



## Explanatory Memorandum to the Recommendation Rec(2004)18

of the Committee of Ministers to member states on teaching transfusion medicine to nurses

### A. Introduction

1. To improve quality and safety in blood transfusion medicine in European countries, harmonization of blood transfusion practices is required.
2. Recent reports on risk assessment in blood transfusion demonstrate that more than 30% of serious adverse reactions and untoward events associated with blood transfusion are due to human errors and system errors in the blood transfusion chain (vein-to-vein). These can be fatal or cause major or minor morbidity to the transfused patient.
3. Most errors occur in blood sampling from the patient, in prescriptions of blood components, in the laboratory of the blood establishment or blood services, during collection of donor blood and in the ward where the blood components are administered.
4. Haemovigilance systems stress that complications of blood transfusion can be avoided or reduced by the application of safety measures before, during, and after transfusion.
5. Blood transfusion safety depends largely on the nursing staff (while the doctors are responsible for prescribing) involved in the transfusion of patients in hospitals or at home, and also on nurses working in many areas: pre- and post-donation counseling procedures in the donor sessions, in blood collection, in the processing, testing, storage and distribution of blood components. Nurses are also actively involved in autologous blood transfusion, as well as in other specialized fields such as bone marrow transplantation, collection, processing, storage and distribution of stem cells, and in organ transplantation.
6. Reports from Europe, the USA and elsewhere on evidence-based practice in the field of blood transfusion stress that inadequate training of nurses is a key determinant of poor transfusion-related knowledge and practice of transfusion safety procedures.
7. Within Europe, there is a wide range of nurses' responsibilities with respect to clinical and laboratory blood transfusion and therefore in the duties and actions they are allowed to undertake.
8. Similarly, the curriculum for nurses' education differs considerably between countries and between the various grades of the profession.
9. Therefore, there is a need to determine common basic principles for pre- and postgraduate education of nurses in both the clinical setting and in the blood transfusion establishment and to define a common basis for good transfusion practice.
10. All nurses should receive education in blood transfusion. Only nurses who have been specifically trained and assessed as competent in BT medicine should be allowed to practice it, in cooperation with physicians and other health professionals and within the context of a training programme on new developments of this field.
11. Procedural guidelines for the nursing staff and other professionals working in the clinical and the laboratory setting of blood transfusion medicine should be developed in compliance with the "Guide to the preparation, use and quality assurance of blood and blood components" and other recommendations of the Council of Europe on blood transfusion, to meet national and local requirements and with the aim of ensuring safety in transfusion.

### B. Current situation

#### Grades of the nursing profession and training in blood transfusion medicine

Within Europe, most nurses receive pre-registration training in college or university level nursing schools. Two to four years' training in the various disciplines of nursing contains a variety of curricula in basic blood transfusion, clinical indications and optimal use of blood products in medical conditions and in surgery.

Postgraduate training to promote quality and safety in blood transfusion is usually organized by scientific societies and locally by academic or national health system institutions. Selection criteria, location of training, selection procedure, and conditions of service of nurses undergoing training, and the structure of the training programme (hours, topics, diploma etc), all vary. The responsibilities and duties of nurses in blood transfusion establishments and in hospital blood banks vary both between countries and within a country. In several European countries with established quality systems in blood transfusion, nursing staff receive accreditation for competence in the areas of their responsibility in conjunction with participation in continuous training in the field. A six-month in-training course in a Regional Blood Transfusion Centre is mandatory in Greece for all nurses and technicians working in a hospital blood bank. In several central and eastern European countries, nurses are involved in compatibility testing and other laboratory activities, as well as in blood sessions, pre- and post-donation counselling procedures, and in the organization of programmes for the recruitment of voluntary blood donors.

In the USA, major challenges for the nurse with regard to complications, treatment and resulting nursing care arise in working with immunocompromised and oncology patients, as well as in preparing patients for bone marrow transplantation. A survey of the procedures performed by critical care nurses showed that those performed by the greatest number related to blood component transfusion, and that critical care nurses frequently performed some of these procedures with little or no supervision by a physician.

In Belgium, a national study assessing blood transfusion practice has concluded that transfusion should be improved by better education of all physicians and nurses involved with transfusion and by improving standardization by better documentation, better reporting and better information to all health care workers involved.

Factors associated with nurses' poor knowledge and practice in blood transfusion in hospitalised care in France were analyzed in relation to reflecting potential danger and life threat to the patients.

Alarming data from SHOT in the United Kingdom put emphasis on the crucial steps in safe transfusion practice, i.e., patient and pre-transfusion checks, asepsis and apparatus, checking and clerical procedures, keeping vigilant and keeping accurate records. A set of guidelines for checking procedures and potentially adverse signs and symptoms have been drawn up in order to alert registered nurses to safe transfusion practice.

The Council of Europe in the "Guide to the preparation, use and quality assurance of blood and blood components" recommends that before and during transfusion the following measures should be applied:

#### Pre-Transfusion:\*

1. Compatibility of identification of patient at blood sampling. The identification system should link the patient identification, the operator, the

- blood sample through processing, the blood product and should confirm the original patient identification at the time of blood administration. Emphasis must be placed on error recognition;
2. Blood group serological investigation including blood typing, antibody screening and compatibility testing before transfusion of red cell products. The normal procedure shall be to make the investigation in due time before expected transfusion.
  3. Preparation/ handling of frozen components

**During and after transfusion: 1\***

1. Safety measures including identification of patient and blood unit and verification of compatibility between patient and blood unit;
2. Clinical surveillance during and after transfusion to include careful observation of the patient, especially in the early stages of the transfusion where significant transfusion reactions are more likely to occur and in the transfusion of any component prepared by an open system;
3. Controlled warming of blood;
4. Avoidance of addition of medical products or infusion solutions in blood components;
5. Handling of frozen units;
6. Vigilance for the risk of air embolism and transfusion complication either in direct relation to the transfusion or with a delay of hours or days.

**C. Elements of nurses' training curricula**

Restructuring the pre and post-registration nurses' education curricula, and evaluating and monitoring good transfusion practice of nurses both within the blood establishment and in the hospitals should be considered by the national authorities of the member states. For this purpose, cooperation between the health authorities, nursing schools and academic institutions is required. Information from international bodies and several European countries suggests the inclusion of the following elements in nurses' basic, pre and post-registration education curricula.

**Basic Education:**

1. Physiology of blood and its functions;
2. The concepts of blood component therapy;
3. The principles of blood transfusion;
4. Documentation and record-keeping.

**Pre-registration education:**

General principles of:

1. Physiology of blood and its functions;
2. The concepts of blood component therapy;
3. History of blood transfusion;
4. Organization aspects of blood transfusion;
5. Blood components (red cells, platelets, plasma);
6. Plasma products (albumin, immunoglobulins, clotting factors, etc.);
7. Blood group serology and basics of red cell compatibility;
8. The principles of blood transfusion and alternatives to the use of donor blood;
9. Pre-transfusion and transfusion procedures;
10. Phlebotomy and blood sampling for cross-match. Detailed procedures for patient identification. Introducing systems that allow error detection. One identification system that links patient, sample and blood product and confirms patient ID at the time of blood administration;
11. Basic knowledge of transfusion triggers;
12. Administering blood components and blood products, including special precautions for patients with heart disease, elderly, newborns. Special considerations in massive transfusion;
13. Shelf life of blood components;
14. Blood administration sets and equipment;
15. Patient care and observation during transfusion. Checking of relevant vital signs and their documentation;
16. Infections transmissible by transfusion;
17. Adverse effects of transfusion: recognize symptoms of adverse reactions and initiate standard immediate action if transfusion reaction is suspected;
18. Haematological disorders;
19. Management of haemophilia and coagulopathies;
20. Acquired haemostatic disorders and Disseminated Intravascular Coagulation;
21. Haemolytic disease of the newborn;
22. Documentation and records.

Two independent stages in post registration training are proposed: donor nursing and transfusion nursing.

**Post-registration education:**

This education can be divided into two stages:

**I. Certification in donor nursing: for nurses working in blood establishments**

1. Procedures to select donors;
2. Detailed procedures for donor identification;
3. Procedures to an aseptic blood collection;
4. The importance of the labelling in transfusion chain;
5. Shelf life of blood components;
6. Sets and equipments utilised in blood establishments to collect, processing, and analyse blood;
7. Blood components processing techniques;
8. Haemapheresis techniques;
9. Autologous transfusion techniques, with special relevance for pre deposit autologous transfusion;
10. Storage conditions of blood components;
11. Transportation conditions of blood components;
12. Fundamentals of leukocytes reduction, irradiation, and cryopreservation;
13. Cryopreservation techniques;
14. Infections transmissible by transfusion, including bacterial contamination;
15. Adverse reactions or events in blood donor;
16. Accidents or incidents during blood collection, processing and storage;
17. Blood inventory management concepts;
18. General concepts of the optimal use of blood components;
19. General concepts of major pathologies using blood transfusion (acute anaemia, chronic anaemia, hereditary haemolytic anaemia, coagulopathies, bone marrow and organ transplantation, etc);
20. Haemovigilance concepts;

22. Quality Systems concepts;
23. Documentation and records.

**II. Certification in transfusion nursing: for nurses working in blood bank hospitals, wards, anaesthesiology and intensive care units:**

1. General concepts of the optimal use of blood components;
2. General concepts of major pathologies using blood transfusion (acute anaemia, chronic anaemia, hereditary haemolytic anaemia, coagulopathies, haematological diseases, bone marrow and organ transplantation, etc);
3. Blood utilization management concepts;
4. Transfusion sets;
5. Administration of blood components: measures and cares pre, during and posttransfusion;
6. Procedures to identify a patient:
  - a. to collect a blood sample to pre transfusion testing
  - b. to transfuse a blood component;
7. Procedures to detect errors in transfusion chain;
8. Pre transfusion testing;
9. Accidents or incidents pre or during transfusion;
10. Blood components: types and clinical indications;
11. Transfusion support in: obstetrics, paediatrics, surgery, and intensive care units;
12. Transfusion in chronic anaemia (oncology patients, hereditary haemolytic anaemia, etc);
13. Transfusion in acute anaemia (emergency, major bleeding);
14. Transfusion in bone marrow and solid organ transplantation;
15. Transfusion in special cases, like Disseminated Intravascular Coagulation, massive transfusion, etc;
16. Precaution measures in patients with heart disease, immune haemolytic anaemia, newborn, elderly;
17. Management of haemophilic patients or others congenital coagulopathies;
18. Emergencies and disasters;
19. Adverse reaction or events in transfused patients;
20. Near misses;
21. Alternatives to blood transfusion;
22. Autologous transfusion techniques;
23. Storage and distribution of blood components;
24. Infections transmissible by transfusion, including bacterial contamination;
25. Ambulatory transfusion;
26. General concepts of collection, processing, and analysis of blood components;
27. Fundamentals of leukocytes reduction, irradiation, and cryopreservation;
28. Haemovigilance concept;
29. Recognition and participation in the management of abnormal reactions after transfusion including "near misses";
30. Quality System concept;
31. Documentation and records;
32. The role of the nurse in hospital blood transfusion committee.

**The following section applies if an investigation of training and responsibilities of nurses is intended:**

**Working methods**

1. Determine the spectrum of duties of nurses during blood transfusion, in the clinical setting as well as in the blood collection establishment, in all member states.
2. Assess the pre- and postgraduate training of nurses in blood transfusion in all member states by questionnaire addressed to national representatives who should obtain the relevant information from the health authorities and nursing institutes in cooperation with hospital senior nurses and academic nurses.
3. Determine the differences in training due to differences in responsibilities.
4. Determine common basic principles for good transfusion practice for nurses.
5. Determine common basic principles for training in pre-registration and during practice for nurses.
6. Investigate information available on the curricula recommended by international organizations.

**Working materials**

Inquiry by questionnaire:

1. To Ministry of Health: number of nurses in the clinical setting – number of hospitals where transfusion occurs – number of blood components transfused – number of patients transfused – organization of blood transfusion – number of nurses in the blood establishments.
2. To Ministry of Education or Ministry of Health (as appropriate): official curriculum for basic transfusion medicine training for nurses – official curriculum for transfusion medicine training for nurses in blood establishments – number of nursing schools – number of nursing students.

Assessment of national data and results from the inquiry.

**Conclusion**

To increase efficiency in blood transfusion medicine, physicians and nurses and other health workers who handle blood or blood components should collaborate on development, evaluation and implementation. Documentation regarding transfusions needs to be simplified and coordinated. Knowledgeable staff is an essential element of safe systems. Basic knowledge should never be assumed: mechanisms to monitor knowledge of key processes along with ongoing feedback and remedial action are necessary to maximize performance. Nurse training curricula and formats at all levels must reflect the requirements of modern transfusion medicine from novice to expert. Working together, nursing and transfusion specialists will improve quality and safety in blood transfusion services.

The Council of Europe's Recommendation could contribute to the adoption and implementation of training programmes at a national level.

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<sup>1</sup> \* It may be helpful if nurses responsible for transfusion are provided with a checklist for each stage of the transfusion process to ensure each step is undertaken appropriately.