bedside Nutrition Monitoring Tool, you can navigate between most of the pages by using the buttons at the top of the screen. This includes:

- Logout
- Account
- Select Patient
- Baseline Form
- Return to Calendar
- View Graph
- Go to Next Day

## 2. Logging In

- 1) Turn on the tablet provided by holding the **power** button.
  - a. To access the Bedside Nutrition monitoring tool, tap the **Bedside Tool** icon found on the homepage of the tablet.
- 2) Tap username.
  - a. A keyboard opens in the bottom half of the screen when you tap an area where information can be typed.
  - b. Enter the username and password provided by the Clinical Evaluation Research Unit.
  - c. Tap the  button in the bottom left-hand corner of the screen to exit the keyboard
- 3) Tap **Log In**.
- 4) Tap **Log Out** at the top of the page whenever you are done using the tool to protect the patient information you have entered.

## 3. Changing Passwords

- 1) After logging in, select **Account**.

- 2) To change your password, you will be asked to enter the following:
  - a. Old Password
  - b. New Password
  - c. Re-type New Password
- 3) After tapping save, a message will be displayed confirming your password has been successfully changed.



Please note that the username and password for the Bedside Nutrition Tool is linked with our electronic data capture system, REDCap. If the password is changed on one system, the other will automatically be updated. If you do not have an account on REDCap, this will not affect you.

## 4. Add a New Patient

- 1) After logging in, select **New Patient**.
- 2) You will be directed to the **Baseline Patient Information** form

## 5. Baseline Patient information

The patient information entered is used to calculate the patient's risk of malnutrition (Malnutrition Screening Tool, see page 25) and the NUTRIC score (see page 26).

- 1) After selecting to add a new patient, you will be brought to the **Baseline Patient Information** form.
- 2) Tap the empty box under **Age**. This will open a pop-up at the bottom of the screen to record the patient's age at the time of this ICU admission. Your response options are:
  - a. < 50
  - b. 50-74
  - c. ≥ 75
- 3) **Hospital Admission** data: This is the date and time of initial presentation to the emergency department or hospital ward, whichever is the earliest. For patients transferred from another institution directly to the ICU, the ICU admission date/time is to be used for the hospital admission date/time. To enter the data:
  - a. Tap the first empty box under the question. A pop-up calendar will appear to select the day, month and year of hospital admission.
  - b. Tap the second empty box under the question. A pop-up clock will appear to select the hour and minutes of hospital admission.

- 4) **ICU Admission:** If the patient has been admitted to your ICU multiple times, use the most recent admission date and time. If a patient is transferred from another ICU enter the date of admission to your ICU. If the patient is admitted directly to your ICU, the ICU and hospital admission dates and times will be the same. To enter the data:
  - a. Tap the first empty box under the question. A pop-up calendar will appear to select the day, month and year of hospital admission.
  - b. Tap the second empty box under the question. A pop-up clock will appear to select the hour and minutes of hospital admission.
- 5) Tap **Next** to proceed to the next question, **Prev** to return to the previous question or **Done** to exit the pop-up and return to the baseline form.
- 6) **Has the patient lost weight recently (without trying) in the last 3 months?:** Record the patient's response, if obtainable, or obtain the information from a family member or close friend. The weight loss timeframe is in the 3 months before this ICU admission. Your response options are:
  - a. Yes
  - b. No
  - c. Unsure
- 7) **If yes, how much?:** Ask the responder how much weight the patient lost in the 3 months before this ICU admission. Your response options are:
  - a. 1-5 kg / 2-11 lbs
  - b. 6-10 kg / 13-22 lbs
  - c. 11-15 kg / 24-33 lbs
  - d. >15 kg / > 33 lbs
  - e. Unsure
- 8) **Has the patient experienced a decline in food intake over the past week due to decreased appetite?:** Obtain the patient's response, if possible, or obtain the information from a family member or close friend. The timeframe for decreased food intake due to poor appetite is the week before this ICU admission. Your response options are:
  - a. Yes
  - b. No
  - c. Unsure
- 9) **APACHE II Score:** If routinely calculated, directly enter the score recorded in the patient's chart. To calculate the score, you may use any tool you wish. We recommend the APACHE II worksheet (see Table 1) or you may go to the following website: <http://www.sfar.org/scores2/apache22.html#haut>  
The website can be accessed directly through the link on the APACHE II Score question.

*Note:* Ensure the units that you are using for serum sodium, potassium and white blood count correspond with the units designated in the tool you are using. For each APACHE variable, use the single worst value out of all values from the first 24 hours of this ICU admission. If variables are not available from the first 24 hours, go outside the 24 hour window and use data closest to ICU admission.

Your response options are:

- a. < 15
- b. 15-19
- c. 20-27
- d.  $\geq$  28

**Table 1: Apache II Severity of Disease Classification System**

| Physiologic Variable<br><i>Use variables from first 24 hours in ICU, only.</i>  |   | HIGH ABNORMAL RANGE  |                          |                          |                                    |                          | LOW ABNORMAL RANGE       |                          |                          |                          |                  |
|---|---|--|--------------------------|--------------------------|------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|------------------|
|   |   | (Check one range per variable and write the severity score in the column to the right.<br>Note: use the worst possible score for all variables, except for the GCS score.) |                          |                          |                                    |                          |                          |                          |                          |                          |                  |
|   | Severity Points   | +4   | +3                       | +2                       | +1                                 | 0                        | +1                       | +2                       | +3                       | +4                       | Severity Score   |
| 1   | Temperature – rectal (°C)<br>(add 0.5° to oral temp, add 1.0° to auxiliary temp)  | <input type="checkbox"/>   | <input type="checkbox"/> |                          | <input type="checkbox"/>           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                  |
|   |   | ≥41°   | 39-40.9°                 |                          | 38.5°-38.9°                        | 36°-38.4°                | 34°-35.9°                | 32°-33.9°                | 30°-31.9°                | ≤29.9°                   |                  |
| 2   | Mean Arterial Pressume (mmHg)   | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> |                                    | <input type="checkbox"/> |                          | <input type="checkbox"/> |                          | <input type="checkbox"/> |                  |
|   |   | ≥160   | 130-159                  | 110-129                  |                                    | 70-109                   |                          | 50-69                    |                          | ≤49                      |                  |
| 3   | Heart Rate (Ventricular Response)   | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> |                                    | <input type="checkbox"/> |                          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                  |
|   |   | ≥180   | 140-179                  | 110-139                  |                                    | 70-109                   |                          | 55-69                    | 40-54                    | ≤39                      |                  |
| 4   | Resp. Rate (non-ventilated or ventilated)   | <input type="checkbox"/>   | <input type="checkbox"/> |                          | <input type="checkbox"/>           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                          | <input type="checkbox"/> |                  |
|   |   | ≥50  | 35-49                    |                          | 25-34                              | 12-24                    | 10-11                    | 6-9                      |                          | ≤5                       |                  |
| 5   | Oxygenation:  | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> |                                    | <input type="checkbox"/> |                          |                          |                          |                          |                  |
|   | a. FIO <sub>2</sub> ≥ 0.5 record A·aDO <sub>2</sub> *                             | ≥500   | 350-499                  | 200-349                  |                                    | <200                     |                          |                          |                          |                          |                  |
|   | b. FIO <sub>2</sub> < 0.5 record only PaO <sub>2</sub>                            |  |                          |                          |                                    | <input type="checkbox"/> | <input type="checkbox"/> |                          | <input type="checkbox"/> | <input type="checkbox"/> |                  |
|   |   |  |                          |                          |                                    | PaO <sub>2</sub> >70     | PaO <sub>2</sub> 61-70   |                          | PaO <sub>2</sub> 55-60   | PaO <sub>2</sub> <55     |                  |
| 6   | Arterial pH   | <input type="checkbox"/>   | <input type="checkbox"/> |                          | <input type="checkbox"/>           | <input type="checkbox"/> |                          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                  |
|   |   | ≥7.7   | 7.6-7.69                 |                          | 7.5-7.59                           | 7.33-7.49                |                          | 7.25-7.32                | 7.15-7.24                | <7.15                    |                  |
| 7   | Serum Sodium (mmol/L)   | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>           | <input type="checkbox"/> |                          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                  |
|   |   | ≥180   | 160-179                  | 155-159                  | 150-154                            | 130-149                  |                          | 120-129                  | 111-119                  | ≤110                     |                  |
| 8   | Serum Potassium (mmol/L)  | <input type="checkbox"/>   | <input type="checkbox"/> |                          | <input type="checkbox"/>           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                          | <input type="checkbox"/> |                  |
|   |   | ≥7   | 6-6.9                    |                          | 5.5-5.9                            | 3.5-5.4                  | 3-3.4                    | 2.5-2.9                  |                          | <2.5                     |                  |
| 9   | Serum Creatinine (µmol/L)<br>(double point score for acute renal failure)         | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> |                                    | <input type="checkbox"/> |                          | <input type="checkbox"/> |                          |                          |                  |
|   |   | ≥309.4   | 176.8-309.3              | 132-177                  |                                    | 53-133                   |                          | <53                      |                          |                          |                  |
| 10  | Hematocrit (%)  | <input type="checkbox"/>   |                          | <input type="checkbox"/> | <input type="checkbox"/>           | <input type="checkbox"/> |                          | <input type="checkbox"/> |                          | <input type="checkbox"/> |                  |
|   |   | ≥60  |                          | 50-59.9                  | 46-49.9                            | 30-45.9                  |                          | 20-29.9                  |                          | <20                      |                  |
| 11  | White Blood Count (total/mm <sup>3</sup> )<br>(in 1000s)                          | <input type="checkbox"/>   |                          | <input type="checkbox"/> | <input type="checkbox"/>           | <input type="checkbox"/> |                          | <input type="checkbox"/> |                          | <input type="checkbox"/> |                  |
|   |   | ≥40  |                          | 20-39.9                  | 15-19.9                            | 3-14.9                   |                          | 1-2.9                    |                          | <1                       |                  |
| 12  | Glasgow Coma Score (GCS) (see next page)<br>Score=15 minus actual GCS             | (Note: The best GCS used for the 1 <sup>st</sup> 24 hours)   |                          |                          |                                    |                          |                          |                          |                          |                          | (15 - GCS Total) |
|   |   | Eye  | Verbal                   | Motor                    | GCS Total (= Eye + Verbal + Motor) |                          |                          |                          |                          |                          |                  |
| <b>A=Total ACUTE PHYSIOLOGY SCORE (APS): Total severity points indicated for Variables 1-12 in the column to the right.</b> |   |  |                          |                          |                                    |                          |                          |                          |                          |                          |                  |
|   | Serum HCO <sub>3</sub> (venous-mmol/L)<br>(Use in place of variable 5 if no ABGs) | <input type="checkbox"/>   | <input type="checkbox"/> |                          | <input type="checkbox"/>           | <input type="checkbox"/> |                          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                  |
|   |   | ≥52  | 41-51.9                  |                          | 32-40.9                            | 22-31.9                  |                          | 18-21.9                  | 15-17.9                  | <15                      |                  |

\* A·aDO<sub>2</sub> = [(FIO<sub>2</sub> (713)-(PaCO<sub>2</sub>/0.8)]-PaO<sub>2</sub>

**Table 1: Apache II Severity of Disease Classification System (continued)**

Scoring:

A= APS Points

B= Age Points (see below)

C= Chronic Health Points (see below)

Total= APACHE II Score

Glasgow Coma Scale:

| <i>Eye Opening</i> | <i>Verbal Response</i>      | <i>Best Motor Response</i> |
|--------------------|-----------------------------|----------------------------|
| 4 – Spontaneous    | 5 – Oriented                | 6 – Obeys commands         |
| 3 – To speech      | 4 – Confused                | 5 – Localizes to pain      |
| 2 – To pain        | 3 – Inappropriate words     | 4 – Withdraws from pain    |
| 1 – None           | 2 – Incomprehensible words  | 3 – Abnormal flexion       |
|                    | 1 – Incomprehensible sounds | 2 – Extension              |
|                    |                             | 1 – None                   |

How to score age points (B):

| Age (years) | Points |
|-------------|--------|
| ≤ 44        | 0      |
| 45-54       | 2      |
| 55-64       | 3      |
| 65-74       | 5      |
| ≥ 75        | 6      |

How to score chronic health points (C):

(If the patient has a history of severe organ system insufficiency or is immunocompromised assign points as follows.

1. For non-operative or emergency postoperative patients → 5
2. For elective postoperative patients → 2
3. Patient does NOT have a history of severe organ system insufficiency and is NOT immunocompromised → 0

10)# **Comorbidities:** Only those co-morbidities found on the taxonomy listing (see Table 2) should be used when calculating the patient's number of co-morbidities. The table can be accessed through a link on the comorbidity question. The response options are:

- a. 0-1
- b.  $\geq 2$

**Table 2: Comorbidity Taxonomy List**

|   |  |
|---|--|
| <p><b>Myocardial</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Angina</li> <li><input type="checkbox"/> Arrhythmia</li> <li><input type="checkbox"/> Congestive heart failure (or heart disease)</li> <li><input type="checkbox"/> Myocardial infarction</li> <li><input type="checkbox"/> Valvular</li> </ul> <p><b>Vascular</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Cerebrovascular disease (Stroke or TIA)</li> <li><input type="checkbox"/> Hypertension</li> <li><input type="checkbox"/> Peripheral vascular disease or claudication</li> </ul> <p><b>Pulmonary</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Asthma</li> <li><input type="checkbox"/> Chronic obstructive pulmonary disease (COPD, emphysema)</li> </ul> <p><b>Neurologic</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Dementia</li> <li><input type="checkbox"/> Hemiplegia (paraplegia)</li> <li><input type="checkbox"/> Neurologic illnesses (such as Multiple sclerosis or Parkinsons)</li> </ul> <p><b>Endocrine</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Diabetes Type I or II</li> <li><input type="checkbox"/> Diabetes with end organ damage</li> <li><input type="checkbox"/> Obesity and/or BMI &gt; 30 (weight in kg/(ht in meters)<sup>2</sup>)</li> </ul> <p><b>Renal</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Moderate or severe renal disease</li> </ul> | <p><b>Gastrointestinal</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Gastrointestinal Disease (hernia or reflux)</li> <li><input type="checkbox"/> GI Bleeding</li> <li><input type="checkbox"/> Inflammatory bowel</li> <li><input type="checkbox"/> Mild liver disease</li> <li><input type="checkbox"/> Moderate or severe liver disease</li> <li><input type="checkbox"/> Peptic ulcer disease</li> </ul> <p><b>Cancer/Immune</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> AIDS</li> <li><input type="checkbox"/> Any Tumor</li> <li><input type="checkbox"/> Leukemia</li> <li><input type="checkbox"/> Lymphoma</li> <li><input type="checkbox"/> Metastatic solid tumor</li> </ul> <p><b>Psychological</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Anxiety or Panic Disorders</li> <li><input type="checkbox"/> Depression</li> </ul> <p><b>Muskoskeletal</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Arthritis (Rheumatoid or Osteoarthritis)</li> <li><input type="checkbox"/> Connective Tissue disease</li> <li><input type="checkbox"/> Degenerative Disc disease (back disease or spinal stenosis or severe chronic back pain)</li> <li><input type="checkbox"/> Osteoporosis</li> </ul> <p><b>Miscellaneous</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Hearing Impairment (very hard of hearing even with hearing aids)</li> <li><input type="checkbox"/> Visual Impairment (cataracts, glaucoma, macular degeneration)</li> </ul> |
|---|--|

## 6. SOFA Score

SOFA (Sequential organ failure assessment) score is used to determine organ dysfunction/failure in the ICU. To calculate the score, there are many variables that MUST be collected at baseline and these variables must be from the first 24 hr period after patient's ICU admission. The exception is for urine output which must be extrapolated for an entire 24 hr period. If the particular variable is missing for the day, choose the range that includes the option N/A. The SOFA score will be calculated at the bottom of the page once all of the above data has been entered. See instructions below:

- 1) **Lowest PaO<sub>2</sub>/FiO<sub>2</sub>:** This is an indication of the patient's respiratory status; a lower ratio indicates a worse status. This ratio or the individual PaO<sub>2</sub> and FiO<sub>2</sub> values are from arterial blood gases and can be obtained from nursing/respiratory flow sheet. You will need to determine the **lowest PaO<sub>2</sub>/FiO<sub>2</sub>** ratio in the study day. Some patients may have many PaO<sub>2</sub> and FiO<sub>2</sub> values available daily and we have provided a table (see Table 3) to help you find the lowest ratio. The table can be accessed through a link on the PaO<sub>2</sub>/FiO<sub>2</sub> Ratio question.

**Table 3: PaO<sub>2</sub>/FiO<sub>2</sub> ratio**

|                          |     | FiO <sub>2</sub> |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------------------|-----|------------------|------|------|------|------|------|------|------|------|------|------|------|------|
|                          |     | 0.40             | 0.45 | 0.50 | 0.55 | 0.60 | 0.65 | 0.70 | 0.75 | 0.80 | 0.85 | 0.90 | 0.95 | 1.00 |
| PaO <sub>2</sub><br>mmHg | 54  | 135              | 120  | 108  | 98   | 90   | 83   | 77   | 72   | 68   | 64   | 60   | 57   | 54   |
|                          | 56  | 140              | 124  | 112  | 102  | 93   | 86   | 80   | 75   | 70   | 66   | 62   | 59   | 56   |
|                          | 58  | 145              | 129  | 116  | 105  | 97   | 89   | 83   | 77   | 73   | 68   | 64   | 61   | 58   |
|                          | 60  | 150              | 133  | 120  | 109  | 100  | 92   | 86   | 80   | 75   | 71   | 67   | 63   | 60   |
|                          | 62  | 155              | 138  | 124  | 113  | 103  | 95   | 89   | 83   | 78   | 73   | 69   | 65   | 62   |
|                          | 64  | 160              | 142  | 128  | 116  | 107  | 98   | 91   | 85   | 80   | 75   | 71   | 67   | 64   |
|                          | 66  | 165              | 147  | 132  | 120  | 110  | 102  | 94   | 88   | 83   | 78   | 73   | 69   | 66   |
|                          | 68  | 170              | 151  | 136  | 124  | 113  | 105  | 97   | 91   | 85   | 80   | 76   | 72   | 68   |
|                          | 70  | 175              | 156  | 140  | 127  | 117  | 108  | 100  | 93   | 88   | 82   | 78   | 74   | 70   |
|                          | 72  | 180              | 160  | 144  | 131  | 120  | 111  | 103  | 96   | 90   | 85   | 80   | 76   | 72   |
|                          | 74  | 185              | 164  | 148  | 135  | 123  | 114  | 106  | 99   | 93   | 87   | 82   | 78   | 74   |
|                          | 76  | 190              | 169  | 152  | 138  | 127  | 117  | 109  | 101  | 95   | 89   | 84   | 80   | 76   |
|                          | 78  | 195              | 173  | 156  | 142  | 130  | 120  | 111  | 104  | 98   | 92   | 87   | 82   | 78   |
|                          | 80  | 200              | 178  | 160  | 145  | 133  | 123  | 114  | 107  | 100  | 94   | 89   | 84   | 80   |
|                          | 82  | 205              | 182  | 164  | 149  | 137  | 126  | 117  | 109  | 103  | 96   | 91   | 86   | 82   |
|                          | 84  | 210              | 187  | 168  | 153  | 140  | 129  | 120  | 112  | 105  | 99   | 93   | 88   | 84   |
|                          | 86  | 215              | 191  | 172  | 156  | 143  | 132  | 123  | 115  | 108  | 101  | 96   | 91   | 86   |
| 88                       | 220 | 196              | 176  | 160  | 147  | 135  | 126  | 117  | 110  | 104  | 98   | 93   | 88   |      |
| 90                       | 225 | 200              | 180  | 164  | 150  | 138  | 129  | 120  | 113  | 106  | 100  | 95   | 90   |      |
| 92                       | 230 | 204              | 184  | 167  | 153  | 142  | 131  | 123  | 115  | 108  | 102  | 97   | 92   |      |
| 94                       | 235 | 209              | 188  | 171  | 157  | 145  | 134  | 125  | 118  | 111  | 104  | 99   | 94   |      |
| 96                       | 240 | 213              | 192  | 175  | 160  | 148  | 137  | 128  | 120  | 113  | 107  | 101  | 96   |      |
| 98                       | 245 | 218              | 196  | 178  | 163  | 151  | 140  | 131  | 123  | 115  | 109  | 103  | 98   |      |
| 100                      | 250 | 222              | 200  | 182  | 167  | 154  | 143  | 133  | 125  | 118  | 111  | 105  | 100  |      |
| 102                      | 255 | 227              | 204  | 185  | 170  | 157  | 146  | 136  | 128  | 120  | 113  | 107  | 102  |      |
| 104                      | 260 | 231              | 208  | 189  | 173  | 160  | 149  | 139  | 130  | 122  | 116  | 109  | 104  |      |

Or use the equation:

$$\text{PaO}_2/\text{FiO}_2 \text{ ratio} = \frac{\text{PaO}_2 \text{ (mmHg)}}{\text{FiO}_2}$$

*Example:*

1. PaO<sub>2</sub> is 88 and FiO<sub>2</sub> is 0.85, the ratio is 104
  2. PaO<sub>2</sub> is 68 and FiO<sub>2</sub> is 0.55, the ratio is 124
  3. PaO<sub>2</sub> is 64 and FiO<sub>2</sub> is 0.90, the ratio is 71
- The PF ratio of 71 is the lowest

Pick the range that corresponds to the lowest value. Your response options are:

- a.  $< 400 - \geq 300$
  - b.  $< 300 - \geq 200$
  - c.  $< 200 - \geq 100$
  - d.  $< 100$
- 2) **Lowest Platelets:** This is an indication of the coagulation status of the patient and the lower the value, the worse the status. Find the lowest platelets in  $\times 10^3/\text{mm}^3$  units. Your response options are:
- a.  $<150 - \geq 100$
  - b.  $<100 - \geq 50$
  - c.  $<50 - \geq 20$
  - d.  $<20$
- 3) **Highest Bilirubin:** This is an indication of liver function and the higher the value, the worse the liver function. Find the highest **total** bilirubin in the day using the correct units (mg/dL or, in brackets,  $\mu\text{mol/L}$ ). Your response options are:
- a. 1.2-1.9 (20-32)
  - b. 2.0-5.9 (33-101)
  - c. 6.0-11.9 ( 102-204)
  - d.  $\geq 12$  ( $\geq 204$ )
- 4) **Did the patient receive vasopressors today?:** Vasopressors are drugs used for hypotension and the higher the dose needed to maintain a normal blood pressure, the worse the hypotension. Some patients may not be on vasopressors and instead a mean arterial pressure (MAP) reading is needed. Your response options are:
- a. Yes (proceed to #5)
  - b. No (proceed to #6)
- 5) *If yes, **Vasopressors:*** This means the patient did receive vasopressors today (defined as Dobutamine, Dopamine, Epinephrine or Norepinephrine). Find the **highest** hourly dose received in the day and pick the range that corresponds to that dose. Your response options are:
- a. Dopamine  $\leq 5 \mu\text{g}/\text{kg}/\text{min}$  or Dobutamine (any dose)
  - b. Dopamine  $6-15 \mu\text{g}/\text{kg}/\text{min}$  or Epinephrine  $\leq 0.1 \mu\text{g}/\text{kg}/\text{min}$  or Norepinephrine  $\leq 0.1 \mu\text{g}/\text{kg}/\text{min}^*$
  - c. Dopamine  $> 15 \mu\text{g}/\text{kg}/\text{min}$  or Epinephrine  $> 0.1 \mu\text{g}/\text{kg}/\text{min}$  or Norepinephrine  $> 0.1 \mu\text{g}/\text{kg}/\text{min}^*$
- \*If you are unable to read the entire response option, turn the tablet lengthwise.*
- 6) *If no, **Mean Arterial Pressure (MAP):*** The patient did not receive vasopressors today, therefore, find the lowest Mean Arterial Pressure. If this is not in the RN flowsheet, you can calculate this using the following link: <http://www.mdcalc.com/mean-arterial-pressure-map/> Enter the lowest systolic blood pressure and corresponding diastolic blood pressure into the website's tool. Or, use the formula as follows:
- $$\text{MAP} = 1/3 \text{ lowest systolic BP} + 2/3 \text{ corresponding diastolic blood pressure}$$
- Your response options are:
- a.  $< 70 \text{ mmHg}$
  - b.  $\geq 70 \text{ mmHg}$

- 7) **Highest Creatinine:** This is an indication of the renal status and the higher the creatinine, the worse the renal function. Find the highest creatinine and ensure that you are using the correct units (mg/dL or, in brackets,  $\mu\text{mol/L}$ ). Your response options are:
- <1.2 (<110) or N/A
  - 1.2 – 1.9 (110-170)
  - 2.0 – 3.4 (171-299)
  - 3.5 – 4.9 (300-440)
  - $\geq 5$  ( $\geq 400$ )
- 8) **Total Urine Output:** This is an indication of the renal status and the lower the urine output, the worse the renal function. Find the total urine output and ensure that you are using the correct units (mL/day). *NOTE:* For Study Day 1 (ICU admission to 23:59 hrs), since this will be a partial day, use the urine output extrapolated for the full 24 hour period vs. the actual urine output. Example: If the patient gets admitted to ICU at 18:00 hrs and has a total urine output of 400 mls from 18:00-23:59 hrs, calculate the total urine output as 1600 mls vs. 400 mls. Record as  $\geq 500$  mls. Your response options are:
- $\geq 500$  mL/day or N/A
  - 200-499 mL/day
  - <200 mL/day
- 9) **Is there a Glasgow Coma Scale already available?:** This is a numeric number that is an indication of the patient's conscious state and the lower the number, the worse the state. GSC can be obtained from the RN flowsheet or APACHE 2. Your response options are:
- Yes (proceed to #8)
  - No (proceed to #9)
- 10) *If yes,* **Glasgow Coma Scale:** Pick the range that corresponds to the Glasgow Coma Scale from your options:
- 13-14
  - 10-12
  - 6-9
  - <6
- 11) *If no,* **Glasgow Coma Scale – Best Eye Response and Best Verbal Response and Best Motor Response:** Choose the response that gives the highest score for the first 24 hr period after patient's ICU admission from each of the 3 categories. If the patient is sedated, then go back to the period when the patient was not receiving sedation or approximate what the score would be if the sedation were to be removed. Enter the values in the 3 separate categories and the GCS will automatically be calculated. Your response options are:
- Eye Opening:**
    - 1- None
    - 2- To Pain
    - 3- To speech
    - 4-Spontaneous
  - Verbal Response:**
    - 1- None
    - 2- Incomprehensible words
    - 3- Inappropriate words

c. **Best Motor Response:**

- 4- Confused
- 5- Oriented
- 1- None
- 2- Extension
- 3- Abnormal flexion
- 4- Withdraws from pain
- 5- Localizes to pain
- 6- Obeys commands

Once you have completed the entire Baseline Patient Information form, tap **Save Patient**. This brings you to the **calendar page**. The **calendar page** displays the patient's ID. You may record the patient's ID on a work sheet for your reference.

You can edit the patient's baseline information at anytime by tapping the **Baseline Form** button at the top of the screen.

## 7. Calendar Page

The screenshot below explains the features you see on the calendar page:

The screenshot shows a calendar interface for July 2012. At the top, the Patient ID is displayed as #553-11. Below the ID, there is a prompt: "Click on the appropriate day to enter prescribed and received calories and protein". The calendar shows days from Sun 1 to Sat 7, with a jump to 14. The day Tue 3 is highlighted with "ICU Admit" in blue text. Navigation buttons for "Previous Month" and "Next Month" are visible. Annotations include: "Patient ID #" pointing to the ID; "ICU admission date as inputted previously on Baseline form." pointing to the ICU Admit text; "ICU admission day is the first day that nutrition information is to be entered." pointing to the highlighted day; and "You can change the month that is displayed by pressing Previous Month or Next Month." pointing to the navigation buttons.

Tap the ICU admission day to bring you to the **nutrition page**. If you try to enter nutrition data for the first time on a day other than ICU admission day, you will be given the error message "You must enter Day 1 as ICU Admission". The ICU admission day will be called Day 1. The next calendar day (from 00:00 to 23:59) is Day 2, and so on.

## 8. Nutrition Page

Ensure you enter data daily from ICU admission (Day 1) to at least Day 12. To make the most use of this tool, if you do happen to miss a day of data entry, enter the data for that missed day as soon as possible. We encourage you to continue using the tool in your ICU after day 12.

- 1) Tap the day for which you would like to enter nutrition data. *Note:* The first day you enter nutrition data for a patient must be on ICU admission day (Day 1). The tool will not let you enter data for the first time for a patient on a day other than ICU admission.
- 2) Tap the empty box under the data for which you wish to add information.
- 3) This will open a pop-up keyboard where you can type the appropriate information (see Table 4).

**Table 4: Nutrition Data**

| Nutrition Data            | Instructions  |
|---------------------------|---|
| Prescribed Energy Intake  | Enter the patient's energy prescription, in kilocalories. For subsequent days, if energy prescription has previously been entered for the patient, you will be asked " <b>Did the nutrition prescription (x cal, x g protein) change today?</b> ". If yes, select <b>yes</b> and enter the new prescription. If no, select <b>no</b> and continue to calories and protein received. |
| Prescribed Protein Intake | Enter the patient's protein prescription, in grams. For subsequent days, If energy prescription has previously been entered for the patient, you will be asked " <b>Did the nutrition prescription (x cal, x g protein) change today?</b> ". If yes, select <b>yes</b> and enter the new prescription. If no, select <b>no</b> and continue to calories and protein received.       |
| Calories                  | Enter the total amount of calories received for that entire day (from 00:00 to 23:59). We suggest that this include calories from propofol, EN, PN and oral intake, and supplements.  |
| Protein                   | Enter the total amount of protein received for that entire day (from 00:00 to 23:59). We suggest that this include protein from EN, PN, oral intake and supplements.  |

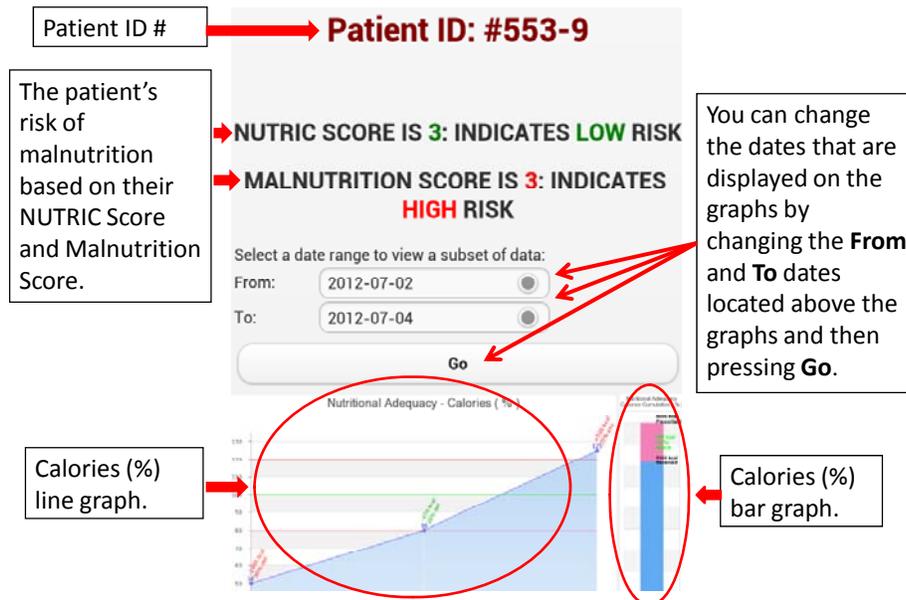
- 4) Tap **Save Day** when you are finished entering the information.
- 5) This brings you to the **graph page**
- 6) To enter nutrition data for another day, tap **Return to Calendar** at the top of the screen and repeat steps 1-4.
- 7) After entering nutrition for Day 3 you will be brought to the **prompt page** (see section 8: Prompts Page).

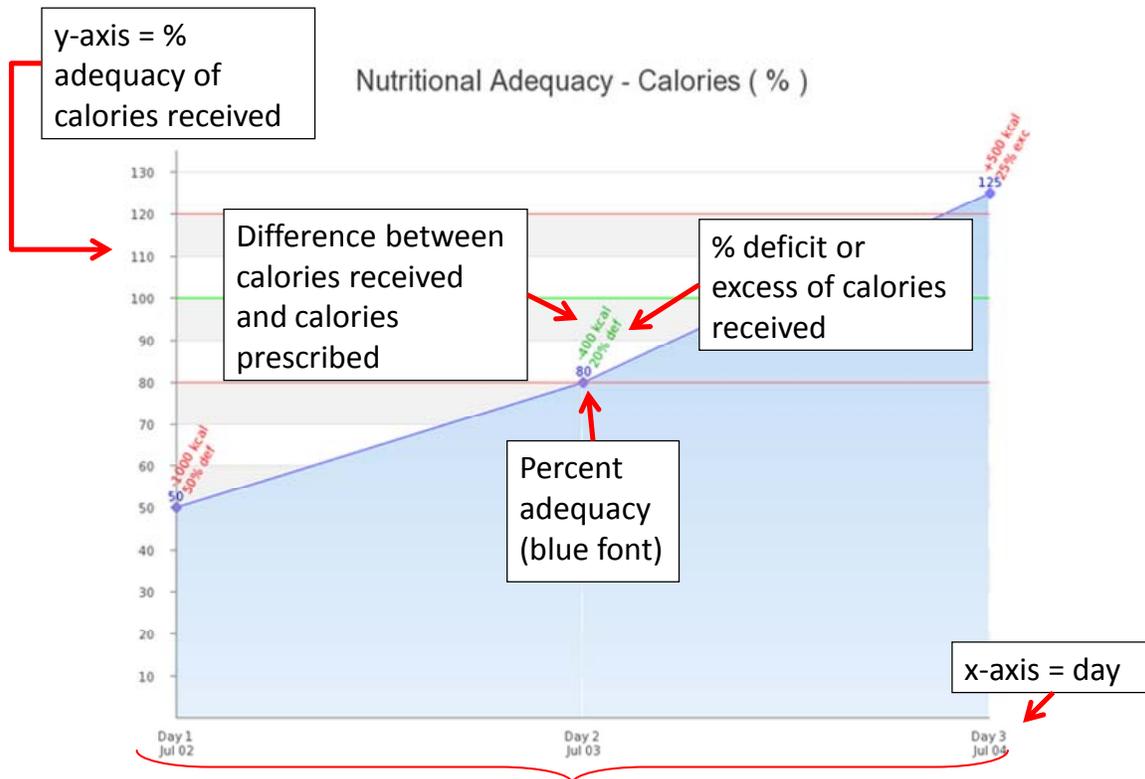
## 9. Graphs Page

Four graphs are displayed on this page:

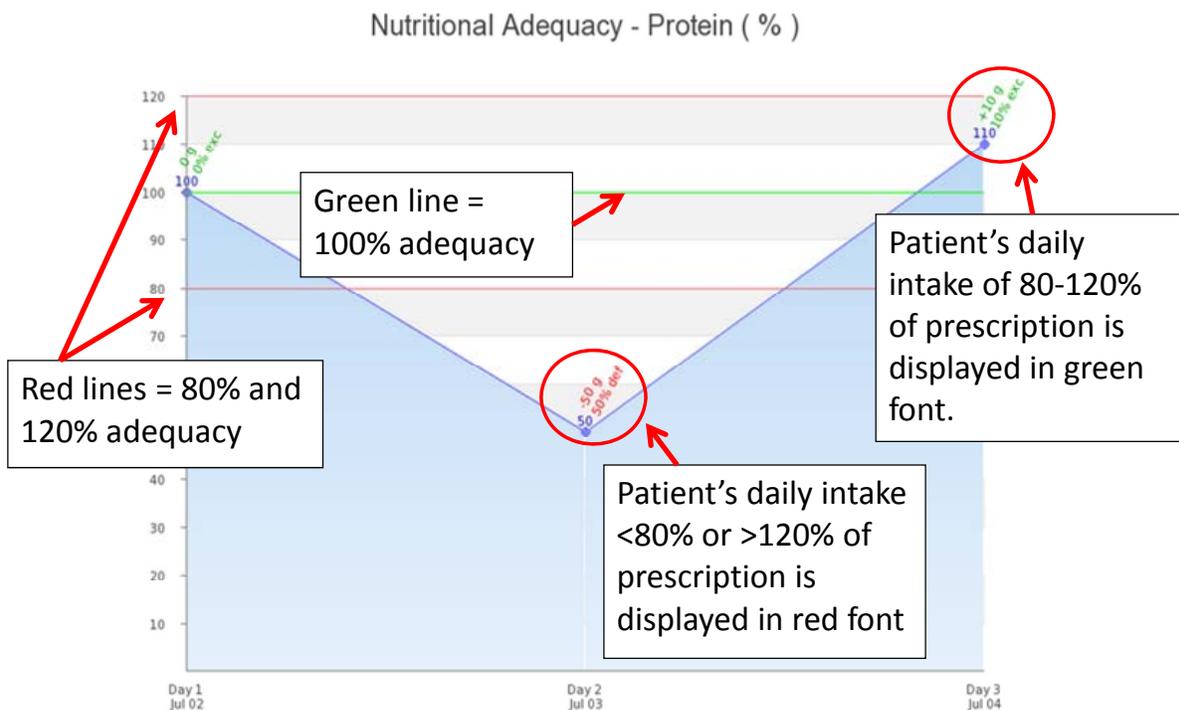
- Line graph of Daily Nutritional Adequacy – Calories (%)
- Bar graph of Cumulative Nutritional Adequacy – Calories (%)
- Line graph of Daily Nutritional Adequacy – Protein (%)
- Bar graph of Cumulative Nutritional Adequacy – Protein (%)

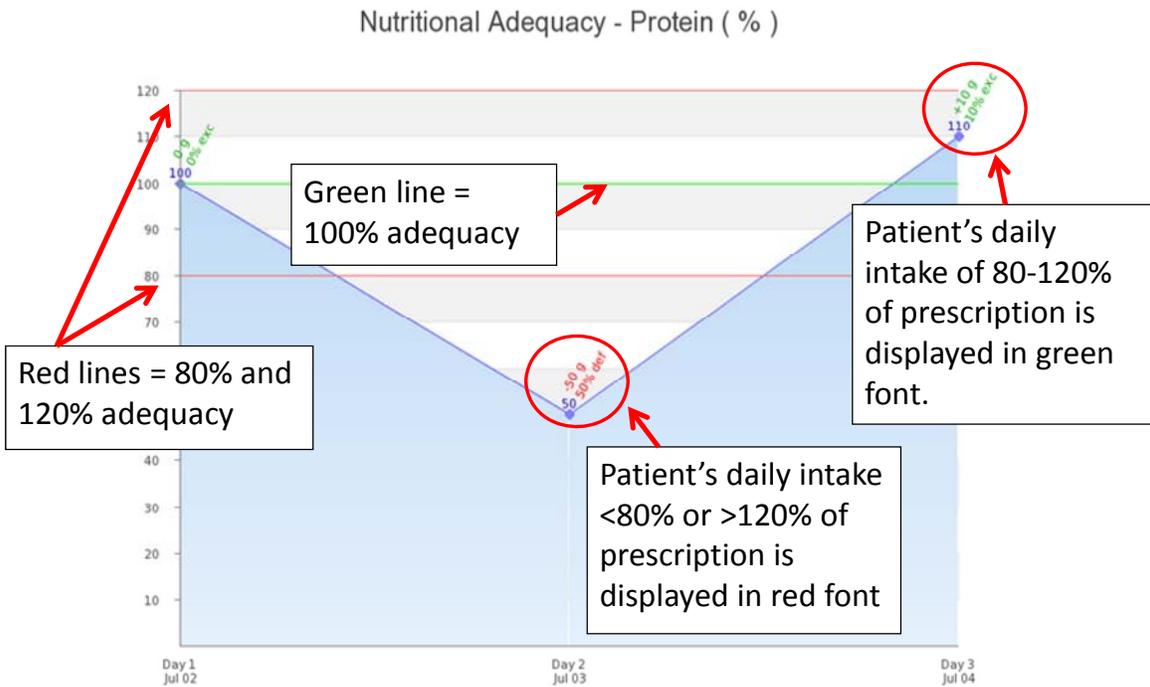
The screenshots below explain the features you see on the graphs page:



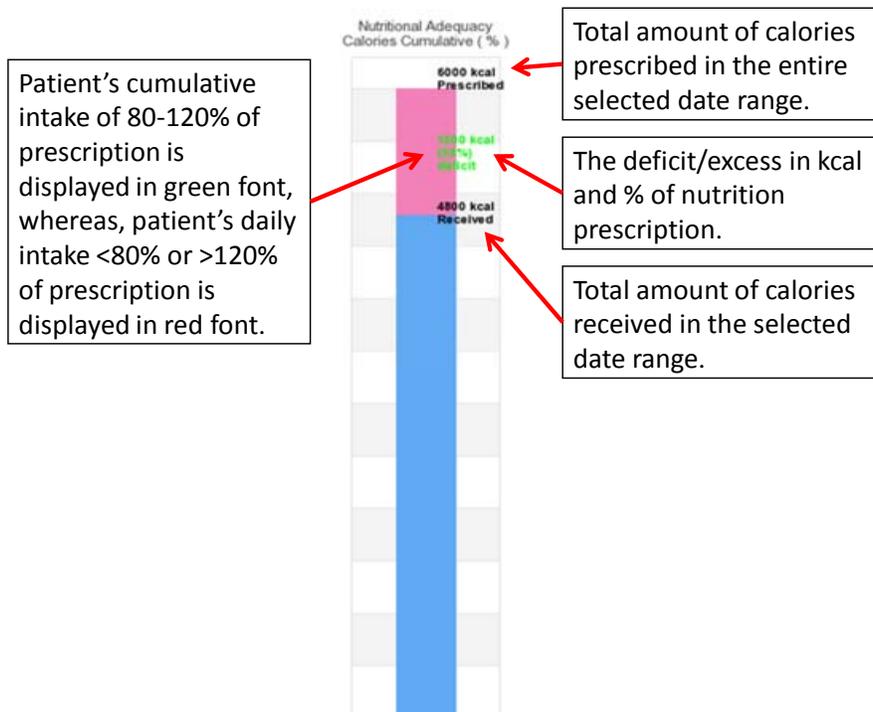


You can display up to 20 consecutive days on the line graph at a time. If the date range selected is for >20 days, it will display the average intake per week.





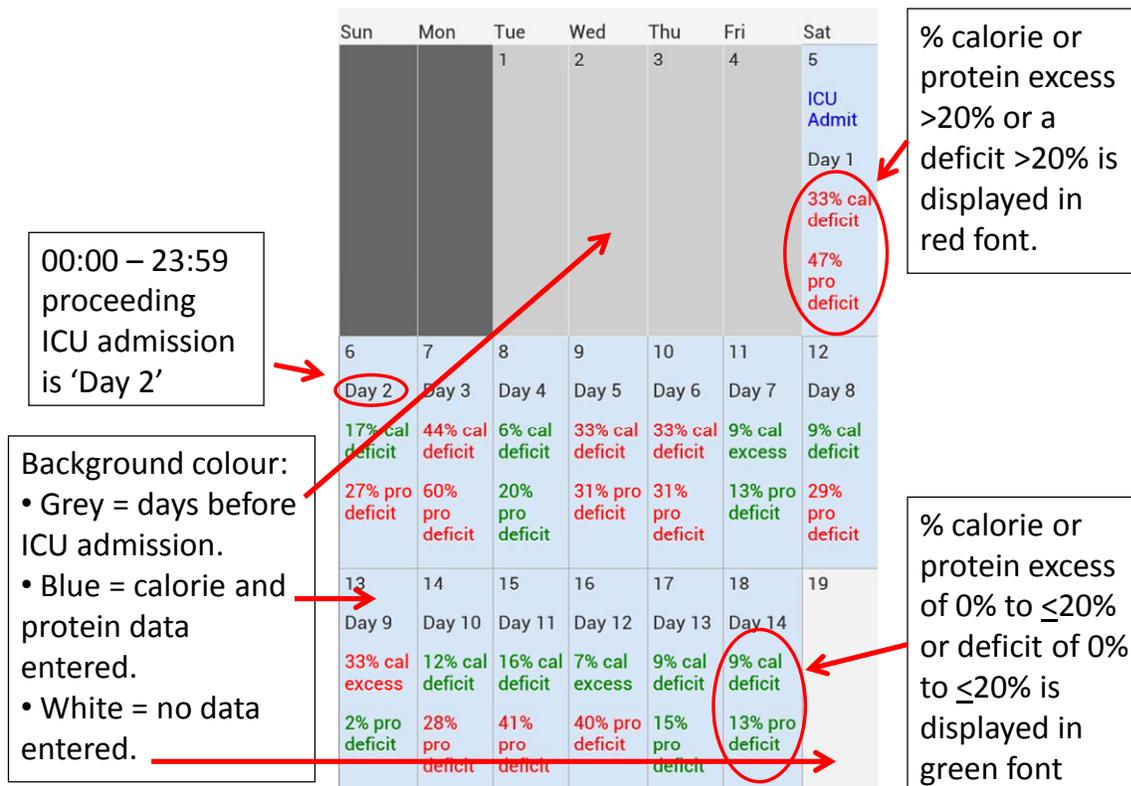
*Note:* If nutrition data has not been entered for a specific day, it will be displayed as “No Data”.



## 10. Continuing to Enter Data

Return to the **calendar page** using the navigation buttons at the top of the page. Continue entering data daily for the patient. You can use the “Go to Next Day” button to enter data on the next calendar day.

The calendar page, like on the graphs, displays the daily percent calorie and protein deficit. The screenshot below explains these features:



## 11. Prompts

There are a few prompts that are described as follows:

Day 3 prompts are based on nutrition received on Day 3, not cumulative since admission:

- percent of prescribed calories
- percent of prescribed protein
- patient's NUTRIC score

- patient's risk of malnutrition

Table 5 outlines the prompts you may receive.

**Table 5: Day 3 Prompts**

| <b>Reason for Prompt</b>   | <b>Prompt</b>   |
|--|---|
| High NUTRIC or malnutrition score and received <80% calories on day 3  | Maximize Enteral Nutrition delivery by considering: <ul style="list-style-type: none"> <li>• small bowel feeding</li> <li>• motility agents</li> </ul>                                |
| High NUTRIC or malnutrition score and received <80% protein received on day 3  | Maximize Enteral Nutrition delivery by considering: <ul style="list-style-type: none"> <li>• small bowel feeding</li> <li>• motility agents</li> <li>• protein supplements</li> </ul> |
| High NUTRIC or malnutrition score, received <80% calories and <80% protein on day 3                                    | Maximize Enteral Nutrition delivery by considering: <ul style="list-style-type: none"> <li>• small bowel feeding</li> <li>• motility agents</li> <li>• protein supplements</li> </ul> |
| High NUTRIC or malnutrition score and received $\geq 80\%$ to $\leq 120\%$ of prescribed calories and protein on day 3 | Good job! Continue monitoring nutritional adequacy!   |
| High NUTRIC or malnutrition score and received >120% of prescribed calories or protein on day 3                        | CAUTION! Received >120% prescribed calories/protein: risk for overfeeding!  |
| Low NUTRIC and malnutrition score, regardless of nutrition adequacy  | No prompt   |

Day 4 prompts are based on nutrition received on Day 4, not cumulative since admission:

- percent of prescribed calories
- percent of prescribed protein
- patient's NUTRIC score
- patient's risk of malnutrition

Table 6 outlines the prompts you may receive.

**Table 6: Day 4 Prompt**

| <b>Reason for Prompt</b>  | <b>Prompt</b>  |
|---|--|
| High NUTRIC or malnutrition score and received <80% calories and <80% protein received on day 4                         | Consider Supplemental Parenteral Nutrition                                 |
| High NUTRIC or malnutrition score and receiving $\geq 80\%$ to $\leq 120\%$ of prescribed calories and protein on day 4 | Good job! Continue monitoring nutritional adequacy!                        |
| High NUTRIC or malnutrition score and received >120% of prescribed calories or protein on day 4                         | CAUTION! Received >120% prescribed calories/protein: risk for overfeeding! |
| Low NUTRIC and malnutrition score, regardless of nutrition adequacy   | No prompt  |
| Day 3 protein and calories received >80% or prescription  | No prompt  |

Use the navigation bars at the top of the screen or **View Graph** at the bottom of the screen to leave the prompts page.

## 12. Selecting a Patient to view/edit

Patients entered in the tool under the same site are organized by their assigned Patient ID. You can select to view a patient's data two ways:

- After logging in, **select a patient** from the dropdown menu
- OR
- If viewing another patient's data, tap **Select Patient** at the top of the screen and then, on the new screen, select a patient from the dropdown menu.

Remember to continue entering nutrition data for a patient daily from ICU admission to Day 12. We encourage you to keep using the tool in your ICU for newly admitted patients and for longer than 12 days per patient.

Repeat steps 1-8 for new patients.

# Bedside Nutrition Monitoring Tool Instructions: Computer Version 1

The following instructions are written for the version of the tool accessible on a desktop or laptop. If using the tablet provided to you, refer to tablet instructions.

To access the Bedside Nutrition Monitoring Tool on your computer:

- 1) Open a new web browser.
- 2) Go to the website: [https://ceru.hpcvl.queensu.ca/EDC/bedside\\_tool/](https://ceru.hpcvl.queensu.ca/EDC/bedside_tool/)

For instructions on using the tool, please refer to the tablet instructions. All content is the same between the tablet and computer versions of the Bedside Nutrition Monitoring Tool. Minor differences you may notice on the computer version are:

- There is no pop-up box or keyboard since you have a keyboard and mouse with your computer and the website is not designed for a touch screen device.
- The screen layout is slightly different and will not match the snapshots in the tablet instructions exactly. However, the same content is present on both the computer and tablet version.

## Malnutrition Screening Tool

The Malnutrition Screening Tool predicts nutritional status as defined by the Subjective Global Assessment. It is composed of 3 short questions that are part of the **Baseline Patient Information form** and explained below. The scoring for the malnutrition risk is shown in Tables 7 and 8 below.

**Table 7: Malnutrition Screening Tool**

| Question  | Option                  | Score |
|---|-------------------------|-------|
| Has the patient lost weight recently (without trying) in the last 3 months? | No                      | 0     |
|   | Unsure                  | 2     |
|   | Yes – if yes, how much? |       |
|   | • 1-5 kg/2-11 lbs       | 1     |
|   | • 6-10 kg/13-22 lbs     | 2     |
|   | • 11-15 kg/24-33 lbs    | 3     |
| • >15 kg/>33 lbs  | 4                       |       |
| • Unsure  | 2                       |       |

|  |        |   |
|--|--------|---|
| Has the patient experienced a decline in food intake over the past week due to a decreased appetite? | No     | 0 |
|  | Unsure | 0 |
|  | Yes    | 1 |

**Table 8: Malnutrition Screening Tool scoring**

| Sum of Scores | Indicates               |
|---------------|-------------------------|
| 0-1           | No risk of malnutrition |
| $\geq 2$      | Risk of malnutrition    |

## NUTRIC Score

The NUTRIC Score is designed to quantify the risk of critically ill patients developing adverse events that may be modified by aggressive nutrition therapy. The score, of 1-9, is based on 5 variables that are explained below. The scoring system is shown in Tables 9 and 10.

**Table 9: NUTRIC Score variables**

| Variable                            | Range     | Points |
|-------------------------------------|-----------|--------|
| Age                                 | <50       | 0      |
|                                     | 50 - <75  | 1      |
|                                     | $\geq 75$ | 2      |
| APACHE II                           | <15       | 0      |
|                                     | 15 - <20  | 1      |
|                                     | 20-28     | 2      |
|                                     | $\geq 28$ | 3      |
| SOFA                                | <6        | 0      |
|                                     | 6 - <10   | 1      |
|                                     | $\geq 10$ | 2      |
| Number of Co-morbidities            | 0-1       | 0      |
|                                     | $\geq 2$  | 1      |
| Days from hospital to ICU admission | 0 - <1    | 0      |
|                                     | $\geq 1$  | 1      |

**Table 10: NUTRIC Score scoring system**

| <b>Sum of points</b> | <b>Category</b>   | <b>Explanation</b>  |
|----------------------|-------------------|---|
| 5-9                  | High NUTRIC Score | - Associated with worse clinical outcomes (mortality, ventilation).<br>- These patients are the most likely to benefit from aggressive nutrition therapy. |
| 0-4                  | LOW NUTRIC Score  | - These patients have a low malnutrition risk.  |