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NHS Bolton NHS Foundation Trust

Red Cell Dosage *Calculator*

User Guide

TechnicalSolutions WORLDWIDE

CE

NHS Bolton NHS Foundation Trust

S. Grey, Version 2 (Dec 2020) Ref: BT-SW-17

... for a better Bolton

Introduction

- The empiric nature of red cell dosing in non-bleeding patients with normovolaemic anaemia can lead to under or over-transfusion when aiming to meet a post-transfusion haemoglobin target, especially when the patient's body weight is not accounted for.

- It is always important to clinically re-evaluate patients after a single unit of red cells regardless of the total number administered. However repeat haemoglobin testing between units has a time and resource impact. This could be avoided if the volume required to meet the target haemoglobin level could be reliably predicted in the context of body weight.

- A web app was developed, technically validated and **CE marked as a class 1 medical device** in 2016 by Bolton NHS Foundation Trust, and clinically implemented in 2017 (version 1), and redeveloped in 2019 which would allow sharing with other NHS organisations (version 2).

- The implementation strategy was supported at organisational executive level and included hosting the App on the Trust intranet, promoting individual desktop access, clinical and laboratory education and awareness, embedding in blood transfusion policy, redesign of the transfusion red cell requesting process, and monthly quality impact assessment audit with staff support and feedback.

Computer says no?

- The calculator may well sometimes be contrary to the clinician's view but the calculator is intended to give the best guidance to prescribe sufficient red cells to meet a target Hb. We know that patients may be symptomatic on the margins of the transfusion triggers (70g/L or 80g/L) which is why a 5g/L 'tolerance' is built into the calculator to avoid this.
- Importantly, the Red Cell Dosage Calculator is **Decision-Support Software**. There may be a good clinical reason to prescribe a different volume: for example if two units is the calculated dose but you feel the patient is at risk of circulatory overload and only want one unit, this is clinically justified and can be documented.
- A **Transfusion-Associated Circulatory Overload (TACO)** risk assessment should be performed before every transfusion episode, and this should also be part of the decision on the appropriate red cell volume to prescribe.

Is it effective?

- After the first month of implementation 56% of red cell issues had evidence of the App being used to calculate the dose, rising to 88% by month nine. There were 581 red cell transfusions where patients received the same number of units as calculated by the web app. One hundred and forty five were excluded from the data because there was either no post-transfusion haemoglobin value, were found to be bleeding on retrospective audit, had profound anaemia and would have required more than two units to reach their target haemoglobin, or received fewer units than calculated and issued.
- Of the remaining 436 cases, 388 (89%) reached their post-transfusion target haemoglobin level. Twenty-four cases (5.5%) did not meet the target, and 24 (5.5%) exceeded the target. At financial month 8 (2017/18), 3016 units had been transfused in total with a prediction that 3348 would be transfused for normovolaemic anaemia by financial year end, representing a projected 16.5% reduction in red cell usage (18% actual).

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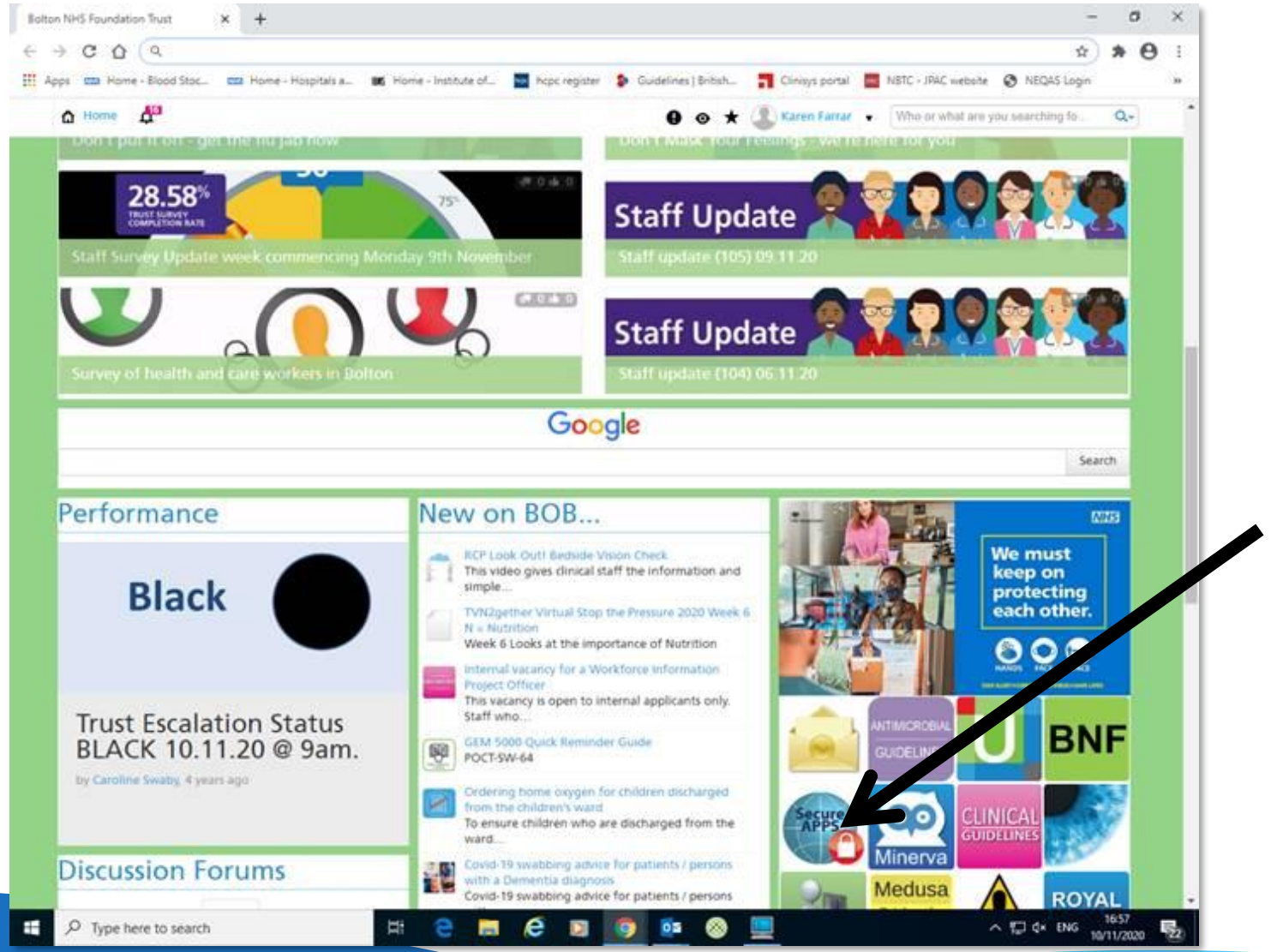
Intranet Access

The App can be hosted on an organisation's intranet page



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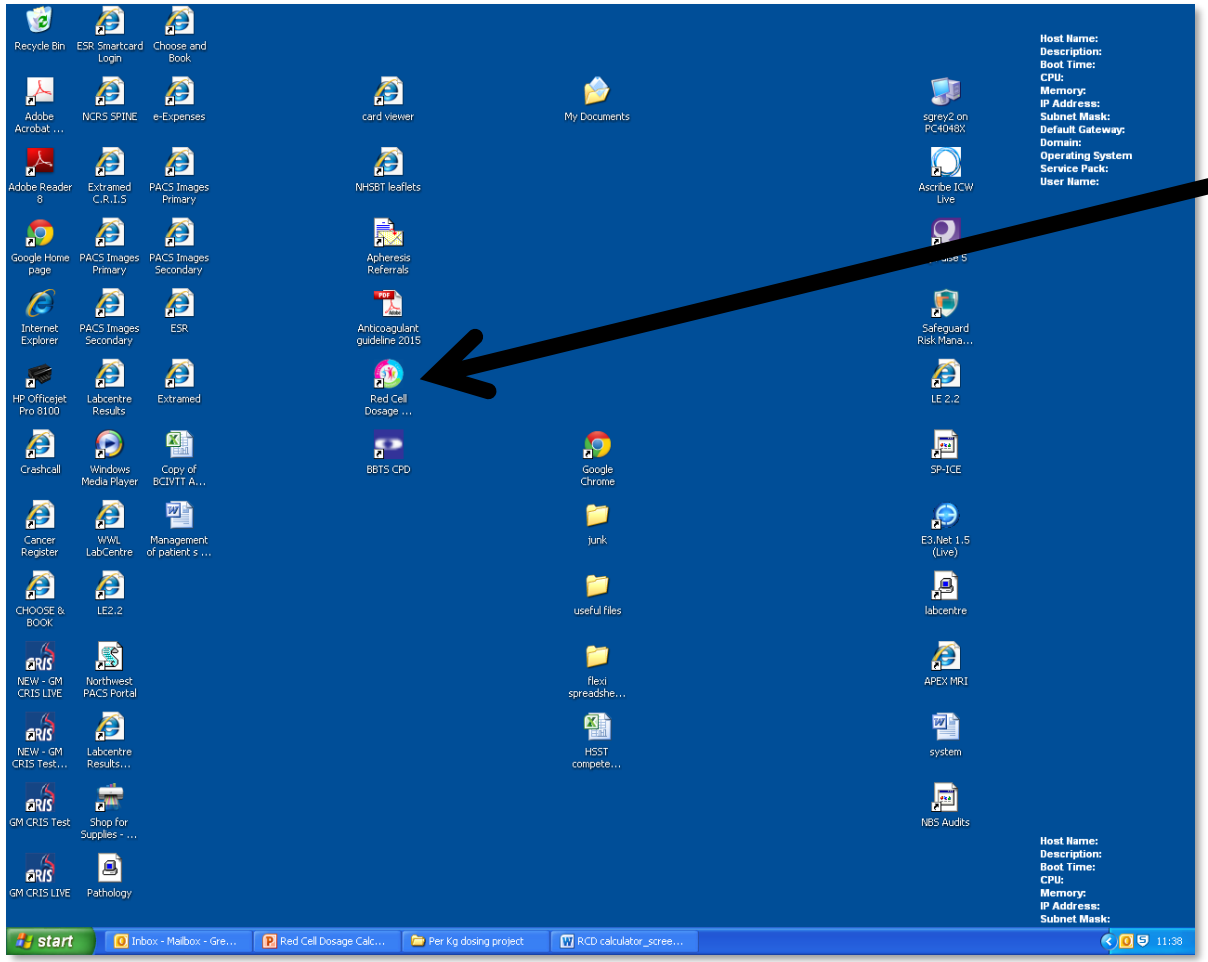
Personal Desktop Access



Enter the home page of the calculator and copy the url address

Right click on your desktop
Click ‘New’…’Shortcut’
Paste the url address

Click ‘next’

Name the shortcut:
‘Red Cell Dosage Calculator’

Click ‘finish’

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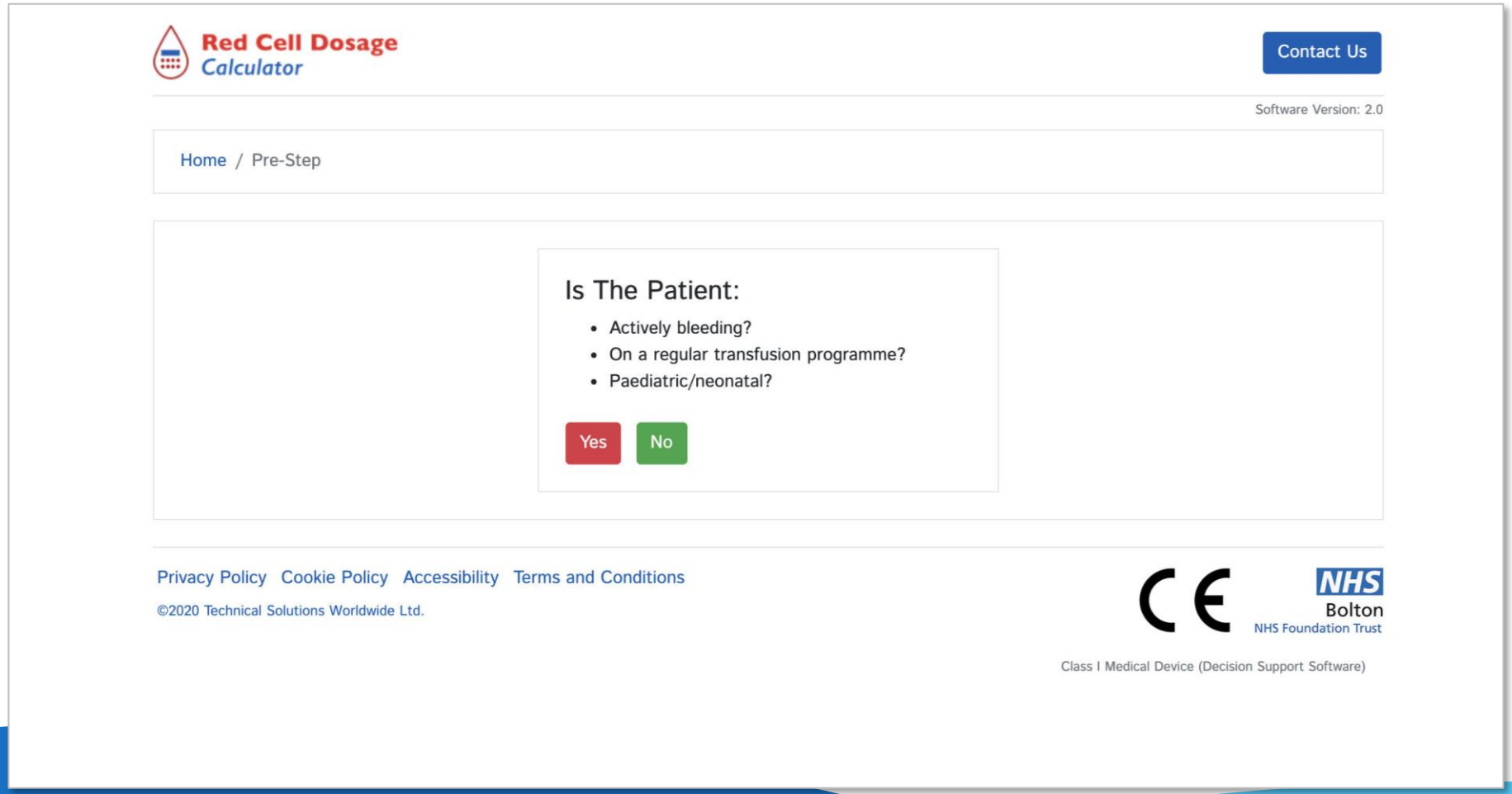
Exclude Non-Appropriate Patients



To be used on all non-bleeding adult patients who are not transfusion-dependent

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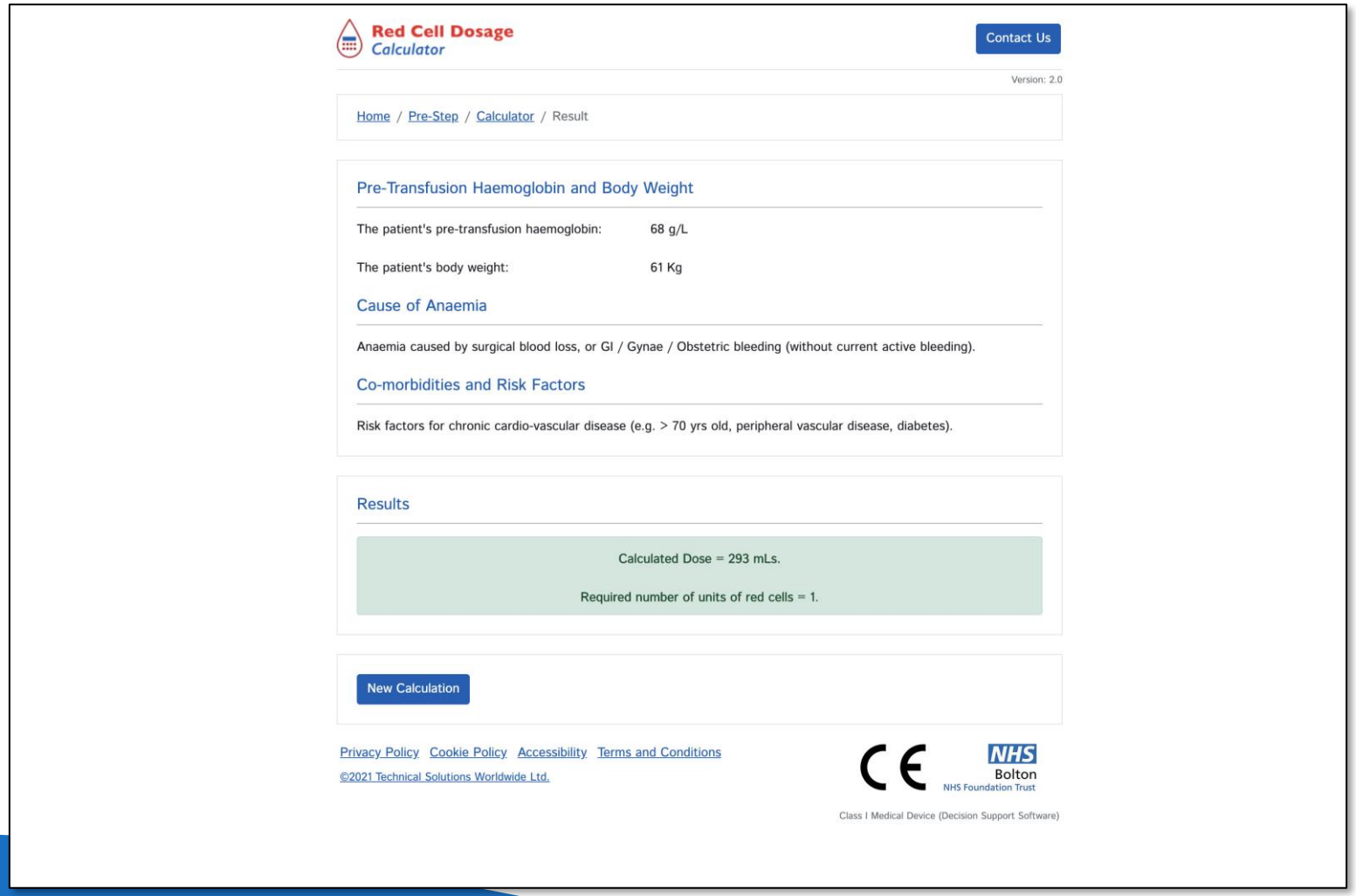
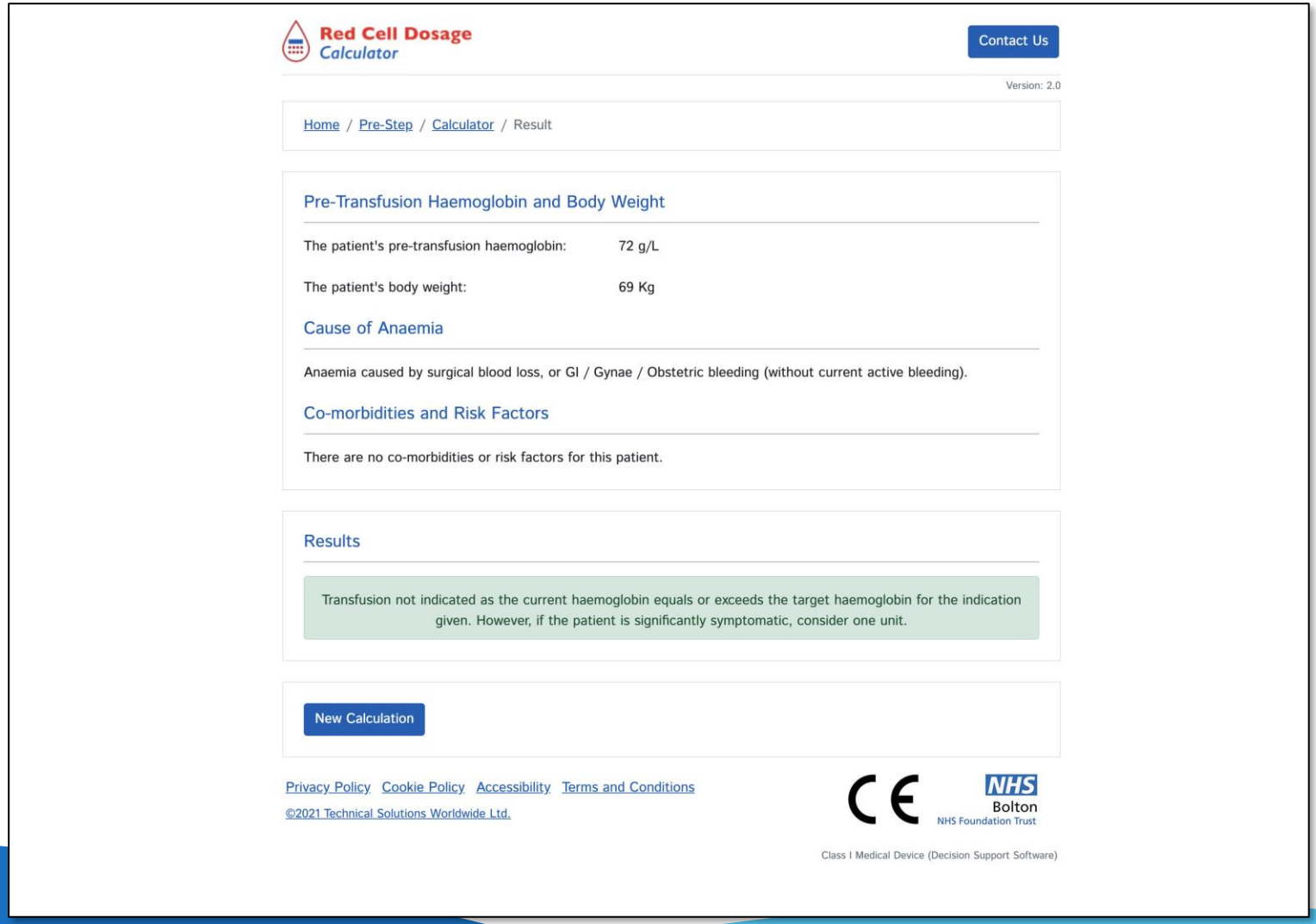
Enter Details…



Example: Borderline Pre-Transfusion Hb



Red Cell Dosage Calculator

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Pre-Transfusion Haemoglobin and Body Weight

The patient's pre-transfusion haemoglobin: 72 g/L

The patient's body weight: 69 Kg

Cause of Anaemia

Anaemia caused by surgical blood loss, or GI / Gynae / Obstetric bleeding (without current active bleeding).

Co-morbidities and Risk Factors

There are no co-morbidities or risk factors for this patient.

Results

Transfusion not indicated as the current haemoglobin equals or exceeds the target haemoglobin for the indication given. However, if the patient is significantly symptomatic, consider one unit.

New Calculation

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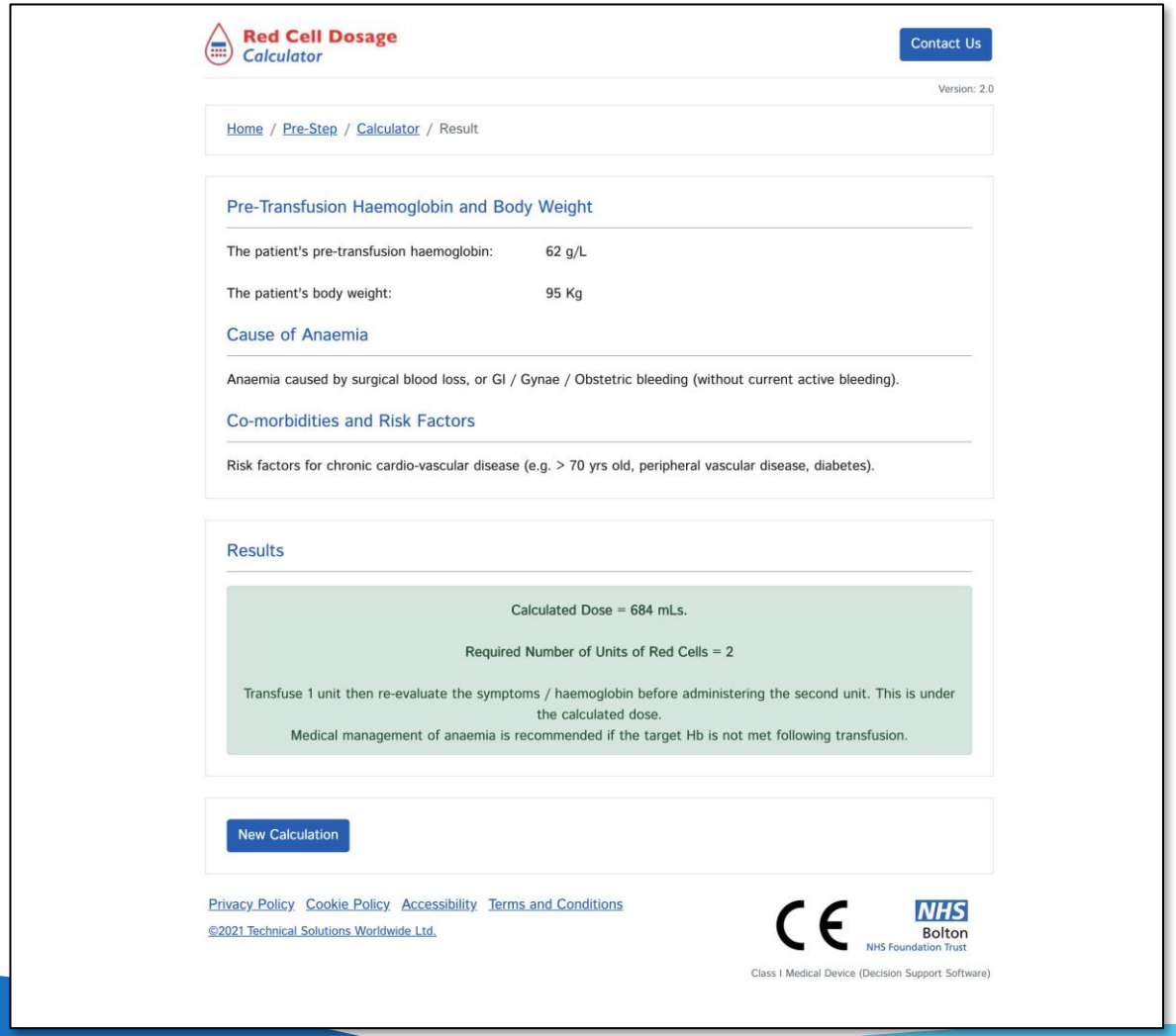
Example: >1 unit still requires review after 1st unit



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Pre-Transfusion Haemoglobin and Body Weight

The patient's pre-transfusion haemoglobin: 62 g/L

The patient's body weight: 95 Kg

Cause of Anaemia

Anaemia caused by surgical blood loss, or GI / Gynae / Obstetric bleeding (without current active bleeding).

Co-morbidities and Risk Factors

Risk factors for chronic cardio-vascular disease (e.g. > 70 yrs old, peripheral vascular disease, diabetes).

Results

Calculated Dose = 684 mLs.

Required Number of Units of Red Cells = 2

Transfuse 1 unit then re-evaluate the symptoms / haemoglobin before administering the second unit. This is under the calculated dose.
Medical management of anaemia is recommended if the target Hb is not met following transfusion.

New Calculation

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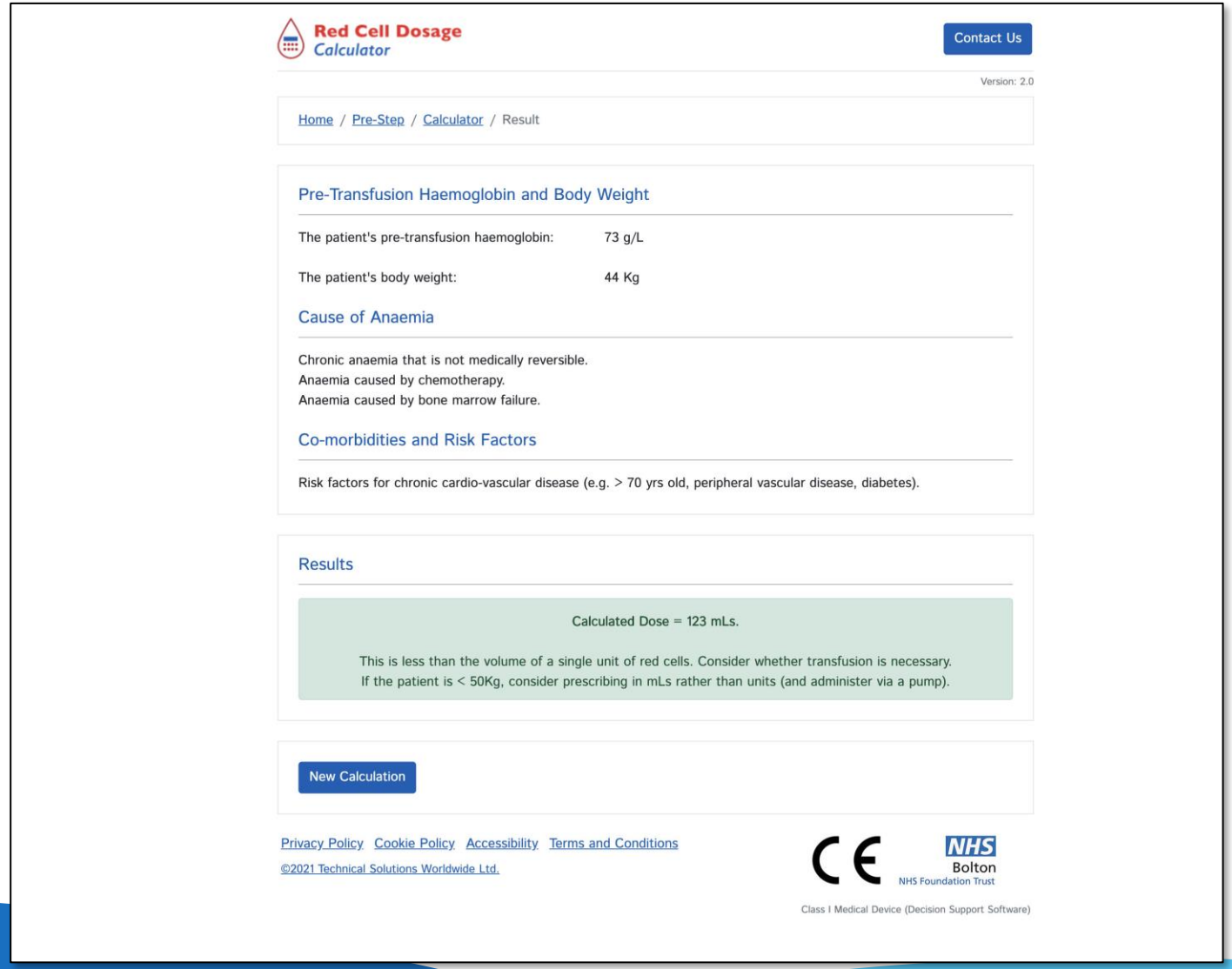
Example: Low body weight patients



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Pre-Transfusion Haemoglobin and Body Weight

The patient's pre-transfusion haemoglobin: 73 g/L

The patient's body weight: 44 Kg

Cause of Anaemia

Chronic anaemia that is not medically reversible.
Anaemia caused by chemotherapy.
Anaemia caused by bone marrow failure.

Co-morbidities and Risk Factors

Risk factors for chronic cardio-vascular disease (e.g. > 70 yrs old, peripheral vascular disease, diabetes).

Results

Calculated Dose = 123 mLs.

This is less than the volume of a single unit of red cells. Consider whether transfusion is necessary.
If the patient is < 50Kg, consider prescribing in mLs rather than units (and administer via a pump).

New Calculation

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Comments and Help

Clinical Comments/Questions

(non-technical or contractual)
htt@boltonft.nhs.uk

Technical and Contractual support:

Contact Technical Solutions Worldwide Ltd via the app website using the web form
www.rcdcalculator.co.uk

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