Il percorso italiano del PBM

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Cagliari, 29 giugno 2018

Disclosure

I do declare that I have no relevant financial or nonfinancial relationships within the products or services described, reviewed, evaluated or compared in this presentation.

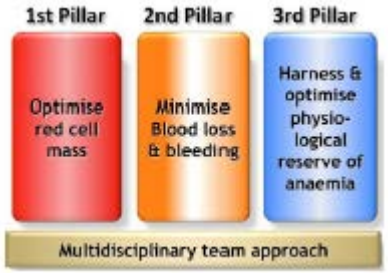
http://apps.who.int/gb/ebwha/pdf_files/WHA63/A63_R12-en.pdf

SIXTY-THIRD WORLD HEALTH ASSEMBLY

Agenda item 11.17

WHA63.12

21 May 2010



Availability, safety and quality of blood products

- This resolution of the World Health Assembly urges all 189 member states of the United Nations to implement various transfusion related strategies including **Patient Blood Management** with its three pillar approach.

World Health Organization

CENTRO NAZIONALE SANGUE

WHA63.12: "Blood Products" definition

"Any therapeutic substances derived from human blood, including whole blood, labile blood components and plasma-derived medicinal products"

World Health Organization

Padilla A, WHO 2010

CENTRO NAZIONALE SANGUE

Spediz. abb. post. - art. 1, comma 1
Legge 27-02-2004, n. 46 - Filiale di Roma

Anno 153° - Numero 241

GAZZETTA UFFICIALE

DELLA REPUBBLICA ITALIANA

PARTE PRIMA — Roma - Lunedì, 15 ottobre 2012 — SI PUBBLICA TUTTI I GIORNI NON FESTIVI

DECRETO 4 settembre 2012.

Programma di autosufficienza nazionale del sangue e dei suoi prodotti per l'anno 2012.

4. L'autosufficienza del sangue e dei suoi prodotti e il percorso di qualificazione del Sistema trasfusionale italiano

sono fornite le seguenti indicazioni per il perseguimento del predetto obiettivo generale:

h) definire ed implementare metodi e strumenti innovativi e più efficaci per garantire l'appropriatezza della gestione, organizzativa e clinica, della risorsa sangue;

- According to the Health Ministry Decree of 4th September 2012 regarding the national self-sufficiency plan of blood and blood components **the concept of PBM was first introduced** as a **tool to pursue the objective of achieving the national self-sufficiency**.
- To achieve this goal the Decree established that it was necessary "**to define and implement innovative and more effective methods and tools to ensure the appropriate clinical and organizational management of blood**".

CENTRO NAZIONALE SANGUE

Spediz. abb. post. - art. 1, comma 1
Legge 27-02-2004, n. 46 - Filiale di Roma

Anno 154° - Numero 292

GAZZETTA UFFICIALE

DELLA REPUBBLICA ITALIANA

PARTE PRIMA

Roma - Venerdì, 13 dicembre 2013

SI PUBBLICA TUTTI I GIORNI NON FESTIVI

DECRETO 29 ottobre 2013.

Programma di autosufficienza nazionale del sangue e dei suoi prodotti, per l'anno 2013.

2.6. *Definizione ed implementazione di metodi e strumenti innovativi ed efficaci per garantire l'appropriatezza della gestione, organizzativa e clinica, della risorsa sangue.*

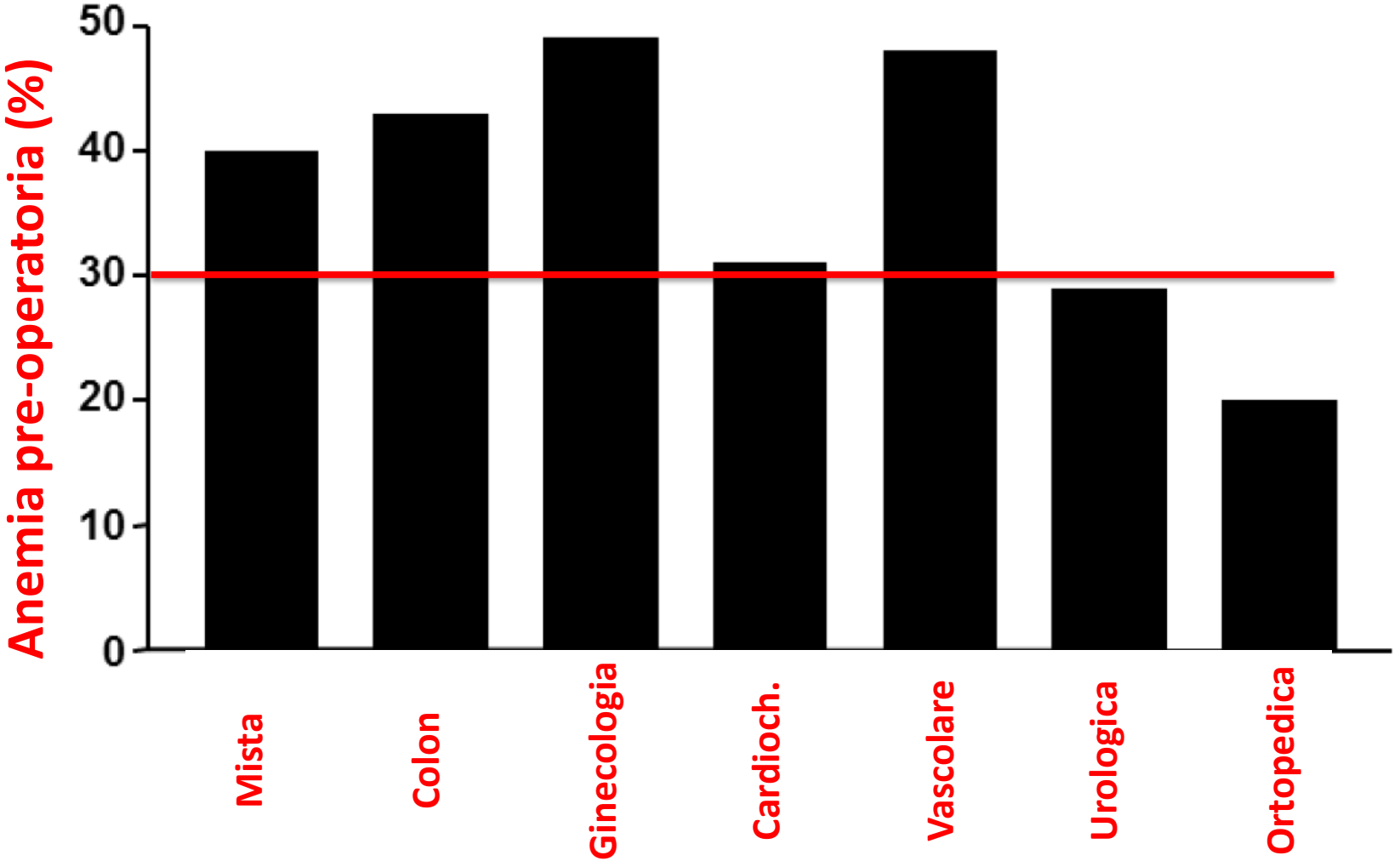
Raccomandazioni:

Con riferimento ai percorsi diagnostico-terapeutici medici e chirurgici a maggiore impatto trasfusionale, si raccomanda di definire e promuovere l'applicazione di approcci multidisciplinari evidence-based, finalizzati a migliorare in modo sostenibile l'outcome del paziente mediante il mantenimento della concentrazione emoglobinica, l'ottimizzazione dell'emostasi e la minimizzazione delle perdite ematiche. In tali ambiti, identificare i pazienti a rischio di trasfusione e definire piani di gestione clinica dello stesso («patient blood management») tesi a ridurre o eliminare il bisogno di trasfusione allogenica, riducendo al contempo i rischi ed i costi ad essa collegati.

- The 2013 national self-sufficiency plan dealt with the same issue introducing clearly the **wording PBM** and **recommending** to "**promote a multidisciplinary and evidence-based approach aiming at improving the patient's outcome through the 3 pillars of PBM**".

CENTRO NAZIONALE SANGUE

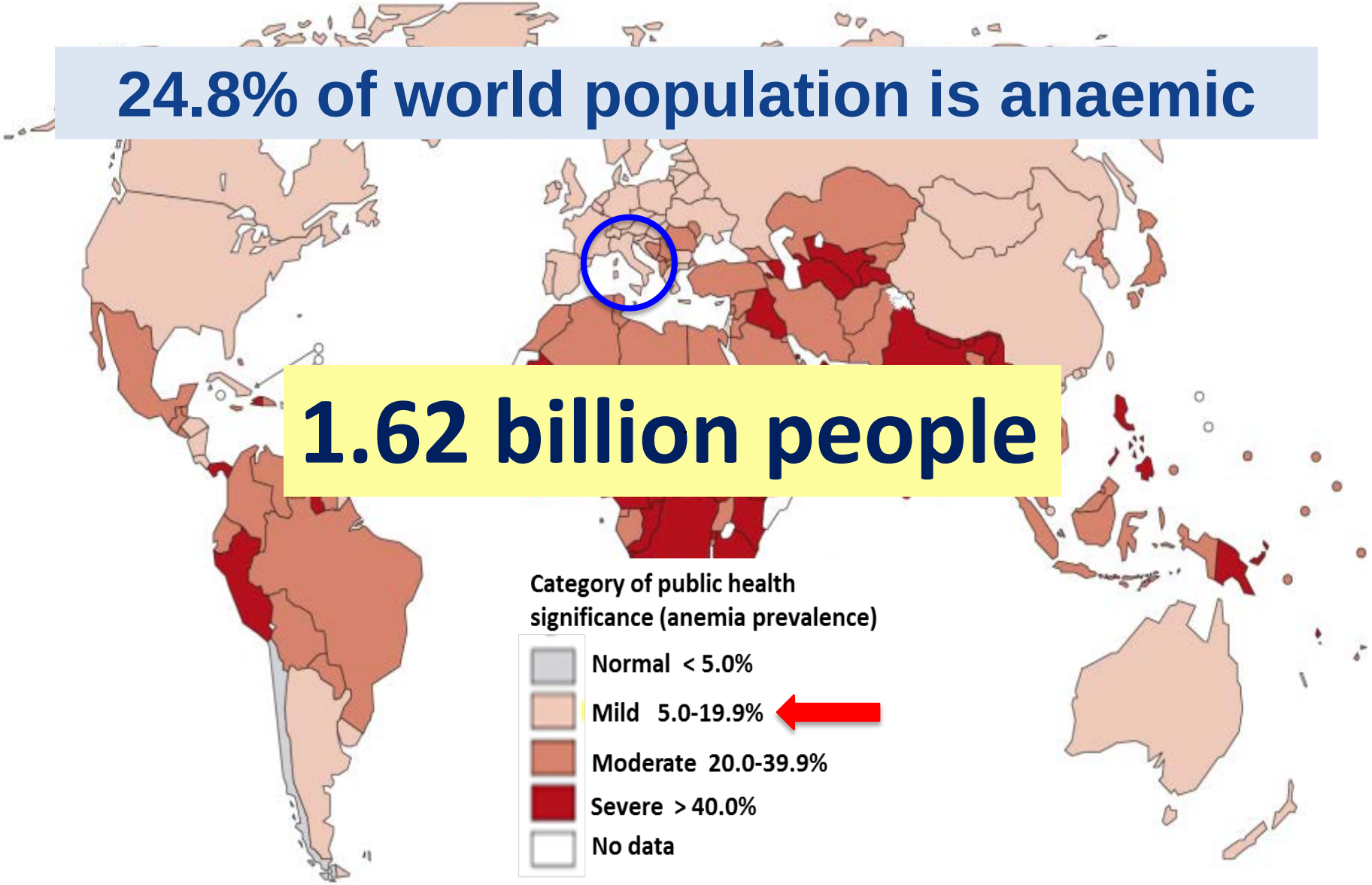
Prevalenza dell'anemia pre-operatoria nei pazienti candidati a interventi di chirurgia maggiore



Muñoz M, Blood Transfus 2015

Worldwide prevalence of anaemia

24.8% of world population is anaemic



de Benoist B, et al. Worldwide Prevalence of Anaemia 1993–2005: WHO Global Database on Anaemia. Geneva, Switzerland: World Health Organization Press; 2008. Available at: http://whqlibdoc.who.int/publications/2008/9789241596657_eng.pdf

CENTRO NAZIONALE SANGUE

Il problema: l'anemia preoperatoria

Anemia preoperatoria e outcome postoperatorio in chirurgia non cardiaca: uno studio retrospettivo di coorte

Khaled M Musallam, Hani M Tamim, Toby Richards, Donat R Spahn, Frits R Rosendaal, Aida Habbal, Mohammad Khreiss, Fadi S Dahdaleh, Kaivan Khavandi , Pierre M Sfeir, Assaad Soweid, Jamal J Hoballah, Ali T Taher, Faek R Jamali

Lancet 2011; 378: 1396–407

Published Online October 6, 2011 DOI:10.1016/S0140-6736(11)61381-0

See Comment page 1362

Department of Internal Medicine (K M Musallam MD, H M Tamim PhD, A Soweid MD, Prof A T Taher MD), Department of Surgery (A Habbal BSN, M Khreiss MD, F S Dahdaleh MD, P M Sfeir MD, Prof J J Hoballah MD, F R Jamali MD), American University of Beirut Medical Center, Beirut, Lebanon; Angelo Bianchi Bonomi Haemophilia and Thrombosis Centre, Fondazione IRCCS Cà Granda, Ospedale Maggiore Policlinico, Milan, Italy (K M Musallam); College of Medicine, King Abdullah International Medical Research Center, King Saud bin Abdulaziz University for Health Sciences, Riyadh, Saudi Arabia (H M Tamim); Division of Surgery and Interventional Science, University College London Hospital, London, UK

Summary

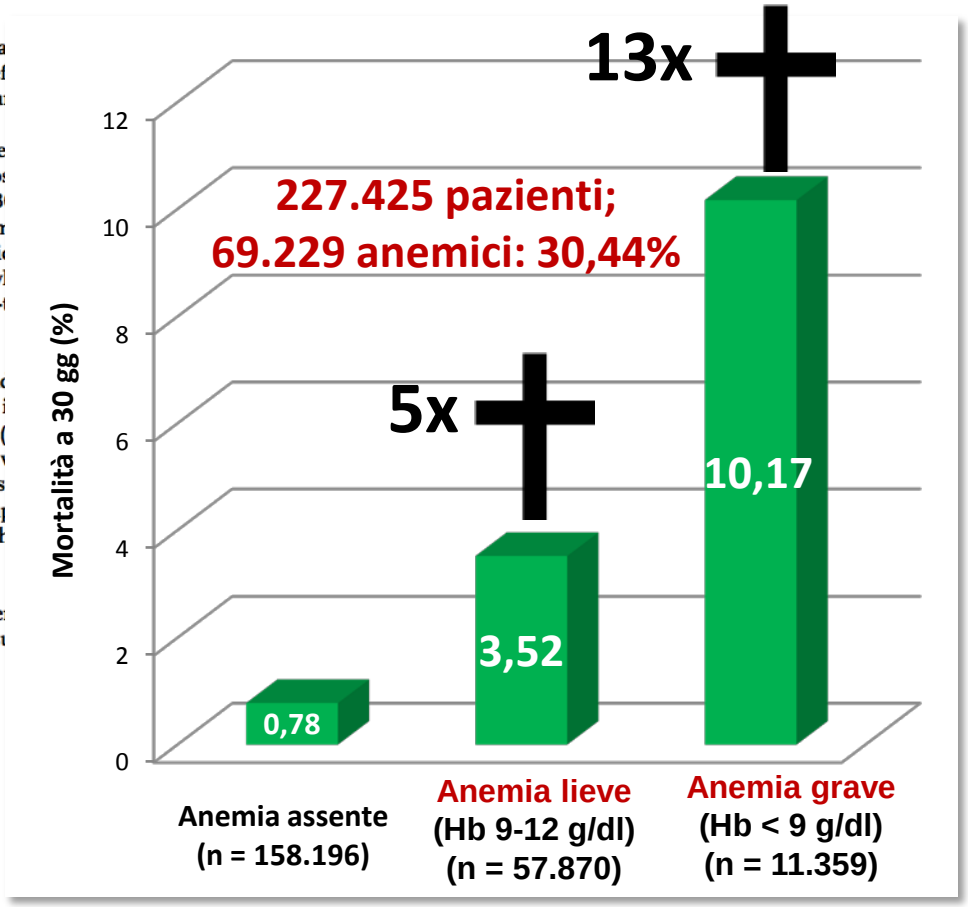
Background Preoperative anaemia is associated with adverse outcomes a non-cardiac surgery are not well established. We aimed to assess the ef postoperative morbidity and mortality in patients undergoing major non-ca

Methods We analysed data for patients undergoing major non-cardiac surge Surgeons' National Surgical Quality Improvement Program database (a pros 211 hospitals worldwide in 2008). We obtained anonymised data for 3 respiratory, CNS, urinary tract, wound, sepsis, and venous thromboem preoperative and perioperative risk factors. We used multivariate logisti modified (nine predefined risk factor subgroups) effect of anaemia, wi concentration >29–<39% in men and >29–<36% in women) or moderate- postoperative outcomes.

Findings We obtained data for 227 425 patients, of whom 69 229 (30·44%) hac postoperative mortality at 30 days was higher in patients with anaemia than i 1·42, 95% CI 1·31–1·54); this difference was consistent in mild anaemia (anaemia (1·44, 1·29–1·60). Composite postoperative morbidity at 30 days v than in those without anaemia (adjusted OR 1·35, 1·30–1·40), again consis 1·26–1·36) and moderate-to-severe anaemia (1·56, 1·47–1·66). When comp defined risk factor, patients with anaemia and most risk factors had a high morbidity than did patients with either anaemia or the risk factor alone.

Interpretation Preoperative anaemia, even to a mild degree, is independe 30-day morbidity and mortality in patients undergoing major non-cardiac su

Funding Vifor Pharma.



Musallam K et al. *Lancet 2011;378:1396-407*

Retrospective, 227,425 patients

Modificato da Zacharowski K, SIMTI 2016

CENTRO NAZIONALE SANGUE

Italy 2013

Arthroplasties in Italy
(Hip & Knee: HA,KA), year 2013

162,162

Anaemic patients (HA, KA) to be managed in peri-operative period in Italy, year 2013:

From 8,108 to 32,270

~ 3-10% mortality (Musallam K, 2011)

~ From 243-811 to 968-3,227 preventable deaths

CENTRO NAZIONALE SANGUE

In the 2014 national self-sufficiency plan a project, coordinated by the National Blood Centre, foreseeing the first pilot application in the field of elective major orthopaedic replacement surgery was introduced

TABELLA I.
Interventi di sostituzione protesica articolare in Italia. Anni 2001-2010. (Fonte: Schede di Dimissione Ospedaliera - Ministero della Salute).

Cod.	Denominazione	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	% (°)
Anca												
81.51	Sostituzione totale dell'anca	45.656	48.672	51.241	54.349	55.516	57.521	58.555	58.679	59.397	59.631	3,0
81.52	Sostituzione parziale dell'anca	20.732	21.331	20.981	21.627	22.380	22.386	22.289	23.034	22.506	23.916	1,6
(*)	Revisione di sostituzione dell'anca	5.969	6.451	6.494	6.683	6.913	7.170	7.229	7.164	7.264	7.342	2,3
	Totale	**72.357**	**76.454**	**78.716**	**82.659**	**84.809**	**87.077**	**88.073**	**88.877**	**89.167**	**90.889**	**2,6**
Ginocchio												
81.54	Sostituzione totale del ginocchio	26.697	30.896	35.650	40.803	43.692	47.862	51.971	54.269	54.652	56.664	8,7
(**)	Revisione di sostituzione del ginocchio	1.262	1.656	1.900	2.182	2.463	2.657	2.997	3.299	3.623	3.630	12,5
	Totale	**27.959**	**32.552**	**37.550**	**42.985**	**46.155**	**50.519**	**54.968**	**57.568**	**58.275**	**60.294**	**8,9**
Spalla												
81.80	Sostituzione totale della spalla	694	798	934	1.238	1.454	1.678	1.991	2.161	2.511	2.959	17,5
81.81	Sostituzione parziale della spalla	844	875	916	1.020	1.049	1.188	1.185	1.233	1.242	1.331	5,2
	Totale	**1.538**	**1.673**	**1.850**	**2.258**	**2.503**	**2.866**	**3.176**	**3.394**	**3.753**	**4.290**	**12,1**
Altre articolazioni												
81.56	Sostituzione totale della tibiotarsica											11,2
81.57	Sostituzione dell'articolazione del piede e dell'alluce											7,4
81.59	Revisione di sostituzione di articolazione delle estremità inferiori, non classificata altrove											-5,3
81.73	Sostituzione totale del polso											2,3
81.84	Sostituzione totale del gomito											17,8
81.97	Revisione di sostituzione di articolazione dell'arto superiore											8,1
	Totale	**847**	**974**	**1.034**	**1.358**	**1.910**	**1.993**	**1.852**	**1.686**	**1.655**	**1.607**	**7,4**
	Totale complessivo	***102.701***	***111.653***	***119.150***	***129.260***	***135.377***	***142.455***	***148.069***	***151.525***	***152.850***	***157.080***	**4,8**

In Italy, every year more than 160,000 arthroplasties are performed in 750 facilities. Total estimated cost only for surgical DRGs: ≅ 1 billion €

(°) Incremento medio annuo espresso in percentuale
(*) Codici intervento di revisione anca: 81.53; dal 1° gennaio 2009 anche 00.70, 00.71, 00.72, 00.73
(**) Codici di intervento di revisione ginocchio: 81.55; dal 1° gennaio 2009 anche 00.80, 00.81, 00.82, 00.83, 00.84

Torre M et al. **Il Registro Italiano Artroprotesi (RIAP): stato dell'arte.** Giornale Italiano di Ortopedia e Traumatologia 2013; **39**: 90-95

CENTRO NAZIONALE SANGUE

2013 - 2014

PATIENT
BLOOD
MANAGEMENT
ITALY

CENTRO NAZIONALE SANGUE

Multidisciplinary recommendations on PBM in elective major orthopaedic surgery - July 2015 - 5 scientific societies

Recommendations for the implementation of a Patient Blood Management programme. Application to elective major orthopaedic surgery in adults

Stefania Vaglio[1,2], Domenico Prisco[3], Gianni Biancofiore[4], Daniela Rafanelli[5], Paola Antonioli[6], Michele Lisanti[7], Lorenzo Andreani[7], Leonardo Basso[8], Claudio Velati[9], Giuliano Grazzini[1], Giancarlo M. Liumbruno[1]

Italian Society of Transfusion Medicine and Immunohaematology (SIMTI)

- Italian Society of Italian Society of Orthopaedics and Traumatology (SIOT)
- Italian Society of Anaesthesia, Analgesia, Resu scitation and Intensive Therapy (SIAARTI)
- Italian Society for the Study of Haemostasis and Thrombosis (SISET)
- The National Association of Hospital Medical Directors (ANMDO)

CENTRO NAZIONALE SANGUE

Meta-analysis of the association between preoperative anaemia and mortality after surgery

A. J. Fowler[1], T. Ahmad[1], M. K. Phull[2], S. Allard[3], M. A. Gillies[4] and R. M. Pearse[1]

[1]Barts and the London School of Medicin…, and Departments of [2]Anaesthesia and [3]Haematology, Royal London Hospital, Barts Health NH… Critical Care and Pain Medicine, Royal Infirmary of Edinburgh, Edinburgh, UK

Correspondence to: Professor R. M. Pearse, …London E1 1BB, UK (e-mail: r.pearse@qmul.ac.uk)

949,445 patients

371,594 with anaemia

mortality, acute kidney injury, infections, stroke

The fact that it has been proved that preoperative anaemia is associated with poor outcomes after surgery makes it an ideal tool to create an urgent need for PBM implementation

Background: Numerous pu…ns between anaemia and adverse outcomes after surgery. Hov…cribing the impact of preoperative anaemia on postoperative ou…

Methods: A systematic revi…ies exploring associations between preoperative anaemia and p…udies investigating trauma, burns, transplant, paediatric and c… primary outcome was 30-day or in-hospital mortality. Secon… stroke and myocardial infarction. Predefined analyses were pe…gery subgroups. A *post hoc* analysis was undertaken to evaluate …ction. Data are presented as odds ratios (O…

Results: Fro…ified. Some 371 594 patients (39·1 per c…ortality (OR 2·90, 2·30 to 3·68; $I^2 = 97$ per cent; I… 6; $I^2 = 60$ per cent; $P < 0·001$) and infection (OR 1·93, 1·17…g cardiac surgical patients, anaemia was associated with stroke (OR 1·2… $P = 0·009$) but not myocardial infarction (OR 1·11, 0·68 to 1·82; $I^2 = 13$ per cen… was associated with an increased incidence of red cell transfusion (OR 5·04, 4·12 to 6·17; I… ent; $P < 0·001$). Similar findings were observed in the cardiac and non-cardiac subgroups.

Conclusion: Preoperative anaemia is associated with poor outcomes after surgery, although heterogeneity between studies was significant. It remains unclear whether anaemia is an independent risk factor for poor outcome or simply a marker of underlying chronic disease. However, red cell transfusion is much more frequent amongst anaemic patients.

Fowler AJ, BJS 2015

CENTRO NAZIONALE SANGUE

Supplemento ordinario alla "Gazzetta Ufficiale,, n. 300 del 28 dicembre 2015 - Serie generale

Spediz. abb. post. - art. 1, comma 1
Legge 27-02-2004, n. 46 - Filiale di Roma

GAZZETTA UFFICIALE
DELLA REPUBBLICA ITALIANA

PARTE PRIMA Roma - Lunedì, 28 dicembre 2015 SI PUBBLICA TUTTI I GIORNI NON FESTIVI

DIREZIONE E REDAZIONE PRESSO IL MINISTERO DELLA GIUSTIZIA - UFFICIO PUBBLICAZIONE LEGGI E DECRETI - VIA ARENULA, 70 - 00186 ROMA
AMMINISTRAZIONE PRESSO L'ISTITUTO POLIGRAFICO E ZECCA DELLO STATO - VIA SALARIA, 691 - 00138 ROMA - CENTRALINO 06-85081 - LIBRERIA DELLO STATO PIAZZA G. VERDI, 1 - 00198 ROMA

MINISTERO DELLA SALUTE

DECRETO 2 novembre 2015.

Provisions on quality and safety of blood and blood components

Art. 25 Transfusion safety

5. For the **prevention of avoidable transfusions** and with particular reference to the preparation of the patient who will undergo pre-scheduled surgical treatments, specific programmes are defined and implemented nationwide (**Patient Blood Management**) on the basis of **guidelines to be issued by the National Blood Centre within six months after entry into force of the present Decree.**

CENTRO NAZIONALE SANGUE

The Italian Regulatory Guidelines for the implementation of Patient Blood Management

Stefania Vaglio[1,2], Sara Gentili[1], Giuseppe Marano[1], Simonetta Pupella[1], Daniela Rafanelli[3], Gianni Biancofiore[4], Paola Antonioli[5], Claudio Velati[6], Giancarlo M. Liumbruno[1].

Recommendations for the pre-, intra- and post-operative period

1 Patients with acquired or congenital coagulopathies and/or thrombocytopathies or positive bleeding anamnesis or those being treated with anticoagulants and/or anti-platelet drugs shall be managed in cooperation with haemostasis and thrombosis specialists.

2 In all adult, clinically stable inpatients who are to undergo a homologous or autologous red blood cell (RBC) transfusion, the adoption of a restrictive transfusion threshold established in cooperation with a transfusion medicine specialist, is recommended. These include critical patients, those with a history of cardiovascular pathologies and those who are to undergo orthopaedic or heart surgery.

3 The threshold for homologous or autologous RBC transfusions in other categories of patients, shall be adopted in cooperation with a transfusion medicine specialist.

4 In clinically stable inpatients needing homologous or autologous RBC transfusions a single unit blood transfusion policy shall be adopted. Further RBC units shall be transfused after a thorough clinical reassessment of the patient.

5 When patients with thrombocytopenia, acquired platelet disorders, or disseminated intravascular coagulation undergo major elective surgery and clinically relevant bleeding or bleeding in vital organs is expected, a prophylactic transfusion of platelet concentrates is suggested. The transfusion threshold, timing and modality shall be established in cooperation with a transfusion medicine specialist.

6 Predeposit autologous blood donation programmes shall be carried out pursuant to the pertinent law in force*.

* At the moment, predeposit autologous donation is indicated for: i) patients with rare erythrocyte phenotype or with complex alloimmunisations for whom it is difficult to obtain compatible homologous blood components; ii) donors of bone marrow haematopoietic stem cells; iii) children who are to undergo scoliosis surgery[9].

7 The volume and frequency of blood samples for laboratory tests shall be minimised to prevent iatrogenic anaemia.

Blood Transfus 2017

CENTRO NAZIONALE SANGUE

Recommendation N. 4: pre- intra- and post-operative period – In clinically stable inpatients needing (allogeneic or autologous) RBC transfusions a **single unit blood transfusion policy shall be adopted**. Further RBC units shall be transfused after a thorough clinical reassessment of the patient.

CENTRO NAZIONALE SANGUE

PATIENT BLOOD MANAGEMENT ITALIA

ONLY ONE

UNA TRASFUSIONE
UNA DECISIONE CLINICA
INDIPENDENTE

LA VIA SEGUITA DALL'ITALIA COMINCIA DA 1

Prescrivi 1 unità di sangue alla volta per ridurre il rischio di eventi avversi

PER TRATTARE L'ANEMIA NEL PAZIENTE STABILE NON EMORRAGICO:

1. Adotta il Patient Blood Management per gestire la risorsa sangue del tuo paziente
2. Quando c'è l'indicazione clinica trasfondi 1 sola unità per volta
3. Rivaluta il tuo paziente prima di trasfondere una seconda unità

PATIENT BLOOD MANAGEMENT ITALIA

Per maggiori informazioni:
www.centronazionalesangue.it/pbm

ONLY + SICUREZZA ONE

ONLY + QUALITÀ ONE

ONLY + APPROPRIATEZZA ONE

CENTRO NAZIONALE SANGUE

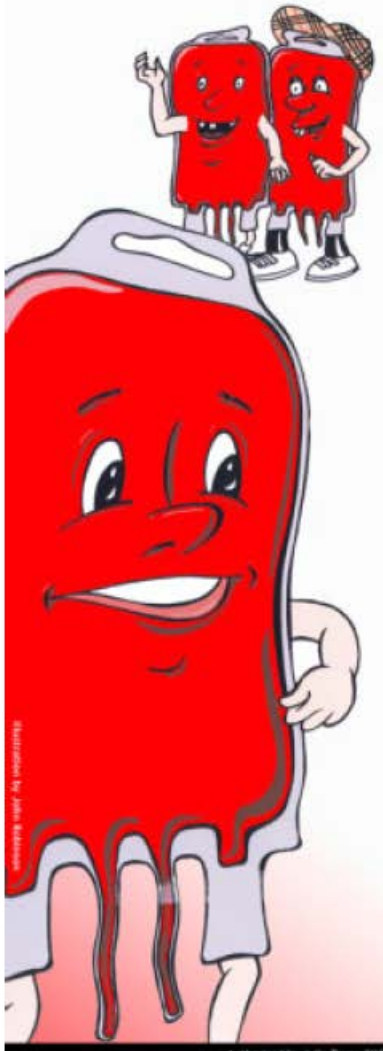
The right transfusion therapy

THE RIGHT TRANSFUSION?

1. THE RIGHT PATIENT
2. THE RIGHT INDICATION
3. THE RIGHT PRODUCT
4. **THE RIGHT DOSE**
5. THE RIGHT TIME
6. THE RIGHT ROUTE
7. THE RIGHT DOCUMENTATION
8. THE RIGHT RESPONSE

Stay Single
... prescribe single units

Fremantle Hospital & Health Service



Prescribing a single unit of blood may reduce the risk of an adverse event

In accord with the NHMRC guidelines a "ONE UNIT" policy will be implemented from August 1st 2009

- Only one unit of blood can be ordered if a patient is not actively bleeding.
- Only one unit will be issued at a time.
- 2nd unit will be issued if clinically indicated after the patient has been reviewed.
- Each unit transfused is an independent clinical decision.
- If requested the Haematology Department will be happy to provide advice on the appropriate management of anaemia

Illustration by John Kennedy

Authorised by Julie Tovey CNC Transfusion Med - July 2009 Review July 2013

Government of Western Australia
Department of Health
Fremantle Hospital and Health Service

One Unit Policy

Prescribing a SINGLE unit of blood may reduce the risk of an adverse event

In accordance with the NHMRC Guidelines

Only one unit of blood can be ordered if a patient is not actively bleeding.

Only one unit will be issued at a time.

Each unit transfused is an independent clinical decision.

2nd unit will be issued if clinically indicated after the patient has been reviewed.

Indications for second unit are:

- Active Blood loss
- Hb <70g/L
- Ongoing chest pain
- Less than 8g/L rise in Hb following first unit

If requested the Hematology Department will be happy to provided advice on the appropriate management of anaemia.

Delivering a **Healthy WA**

Leahy MF, Transfusion 2014

CENTRO NAZIONALE SANGUE

NHS
Blood and Transplant

SINGLE Unit Blood Transfusions reduce the risk of an adverse reaction

Don't give two without review

THINK!

- Is your patient symptomatic?
- Is the transfusion appropriate?
- What is the haemoglobin trigger level?
- What is the patient's target haemoglobin level?

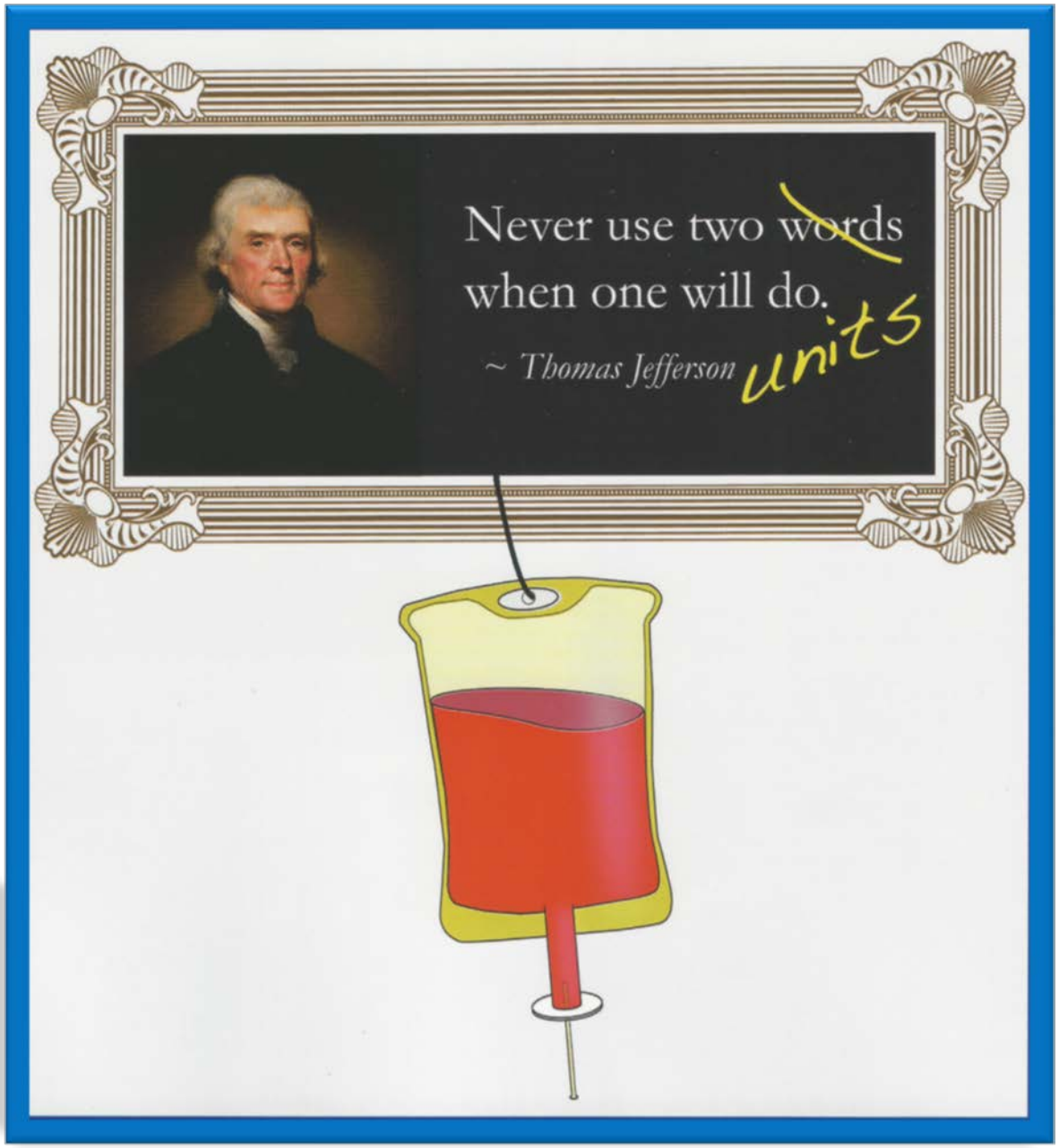
Each unit transfused is an independent clinical decision

DO!

- ✓ Clinically re-assess the patient after each unit transfused.
- ✓ Only one unit should be ordered for non-bleeding patients.
- ✓ Document the reason for Transfusion.[1]

1. *British Committee for Standards in Haematology: Addendum to Administration of Blood Components. 2012*

CENTRO NAZIONALE SANGUE


Never use two words
when one will do.
~ Thomas Jefferson
units

NHS
Blood and Transplant

Platelets

Don't use two...

...when one will do

For prophylactic use in a 70kg adult, one adult therapeutic dose (ATD) typically gives an immediate rise in platelet count of

20 - 40 x 10^9/l(1)

Do not administer double dose platelets for prophylactic transfusions as this practice does not decrease the risk of bleeding(2)

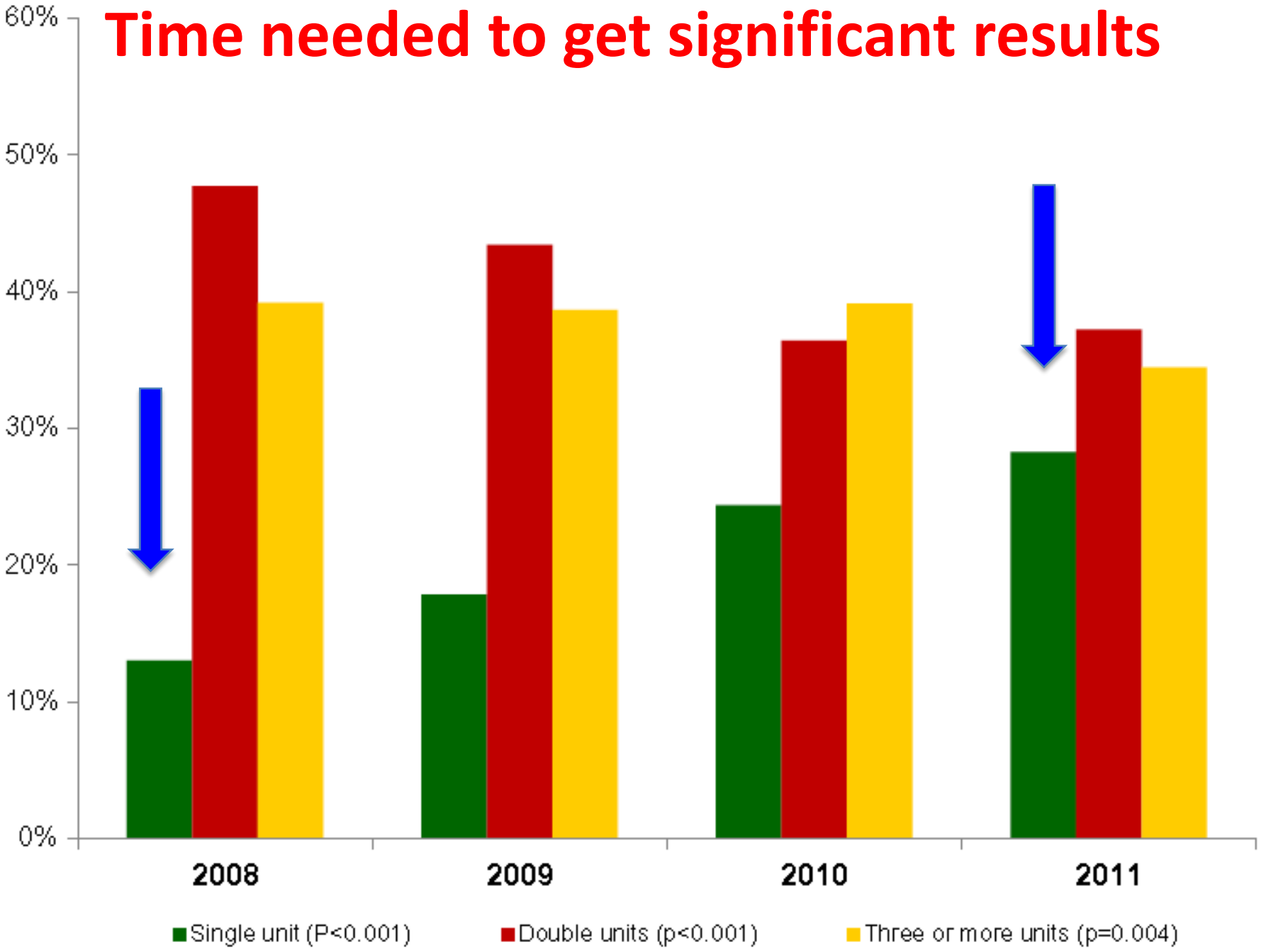
Request and administer one unit/ATD, then reassess your patient.

A platelet increment can be obtained 10 minutes after completion of the transfusion(3)

1. Norfolk D (Ed) (2013) *Handbook of Transfusion Medicine* 5th Edition, The Stationery Office
2. Slichter SJ, Kaufman RM, Assmann SF, et al. *Dose of prophylactic platelet transfusions and prevention of haemorrhage.* N Engl J Med 2010;362:600-13
3. O'Connell B, Lee EJ, Schiffer CA. *The value of 10-minute post transfusion platelet counts.* Transfusion 1988; 28: 66-67

CENTRO NAZIONALE SANGUE

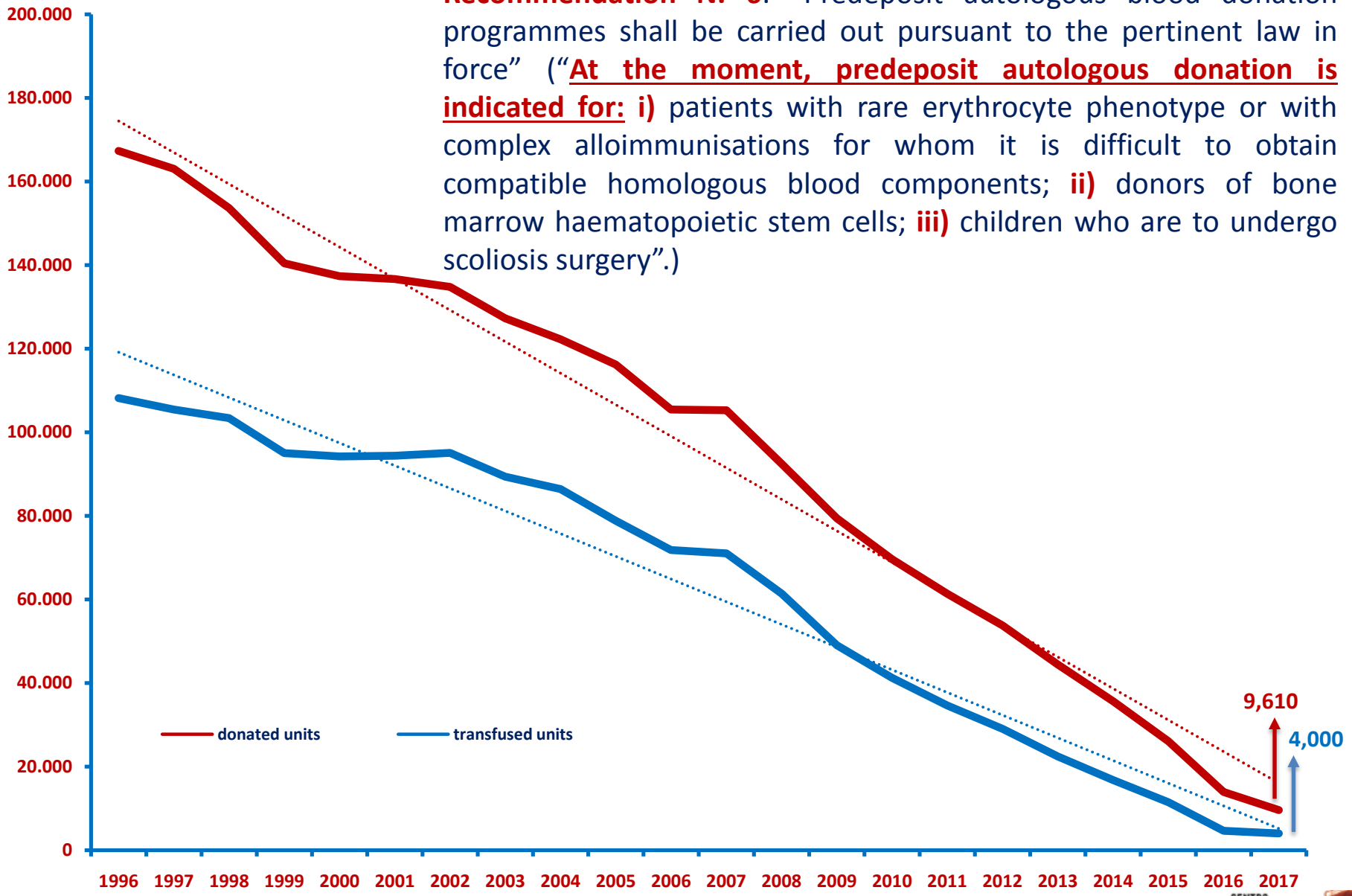
Time needed to get significant results



Leahy MF, Transfusion 2014

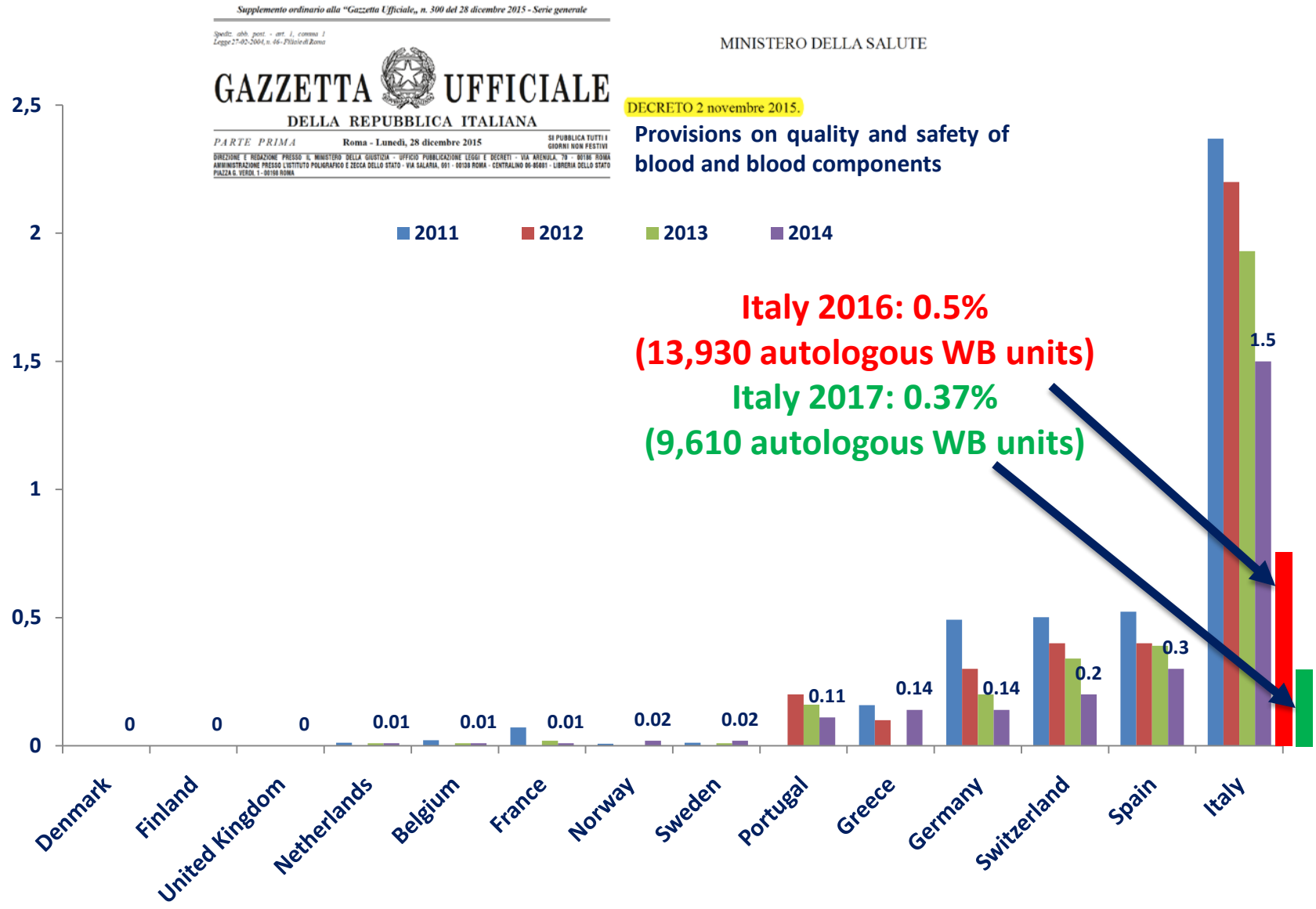
Autologous blood - Italy: 1996-2017

Recommendation N. 6: "Predeposit autologous blood donation programmes shall be carried out pursuant to the pertinent law in force" ("**At the moment, predeposit autologous donation is indicated for: i)** patients with rare erythrocyte phenotype or with complex alloimmunisations for whom it is difficult to obtain compatible homologous blood components; **ii)** donors of bone marrow haematopoietic stem cells; **iii)** children who are to undergo scoliosis surgery".)



CENTRO NAZIONALE SANGUE

Autologous whole blood units/total whole blood (%)



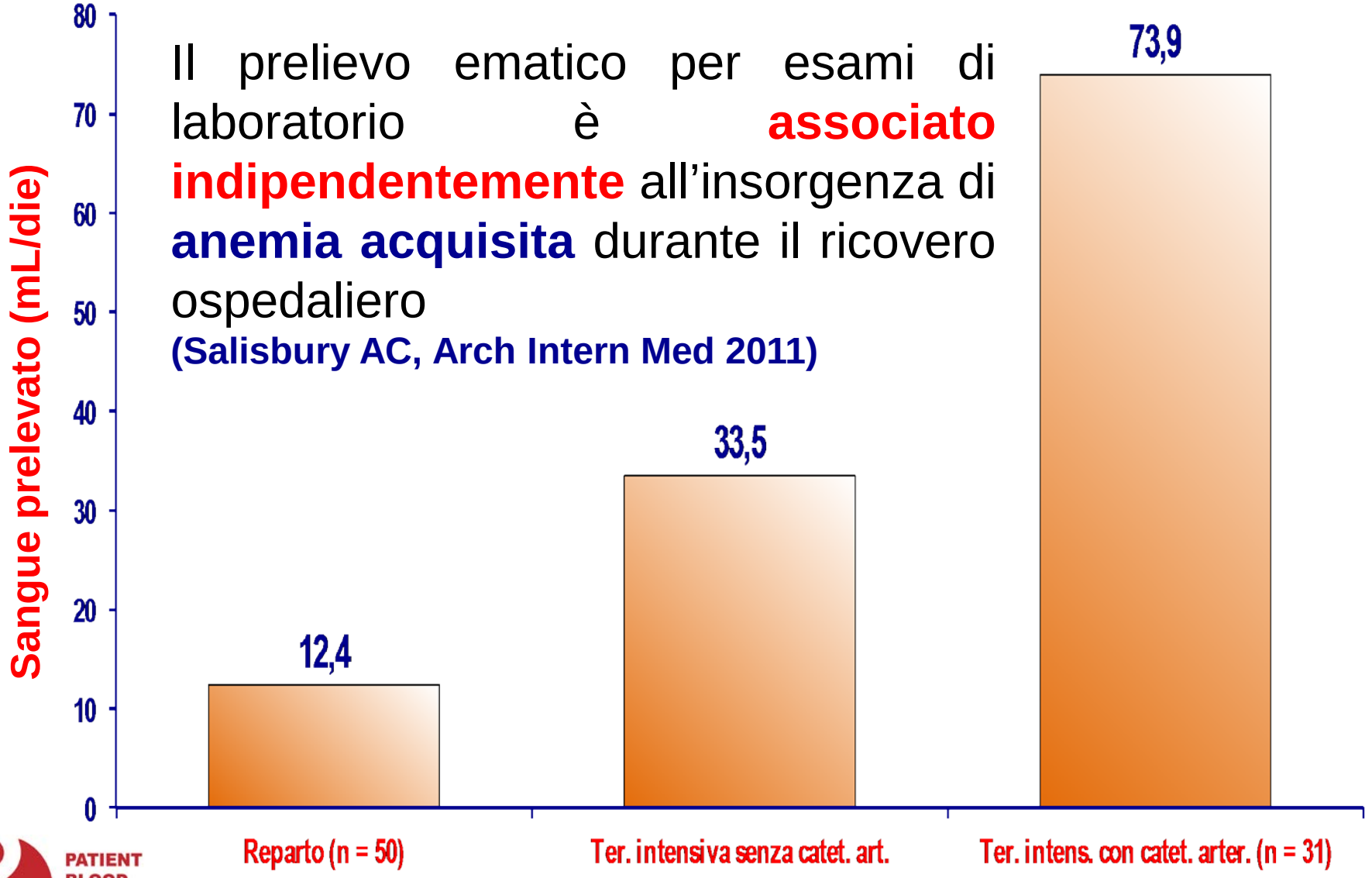
EDQM, modified

CENTRO NAZIONALE SANGUE

Anemizzazione da prelievo

Il prelievo ematico per esami di laboratorio è **associato indipendentemente** all'insorgenza di **anemia acquisita** durante il ricovero ospedaliero

(Salisbury AC, Arch Intern Med 2011)



Smoller BR, N Engl J Med 1986

PATIENT BLOOD MANAGEMENT ITALY

CENTRO NAZIONALE SANGUE

The Italian Regulatory Guidelines for the implementation of Patient Blood Management

Stefania Vaglio[1,2], Sara Gentili[1], Giuseppe Marano[1], Simonetta Pupella[1], Daniela Rafanelli[3], Gianni Biancofiore[4], Paola Antonioli[5], Claudio Velati[6], Giancarlo M. Liumbruno[1].

Recommendations for the pre-operative period

8 The preparation of patients who are to undergo non-oncologic major elective surgery, and are expected to have clinically relevant peri-operative bleeding, foresees a careful pre-operative evaluation through clinical and laboratory investigations aimed at providing an exhaustive personal and family anamnesis, detecting anaemia (to minimise homologous RBC transfusion that can lead to a negative outcome), optimising erythropoiesis, identifying and managing bleeding risk as well as assessing and optimising their individual physiological tolerance of anaemia (through the evaluation of cardio-respiratory functional reserve when necessary), and identifying risk factors. The evaluation should be carried out at least 30 days before the planned date of the operation, in order to enable more detailed investigations and/or arrange appropriate treatment.

9 It is recommended that all adult patients who are candidates for elective major surgery for which a multidisciplinary programme of co-ordinated interventions has been established involving the adoption of pharmacological and non-pharmacological techniques aimed at optimising erythropoiesis, minimising blood losses and optimising tolerance of anaemia, before giving consent to one or more of the above-mentioned treatments, receive detailed information on their clinical state and strategies to limit homologous transfusion needs included in the local patient blood management programme; explanatory material prepared ad hoc by the hospital may be used for this purpose.

10 The haemoglobin (Hb) target value before elective major surgery shall be within the normal range according to World Health Organization (WHO) criteria.

11 Anaemia is defined according to Hb threshold values indicated by the WHO.

12 If a state of anaemia is detected, the subsequent laboratory tests shall be performed with the aim of identifying iron or other nutritional deficiencies (folic acid and/or vitamin B_{12}), chronic kidney disease and/or chronic inflammatory disorders.

13 Since the pre-operative Hb value is the main, independent risk factor for an RBC transfusion, any nutritional deficiencies (iron, vitamin B_{12}, folate), once detected, shall be treated with haematinics.

14 In the event of iron deficiency being detected, when the oral administration of iron is ineffective or not tolerated, or when the elective major surgery is scheduled for less than four weeks after anaemia has been diagnosed, the intravenous administration of iron is suggested.

15 Following an appropriate evaluation, to avoid a functional deficiency of iron in patients during treatment with erythropoietic growth factor, it is suggested that intravenous iron be administered.

16 When the administration of intravenous iron is necessary, the utilisation of a single high-dose preparation for the repletion of iron in storage sites is suggested.

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Current misconceptions in diagnosis and management of iron deficiency

Manuel Muñoz[1], Susana Gómez-Ramírez[2], Martin Besser[3], José Pavía[4], Fernando Gomollón[5], Giancarlo M. Liumbruno[6], Sunil Bhandari[7], Mercé Cladellas[8], Aryeh Shander[9], Michael Auerbach[10]

1. Iron status can be easily evaluated and normal ferritin concentrations exclude iron deficiency
2. Non-anaemic iron deficiency does not require any intervention
3. Oral iron is "always" efficacious if patients tolerate high daily doses
4. The use of intravenous iron should be restricted to severe cases of anaemia
5. There is no need for re-assessment after iron repletion with intravenous iron
6. All intravenous iron formulations are alike
7. Intravenous iron is associated with a high risk of anaphylaxis
8. Premedication reduces infusion reactions during intravenous iron administration
9. Intravenous iron may increase the risks of infection and oxidative stress
10. No adjuvant iron is needed with erythropoiesis stimulating agent treatment if the ferritin level is normal

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Recommendations for the intra-operative period

17 As a pharmacological alternative to improve oxygen transport to correct bleeding-induced hypovolaemia, it is recommended that crystalloid or protein-free colloid solutions be used as first-line therapy, with albumin 5% solution as second-line therapy, when crystalloid or non-protein colloid solutions have already been used at maximum doses, without having produced an adequate clinical response, and when non-protein colloids are contraindicated.

18 With the purpose of containing intra-operative bleeding effectively during elective surgery, it is suggested that combinations of appropriate surgical techniques and instruments to reduce blood loss, minimise trauma to tissues and vessels and promote local haemostasis, which can also be aided by the local administration of vasoconstrictive drugs, be used.

19 With the aim of managing fluid therapy, preference should be given to continuous or semi-continuous haemodynamic monitoring based on the evaluation of flow rather than pressure.

20 It is suggested that intra-operative fluid administration protocols based on haemodynamic optimisation be adopted.

21 In patients who are to undergo surgery where clinically relevant bleeding is expected but who do not have risk factors for hypercoagulability in the preoperative anamnesis, the utilisation of tranexamic acid is suggested.

22 It is recommended that intra-operative blood recovery be used in major surgery in cases in which blood loss is expected to be at least 1,000 mL or in any case ≥20% of the patient's volaemia **despite adopting multimodal strategies**, including the use of pharmacological, surgical and anaesthesiological blood-conservation techniques, and intra-operative cell salvage.

23 It is recommended that point-of-care (POC) instruments be used for the non-invasive continuous measurement of Hb and haematocrit levels.

24 It is suggested that POC instruments be used for the overall monitoring of haemostasis with the purpose of managing clotting factor replacement therapy and limiting the use of transfusion with blood components in elective major heart surgery and all operations with a high risk of bleeding or in the presence of major bleeding.

25 In the presence of massive bleeding during elective major surgery and in association with the correction of the triggering cause, it is suggested that severe hypofibrinogenaemia (<1 g/L) which persists despite treatment with fresh-frozen plasma be treated with fibrinogen concentrate° or, if not available, with cryoprecipitate.

26 In the presence of massive bleeding during elective major surgery and in association with the correction of the triggering cause during massive transfusion, it is suggested that treatment with fibrinogen concentrate°, or if not available with cryoprecipitate, be considered to prevent the fibrinogen level from falling below 1 g/L, the critical threshold for haemostasis.

27 The administration of fibrinogen concentrate°, or if not available cryoprecipitate, is to be preferred to fresh-frozen plasma when there are contraindications to volume overloading.

° Currently, fibrinogen concentrate is not registered in Italy for this use.

Vaglio S, Blood Transfus 2017

CENTRO NAZIONALE SANGUE

The Italian Regulatory Guidelines for the implementation of Patient Blood Management

Stefania Vaglio[1,2], Sara Gentili[1], Giuseppe Marano[1], Simonetta Pupella[1], Daniela Rafanelli[3], Gianni Biancofiore[4], Paola Antonioli[5], Claudio Velati[6], Giancarlo M. Liumbruno[1].

Recommendations for the post-operative period

28 The utilisation of POC instruments for the non-invasive continuous measurement of Hb and haematocrit levels is suggested.

29 When the administration of iron is necessary, an intravenous therapy is recommended, and where possible through the utilisation of a single high-dose preparation for the repletion of iron in storage sites.

30 Post-operative blood salvage is recommended only in cases where the post-operative blood loss is expected to be ≥10% of the patient's volaemia despite implementing multimodal strategies, including the integrated use of other pharmacological, surgical and anaesthesiological blood-conservation techniques.

31 When post-operative cell salvage is utilised, the use of blood-washing systems is to be preferred.

32 When using non-washing systems, it is suggested that the concentration of free Hb be determined before re-infusing the blood to ensure that the level of haemolysis is less than 0.8% of the red cell mass contained in the product transfused.

- In January 2017 the Health Ministry sent PBM (regulatory) guidelines to all Regions and Autonomous Provinces inviting them to ensure the compliance of hospitals and clinics
- **The aim was to deliver effective therapies, to contain transfusion needs, to enhance healthcare and to reduce costs**

Blood Transfus 2017

CENTRO NAZIONALE SANGUE

SERIE GENERALE

Spediz. abb. post. - art. 1, comma 1
Legge 27-02-2004, n. 46 - Filiale di Roma

Anno 158° - Numero 212

GAZZETTA UFFICIALE

DELLA REPUBBLICA ITALIANA

PARTE PRIMA

Roma - Lunedì, 11 settembre 2017

SI PUBBLICA TUTTI I GIORNI NON FESTIVI

Ministero della salute

DECRETO 20 luglio 2017.

Programma di autosufficienza nazionale del sangue e dei suoi prodotti, per l'anno 2017. (17A06250) . . . . . .

La adozione delle linee guida di cui all'art. 25, comma 5 del Decreto del Ministro della salute del 2 novembre 2015[8], finalizzate alla prevenzione della trasfusione evitabile mediante l'implementazione delle strategie e tecniche multidisciplinari e multimodali del PBM, costituisce un ulteriore elemento strategico ai fini del mantenimento dell'autosufficienza e ha un potenziale significativo impatto sul contenimento dei costi, non solo di quelli associati alla terapia trasfusionale. Il CNS, attraverso le SRC, monitorerà l'applicazione delle predette linee guida mediante indicatori all'uopo sviluppati.

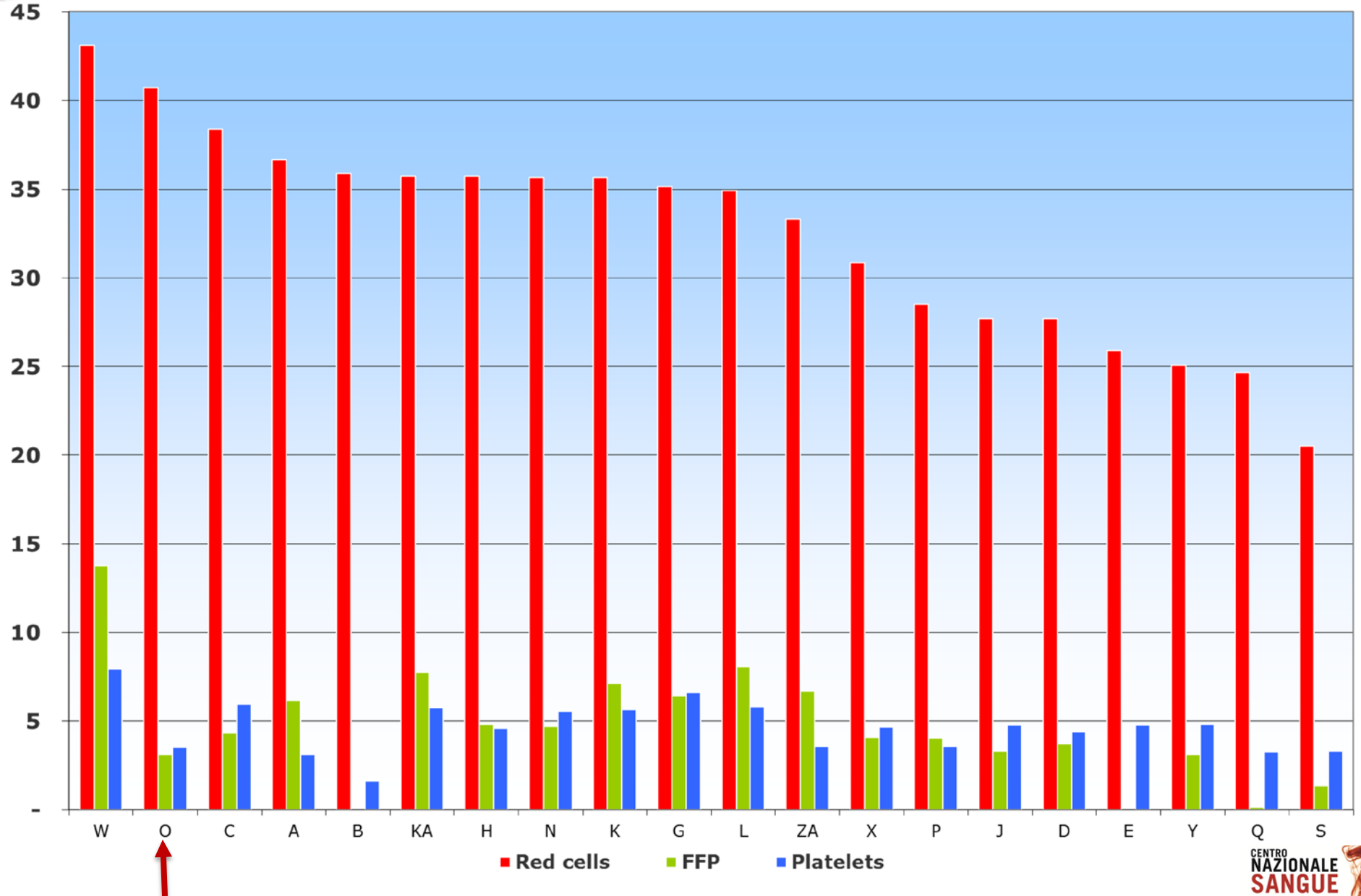
- The adoption of PBM regulatory guidelines…..
- Is a strategy to maintain self-sufficiency and has the potential to significantly contain costs and not only those associated to transfusion therapy
- The Italian National Blood Centre through the Regional Blood Centres will monitor their application with ad hoc performance indicators

CENTRO NAZIONALE SANGUE

EUROPEAN BLOOD ALLIANCE

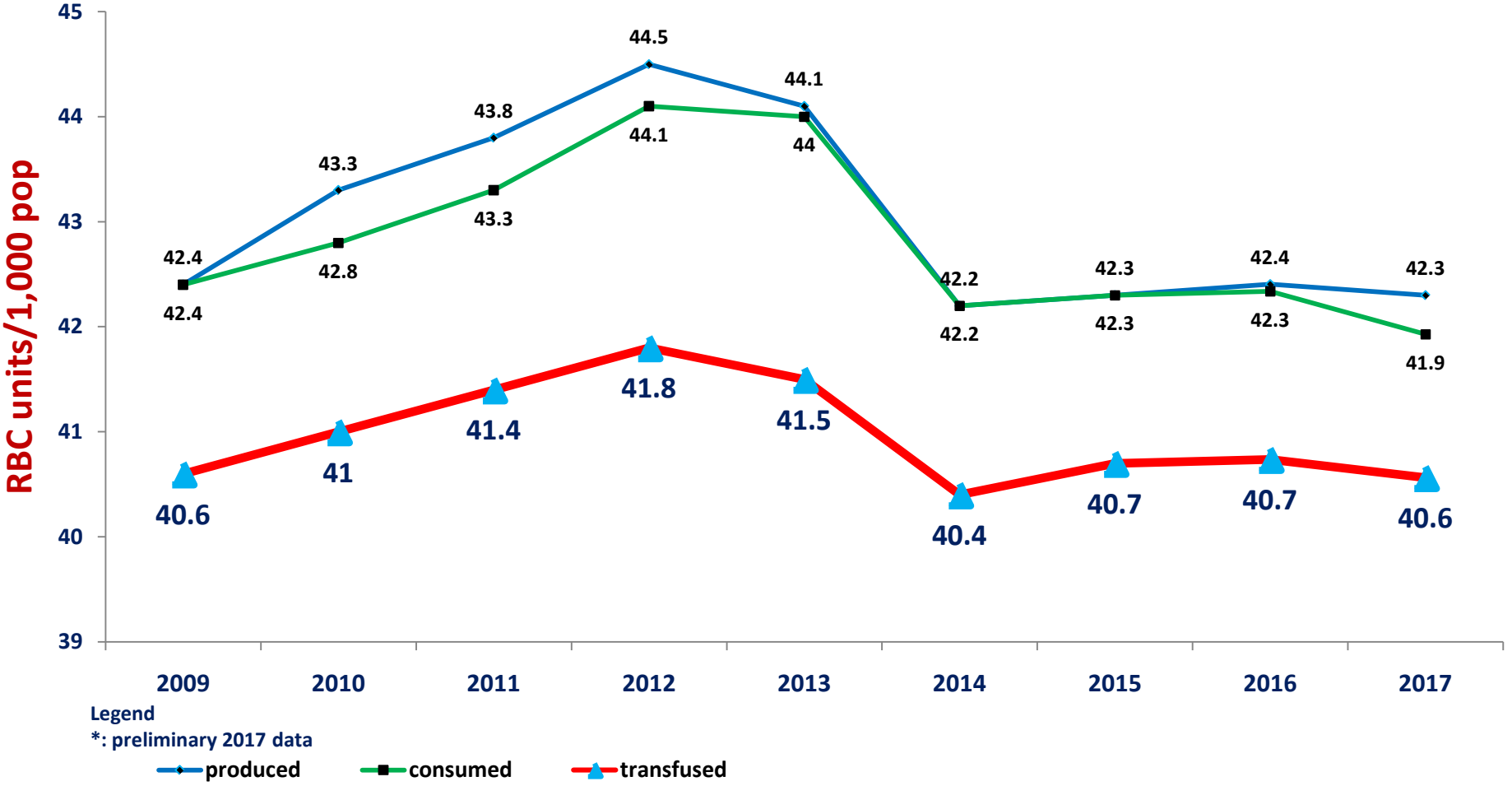
Issues per 1,000 Population

2016 - (Italy: RBCs transfused)

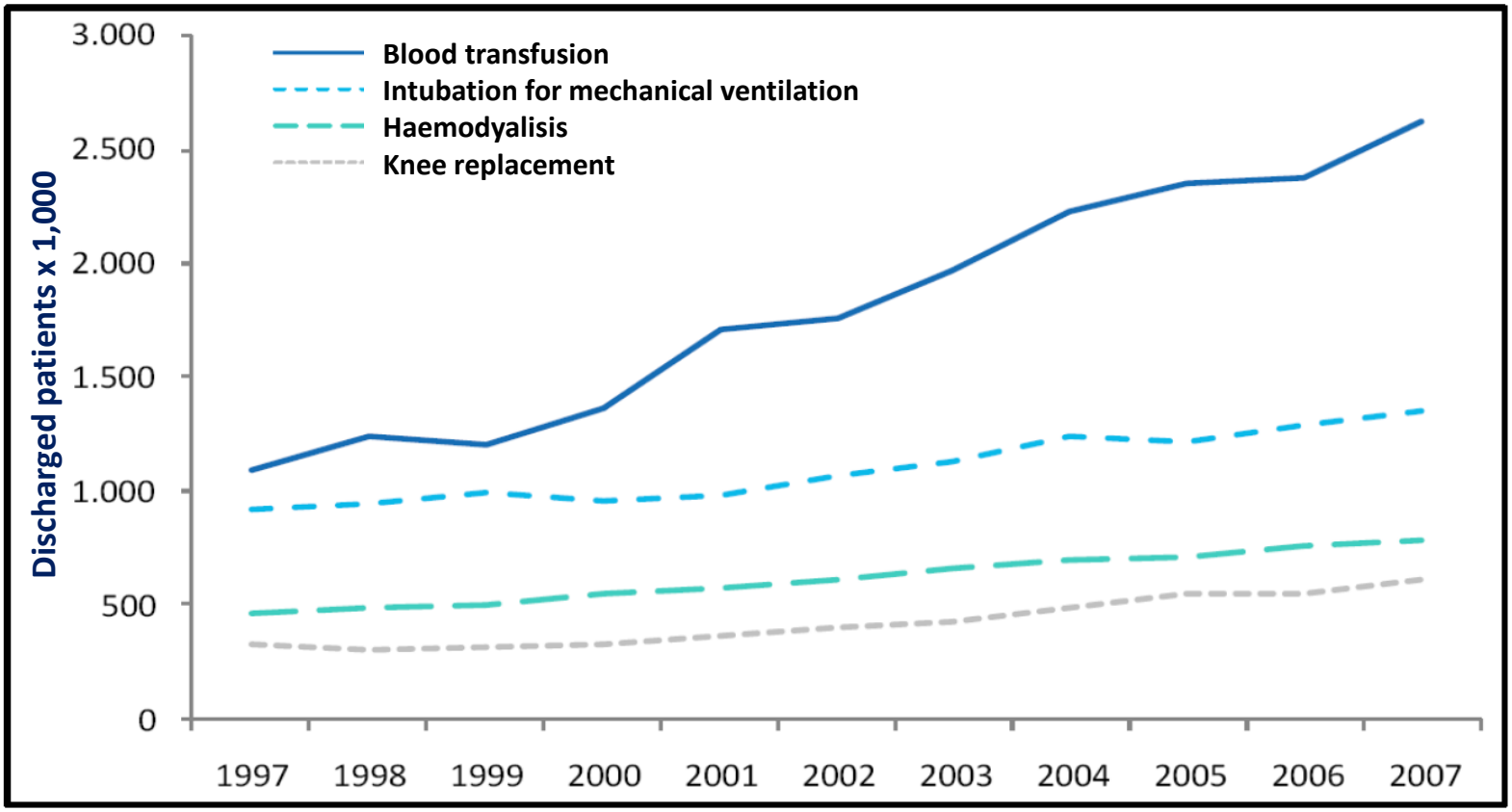


CENTRO NAZIONALE SANGUE

Red blood cell production, consumption and transfusion/1,000 pop: Italy 2009-2017



Frequency of blood transfusion in hospitalised patients



Patients transfused during hospitalisation: 1 out of 10

Increased hospital costs associated with red blood cell transfusion

Kevin M. Trentino,[1] Shannon L. Farmer,[2,3] Stuart G. Swain,[1] Sally A. Burrows,[4] Axel Hofmann,[2,3] Rinaldo Ienco,[1] Warren Pavey,[5] Frank E.S. Daly,[6,7] Anton Van Niekerk,[8] Steven A.R. Webb,[4,9] Simon Towler,[10,11] and Michael F. Leahy[4,12]

TABLE 3. Top 10 adjusted DRGs with highest volume of acute-care inpatients transfused and adjusted incremental costs associated with RBC transfusion*

Adjusted DRG family	Inpatients transfused RBCs	Adjusted cost *without* RBC transfusion	Adjusted cost *with* RBC transfusion	Adjusted incremental cost†
Q61–RBC disorders	430 (78.32)	2,524 (2,324-2,724)	4,626 (4,278-4,977)	2,102
I08–other hip and femur procedures	261 (35.75)	11,084 (10,590-11,577)	20,322 (19,341-21,302)	9,238
G46–complex gastroscopy	200 (51.15)	5,549 (5,160-5,938)	10,174 (9,452-10,897)	4,625
G47–other gastroscopy	189 (29.12)	4,110 (3,870-4,350)	7,536 (7,074-7,998)	3,426
I03–hip replacement	164 (20.50)	17,542 (16,758-18,327)	32,164 (30,544-33,785)	14,622
R61–lymphoma and nonacute leukemia	149 (36.17)	6,791 (6,173-7,409)	12,452 (11,278-13,625)	5,661
G02–major small and large bowel procedures	102 (21.21)	14,976 (14,012-15,939)	27,457 (25,553-29,361)	12,481
Q60–reticuloendothelial and immunity disorders	95 (33.45)	5,881 (5,347-6,415)	10,783 (9,787-11,779	4,902
G61–GI hemorrhage	92 (25.34)	2,687 (2,515-2,859)	4,927 (4,595-5,260)	2,240
R60–acute leukemia	88 (65.67)	11,256 (9,193-13,320)	20,639 (16,860-24,417)	9,383

* Data are reported as number (%) or mean (95% CI).

† Adjusted incremental costs are predicted values from the model. They represent the cost difference between a transfused inpatient and a nontransfused inpatient that were male, nonelective admissions to a teaching hospital with an average comorbidity score who were discharged home. Costs have been converted into US dollars (US$).

Trentino KM, Transfusion 2015

CENTRO NAZIONALE SANGUE

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American Heart Journal

Clinical Investigation

Clinical trials evaluating red blood cell transfusion thresholds: An updated systematic review and with additional focus on patients with cardiovascular disease

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ABSTRACT

Background: Several new trials evaluating transfusion strategies in patients with cardiovascular disease have recently been published, increasing the number of enrolled patients by over 30%. The objective was to evaluate transfusion thresholds in patients with cardiovascular disease.

Methods: We conducted an updated systematic review of randomized trials that compared patients assigned to maintain a lower (restrictive transfusion strategy) or higher (liberal transfusion strategy) hemoglobin concentration. We focused on new trial data in patients with cardiovascular disease. The primary outcome was 30-day mortality. Specific subgroups were patients undergoing cardiac surgery and with acute myocardial infarction.

Results: A total of 37 trials that enrolled 19,049 patients were appraised. In cardiac surgery, mortality at 30 days was comparable between groups (risk ratio 0.99; 95% confidence interval 0.74-1.33). In 2 small trials (n = 154) in patients with myocardial infarction, the point estimate for the mortality risk ratio was 3.88 (95% CI, 0.83-18.13) favoring the liberal strategy. Overall, from 26 trials enrolling 15,681 patients, 30-day mortality was not different between restrictive and liberal transfusion strategies (risk ratio 1.0, 95% CI, 0.86-1.16). Overall and in the cardiovascular disease subgroup, there were no significant differences observed across a range of secondary outcomes.

Conclusions: New trials in patients undergoing cardiac surgery establish that a restrictive transfusion strategy of 7 to 8 g/dL is safe and decreased red cell use by 24%. Further research is needed to define the optimal transfusion threshold in patients with acute myocardial infarction.

JAMA Surgery | Original Investigation 2018

Association of Perioperative Red Blood Cell Transfusions With Venous Thromboembolism in a North American Registry

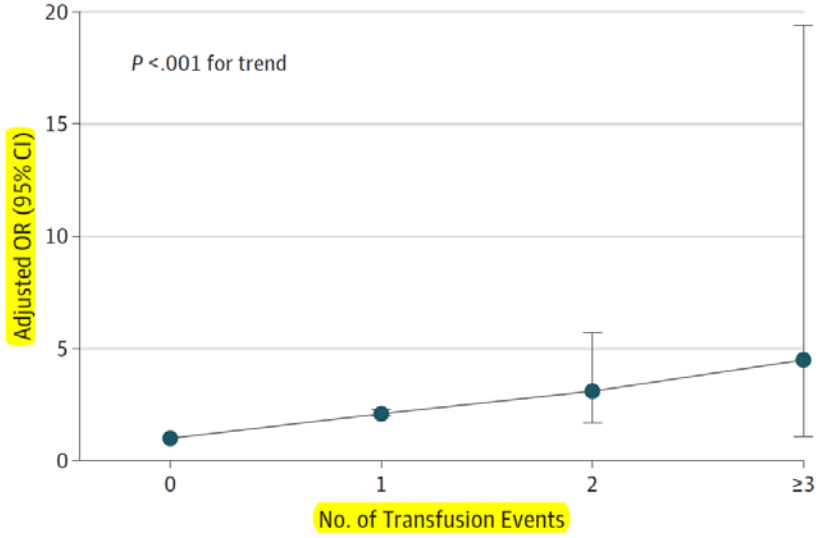
Ruchika Goel, MD, MPH; Eshan U. Patel, MPH; Melissa M. Cushing, MD; Steven M. Frank, MD; Paul M. Ness, MD; Clifford M. Takemoto, MD; Ljiljana V. Vasovic, MD; Sujit Sheth, MD; Marianne E. Nellis, MD; Beth Shaz, MD; Aaron A. R. Tobian, MD, PhD

Key Points

Question What is the association between perioperative red blood cell transfusions and postoperative venous thromboembolism within 30 days of a surgical procedure?

Findings In this registry study of 750 937 patients undergoing surgery, perioperative red blood cell transfusions (preoperative and intraoperative or postoperative) were significantly associated with higher risk for venous thromboembolism. The effect of this association was dose dependent, and the association remained robust with propensity score matching.

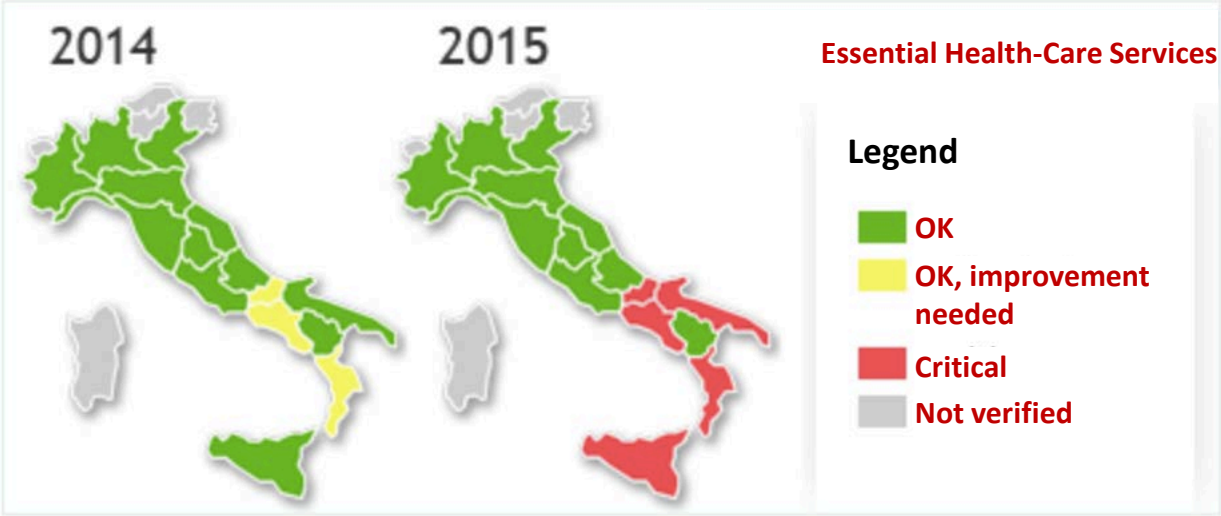
Meaning These findings should reinforce the importance of rigorous perioperative patient blood management practices.



Adjusted odds ratios (ORs) of 30-day postoperative venous thromboembolism with increased number of red blood cell (RBC) events intraoperatively or postoperatively vs no intraoperative or postoperative RBC transfusion are shown. The multivariable model was adjusted for age, sex, race, sepsis, length of stay, mechanical ventilation, disseminated cancer, body mass index, work-related relative value unit for the surgery (surrogate for complexity of surgery), and American Society of Anesthesiology severity class and functional status before surgery. Data were derived from the American College of Surgeons' National Surgical Quality Improvement Program database for 2014.

CENTRO NAZIONALE SANGUE

Appropriate delivery of essential health-care services (EHCSs)



The Regions that appropriately deliver EHCSs receive an additional 2% of the **national health-care fund assigned to them**

2018 Performance Indicator

APPOINTMENT OF THE HAEMOSTASIS & THROMBOSIS SPECIALIST

- "Patients with acquired or congenital coagulopathies and/or thrombocytopathies or positive bleeding anamnesis or those being treated with anticoagulants and/or anti-platelet drugs **shall be managed** in cooperation with haemostasis and thrombosis specialists"
- **As regards the initial implementation of PBM, hospitals are required to provide documentation related to the appointment of a haemostasis and thrombosis specialist for the management of the above-mentioned patients in pre-intra- and post-operative period**

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(Possible) future Performance Indicators

MULTIDISCIPLINARY ANAEMIA CLINICS

- Setting up of multidisciplinary Anaemia Clinics which will act as case manager with the cooperation (at least) of the following specialists: transfusion medicine, haemostasis & thrombosis, clinical haematology, cardiology, anaesthesia, and any other specialist needed to treat patients undergoing elective surgery

Possible future Performance Indicators

REDUCTION OF RED BLOOD CELL TRANSFUSIONS

- **Reduction of RBC transfusions in hospitalised patients**

REDUCTION OF AUTOLOGOUS BLOOD TRANSFUSION

- **Reduction of autologous RBC transfusions in hospitalised patients**

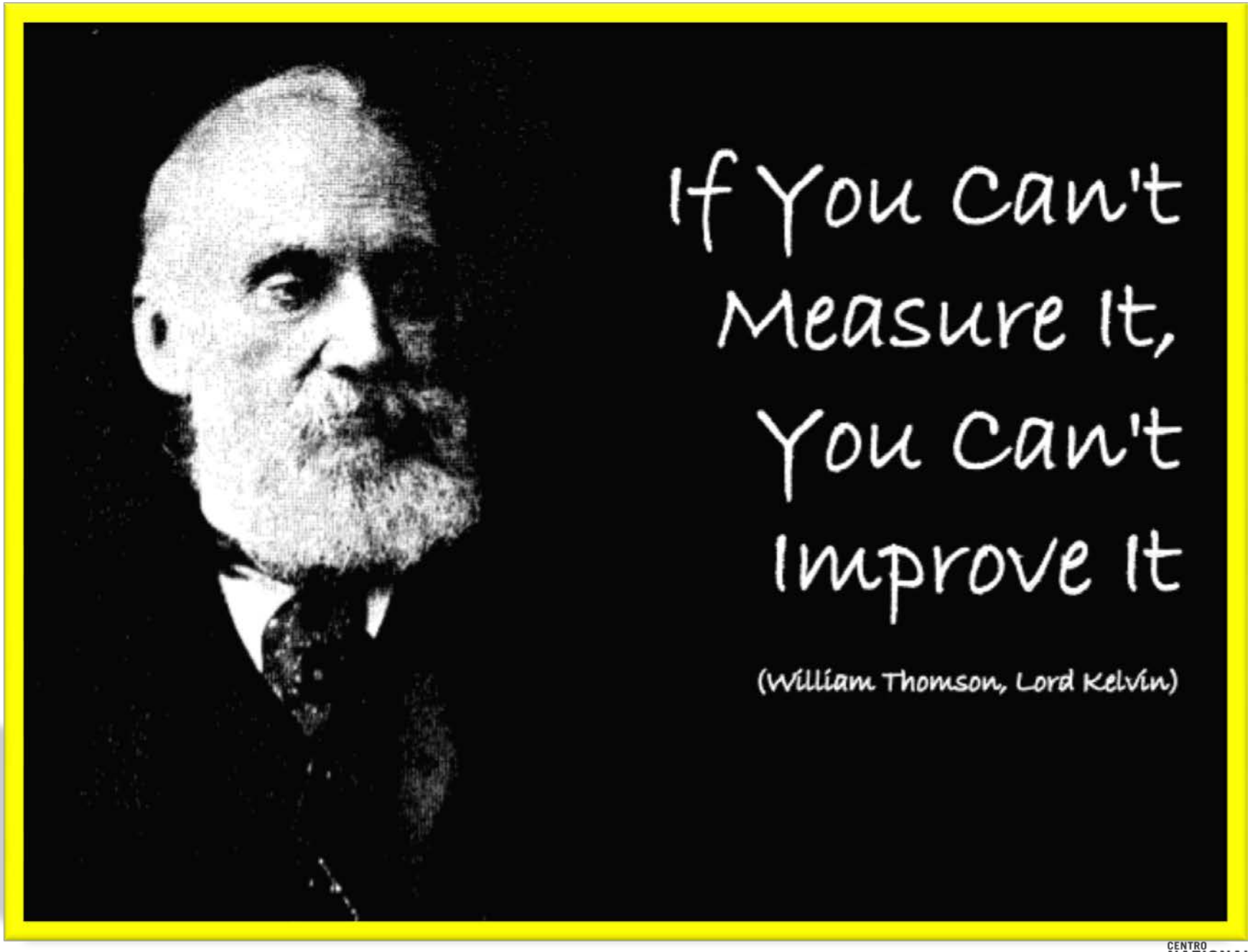
CENTRO NAZIONALE SANGUE

Towards the implementation of patient blood management across Europe

Massimo Franchini[1,2], Manuel Muñoz[3]

In conclusion, mirroring those of other non-European countries[19,20], European governments should intervene directly, issuing regulatory actions and recommendations and providing resources to implement PBM programmes effectively. The Italian regulatory guidelines may represent an excellent model for inspiring how to pursue this objective.

Blood Transfus 2017, in press


If You Can't
Measure It,
You Can't
Improve It
(William Thomson, Lord Kelvin)

Thanks for your attention!