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# Teaching basic life support at school: a note in a European context[1]

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**ABSTRACT**

Teaching basic life support (BLS) in schools is crucial to empower students to act in emergency situations. Several studies highlight the effectiveness of teacher training, as they become knowledge multipliers in BLS. This documentary study frames BLS in five European countries that have legislated its teaching in schools and characterizes teaching and assessment methodologies. The results point to the improvement of students' skills in identifying emergency situations and activating emergency services. Furthermore, the dissemination of BLS knowledge contributes to strengthening the chain of survival and saving lives. It is concluded that BLS education in schools is essential for shaping citizens prepared to act in critical situations, promoting community safety and well-being.

**KEYWORDS:** Basic life support; School; Citizenship; Europe.

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*O ensino do suporte básico de vida na escola: um apontamento em contexto europeu*

**RESUMO**

O ensino do suporte básico de vida (SBV) nas escolas é crucial para capacitar os alunos a agirem em situações de emergência. Diversos estudos destacam a eficácia do treino de professores, que se tornam multiplicadores do conhecimento em SBV. Este estudo de natureza documental, enquadra o SBV em cinco países europeus que legislaram o seu ensino na escola e carateriza as metodologias de ensino e de avaliação. Os resultados apontam para a melhoria das habilidades dos alunos na identificação de situações de emergência e na ativação dos serviços de emergência. Além disso, a disseminação do conhecimento em SBV contribui para fortalecer a cadeia de sobrevivência e salvar vidas. Conclui-se que a educação em SBV nas escolas é essencial para formar cidadãos preparados para agir em situações críticas, promovendo a segurança e o bem-estar da comunidade.

**PALAVRAS-CHAVE:** Suporte básico de vida; Escola; Cidadania; Europa.

*La enseñanza del soporte vital básico en la escuela: una nota en el contexto europeo*

**RESUMEN**

La enseñanza de soporte vital básico (SVB) en las escuelas es crucial para capacitar a los alumnos a actuar en situaciones de emergencia. Varios estudios resaltan la eficacia del entrenamiento de los profesores, quienes se convierten en multiplicadores del conocimiento en SVB. Este estudio documental enmarca el SVB en cinco países europeos que han legislado su enseñanza en las escuelas y caracteriza las metodologías de enseñanza y evaluación. Los resultados señalan la mejora de las habilidades de los estudiantes en la identificación de situaciones de emergencia y la activación de los servicios de emergencia. Además, la difusión del conocimiento en SVB contribuye a fortalecer la cadena de supervivencia y salvar vidas. Se concluye que la educación en SVB en las escuelas es esencial para formar ciudadanos preparados para actuar en situaciones críticas, promoviendo la seguridad y el bienestar de la comunidad.

**PALABRAS CLAVE:** Soporte vital básico; Escuela; Ciudadanía; Europa.

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## Introduction

Education and training are fundamental foundations for the future of individuals and the country, cooperating in the exercise of citizenship (Bonito, 2021). Personal satisfaction in acting for the well-being of others is a revelation of citizenship.

The citizenship is not learned only through transmissive teaching, but through experiential processes, which must be integrated into the school culture, in a logic of participation and co-responsibility, throughout the curriculum of compulsory education. Therefore, citizenship is associated with a participatory, individual and collective process of reflection and awareness, about individual and social problems (Bonito, 2018). The aim is that, through the teaching of citizenship, society is built on the basis of the dignity of the human person, more responsible and altruistic, committed to others.

In this context, the application of Basic Life Support (BLS) measures to victims of Out-of-Hospital Cardiopulmonary Arrest (OHCA) constitutes an act of altruism and citizenship, and learning about them is imperative for the development of active and participatory citizenship.

The OHCA remains a public health problem, and survival rates remain low despite advances in resuscitation science (AHA, 2020). A primary educational objective in OHCA should be the training of non-professionals in Cardiopulmonary Resuscitation (CPR) due to its recognized importance in intervention, its impact on survival gains, and its effectiveness in increasing the number of people willing to perform BLS in a real situation (Greif et al., 2015; Martins, 2014; Nielsen; Isbye; Lipert, 2013; Schmolzer; Agarwal; Kamlin, 2013; Trevisanuto Et Al., 2015). The goal can be achieved by teaching children 2 hours per year from the age of 12, and training improves performance and retention of learning (Monsieurs et al., 2015; Plant; Taylor, 2013).

There is no evidence on the best educational strategy for teaching CPR to children. Therefore, the teaching format depends on local requirements and circumstances (Greif et al., 2021). According to Böttiger, Semeraro and Wingen (2017), educating school-age children in CPR is a civic duty that requires support to be implemented. The CPR training should be provided across the spectrum from preschool to university education, and CPR skills should be age-appropriate (Greif et al., 2021).

Training school-age children in this content is easy and cost-effective. Training can be delivered by qualified teachers or healthcare professionals with equal effectiveness (Böttiger; Semeraro; Wingen, 2017). Teachers advocate BLS training, but they often lack mastery of the content, which constitutes a barrier. Therefore, it is only necessary for teachers to learn the specific CPR skills that they will teach to their students, and the inclusion of BLS teaching in teacher training curricula is highly recommended (Greif et al, 2021).

Currently, in some countries, CPR education for children is legislated, while in others, there are only local and regional initiatives. There are 6 European countries in which CPR education is provided for by law: Belgium, Denmark, France, Italy, Portugal and the United Kingdom. In 23 countries, this education is recommended (16 in 2015). According to Semeraro et al. (2016), the focus of CPR education in countries with legislation is primary schools (40%), primary/secondary schools (40%) and secondary schools (20%). Among countries without legislation, the focus is primary schools (45%), secondary schools (32%) and primary/secondary schools (14%). The equipment used for practical CPR training is mainly a low-reliability manikin (26%), an automatic external defibrillation training device (21%) and a CPR manikin (21%). Among European countries, where CPR teaching is legislated, the content covered is similar.

This paper aims to analyze the role attributed by Denmark, France, Italy, Portugal and the United Kingdom to teaching BLS in schools, as well as to identify the best educational approaches used in training students in BLS.

## Methods

This is a documentary study, which used two types of sources: to frame the teaching of BLS, documentation from the various official organizations (direct state administration/ministry, resuscitation councils) and legislation from each country under consideration were studied. For the teaching and assessment of BLS, a non-systematic literature review was carried out, selecting the most recent available information based on a convenience criterion.

## Results

Firstly, it is highlighted that decision-making powers in Belgium are not centralized, but are distributed between the federal government, the three linguistic communities and the three regions. Thus, there is no common educational policy for the country. Therefore, only information on the other five countries will be presented.

*Denmark*

Denmark is one of the most active countries in promoting increased CPR rates for laypeople and one of the largest holders of legislation for teaching CPR in schools. According to Böttinger, Semeraro, and Wingen (2017), the following factors may be considered to be favorable to CPR training in schools in this country: *a)* the belief that other schools were providing training, *b)* awareness of the mandatory compliance with legislation, *c)* the presence of a CPR training coordinator, *d)* teachers feeling competent to conduct the training, and *e)* easy access to training materials.

The Danish Resuscitation Council (DRG) argues that 12-year-old children are strong enough to resuscitate an adult in cardiac arrest and should be trained in CPR (DRG, n.d.). The Council supports the recommendation of 2 hours of annual resuscitation training for children from 12 years of age. Since 2006, training sessions have been provided in schools and equipment for practicing CPR, including mannequins, has been

distributed. The following materials are also used as a complement: *a)* instructional films covering chest compressions and insufflations, *b)* the dilemma game, which creates a qualified discussion about resuscitation, *c)* *kahoot* quiz, which includes theoretical and practical questions for those in the presence of someone in cardiac arrest. The DRG regularly plans to launch new teaching materials with the aim of offering them to schools and thus continue to encourage the teaching of CPR.

*France*

In France, first aid training is compulsory. It is believed that this training increases awareness of risk prevention and the teaching of general safety rules for responsible education, which meet the educational requirements of civil safety and public health. In 2016, the Ministry of National Education and the Ministry of the Interior strengthened awareness and training for students from secondary to higher education in providing first aid (MENJS, 2020):

a) *École élémentaire* (6-11 years): the "Learning to provide first aid" system is used from cycles 1 to 3 (first learning cycle – fundamental learning cycle – consolidation cycle);

b) *Collège and lycée*, to raise students' awareness of life-saving gestures and level 1 training "Prevention and Civic Aid";

c) *Lycée*, through continuing education and first aid training for students in vocational training.

*Italy*

In Italy, in 2015, the development of training initiatives for students in the field of first aid was regulated. The Ministry of Health, together with the Ministry of Education, Higher Education and Research, have defined guidelines for the implementation of first aid training activities. First aid training is intended for all students (*Scuola dell'infanza, scuola primaria, scuola secondaria di primero grado, scuola secondaria di secondo grado*) (Chart 1), teachers and technical assistants.

**CHART** 1: Training objectives by level of education and teaching materials in Italy.

| **Level of education** | **Duration / Purpose of training** | **Teaching materials** |
|---|---|---|
| *Scuola dell'infanza* (3-6 years old)) | The training course lasts two hours in total and is divided into two separate sessions, in which the same content is covered. "(…) adopt appropriate behaviours to improve their own safety and that of others, to identify the main dangerous situations in different environments, to recognise circumstances that require the help of an adult and immediate rescue intervention. In addition, the student is able to alert the emergency services on 118/112". (p. 10)) | Mannequins for training pediatric and adult CPR; Mannequins for training pediatric and adult unblocking techniques; Simulators suitable for early defibrillation; Mannequins and devices for external bleeding control techniques and trauma management; Printed teaching materials and multimedia tools, such as: booklets with comics; video games for educational purposes; video clips (films, cartoons); educational applications for smartphones; multimedia platform of the main dangerous situations; other useful modalities for didactic and educational purposes: stories and fairy tales, games and songs, small group simulations, role-playing games, workshops and guided visits to emergency services. |
| *Scuola primaria* (6-11 years old) | The training lasts a total of 6 hours, divided into two hours in the first two years and 4 hours in the following three years. "(…) recognize the importance of first aid and the civic and ethical duty to provide help and assistance to people in need; be able to identify situations that require immediate intervention by 118/112 and alert the emergency services appropriately. Be able to use and apply the knowledge and techniques learned." (p. 10) | |
| *Scuola secondaria di primero grado* (11-14 years old) | The training, which includes simulation tests, lasts a total of 8 hours, divided into a 4-hour intervention in the first year and the remaining 4 hours in the 2nd or 3rd year. At the end of the training activities in primary secondary school, the student shows an improvement in the level of his/her skills in identifying situations that require immediate intervention by 118 and the ability to adequately alert the emergency services". (pp. 10-11) | |
| *Scuola secondaria di secondo grado* (14-19 years old) | At this level of education, training lasts a total of 12 hours, divided into 4 hours in the first two years, 4 hours in the second two years and another 4 hours in the last year, dedicated to defibrillation (which confers certification to use AEDs at 18 years of age). "(…) the student is able to identify and deal with health emergency cases, correctly performing life-saving maneuvers: CPR, early defibrillation, airway clearance in adult and pediatric patients, first aid for trauma patients." (pp. 12) | |

**Source:** Adapted from **MIUR** (n.d.).

*Portugal*

In Portugal, first aid has been taught in schools since 1978. The complementary course in the area of natural science studies, in the vocational health training component, included the subject of First Aid, in the 10th or 11th grades, with 2 hours per week. The subject content included the SBV (Normative Order No. 140-A/78, of June 22). The curriculum was revoked in 1989, resulting from the Basic Law of the Education System (Law No. 46/86, of October 14).

In 2010, Resolution Project 162/XI of the Assembly of the Republic recommended the introduction of compulsory attendance of SBV in the 3rd cycle of basic education. In 2011, this initiative ended with the end of the 11th Legislature. Draft Resolution 590/XII, of the same nature as the previous one, was returned to the Assembly of the Republic in 2013, recommending that the Government introduce in national schools, at the beginning of the 2013-2014 school year, a mandatory training course aimed at students in the 3rd cycle of basic education and lasting a total of 6-8 hours" (Resolution of the Assembly of the Republic No. 33/2013, of March 15).

In 2013, the curricular goals for the subject of Natural Sciences (from the 5th to the 8th year) were approved, and in 2014 those for the 9th year (Order No. 110-A/2014, of January 3). Due to the limitations of the restructuring of the 9th year content, the teaching of BLS was introduced for the first time in basic education in the domain "Living better on Earth", subdomain "Human organism in balance". For the application of BLS measures, the following objectives were defined, with the first implementation in the 2015-2016 school year: *a)* Explain the importance of the chain of survival in increasing the survival rate in cardiovascular arrest*; b)* Perform the examination of the patient (adult and pediatric) based on the initial ABC approach (airway, breathing and circulation); *c)* Exemplify the procedures for a correct alarm in case of emergency; *d)* Perform BLS procedures (adult and pediatric), following the algorithms of the European Resuscitation Council; *e)* Exemplify rescue measures for severe and mild obstruction of the airway (removal

of any evident obstruction, head extension, interscapular claps, Heimlich maneuver, encouragement of coughing); *f)* Demonstrate the lateral safety position (Bonito et al., 2014).

With the curricular reorganization that took place in 2018, essential learning emerged which, converging with the Profile of Students Leaving Compulsory Schooling (Martins et al., 2018), allow for curricular flexibility and management by schools and teachers. The objectives relating to the SBV are confirmed and, basically, transcribe those of the curricular goals (DGE, 2018a).

At the 6th grade level, the curricular goals for the subject of Natural Sciences, which came into force in the 2015-2016 school year (Order No. 9633/2014, of July 25), establish for the domain "Common vital processes in living beings", subdomain "Nutritional exchanges between the organism and the environment: in animals", the general objective "To understand the structure and functioning of the human cardiovascular system", with the descriptor "To demonstrate the procedures for detecting the absence of signs of ventilation and circulation in a person, and for activating the integrated medical emergency system" (Bonito et al., 2013, p. 9). The essential learnings changed this descriptor, reformulating the introductory verb, giving it a new wording "To apply simple procedures for detecting the absence of vital signs in humans and activating 112" (DGE, 2018b, p. 9).

*United Kingdom*

In the United Kingdom, the Resuscitation Council United Kingdom (RCUK) recommends that all students should learn CPR and have knowledge of how to use an automated external defibrillator. As a motivation, it states that trained students can make the difference between life and death for someone they care about, since 80% of cardiac arrests occur at home. The United Kingdom is the European country that most recently legislated the teaching of BLS in schools (Chart 2).

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**CHART 2:** Training purposes by level of education and teaching materials, in the United Kingdom.

| Level of education | Duration / Purpose of training | Teaching materials |
|---|---|---|
| *Secondary school* | England – CPR is part of the Health Education curriculum for secondary school pupils and is recommended for pupils aged 12 and over:<br>knowledge of life-saving skills, including how to administer CPR and apply defibrillators and recognise when an individual may need it.<br><br>Scotland – Local authorities teach CPR to all pupils.<br><br>Northern Ireland – Development of preventive strategies for accidents at home, school and on the road, including knowing what to do in the event of injuries, burns, fire and emergency first aid. | CPR lesson plans for secondary school students – The plans include face-to-face and online options for teaching essential skills, provided by RCUK; a free digital game that puts young people at the heart of the action as they make the decisions and learn the skills needed to save a life; an animation of CPRs to demonstrate how to minimize risk when performing CPR during a time of increased risk of infection, particularly during COVID-19; and a video: 'Sam's Story'. A true-life story revealing how CPR knowledge, acquired in the classroom, was the difference between life and death for secondary school student Sam. |

**Source:** RCUK (2021). Prepared by the authors.

*Teaching/assessment methods*

The BLS is the cornerstone of resuscitation, and CPR performed by a bystander is crucial to survival in OHCA. This is an established fact. Chest compressions and early defibrillation are the main determinants of survival in OHCA, and there is evidence that training laypeople improves survival (GREIF et al., 2015). Based on the above, the primary educational objective should be to train laypeople in CPR.

It should be noted that research about teaching resuscitation has, for the most part, focused on training adults to provide assistance to adults, but teaching children and young people requires different approaches (Plant; Taylor, 2013). Therefore, the BLS content to be addressed should be adapted to the target audience and presented as simplified as possible (GREIF et al., 2015). Access to different training modalities (e.g., digital technologies, distance learning, instructor-led learning) and self-directed learning offer alternative teaching methods.

Programs with synchronous or asynchronous classes (i.e., video, DVD, computer feedback during training) also tend to be an effective alternative to instructor-led courses for laypeople (Cason; Kardong-Edgren; Cazzell, 2009). According to Greif et al. (2015), training should be adapted to different types of students and a variety of teaching methods should be used to ensure the acquisition and maintenance of CPR knowledge and skills.

According to Miró et al. (2012), the main aspects to consider when starting and maintaining a BLS program in schools tend to be: *a)* developing a specific program adapted to the age of the target students; *b)* adapting the program to educational characteristics; *c)* associating the program with cross-curricular aspects of the disciplines; *d)* directly involve teaching staff in the design, implementation planning and teaching of the course; *e)* involve all students; *f)* provide all necessary materials; *g)* schedule a sufficient number of hours for the program to be integrated into the school year, going beyond a single session (ideally between 5 and 10 hours); *h)* concentrate the training in a period of no more than two weeks; and *i)* obtain commitments from educational administrations.

A number of studies provide examples of different approaches used in the training of children and young people (Chart 3).

**CAHRT 3**: Strategies for teaching BLS.

| | Authors | Country | Objectives | Subjects | Procedures | Knowledge assessment |
|---|---|---|---|---|---|---|
| E1 | Gala (2014). | Portugal | Assess the skills of 9th and 12th grade students in BLS. | Students in the 9th and 12th grades. | Training provided by trainers from the National Institute of Medical Emergency. | Quiz. |
| E2 | Iserbyt, Charlierb, and Molsa (2014). | Belgium | Learn about BLS learning from a video. | Students with an average age of 17. | Training through images combined with written instructions. | Practice after 3 weeks. |
| E3 | Isbye, Rasmussen, and Ringsted (2007). | Denmark | To evaluate the effect of mass distribution of CPR instructional materials among schoolchildren. | Students aged 12-14 years. | CPR instructional training by viewing a DVD. Then training of family and friends. | Quiz. |
| E4 | Iserbyt and Byra (2013). | Belgium | Understand the importance of the design of tools used in BLS learning. | Students with an average age of 13. | Use of task cards that combine an image with written instructions about how to perform it. | - |
| E5 | Semeraro et al. (2017). | Italy | Evaluate game usage "*Relive*". | Students aged 11-14 years. | Game usage "*Relive*". | Theoretical knowledge and practical skills. |

**Source:** Prepared by the authors, 2024.

## Discussion

According to Martins (2014), the increase in CPR practiced by bystanders over time, associated with the increase in the number of patients who survive until hospital admission, is a strong indicator of the improvements achieved in the out-of-hospital environment. These results are motivating for investment in BLS training for children and young people.

There are six European countries that have legislated about the teaching of BLS, although the situation in Belgium, given its administrative structure, does not facilitate its knowledge. The ERC position statement on CPR education in schools Kids save lives presents 10 principles, based on scientific evidence, that promote survival (ERC,

2015), considering that everyone can save a life, including school-age children from 12 years of age. For them, up to 2 hours of CPR training per year seems to be sufficient, as long as the training involves practice and is complemented with theory, including virtual learning. Training can be carried out without sophisticated equipment or specific resuscitation mannequins (ERC, 2016).

The maintenance of BLS skills by laypeople, after BLS training, has variable periods. Studies show that it is maintained after: two months (Hill et al., 2009; Cuijipers et al., 2016), 4 months (Meissner; Kloppe; Hanefeld, 2012), 6 months (Bollig; Wahl; Svendsen, 2009; Lukas et al., 2016), 8 months (FONSECA et al., 2016). A study carried out by Plotnikoff and Moore (1989) reveals that CPR taught to children aged 11 and 12 years old, their performance decreases markedly in a period of 5 months after training.

A study by Kanstad, Nilsena and Fredriksenb (2011) concluded that young Norwegians, aged between 16 and 19, are motivated to perform BLS. However, barriers to their performance are more detailed and realistic OHCA scenarios, the fact that the victim is a family member, a child or a user of intravenous psychoactive substances. A study by Finke et al. (2018) reveals that female students were more motivated to participate in BLS training and to respond to OHCA, had a better level of theoretical knowledge, and had a better multiplier effect in training family members and friends in BLS. Male students showed more confidence in their proficiency in BLS and performed deeper chest compressions.

Studies show that several actors successfully train students in BLS: *a)* medical students, physical education teachers and nurses are among these actors and their performance is equally effective (PETRIĆ et al., 2013*); b)* teachers, previously trained by medical students, taught BLS to children aged 10-12, using the ABC for Life program, also successfully (ISBYE et al., 2007); *c)* practical training given by junior doctors appears to be effective in training bystanders (Aaberg et al., 2014); *d)* Teachers have expressed interest in teaching the theoretical classes of a BLS

program to be developed in schools, after prior training and prefer that health professionals teach the practices (Miró et al., 2006).

Several studies show that trained teachers were able to empower their students in BLS (Aaberg et al., 2014; Bohn Et Al., 2012; Bollig; Myklebust; Østringen, 2011; Boné; Loureiro; Bonito, 2020; Cuijpers Et Al., 2016; Isbye Et Al., 2007; Lorem; Palm; Wikbc, 2008; Lukas Et Al., 2016; Toner; Connolly; Laverty, 2007), which contributes to an easy dissemination of training in a school context. A study carried out by the Thai Red Cross highlights the training potential of teachers. Due to the increase in the number of deaths due to choking and cardiac arrest, the Thai Red Cross organized two-day CPR and airway clearance training, training 153 teachers from different districts of Bangkok, Thailand. They then took on the role of trainers, which resulted in the training of more than 5,000 young people to work with their families, communities and the most vulnerable people (IFRC, 2016).

**Conclusions**

Teaching BLS in schools has several advantages, including strengthening the first two links in the chain of survival, reducing anxiety about making mistakes, increasing students' willingness to help, and also increasing their confidence in their learning, which allows them to save lives. Younger students are not always able to fully perform CPR procedures, but they are a preferred group, quickly accessible and motivated.

In addition to providing training and empowerment in the subject and in resuscitation practices, BLS training also contributes to reducing anxiety, increasing the willingness to help and provide assistance, and increasing self-confidence in action. Several studies conclude that training lay people in BLS is effective in improving the number of people willing to apply BLS in a real situation.

Trained students show measurable gains in BLS skills, and resources tend to favorably influence the gains and maintenance of BLS learning. Compression depth appears to be related to the age, weight, and height of children. The constraints encountered were the lack of time to address BLS, and the lack of funding and

equipment. The theoretical and practical learning carried out by students tends to be maintained, and its periodic reinforcement is relevant, in terms of the skills acquired and in terms of strengthening the confidence for the students to act.

There are 6 European countries that are most active in promoting the increase in cardiopulmonary resuscitation rates for lay people, through formal teaching in BLS in schools.

Therefore, it is essential to increase research, in defining the content to be addressed, in strategies, resources, funding and continuous feedback with a view to improving BLS practices. The success of BLS teaching and the consequent increase in bystanders tend to occur based on the aforementioned factors, strengthening the symbiotic relation between education and health, between the student and the citizen.

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